



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	9:30 AM - 12:00 PM
Subject	ALP Stage 2 Electronics Mechanic

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

- Q.1** Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some glasses are spoons.

All spoons are forks.

Conclusions:

(I) Some glasses are forks.

(II) All forks are spoons.

- Ans**
- ☒ A. Both conclusions (I) and (II) follow
- ☒ B. Only conclusion (II) follows
- ☒ C. Only conclusion (I) follows
- ☒ D. Neither conclusion (I) nor (II) follows

- Q.2** In this question, a group of numbers/symbols is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer. If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	6	1	&	3	%	8	+	4	#	7	@	5	2	\$
Code	R	V	G	D	S	C	T	L	F	W	H	U	Y	N

Conditions:

- (i) If the first element is a symbol and the last element is an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and last elements are to be coded as ©.
- (iii) If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?

+ 6 \$ 2 7

- Ans**
- ☒ A. WSNYT
- ☒ B. TSNWW
- ☒ C. WRNYT
- ☒ D. STMWV

Q.3 Which of the following statements correctly describes average velocity and its SI unit?

- Ans
- ☐ A. Average velocity is the total distance divided by total time, and its unit is kilometer per hour.
 - ☐ B. Average velocity is the total distance divided by total time, and its unit is meter per second.
 - ☒ C. Average velocity is the total displacement divided by total time, and its unit is meter per second.
 - ☐ D. Average velocity is the total displacement divided by total time, and its unit is kilometer per hour.

Q.4 A boat sails 40 km downstream and then 40 km upstream in a river. The boat's speed in still water is 12 km/hr and the speed of the stream is 4 km/hr. How much time does the boat take to cover the entire distance (both upstream and downstream)?

- Ans
- ☐ A. 8 hours
 - ☒ B. 7.5 hours
 - ☐ C. 6 hours
 - ☐ D. 10 hours

Q.5 Three pipes A, B and C can fill a tank in 12 hours, 18 hours and 24 hours, respectively. A leak at the bottom can empty the full tank in 36 hours. If all the pipes are opened together, in how many hours will the tank be filled? (Round off your answer to two decimal places.)

- Ans
- ☐ A. 9.45 hours
 - ☐ B. 5.56 hours
 - ☐ C. 3.33 hours
 - ☒ D. 6.55 hours

Q.6 What is the primary function of a fire hydrant in a workplace safety system?

- Ans
- ☐ A. Detecting smoke and warning employees
 - ☐ B. Removing hazardous fumes from the area
 - ☐ C. Activating fire alarms automatically in emergencies
 - ☒ D. Supplying large quantities of water to fight fires

Q.7 A diamond ring costs ₹85,000. Its price is reduced first by 11% and then by 4% on the reduced price. Find the final price of the ring after both discounts.

- Ans
- ☐ A. ₹72,604
 - ☒ B. ₹72,624
 - ☐ C. ₹74,624
 - ☐ D. ₹73,624

Q.8 When a moving car suddenly applies brakes, its kinetic energy is transformed mainly into which form of energy?

- Ans
- ☒ A. Heat energy
 - ☐ B. Sound energy
 - ☐ C. Potential energy
 - ☐ D. Light energy

Q.9 Simplify: $60 - \{(-8) \times (-16 - 19 - 2)\} \div [5 \times \{2 + (-1) \times (-1)\}]$

- Ans
- ☒ A. $\frac{604}{15}$
 - ☐ B. $\frac{594}{15}$
 - ☐ C. $\frac{614}{15}$
 - ☐ D. $\frac{608}{15}$

Q.10 Which statement best describes a 'point' in engineering drawing?

- Ans**
- ☒ A. A point indicates a precise location but has no size, length, or width.
 - ☐ B. A point is the intersection of two lines and always has measurable length.
 - ☐ C. A point is a short line segment used to mark measurements.
 - ☐ D. A point represents a small area with both length and width.

Q.11 What is an email used for?

- Ans**
- ☐ A. File storage
 - ☐ B. Creating documents
 - ☒ C. Sending messages
 - ☐ D. Data processing

Q.12 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between X and Z when counted from the right of X. Only two people sit between Z and D. Only three people sit between X and B. A sits to the immediate left of C. Who sits third to the left of Y?

- Ans**
- ☐ A. Z
 - ☐ B. X
 - ☒ C. C
 - ☐ D. A

Q.13 An engineer is tasked with creating a hollow cone for a machine part, where the wall thickness must be consistent and the slant height is critical for assembly. Which factor is most important to ensure the cone will fit correctly in the final design?

- Ans**
- ☒ A. Ensuring the slant height matches the assembly requirement
 - ☐ B. Prioritizing uniform wall thickness over all other features
 - ☐ C. Matching only the overall height of the cone
 - ☐ D. Focusing only on base diameter for precise fit

Q.14 The average of 8 numbers is 45. If one number, 59, is removed, what will the new average be?

- Ans**
- ☐ A. 42
 - ☒ B. 43
 - ☐ C. 41.5
 - ☐ D. 42.5

Q.15 In third angle projection, where is the object placed relative to the plane of projection?

- Ans**
- ☒ A. The object is placed in the third quadrant
 - ☐ B. The object is placed in the first quadrant
 - ☐ C. The object is placed in the second quadrant
 - ☐ D. The object is placed in the fourth quadrant

Q.16 A train X crosses a man who is sitting in another train Y, which is moving in the opposite direction, in 8 seconds. However, when both trains are moving in the same direction, train X takes 20 seconds to pass the same man. If the length of train X is 360 meters and the length of train Y (in which the man is sitting) is 240 meters, what is the speed of train Y?

- Ans**
- ☐ A. 45.8 km/h
 - ☐ B. 46.5 km/h
 - ☐ C. 45.3 km/h
 - ☒ D. 48.6 km/h

Q.17 An engineering student is tasked with creating a detailed side view of a complex machine part for an assembly drawing. Which approach will most accurately represent all features visible from the side while avoiding hidden overlaps or misinterpretations?

- Ans**
- ☐ A. Sketch the side view freely without using projections from the main view
 - ☐ B. Use only hidden lines for representing features on the far side in the view
 - ☒ C. Project all visible elements from the side and omit hidden features unless needed
 - ☐ D. Include all features even those not visible from the selected side view

Q.18 What should come in place of the question mark (?) in the given series?

74, 83, 101, 128, ?, 209

- Ans**
- ☒ A. 164
 - ☐ B. 176
 - ☐ C. 146
 - ☐ D. 155

Q.19 E, F, G, H, L and M live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live above G. Only two people live between L and E. Only two people live between M and G. E lives below G but above F. How many people live below H?

- Ans**
- ☒ A. Three
 - ☐ B. Four
 - ☐ C. One
 - ☐ D. Two

Q.20 If 'A' stands for '+', 'B' stands for 'x', 'C' stands for '+' and 'D' stands for '-', what will come in place of the question mark '?' in the following equation?

14 A 30 B 45 C 15 D 9 = ?

- Ans**
- ☐ A. 29
 - ☒ B. 27
 - ☐ C. 25
 - ☐ D. 28

Q.21 A cyclist covers 120 meters in 16 seconds on a straight road, then immediately covers 180 meters in 24 seconds on a similar road segment. What is the average speed of the cyclist during the entire journey?

- Ans**
- ☐ A. 8.0 meters per second
 - ☐ B. 7.0 meters per second
 - ☐ C. 6.5 meters per second
 - ☒ D. 7.5 meters per second

Q.22 An object has a mass of 10 kilograms. How does its weight on the Moon compare to its weight on Earth?

- Ans**
- ☐ A. The object weighs zero on the Moon
 - ☐ B. The object weighs the same on both the Moon and Earth
 - ☐ C. The object weighs more on the Moon than on Earth
 - ☒ D. The object weighs less on the Moon than on Earth

Q.23 What is the main purpose of ambient air quality standards?

- Ans**
- ☐ A. To ensure air is routinely sampled to map historical pollution trends.
 - ☐ B. To focus exclusively on industrial operations while ignoring other sectors.
 - ☐ C. To require all industries to reduce emissions by the exact same percentage.
 - ☒ D. To set legally permissible limits for specific pollutants to protect public health.

Q.24 Which approach most effectively reduces both nitrogen and phosphorus concentrations during wastewater treatment?

- Ans**
- ☒ A. Biological and chemical nutrient removal
 - ☐ B. UV disinfection following secondary treatment
 - ☐ C. Surface-flow constructed wetlands
 - ☐ D. Primary sedimentation with extended aeration

Q.25 Which property of a fuse wire ensures it melts quickly when excess current flows?

- Ans**
- ☐ A. High electrical resistance
 - ☐ B. Thick wire
 - ☐ C. High melting point
 - ☒ D. Low melting point

Q.26 When using a hand file during fitting operations, which action demonstrates adherence to tool safety protocols?

- Ans**
- ☒ A. Fitting a proper handle securely to the tang
 - ☐ B. Filing above shoulder height for better leverage
 - ☐ C. Holding the file near its tang during filing work
 - ☐ D. Applying excessive downward force when filing

Q.27 O, P, Q, U and V have different heights. Only three people have heights between V and Q. P is taller than U but shorter than O. V is taller than Q. How many people are shorter than P?

- Ans**
- ☐ A. Three
 - ☒ B. Two
 - ☐ C. Four
 - ☐ D. One

Q.28 A car travels on a highway, and its odometer records a reading of 180 km at 8:00 am and 240 km at 9:30 am. Based on this information, which statement best describes the car's average speed during this interval?

- Ans**
- ☒ A. The car's average speed is 40 km per hour as calculated from the odometer readings and time interval.
 - ☐ B. The car's average speed is 240 km per hour since that was the odometer reading at 9:30 am.
 - ☐ C. The car's average speed is 180 km per hour since that was the odometer reading at 8:00 am.
 - ☐ D. The car's average speed is 60 km per hour based only on the change in odometer readings.

Q.29 Solve the system of equations:

$$\begin{aligned} -3x + 2y - z &= -1, & 6x - 6y + 7z &= -7, & 3x - 4y + 4z &= -6 \end{aligned}$$

- Ans**
- ☐ A. $x = -2, y = 2, z = 11$
 - ☐ B. $x = 1, y = 2, z = 2$
 - ☒ C. $x = 2, y = 2, z = -1$
 - ☐ D. $x = 2, y = 1, z = -3$

Q.30 Below are given two sets of numbers. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

10 - 100 - 50 - 25; 2 - 4 - 2 - 1

Ans ☒ A. 12 - 144 - 62 - 31

☒ B. 5 - 25 - 15 - 7

☒ C. 4 - 16 - 8 - 4

☒ D. 8 - 64 - 32 - 14

Q.31 P, Q, R, S and T have different ages. T is elder than only one person. S is elder than P but younger than Q. R is elder than Q. Who is the youngest?

Ans ☒ A. R

☒ B. P

☒ C. Q

☒ D. S

Q.32 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements: All girls are hens. No hen is a cat.

Conclusion (I): No girl is a cat.

Conclusion (II): Some cats are hens.

Ans ☒ A. Only conclusion (I) follows

☒ B. Both conclusions (I) and (II) follow

☒ C. Only conclusion (II) follows

☒ D. Neither conclusion (I) nor (II) follows

Q.33 If $\left(x + \frac{1}{x}\right) = 3$, find the value of $\left(x^3 + \frac{1}{x^3}\right)$.

Ans ☒ A. 18

☒ B. 16

☒ C. 15

☒ D. 20

Q.34 A mechanical engineer must design a flange joint where two pipes are to be connected at a 45-degree angle. Which method should the engineer use to accurately represent the intersection line on a technical drawing of the two cylindrical pipes?

Ans ☒ A. Use only standard orthographic projection without auxiliary views

☒ B. Draw a simple circle at the junction in the top view

☒ C. Represent the intersection as a straight line in the side view

☒ D. Draw the true shape of the intersection using auxiliary projection

Q.35 A father distributed two different amounts among his sons P, Q, R and S. First amount was distributed in the ratio 5 : 4 : 3 : 2 and the second amount was distributed in the ratio 6 : 7 : 8 : 9. If the second amount is thrice the first amount, then which son will get the maximum amount?

- Ans** ☒ A. S
☒ B. Q
☒ C. P
☒ D. R

Q.36 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans** ☒ A. TN-ZD
☒ B. WQ-CG
☒ C. EY-KO
☒ D. QK-VA

Q.37 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

BIP : EMU
GNU : JRZ

- Ans** ☒ A. FMT : IQY
☒ B. XDE : PON
☒ C. VCD : GRD
☒ D. CGW : NHT

Q.38 Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) A T D E B R C L M Q O N P J M Q E A O Z W F U K S L (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans** ☒ A. 2
☒ B. 0
☒ C. 3
☒ D. 1

Q.39 If Rohan's income increases by 20% and his expenditure increases by 10%, then his savings increase by ₹1,200. If his original income was ₹12,000, what was his original expenditure? (Assume that savings = income – expenditure.)

- Ans** ☒ A. ₹11,000
☒ B. ₹9,000
☒ C. ₹10,000
☒ D. ₹12,000

Q.40 In a certain code language, 'KING' is coded as '9713' and 'ITCH' is coded as '2945'. What is the code for 'I' in the given code language?

- Ans** ☒ A. 9
☒ B. 2
☒ C. 4
☒ D. 7

Q.41 What is the best description of the purpose of multi-view drawing in engineering drawing?

- Ans**
- ☐ A. To show different colors of an object for better visual appearance
 - ☐ B. To present the object in a single three-dimensional visual form only
 - ☒ C. To represent different sides of an object clearly on a flat surface
 - ☐ D. To view an object from only one direction

Q.42 What do touch gestures in Microsoft Windows allow users to do?

- Ans**
- ☐ A. Connect external devices
 - ☒ B. Perform actions using finger movements
 - ☐ C. Type faster on the keyboard
 - ☐ D. Increase screen brightness

Q.43 Two students move identical boxes through a distance of 10 m. Student A applies a force of 50 N, while Student B applies a force of 100 N. What is the difference in the work done by the two students?

- Ans**
- ☐ A. 1000 J
 - ☐ B. 0 J
 - ☐ C. 50 J
 - ☒ D. 500 J

Q.44 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer. Among the five poles—I, N, C, H, and L—each having a different height, which pole is the tallest?
(I) I is shorter than N but taller than C. C is taller than only one pole.
(II) H is taller than L.

- Ans**
- ☐ A. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☐ B. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ C. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ D. Both statements I and II together are NOT sufficient to answer the question

Q.45 A trader marks an article 25% above its cost price. He allows a discount of 10% on the marked price. After giving the discount, he makes a profit of ₹180 on the article. What is the cost price of the article?

- Ans**
- ☐ A. ₹1,200
 - ☐ B. ₹1,260
 - ☒ C. ₹1,440
 - ☐ D. ₹1,380

Q.46 Namia is facing the west. She turns left and walks 15 m. She turns left and walks 25 m. She again turns left and walks 40 m. She finally turns left and walks 40 m to reach home. In which direction is her home with respect to the starting point?

- Ans**
- ☐ A. South-East
 - ☐ B. South-West
 - ☒ C. North-West
 - ☐ D. North-East

Q.47 Find the LCM of 72, 78, and 90.

- Ans**
- ☐ A. 4120
 - ☐ B. 4280
 - ☒ C. 4680
 - ☐ D. 4250

Q.48 A laboratory record shows a distance of 0.004 kilometers between two points. How should this be written in SI units of length for a scientific report?

- Ans**
- ☒ A. 4 m
 - ☐ B. 4000 mm
 - ☐ C. 400 cm
 - ☐ D. 0.4 m

Q.49 Which is the most important safety check before operating any machine in a workshop?

- Ans**
- ☐ A. Ensure the machine area is properly illuminated
 - ☐ B. Check if the machine is plugged in properly
 - ☐ C. Wipe the machine with a dry cloth before use
 - ☒ D. Inspect the machine for loose or damaged parts

Q.50 Which of the following best defines 'work' in physics?

- Ans**
- ☐ A. Work is done if a force acts at any angle to the motion.
 - ☐ B. Work is done whenever a force is applied, regardless of movement.
 - ☒ C. Work is done when a force moves an object in the direction of the force.
 - ☐ D. Work is done when energy is stored in an object.

Q.51 16 is related to 260 following a certain logic. Following the same logic, 25 is related to 630. To which of the following is 9 related, following the same logic?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☐ A. 78
 - ☐ B. 732
 - ☐ C. 729
 - ☒ D. 84

Q.52 A conical tent has a base radius of 14 m and a height of 48 m. How many cubic meters of air can it hold? (Use $\pi = \frac{22}{7}$)

- Ans**
- ☒ A. 9856
 - ☐ B. 9865
 - ☐ C. 8956
 - ☐ D. 9568

Q.53 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. Only three boxes are kept above S. Exactly one box is kept between T and S. Exactly three boxes are kept between T and U, and U is kept somewhere above S. V is kept immediately below U. W is kept at one of the places above P. Q is not kept immediately above or below T. Based on the given information, which box is kept at the lowermost position?

- Ans**
- ☒ A. P
 - ☐ B. S
 - ☐ C. Q
 - ☐ D. V

Q.54 A worker's hand is at risk of injury from a mechanical shearing action. Which situation best describes a shearing hazard?

- Ans**
- ☐ A. A hand touching a hot metallic machine surface during maintenance activity
 - ☐ B. A hand becoming entangled in a rotating machine shaft during operation
 - ☐ C. A hand sliding repeatedly across a rough abrasive machine surface during work
 - ☒ D. A hand caught between a moving blade and a fixed machine surface during operation

Q.55 If 'A' stands for '+', 'B' stands for '−', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

28 A 16 C 3 B 12 D 4 = ?

- Ans ☒ A. 73
☐ B. 70
☐ C. 71
☐ D. 72

Q.56 A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q such that OQ = 12 cm. What is the length of PQ?

- Ans ☐ A. $\sqrt{117}$ cm
☒ B. $\sqrt{119}$ cm
☐ C. $\sqrt{97}$ cm
☐ D. $\sqrt{107}$ cm

Q.57 A car of mass 1200 kg accelerates from rest to a speed of 20 m/s on a straight road. If the kinetic energy gained by the car is completely due to the work done by the engine, which of the following best represents the total kinetic energy acquired by the car at this speed?

- Ans ☐ A. 24,000 joules
☒ B. 240,000 joules
☐ C. 480,000 joules
☐ D. 12,000 joules

Q.58 What is the simplified value of the expression $\left[\frac{\cos A}{(1 - \tan A)} \right] + \left[\frac{\sin A}{(1 - \cot A)} \right]$?

- Ans ☒ A. $\cos A + \sin A$
☐ B. $\sin A - \cos A$
☐ C. 0
☐ D. 1

Q.59 Which integrated strategy best addresses soil pollution, falling crop yields, and low microbial activity near an industrial zone?

- Ans ☐ A. Reforestation in nearby urban centers.
☐ B. Ban all regional chemical fertilizers.
☒ C. Control industrial waste for sustainability.
☐ D. Expand urban areas into farmland.

Q.60 An engineer uses fault tree analysis to assess a machine-related injury in a factory. Which step should be taken first according to standard procedure?

- Ans ☐ A. List all possible causes of failures
☒ B. Define the top event representing the injury
☐ C. Validate the analysis using workplace data
☐ D. Establish preventive measures to control risks

Q.61 Which situation best describes an entanglement hazard in a mechanical workshop?

- Ans ☐ A. Gloves worn near hot surfaces
☒ B. Loose clothing caught in a rotating shaft
☐ C. Hand pinched between gears
☐ D. Finger cut by a sharp edge

Q.62 Which line symbol is commonly used in engineering drawings to represent a hidden edge that is not directly visible?

- Ans**
- ☒ A. Zigzag line
 - ☒ B. Solid thick line
 - ☒ C. Chain thin line
 - ☒ D. Dashed line

Q.63 What should come in place of the question mark (?) in the given series?

98, 104, 116, 134, 158, ?

- Ans**
- ☒ A. 186
 - ☒ B. 190
 - ☒ C. 188
 - ☒ D. 184

Q.64 The simple interest earned on a certain sum of money for 3 years at 15% per annum is ₹2,700. Find the sum.

- Ans**
- ☒ A. ₹6,000
 - ☒ B. ₹8,000
 - ☒ C. ₹9,000
 - ☒ D. ₹5,000

Q.65 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Among five people – A, B, C, D, and E – who is the tallest?

(I) A is taller than B. B is taller than C.

(II) D is taller than E.

- Ans**
- ☒ A. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ B. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☒ C. Both statements I and II together are NOT sufficient to answer the question.
 - ☒ D. Data in statement I alone is sufficient to answer the question while data in statement II is not

Q.66 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☒ A. CH – EK
 - ☒ B. DJ – GM
 - ☒ C. AF – DI
 - ☒ D. BG – EJ

Q.67 Which of the following scenarios best demonstrates the conversion of chemical energy to mechanical energy?

- Ans**
- ☒ A. A flashlight turns on after inserting new batteries
 - ☒ B. A stone falls off a table to the ground
 - ☒ C. A runner uses stored energy from food to sprint forward
 - ☒ D. A stretched rubber band snaps back to its original shape

Q.68 Which component makes up the largest proportion of Earth's atmosphere by volume?

- Ans**
- ☒ A. Carbon dioxide
 - ☒ B. Argon
 - ☒ C. Nitrogen
 - ☒ D. Oxygen

Q.69 Three workers, X, Y, and Z, can complete a certain job in 10 days, 12 days, and 15 days, respectively. Determine the number of days required for them to complete the job when they work together.

- Ans**
- ☐ A. 5 days
 - ☒ B. 4 days
 - ☐ C. 6 days
 - ☐ D. 8 days

Q.70 Which of the following best describes a key environmental concern associated with improper disposal of e-waste?

- Ans**
- ☒ A. Release of toxic metals into soil and water
 - ☐ B. Release of greenhouse gases from decomposition
 - ☐ C. Enhanced biodegradation of plastics
 - ☐ D. Increased recycling rates of precious metals

Q.71 Which feature is a requirement of the BIS drawing standard in engineering drawings?

- Ans**
- ☐ A. Use of colored pencils for clarity
 - ☐ B. Freehand sketches without scale
 - ☒ C. Title block with specific information
 - ☐ D. Margin lines of random width

Q.72 PJAE is related to JOWH in a certain way based on the English alphabetical order. In the same way, OIVC is related to INRF. To which of the following is NEZF related to following the same logic?

- Ans**
- ☐ A. IKUH
 - ☐ B. HKVJ
 - ☒ C. HJVI
 - ☐ D. IJVJ

Q.73 The median of the following data is :
25, 15, 23, 25, 17, 27, 20, 18, 24, 30, 19, 28, 35, 10, 31, 40

- Ans**
- ☐ A. 23.5
 - ☐ B. 20.5
 - ☒ C. 24.5
 - ☐ D. 25

Q.74 Which of the following is both, an input and output device?

- Ans**
- ☐ A. Projector
 - ☐ B. Printer
 - ☒ C. Touchscreen monitor
 - ☐ D. Keyboard

Q.75 What is the typical temperature range covered by a laboratory thermometer used in school experiments?

- Ans**
- ☐ A. Zero to two hundred degrees Celsius
 - ☒ B. Minus ten to one hundred and ten degrees Celsius
 - ☐ C. Minus fifty to fifty degrees Celsius
 - ☐ D. Thirty five to forty two degrees Celsius

Q.76 A trader buys 187 pens at ₹23 each. During transportation, 7 pens get damaged and cannot be sold. He sells the remaining pens at ₹27 each. Find his profit percentage. (rounded off to one decimal place)

- Ans**
- ☒ A. 12.6%
 - ☒ B. 13.7%
 - ☒ C. 13.0%
 - ☒ D. 14.1%

Q.77 A shopkeeper marks a product 75% above cost price and offers two successive discounts of 30% and 40%. What is the profit or loss percentage?

- Ans**
- ☒ A. 15.7% profit
 - ☒ B. 26.5% loss
 - ☒ C. 22.6% profit
 - ☒ D. 20.9% profit

Q.78 A pendulum takes 60 seconds to complete 24 oscillations. If its length is increased and it now takes 72 seconds for the same number of oscillations, what has happened to its time period?

- Ans**
- ☒ A. It has decreased to 1.5 seconds
 - ☒ B. It has decreased to 2.0 seconds
 - ☒ C. It has increased to 3.0 seconds
 - ☒ D. It remains at 2.5 seconds

Q.79 A runner completes one lap of a 200 meter circular track in 50 seconds. What is the average speed of the runner?

- Ans**
- ☒ A. 4.5 meter per second
 - ☒ B. 3 meter per second
 - ☒ C. 3.5 meter per second
 - ☒ D. 4 meter per second

Q.80 If the mean of the following data is 40, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	30	27	44	29	X

- Ans**
- ☒ A. 82
 - ☒ B. 99
 - ☒ C. 93
 - ☒ D. 98

Q.81 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UMD ZQG EUJ JYM ?

- Ans**
- ☒ A. NDO
 - ☒ B. PDP
 - ☒ C. NBQ
 - ☒ D. OCP

Q.82 If 'A' stands for '+', 'B' stands for '-', 'C' stands for 'x' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

$$31 \text{ B } 35 \text{ D } 7 \text{ A } 9 \text{ C } 2 = ?$$

- Ans**
- ☒ A. 48
 - ☒ B. 42
 - ☒ C. 46
 - ☒ D. 44

Q.83 A sample of water is heated from 15 degrees Celsius to 35 degrees Celsius. What is the temperature change in Kelvin?

- Ans**
- ☒ A. The temperature change is 15 K.
 - ☒ B. The temperature change is 20 K.
 - ☒ C. The temperature change is 30 K.
 - ☒ D. The temperature change is 50 K.

Q.84 Which of the following statements correctly reflects the characteristics of a Local Area Network (LAN) and the role of Ethernet within it?

- Ans**
- ☒ A. A LAN always requires Gigabit Ethernet to function and is insecure because it allows open access to all network devices.
 - ☒ B. Ethernet in a LAN provides low-speed data transfer and connects users over public Internet infrastructure.
 - ☒ C. LANs are designed for long-distance communication and use Ethernet primarily for wireless data exchange.
 - ☒ D. Ethernet is a standard that governs how devices in a LAN communicate via wired connections, supporting speeds from 10 Mbps to 1000 Mbps.

Q.85 Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right.

(Left) Z @ B R J # D * Q A M S % P L V O U S N T W Z (Right)

How many such symbols are there, each of which is immediately preceded by a letter and also immediately followed by a letter?

- Ans**
- ☒ A. Four
 - ☒ B. None
 - ☒ C. Three
 - ☒ D. Two

Q.86 A car travels 90 km east and then 30 km west along the same straight road. If the entire journey takes 3 hours, what is the average velocity of the car?

- Ans**
- ☒ A. 20 km/h east
 - ☒ B. 40 km/h east
 - ☒ C. 30 km/h east
 - ☒ D. 50 km/h north

Q.87 An engineer is tasked with creating the front view of a mechanical part. The part has a rectangular base with a vertical circular hole passing through it and a triangular prism attached on top. Which of the following best describes what will be visible in the front view?

- Ans**
- ☒ A. Only the rectangular base outline will be visible in the front view drawing
 - ☒ B. The outline of rectangular base and triangular prism will be visible but hole is not shown
 - ☒ C. The outline of triangular prism and circular hole will be visible in front view only
 - ☒ D. Only the triangular prism will be clearly visible in the front view drawing

Q.88 The circumference of the base of a solid right circular cylinder is 88 cm and its height is 150 cm. What is the volume (in cm^3) of the cylinder?

$$\left(\text{Take } \pi = \frac{22}{7} \right)$$

- Ans
- ☐ A. 92500
 - ☒ B. 92400
 - ☐ C. 92550
 - ☐ D. 92450

Q.89 In how many years will a sum of ₹16,000 at 10% per annum compounded semi-annually become ₹18,522?

- Ans
- ☐ A. 2 years
 - ☐ B. 2.5 years
 - ☐ C. 1 year
 - ☒ D. 1.5 years

Q.90 Refer to the given letter series and answer the question that follows. Counting to be done from left to right.

(Left) B F O P P S Q A L M K A W X S N U Q J O M Y (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans
- ☐ A. 7
 - ☒ B. 5
 - ☐ C. 6
 - ☐ D. 4

Q.91 In a spreadsheet application, a user selects a range of cells and presses Ctrl + C, followed by Ctrl + V in a different worksheet. What happens to the data?

- Ans
- ☐ A. The selected cells are deleted from the original worksheet.
 - ☐ B. The selected cells are saved to a new file.
 - ☐ C. The selected cells are moved to the new worksheet.
 - ☒ D. The selected cells are copied to the new worksheet.

Q.92 If a scooter travels at a constant speed of 25 km per hour, how far will it travel in 4 hours?

- Ans
- ☐ A. 80 km
 - ☐ B. 120 km
 - ☒ C. 100 km
 - ☐ D. 75 km

Q.93 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

QOI 5, OMG 10, MKE 15, KIC 20, ?

- Ans
- ☒ A. IGA 25
 - ☐ B. HIZ 30
 - ☐ C. JHZ 24
 - ☐ D. IHS 23

Q.94 A car travels 60 km north in 2 hours, then 40 km south in the next 1 hour. What is the car's average velocity over the entire trip?

- Ans**
- ✔ A. 6.7 km/h north
 - ✘ B. 33.3 km/h north
 - ✘ C. 20 km/h south
 - ✘ D. 0 km/h

Q.95 A thermometer shows a reading of 37 degrees Celsius. What is the corresponding temperature in Kelvin?

- Ans**
- ✘ A. 300 K
 - ✘ B. 320 K
 - ✔ C. 310 K
 - ✘ D. 270 K

Q.96 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Shreya related to Mahak if 'Shreya + Dev - Taran × Harshit % Mahak'?

- Ans**
- ✘ A. Mother's sister
 - ✘ B. Father's sister
 - ✘ C. Father's mother
 - ✔ D. Mother's mother

Q.97 A sum of ₹420 is divided among A, B, C, and D such that: A : B = 4 : x, B : C = x : 7, C : D = 6 : (x - 3). If B and C together get ₹210, find the value of x.

- Ans**
- ✘ A. 27
 - ✘ B. 53
 - ✘ C. 42
 - ✔ D. 39

Q.98 G is the mother of Y. Y is the sister of V. S is the father of L. L is the husband of V. How is G related to S?

- Ans**
- ✔ A. Son's wife's mother
 - ✘ B. Mother's mother
 - ✘ C. Son's wife
 - ✘ D. Son's wife's sister

Q.99 A roller coaster at the top of its track has maximum potential energy. As it descends and speeds up, what principle explains why the sum of its kinetic and potential energies remains constant if we ignore friction and air resistance?

- Ans**
- ✘ A. Law of inertia
 - ✔ B. Law of conservation of energy
 - ✘ C. Principle of superposition
 - ✘ D. Principle of inertia

Q.100 There are two types of silver–copper alloys. The first alloy contains $93\frac{1}{3}\%$ silver, while the second alloy contains $86\frac{2}{3}\%$ silver. Find the amount of the first alloy that should be mixed with some quantity of the second alloy to obtain a 100 kg mixture containing 90% silver.

- Ans**
- ☐ A. 45 kg
 - ☐ B. 52 kg
 - ☐ C. 48 kg
 - ☒ D. 50 kg

Section : **PART-B**

Q.1 Which safety action shall be completed first before replacing a blown fuse in an electrical circuit?

- Ans**
- ☐ A. Replace the fuse with a copper wire
 - ☐ B. Replace the fuse with a higher current rating
 - ☒ C. Switch OFF the circuit supply
 - ☐ D. Touch the fuse terminals to confirm the fault

Q.2 How many pins are present on a standard PATA ribbon cable header for desktop hard drives?

- Ans**
- ☐ A. 50 pins
 - ☒ B. 40 pins
 - ☐ C. 68 pins
 - ☐ D. 34 pins

Q.3 Which antenna is best suited for directional communication over long distances?

- Ans**
- ☐ A. Monopole antenna
 - ☐ B. Dipole antenna
 - ☐ C. Isotropic antenna
 - ☒ D. Parabolic antenna

Q.4 Which electrical quantity is defined as the potential difference between two points in an electrical circuit?

- Ans**
- ☒ A. Voltage
 - ☐ B. Power
 - ☐ C. Resistance
 - ☐ D. Current

Q.5 You measure an intact SMD diode in the high-frequency switching stage of an LED driver. The multimeter forward voltage drop reads 0.240 V. What specific type of diode does this low voltage threshold identify?

- Ans**
- ☐ A. Zener Diode
 - ☐ B. Light Emitting Diode (LED)
 - ☐ C. Standard Silicon Rectifier Diode
 - ☒ D. Schottky Diode

Q.6 A technician connects a load to the output of a half-wave rectifier without using a filter. What is the nature of the voltage across the load?

- Ans**
- ☐ A. Pure DC voltage
 - ☐ B. Alternating voltage
 - ☒ C. Pulsating DC voltage
 - ☐ D. Pulsating AC voltage

Q.7 If the equivalent inductance in a Hartley oscillator is doubled, the frequency is:

- Ans**
- ☐ A. Increased by $\sqrt{2}$
 - ☐ B. Halved
 - ☒ C. Reduced by $\sqrt{2}$
 - ☐ D. Doubled

Q.8 When a zero crossing detector is used to measure the frequency of a periodic AC signal, what quantity must be counted?

- Ans**
- ☐ A. The phase difference between input and output signals
 - ☐ B. The average voltage level of the output signal
 - ☐ C. The number of input voltage peaks per cycle
 - ☒ D. The number of output transitions per unit time

Q.9 How does Hard Disk store data in a desktop computer?

- Ans**
- ☐ A. Paper tape
 - ☒ B. Magnetic platters
 - ☐ C. Optical discs
 - ☐ D. Flash chips only

Q.10 The working principle of a crystal oscillator is based on:

- Ans**
- ☒ A. Piezoelectric effect
 - ☐ B. Hall effect
 - ☐ C. Thermionic emission
 - ☐ D. Photoelectric effect

Q.11 During a laboratory test, a trainee builds an RS flip-flop using NOR gates (active-HIGH inputs). Initially, the output Q = 0. The trainee applies S = 1 (Set input) and R = 0 (Reset input). After this, both inputs are returned to S = 0 and R = 0. What will happen to the output Q?

- Ans**
- ☐ A. Q will continuously toggle between 0 and 1.
 - ☐ B. Q will return to 0 after inputs become 0.
 - ☒ C. Q will remain at 1 after inputs become 0, holding the last state.
 - ☐ D. Q will become invalid when inputs return to 0.

Q.12 Which set of terminals is commonly used to connect a Field Effect Transistor in a circuit?

- Ans**
- ☐ A. Emitter, Collector, Base
 - ☐ B. Positive, Negative, Neutral
 - ☐ C. Anode, Cathode, Grid
 - ☒ D. Gate, Drain, Source

Q.13 Why are optical fibers less susceptible to electromagnetic interference compared to copper wires?

- Ans**
- ☐ A. They are thicker than copper wires
 - ☐ B. They are covered with metal
 - ☐ C. They have higher resistance
 - ☒ D. They use light instead of electrical signals

Q.14 During the operation of a two-phase stepper motor, one of its phase windings becomes disconnected. What is the most likely effect on the performance of the motor?

- Ans**
- ☐ A. The motor will continue to operate normally with full torque.
 - ☒ B. The motor will experience a significant reduction in torque and may fail to step accurately.
 - ☐ C. The motor efficiency will improve due to reduced power consumption.
 - ☐ D. The motor will rotate at twice its rated speed.

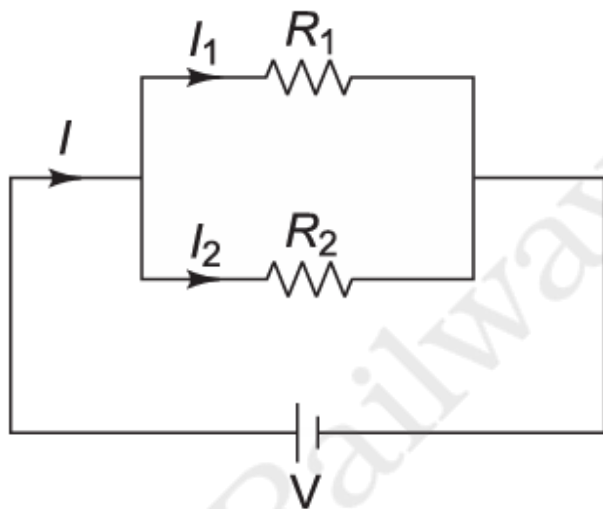
Q.15 Which trigonometric ratio represents the opposite side divided by the hypotenuse in a right triangle?

- Ans**
- ☐ A. Tangent
 - ☒ B. Sine
 - ☐ C. Cotangent
 - ☐ D. Cosine

Q.16 Which component provides power to the motherboard and other devices?

- Ans**
- ☐ A. RAM
 - ☐ B. Heat Sink
 - ☒ C. SMPS
 - ☐ D. HDD

Q.17 Two resistors of $8\ \Omega$ and $24\ \Omega$ are connected in parallel across a 12 V supply, as shown in the following figure. What is the total current drawn from the source?



- Ans**
- ☐ A. 1 A
 - ☐ B. 0.5 A
 - ☒ C. 2 A
 - ☐ D. 4 A

Q.18 Which feature best distinguishes a stud extractor from an open-end spanner in its intended application?

- Ans**
- ☐ A. A stud extractor requires external heating before use, while an open-end spanner does not.
 - ☐ B. A stud extractor is longer than an open-end spanner, providing greater torque.
 - ☒ C. A stud extractor grips and removes a stud, while an open-end spanner fits the flats of a bolt.
 - ☐ D. A stud extractor is used only for tightening, while an open-end spanner is used only for loosening.

Q.19 A semiconductor sample shows conduction mainly due to holes, while electrons exist only in small numbers due to thermal generation. Identify the semiconductor type.

- Ans**
- ☐ A. N-type semiconductor at room temperature
 - ☐ B. Intrinsic semiconductor at room temperature
 - ☒ C. P-type semiconductor at room temperature
 - ☐ D. Intrinsic semiconductor at 0 K

Q.20 Which internal hardware component of an LCD TV is responsible for regulating, filtering, and distributing the appropriate low-voltage direct current (DC) operational power rails required by the main logic board and the panel timing controller?

- Ans**
- ☐ A. T-CON microprocessing chip
 - ☐ B. Liquid Crystal Display (LCD) shutter matrix
 - ☐ C. Low-Voltage Differential Signaling (LVDS) interface
 - ☒ D. Switch-Mode Power Supply (SMPS) board

Q.21 While free-hand sketching a circular pipe from a very steep viewing angle, the circular end appears as a narrow ellipse. Which statement is correct?

- Ans**
- ☐ A. Both axes reduce equally, forming a smaller circle
 - ☐ B. The major axis becomes twice the true diameter, while the minor axis remains unchanged
 - ☒ C. The major axis equals the true diameter, while the minor axis becomes very small
 - ☐ D. The minor axis equals the true diameter, while the major axis becomes very small

Q.22 Which factor determines the selection of a soldering iron tip for a solder joint?

- Ans**
- ☐ A. The storage condition of the soldering iron
 - ☒ B. The size and type of the solder joint
 - ☐ C. The frequency of tip cleaning
 - ☐ D. The color of the soldering iron handle

Q.23 A technician connecting a desktop PC to a network switch in a modern office environment should use a _____ cable terminated with _____ connectors to establish a stable local connection.

- Ans**
- ☒ A. twisted pair; RJ45
 - ☐ B. fiber optic; SC
 - ☐ C. USB; Type A
 - ☐ D. coaxial; BNC

Q.24 During a lab experiment, the current through a magnetizing coil is increased, while the magnetic path length remains unchanged. What will happen to the magnetic field strength?

- Ans**
- ☐ A. It becomes zero
 - ☐ B. It decreases
 - ☒ C. It increases
 - ☐ D. It remains constant

Q.25 In an n-channel enhancement mode MOSFET, what must be applied to the gate terminal relative to the source to turn the device on?

- Ans**
- ☐ A. A zero voltage
 - ☐ B. A negative voltage
 - ☐ C. A gate current
 - ☒ D. A positive voltage

Q.26 In engineering drawing practice, which lettering convention is preferred for marking part numbers to maintain clarity, readability, and uniformity?

- Ans**
- ☐ A. Use lowercase letters for small-sized part numbers to save space
 - ☐ B. Use a mixture of uppercase and lowercase letters for all part numbers
 - ☐ C. Use lowercase letters for part numbers to reduce writing effort
 - ☒ D. Use uppercase letters for all part numbers to maintain standardization

Q.27 In a Pulse Width Modulation (PWM) signal, the duty cycle is defined as:

- Ans**
- ☐ A. Variation in the amplitude of the pulses
 - ☐ B. Variation in the frequency of the pulses
 - ☐ C. Phase difference between input and output signals
 - ☒ D. Ratio of the pulse ON-time (width) to the total time period of the signal

Q.28 What is the first safety step before dismantling a desktop computer?

- Ans**
- ☒ A. Switch off and unplug the power supply
 - ☐ B. Remove RAM from all RAM slots
 - ☐ C. Open the cabinet
 - ☐ D. Disconnect data cables

Q.29 Which of the following statements about HDDs is correct in computer hardware technology?

- Ans**
- ☒ A. HDDs store data on spinning magnetic disks
 - ☐ B. HDDs use flash memory to store data
 - ☐ C. HDDs are used for temporary storage only
 - ☐ D. HDDs use optical discs for storage

Q.30 Which of the following is a type of RC Oscillator?

- Ans**
- ☐ A. Hartley Oscillator
 - ☐ B. Crystal Oscillator
 - ☐ C. Colpitts Oscillator
 - ☒ D. Phase Shift Oscillator

Q.31 What happens if an amplifier is not properly biased?

- Ans**
- ☐ A. It always turns off the amplifier
 - ☐ B. It improves efficiency
 - ☐ C. It increases output power
 - ☒ D. It may cause distortion

Q.32 During circuit testing across a PN junction diode, a technician finds that holes are responsible for electrical conduction in a semiconductor. Which region of a PN junction diode does this indicate?

- Ans**
- ☐ A. Depletion region
 - ☐ B. Intrinsic region
 - ☐ C. N-type region
 - ☒ D. P-type region

Q.33 In a JK flip flop, the J input mainly performs which function when K = 0 and the clock is active?

- Ans**
- ☒ A. The Set input
 - ☐ B. The Reset input
 - ☐ C. The Clock input
 - ☐ D. The Toggle input

Q.34 How should screws be tightened when mounting a Hard Disk Drive (HDD) in a desktop computer?

- Ans**
- ☐ A. Tighten only one side
 - ☐ B. Leave screws slightly loose for HDD to move freely
 - ☒ C. Tighten screws evenly and firmly without over-tightening
 - ☐ D. Tighten as much as possible with full force

Q.35 What is the configuration called when the emitter terminal of a transistor is common to both input and output circuits?

- Ans**
- ☐ A. Common base
 - ☐ B. Emitter follower
 - ☐ C. Common collector
 - ☒ D. Common emitter

Q.36 An industrial engineer wants to optimize a photoelectric switch system for detecting various packages on a conveyor belt, where the packages differ in shape, color, and surface reflectivity. Which of the following changes would most improve the switch's detection reliability for all package types?

- Ans**
- ☐ A. Using a heavier sensor for mounting stability
 - ☐ B. Increasing supply voltage to the sensor within rated limits
 - ☒ C. Adjusting the sensor's sensitivity and alignment to account for target surface characteristics
 - ☐ D. Changing wire insulation material for better signal integrity

Q.37 In the two-wattmeter method used for measuring power in a balanced three-phase load, both wattmeters show equal readings. Based on this observation, what is the power factor of the load?

- Ans**
- ☐ A. 0
 - ☒ B. 1.0
 - ☐ C. 0.5
 - ☐ D. 0.866

Q.38 To connect a local computer to a network switch, a technician must crimp an 8-pin _____ connector onto the Ethernet cable and plug it directly into the switch's matching _____.

- Ans**
- ☒ A. RJ45; LAN port
 - ☐ B. USB; console interface
 - ☐ C. BNC; coaxial socket
 - ☐ D. RJ11; telephone jack

Q.39 How does a voltage cut-off system contribute to the reliability of a power inverter in industrial use?

- Ans**
- ☒ A. It ensures the inverter operates only within safe voltage parameters.
 - ☐ B. It increases the battery life in all circumstances.
 - ☐ C. It maintains efficiency regardless of input voltage.
 - ☐ D. It directly lowers electromagnetic interference.

Q.40 A Pulse Amplitude Modulation signal can be recovered at the receiver end using a/an _____.

- Ans**
- ☐ A. Attenuator
 - ☐ B. Inverter
 - ☒ C. Low-pass filter
 - ☐ D. High-pass filter

Q.41 In an operational amplifier integrator circuit, which component acts as feedback between the output and the input?

- Ans**
- ☐ A. Transistor
 - ☒ B. Capacitor
 - ☐ C. Resistor
 - ☐ D. Inductor

Q.42 Which connection interface should be used to link a high-definition (HD) digital set-top box to a modern LED or LCD TV to transmit both uncompressed digital video and multi-channel audio through a single cable while supporting Consumer Electronics Control (CEC) to operate both devices with a single remote?

- Ans**
- ☐ A. Composite Video (RCA)
 - ☐ B. Component Video (YPbPr)
 - ☒ C. HDMI
 - ☐ D. S-Video

Q.43 Which operational amplifier configuration is commonly used in zero crossing detectors?

- Ans**
- ☐ A. Non-inverting amplifier with positive feedback is used.
 - ☐ B. Inverting amplifier with negative feedback is used.
 - ☐ C. Integrator circuit with resistive feedback is used.
 - ☒ D. Comparator configuration without feedback is used.

Q.44 In a three-phase, four-wire electrical distribution system, the fourth pole of a four-pole Miniature Circuit Breaker (MCB) is generally used for switching and protecting which conductor?

- Ans**
- ☐ A. Earth conductor
 - ☐ B. Control circuit conductor
 - ☒ C. Neutral conductor
 - ☐ D. Pilot wire

Q.45 Which motherboard component is used to connect storage devices like HDD or SSD in desktop computer system?

- Ans**
- ☒ A. SATA port
 - ☐ B. RAM slot
 - ☐ C. USB port
 - ☐ D. PCIe slot

Q.46 What is the resistance value of a surface-mount resistor marked '472' according to SMD resistor code conventions?

- Ans**
- ☐ A. 470 ohms
 - ☒ B. 4700 ohms
 - ☐ C. 4.7 ohms
 - ☐ D. 47000 ohms

Q.47 A work area contains flammable chemicals and moving machinery. Which combination of safety signs is most appropriate for these hazards?

- Ans**
- ☐ A. Caution signs for chemicals and warning signs for exits
 - ☐ B. Danger signs for machinery and caution signs for chemicals
 - ☐ C. Warning signs for chemicals and caution signs for machinery
 - ☒ D. Danger signs for chemicals and warning signs for machinery

Q.48 What is the main function of the sensors in an IoT system?

- Ans**
- ☐ A. To store large amounts of information
 - ☒ B. To collect data from the environment
 - ☐ C. To process collected data
 - ☐ D. To perform an action that changes the environment

Q.49 In a single-phase fan or motor circuit used in workshop practice, why is a capacitor connected in series with the auxiliary winding?

- Ans**
- ☒ A. To increase conductor resistance permanently
 - ☒ B. To produce phase difference for better starting torque
 - ☒ C. To act as a fuse during overload
 - ☒ D. To reduce the supply frequency

Q.50 How does the construction of a MOSFET help to achieve high input impedance?

- Ans**
- ☒ A. The gate is insulated from the channel by a thin oxide layer
 - ☒ B. The gate uses a resistive layer to limit current
 - ☒ C. The gate is connected directly to the channel
 - ☒ D. The device has a thick substrate for support

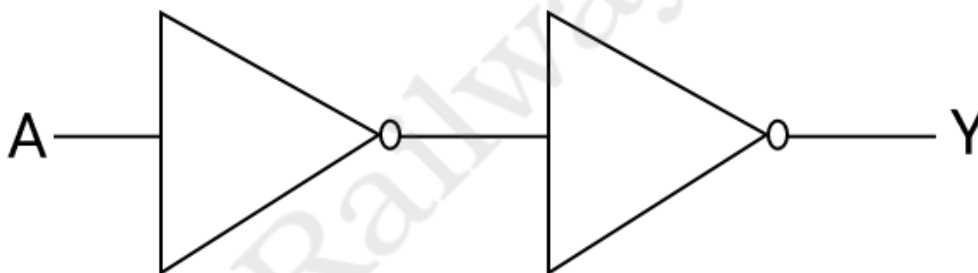
Q.51 What does 'hand off' mean in the context of cell phones?

- Ans**
- ☒ A. Make a new phone call
 - ☒ B. Charge the phone battery
 - ☒ C. Turn off the cell phone
 - ☒ D. Handover a call from one cell to another

Q.52 What is the function of an HDMI port when connecting an external source device to an LED or LCD TV?

- Ans**
- ☒ A. To step down the main AC power voltage to safely operate the internal TV logic boards
 - ☒ B. To convert incoming analog video signals into digital formats inside the TV panel
 - ☒ C. To transmit uncompressed digital video and multi-channel audio simultaneously through a single cable
 - ☒ D. To automatically increase the native optical refresh rate of the liquid crystal display pixels

Q.53 What is the output Y of the following digital circuit if the input A = 1?
(Note: Both the logic gates shown in the diagram are NOT gates.)



- Ans**
- ☒ A. 0
 - ☒ B. High Impedance State
 - ☒ C. Undefined
 - ☒ D. 1

Q.54 In a Common-Base (CB) transistor amplifier, the phase difference between the input voltage (emitter-base) and the output voltage (collector-base) is:

- Ans**
- ☒ A. 180°
 - ☒ B. 90°
 - ☒ C. 0°
 - ☒ D. 45°

Q.55 If the input resistor of an inverting amplifier using OP-AMP is doubled and the feedback resistor remains the same, what happens to the magnitude of voltage gain?

- Ans**
- ☒ A. It is halved
 - ☒ B. It doubles
 - ☒ C. Stays the same
 - ☒ D. Becomes one fourth
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Q.56 Which of the following components are used to determine the frequency of oscillation in a Colpitts oscillator?

- Ans**
- ☐ A. Diodes and resistors
 - ☒ B. Capacitors and inductor
 - ☐ C. Resistors and capacitors
 - ☐ D. Inductor and resistors

Q.57 A wire of some material has resistance 10 ohm at a certain length. To make its resistance 5 ohm using the same material and same cross-sectional area, what should be the new length?

- Ans**
- ☒ A. Half of the original length
 - ☐ B. Double the original length
 - ☐ C. Same as the original length
 - ☐ D. One fourth of the original length

Q.58 Which of the following is **NOT** a sensor performance characteristic?

- Ans**
- ☐ A. Range
 - ☒ B. Cost
 - ☐ C. Sensitivity
 - ☐ D. Linearity

Q.59 What is the phase shift required in RC phase shift oscillator from the entire feedback RC network to produce oscillations?

- Ans**
- ☐ A. 90 degrees
 - ☒ B. 180 degrees
 - ☐ C. 360 degrees
 - ☐ D. 270 degrees

Q.60 When following the proper procedure to read voltage using a PMMC Voltmeter, which type of voltage can be measured accurately?

- Ans**
- ☐ A. Alternating current (AC) voltage only
 - ☐ B. Both AC and DC voltage accurately
 - ☒ C. Direct current (DC) voltage only
 - ☐ D. High-frequency AC voltage only

Q.61 What problem can occur with a Digital Storage Oscilloscope (DSO) if its sampling rate is too low for a high-frequency signal, compared to an analog CRO?

- Ans**
- ☐ A. The entire display screen will permanently turn off due to over-sampling.
 - ☐ B. The input signal will automatically switch to a direct current measurement mode.
 - ☐ C. The analog input probe tips will melt due to excessive heat generation.
 - ☒ D. Aliasing error, where the displayed waveform appears as an incorrect low-frequency signal shape.

Q.62 Which component is used to set biasing in a transistor amplifier but, if omitted, leads to unstable operation?

- Ans**
- ☐ A. Transformer
 - ☐ B. Inductor
 - ☒ C. Resistor network
 - ☐ D. Diode

Q.63 Which phase relationship exists between input and output signals in a Common Emitter amplifier?

- Ans**
- ☐ A. Output is in phase with input
 - ☒ B. 180° phase shift
 - ☐ C. Output leads input by 90°
 - ☐ D. Output lags input by 90°

Q.64 A standard multiplexed 6 by 4 LED matrix contains a total of _____ independent light-emitting nodes, which can be fully operated using a minimum of _____ microcontroller control pins.

- Ans**
- ☐ A. 24; 24
 - ☐ B. 10; 24
 - ☐ C. 48; 48
 - ☒ D. 24; 10

Q.65 Which of the following is a primary criterion when choosing a sensor for monitoring temperature in a manufacturing process?

- Ans**
- ☐ A. Color of the sensor housing
 - ☐ B. Overall cost of the sensor
 - ☒ C. Accuracy of the sensor readings
 - ☐ D. Physical size of the sensor

Q.66 A 1 kHz square wave signal is applied to the input A of a NOT gate. What will be observed at the output of the NOT gate?

- Ans**
- ☐ A. A 1 kHz square wave signal identical to the input
 - ☒ B. A 1 kHz square wave signal inverted (complemented) with respect to the input
 - ☐ C. A constant LOW (0) signal
 - ☐ D. A constant HIGH (1) signal

Q.67 In an 8051 microcontroller, during a debugging session, several PUSH instructions are executed, and the stack pointer reaches address 31H. Which memory area is now being used for stack storage?

- Ans**
- ☐ A. Register bank area
 - ☐ B. Program memory area
 - ☐ C. Bit-addressable RAM area
 - ☒ D. General-purpose RAM area

Q.68 While diagnosing an NPN BJT in a SOT-23 package, your multimeter positive probe (+) is locked on the Base (Pin 1). Measuring to Pin 3 reads 0.6 V, while measuring to Pin 2 reads 0.68 V. Which pin is the Emitter?

- Ans**
- ☐ A. Neither pin; the transistor is broken because the readings don't match.
 - ☒ B. Pin 2 is the Emitter, because it has the higher voltage drop.
 - ☐ C. Both pins are identical and can be used interchangeably.
 - ☐ D. Pin 3 is the Emitter, because it has the lower voltage drop.

Q.69 A technician notices the relay in a stabilizer frequently clicks on and off rapidly when connected to an SMPS. What is the most probable issue?

- Ans**
- ☐ A. The relay is stuck in one position
 - ☒ B. The input voltage is fluctuating rapidly
 - ☐ C. The stabilizer has a blown fuse
 - ☐ D. The SMPS is overloaded

Q.70 While designing a system using an 8051 microcontroller, the lower address byte and data are multiplexed on the same lines. Which hardware component is required to hold the lower address byte temporarily for correct memory access?

- Ans**
- ☐ A. Encoder
 - ☐ B. Multiplexer
 - ☐ C. Subtractor
 - ☒ D. Latch

Q.71 A telecommunications company observes call drops at the borders of adjacent cell sites. Which cell site configuration adjustment would minimize this issue?

- Ans**
- ☐ A. Assigning the same frequency to neighboring cell sites
 - ☐ B. Decreasing the height of all cell site antennas
 - ☐ C. Reducing the transmission power of each cell site
 - ☒ D. Introducing overlapping coverage areas with handover protocols

Q.72 Three identical 12 V batteries are connected in parallel to supply a load current of 18 A. Assuming equal sharing, how much current is supplied by each battery?

- Ans**
- ☐ A. 9 A
 - ☐ B. 4 A
 - ☒ C. 6 A
 - ☐ D. 18 A

Q.73 Which statement correctly distinguishes a primary battery from a secondary battery?

- Ans**
- ☒ A. A primary battery is generally non-rechargeable, while a secondary battery can be recharged and reused
 - ☐ B. A primary battery is used only in automobiles, while a secondary battery is used only in torches
 - ☐ C. A primary battery always has higher voltage than a secondary battery
 - ☐ D. A primary battery can be recharged many times, while a secondary battery cannot be recharged

Q.74 A draftsman needs to construct a precise 75° angle without using a protractor. Which combination of instruments should be used?

- Ans**
- ☐ A. Use two 45° set-squares together against a T-square
 - ☐ B. Use a divider to bisect a 120° angle accurately
 - ☐ C. Use a mini-drafter aligned with a T-square edge
 - ☒ D. Use a 45° set-square with a 30°–60° set-square against a T-square

Q.75 An n-type semiconductor is formed by doping with:

- Ans**
- ☒ A. Pentavalent impurities
 - ☐ B. Divalent impurities
 - ☐ C. Monovalent impurities
 - ☐ D. Trivalent impurities



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सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	9:30 AM - 12:00 PM
Subject	ALP Stage 2 Fitter

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 A trader marks an article 25% above its cost price. He allows a discount of 10% on the marked price. After giving the discount, he makes a profit of ₹180 on the article. What is the cost price of the article?

- Ans**
- ☒ A. ₹1,200
 - ☒ B. ₹1,260
 - ☒ C. ₹1,380
 - ☒ D. ₹1,440

Q.2 A shopkeeper marks a product 75% above cost price and offers two successive discounts of 30% and 40%. What is the profit or loss percentage?

- Ans**
- ☒ A. 26.5% loss
 - ☒ B. 22.6% profit
 - ☒ C. 15.7% profit
 - ☒ D. 20.9% profit

Q.3 If 'A' stands for '+', 'B' stands for '-', 'C' stands for 'x' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

28 A 16 C 3 B 12 D 4 = ?

- Ans**
- ☒ A. 72
 - ☒ B. 73
 - ☒ C. 71
 - ☒ D. 70

Q.4 The median of the following data is :
25, 15, 23, 25, 17, 27, 20, 18, 24, 30, 19, 28, 35, 10, 31, 40

- Ans**
- ☒ A. 23.5
 - ☒ B. 25
 - ☒ C. 20.5
 - ☒ D. 24.5

Q.5 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.
Among the five poles—I, N, C, H, and L—each having a different height, which pole is the tallest?

(I) I is shorter than N but taller than C. C is taller than only one pole.

(II) H is taller than L.

- Ans**
- ☒ A. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☒ B. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☒ C. Both statements I and II together are NOT sufficient to answer the question
 - ☒ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.6 Which statement best describes a 'point' in engineering drawing?

- Ans**
- ☒ A. A point is a short line segment used to mark measurements.
 - ☒ B. A point indicates a precise location but has no size, length, or width.
 - ☒ C. A point is the intersection of two lines and always has measurable length.
 - ☒ D. A point represents a small area with both length and width.

Q.7 Which property of a fuse wire ensures it melts quickly when excess current flows?

- Ans**
- ☒ A. Low melting point
 - ☒ B. Thick wire
 - ☒ C. High electrical resistance
 - ☒ D. High melting point

Q.8 Namia is facing the west. She turns left and walks 15 m. She turns left and walks 25 m. She again turns left and walks 40 m. She finally turns left and walks 40 m to reach home. In which direction is her home with respect to the starting point?

- Ans**
- ☒ A. North-East
 - ☒ B. South-East
 - ☒ C. South-West
 - ☒ D. North-West

Q.9 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements: All girls are hens. No hen is a cat.

Conclusion (I): No girl is a cat.

Conclusion (II): Some cats are hens.

- Ans**
- ☒ A. Only conclusion (II) follows
 - ☒ B. Neither conclusion (I) nor (II) follows
 - ☒ C. Both conclusions (I) and (II) follow
 - ☒ D. Only conclusion (I) follows

Q.10 A car travels on a highway, and its odometer records a reading of 180 km at 8:00 am and 240 km at 9:30 am. Based on this information, which statement best describes the car's average speed during this interval?

- Ans**
- ☒ A. The car's average speed is 60 km per hour based only on the change in odometer readings.
 - ☒ B. The car's average speed is 180 km per hour since that was the odometer reading at 8:00 am.
 - ☒ C. The car's average speed is 240 km per hour since that was the odometer reading at 9:30 am.
 - ☒ D. The car's average speed is 40 km per hour as calculated from the odometer readings and time interval.

Q.11 Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) A T D E B R C L M Q O N P J M Q E A O Z W F U K S L (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans
- ☒ A. 2
 - ☒ B. 3
 - ☒ C. 0
 - ☒ D. 1

Q.12 Which component makes up the largest proportion of Earth's atmosphere by volume?

- Ans
- ☒ A. Oxygen
 - ☒ B. Argon
 - ☒ C. Nitrogen
 - ☒ D. Carbon dioxide

Q.13 Which of the following scenarios best demonstrates the conversion of chemical energy to mechanical energy?

- Ans
- ☒ A. A runner uses stored energy from food to sprint forward
 - ☒ B. A stretched rubber band snaps back to its original shape
 - ☒ C. A stone falls off a table to the ground
 - ☒ D. A flashlight turns on after inserting new batteries

Q.14 What do touch gestures in Microsoft Windows allow users to do?

- Ans
- ☒ A. Increase screen brightness
 - ☒ B. Perform actions using finger movements
 - ☒ C. Connect external devices
 - ☒ D. Type faster on the keyboard

Q.15 An object has a mass of 10 kilograms. How does its weight on the Moon compare to its weight on Earth?

- Ans
- ☒ A. The object weighs less on the Moon than on Earth
 - ☒ B. The object weighs the same on both the Moon and Earth
 - ☒ C. The object weighs zero on the Moon
 - ☒ D. The object weighs more on the Moon than on Earth

Q.16 16 is related to 260 following a certain logic. Following the same logic, 25 is related to 630. To which of the following is 9 related, following the same logic?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans
- ☒ A. 78
 - ☒ B. 732
 - ☒ C. 729
 - ☒ D. 84

Q.17 A thermometer shows a reading of 37 degrees Celsius. What is the corresponding temperature in Kelvin?

- Ans**
- ☒ A. 270 K
 - ☒ B. 310 K
 - ☒ C. 300 K
 - ☒ D. 320 K

Q.18 Find the LCM of 72, 78, and 90.

- Ans**
- ☒ A. 4250
 - ☒ B. 4680
 - ☒ C. 4280
 - ☒ D. 4120

Q.19 A worker's hand is at risk of injury from a mechanical shearing action. Which situation best describes a shearing hazard?

- Ans**
- ☒ A. A hand becoming entangled in a rotating machine shaft during operation
 - ☒ B. A hand touching a hot metallic machine surface during maintenance activity
 - ☒ C. A hand sliding repeatedly across a rough abrasive machine surface during work
 - ☒ D. A hand caught between a moving blade and a fixed machine surface during operation

Q.20 There are two types of silver–copper alloys. The first alloy contains $93\frac{1}{3}\%$ silver, while the second alloy contains $86\frac{2}{3}\%$ silver. Find the amount of the first alloy that should be mixed with some quantity of the second alloy to obtain a 100 kg mixture containing 90% silver.

- Ans**
- ☒ A. 50 kg
 - ☒ B. 45 kg
 - ☒ C. 48 kg
 - ☒ D. 52 kg

Q.21 In this question, a group of numbers/symbols is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer. If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	6	1	&	3	%	8	+	4	#	7	@	5	2	\$
Code	R	V	G	D	S	C	T	L	F	W	H	U	Y	N

Conditions:

- (i) If the first element is a symbol and the last element is an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and last elements are to be coded as ©.
- (iii) If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?
+ 6 \$ 2 7

- Ans**
- ☒ A. WSNYT
 - ☒ B. STMWV
 - ☒ C. WRNYT
 - ☒ D. TSNWW

Q.22 The average of 8 numbers is 45. If one number, 59, is removed, what will the new average be?

- Ans**
- ☒ A. 43
 - ☒ B. 42
 - ☒ C. 42.5
 - ☒ D. 41.5

Q.23 If $\left(x + \frac{1}{x}\right) = 3$, find the value of $\left(x^3 + \frac{1}{x^3}\right)$.

- Ans ☒ A. 18
☐ B. 15
☐ C. 20
☐ D. 16

Q.24 An engineer uses fault tree analysis to assess a machine-related injury in a factory. Which step should be taken first according to standard procedure?

- Ans ☐ A. Validate the analysis using workplace data
☐ B. List all possible causes of failures
☒ C. Define the top event representing the injury
☐ D. Establish preventive measures to control risks

Q.25 What should come in place of the question mark (?) in the given series?

98, 104, 116, 134, 158, ?

- Ans ☐ A. 190
☒ B. 188
☐ C. 184
☐ D. 186

Q.26 Simplify: $60 - \{(-8) \times (-16 - 19 - 2)\} \div [5 \times \{2 + (-1) \times (-1)\}]$

- Ans ☒ A. $\frac{604}{15}$
☐ B. $\frac{608}{15}$
☐ C. $\frac{614}{15}$
☐ D. $\frac{594}{15}$

Q.27 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Among five people – A, B, C, D, and E – who is the tallest?

(I) A is taller than B. B is taller than C.

(II) D is taller than E.

- Ans ☐ A. Data in statement I alone is sufficient to answer the question while data in statement II is not
☒ B. Both statements I and II together are NOT sufficient to answer the question.
☐ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
☐ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.28 Two students move identical boxes through a distance of 10 m. Student A applies a force of 50 N, while Student B applies a force of 100 N. What is the difference in the work done by the two students?

- Ans ☐ A. 0 J
☒ B. 500 J
☐ C. 1000 J
☐ D. 50 J

Q.29 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans
- ☒ A. EY-KO
 - ☒ B. WQ-CG
 - ☒ C. QK-VA
 - ☒ D. TN-ZD

Q.30 Which of the following best defines 'work' in physics?

- Ans
- ☒ A. Work is done whenever a force is applied, regardless of movement.
 - ☒ B. Work is done when energy is stored in an object.
 - ☒ C. Work is done when a force moves an object in the direction of the force.
 - ☒ D. Work is done if a force acts at any angle to the motion.

Q.31 A trader buys 187 pens at ₹23 each. During transportation, 7 pens get damaged and cannot be sold. He sells the remaining pens at ₹27 each. Find his profit percentage. (rounded off to one decimal place)

- Ans
- ☒ A. 13.0%
 - ☒ B. 13.7%
 - ☒ C. 14.1%
 - ☒ D. 12.6%

Q.32 A cyclist covers 120 meters in 16 seconds on a straight road, then immediately covers 180 meters in 24 seconds on a similar road segment. What is the average speed of the cyclist during the entire journey?

- Ans
- ☒ A. 8.0 meters per second
 - ☒ B. 6.5 meters per second
 - ☒ C. 7.0 meters per second
 - ☒ D. 7.5 meters per second

Q.33 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between X and Z when counted from the right of X. Only two people sit between Z and D. Only three people sit between X and B. A sits to the immediate left of C. Who sits third to the left of Y?

- Ans
- ☒ A. X
 - ☒ B. C
 - ☒ C. Z
 - ☒ D. A

Q.34 If the mean of the following data is 40, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	30	27	44	29	X

- Ans
- ☒ A. 82
 - ☒ B. 98
 - ☒ C. 99
 - ☒ D. 93

Q.35 A father distributed two different amounts among his sons P, Q, R and S. First amount was distributed in the ratio 5 : 4 : 3 : 2 and the second amount was distributed in the ratio 6 : 7 : 8 : 9. If the second amount is thrice the first amount, then which son will get the maximum amount?

- Ans**
- ☐ A. Q
 - ☐ B. R
 - ☒ C. S
 - ☐ D. P

Q.36 What is the best description of the purpose of multi-view drawing in engineering drawing?

- Ans**
- ☐ A. To view an object from only one direction
 - ☒ B. To represent different sides of an object clearly on a flat surface
 - ☐ C. To present the object in a single three-dimensional visual form only
 - ☐ D. To show different colors of an object for better visual appearance

Q.37 What should come in place of the question mark (?) in the given series?

74, 83, 101, 128, ?, 209

- Ans**
- ☐ A. 176
 - ☒ B. 164
 - ☐ C. 155
 - ☐ D. 146

Q.38 If Rohan's income increases by 20% and his expenditure increases by 10%, then his savings increase by ₹1,200. If his original income was ₹12,000, what was his original expenditure? (Assume that savings = income – expenditure.)

- Ans**
- ☐ A. ₹11,000
 - ☐ B. ₹9,000
 - ☒ C. ₹12,000
 - ☐ D. ₹10,000

Q.39 In a certain code language, 'KING' is coded as '9713' and 'ITCH' is coded as '2945'. What is the code for 'I' in the given code language?

- Ans**
- ☐ A. 4
 - ☒ B. 9
 - ☐ C. 7
 - ☐ D. 2

Q.40 A train X crosses a man who is sitting in another train Y, which is moving in the opposite direction, in 8 seconds. However, when both trains are moving in the same direction, train X takes 20 seconds to pass the same man. If the length of train X is 360 meters and the length of train Y (in which the man is sitting) is 240 meters, what is the speed of train Y?

- Ans**
- ☐ A. 46.5 km/h
 - ☐ B. 45.3 km/h
 - ☐ C. 45.8 km/h
 - ☒ D. 48.6 km/h

Q.41 A sample of water is heated from 15 degrees Celsius to 35 degrees Celsius. What is the temperature change in Kelvin?

- Ans**
- ☒ A. The temperature change is 20 K.
 - ☐ B. The temperature change is 50 K.
 - ☐ C. The temperature change is 30 K.
 - ☐ D. The temperature change is 15 K.

Q.42 In third angle projection, where is the object placed relative to the plane of projection?

- Ans
- ☒ A. The object is placed in the third quadrant
 - ☐ B. The object is placed in the first quadrant
 - ☐ C. The object is placed in the fourth quadrant
 - ☐ D. The object is placed in the second quadrant

Q.43 If a scooter travels at a constant speed of 25 km per hour, how far will it travel in 4 hours?

- Ans
- ☐ A. 80 km
 - ☐ B. 120 km
 - ☐ C. 75 km
 - ☒ D. 100 km

Q.44 A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q such that OQ = 12 cm. What is the length of PQ?

- Ans
- ☐ A. $\sqrt{117}$ cm
 - ☒ B. $\sqrt{119}$ cm
 - ☐ C. $\sqrt{97}$ cm
 - ☐ D. $\sqrt{107}$ cm

Q.45 E, F, G, H, L and M live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live above G. Only two people live between L and E. Only two people live between M and G. E lives below G but above F. How many people live below H?

- Ans
- ☒ A. Three
 - ☐ B. One
 - ☐ C. Two
 - ☐ D. Four

Q.46 When using a hand file during fitting operations, which action demonstrates adherence to tool safety protocols?

- Ans
- ☐ A. Applying excessive downward force when filing
 - ☒ B. Fitting a proper handle securely to the tang
 - ☐ C. Filing above shoulder height for better leverage
 - ☐ D. Holding the file near its tang during filing work

Q.47 Solve the system of equations:

$$-3x + 2y - z = -1, 6x - 6y + 7z = -7, 3x - 4y + 4z = -6$$

- Ans
- ☐ A. $x=1, y=2, z=2$
 - ☐ B. $x=2, y=1, z=-3$
 - ☐ C. $x=-2, y=2, z=11$
 - ☒ D. $x=2, y=2, z=-1$

Q.48 P, Q, R, S and T have different ages. T is elder than only one person. S is elder than P but younger than Q. R is elder than Q. Who is the youngest?

- Ans
- ☐ A. R
 - ☐ B. Q
 - ☐ C. S
 - ☒ D. P

Q.49 Which situation best describes an entanglement hazard in a mechanical workshop?

- Ans**
- ☐ A. Gloves worn near hot surfaces
 - ☐ B. Hand pinched between gears
 - ☒ C. Loose clothing caught in a rotating shaft
 - ☐ D. Finger cut by a sharp edge

Q.50 Which of the following statements correctly reflects the characteristics of a Local Area Network (LAN) and the role of Ethernet within it?

- Ans**
- ☐ A. LANs are designed for long-distance communication and use Ethernet primarily for wireless data exchange.
 - ☐ B. Ethernet in a LAN provides low-speed data transfer and connects users over public Internet infrastructure.
 - ☒ C. Ethernet is a standard that governs how devices in a LAN communicate via wired connections, supporting speeds from 10 Mbps to 1000 Mbps.
 - ☐ D. A LAN always requires Gigabit Ethernet to function and is insecure because it allows open access to all network devices.

Q.51 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

QOI 5, OMG 10, MKE 15, KIC 20, ?

- Ans**
- ☐ A. IHS 23
 - ☐ B. JHZ 24
 - ☒ C. IGA 25
 - ☐ D. HIZ 30

Q.52 A mechanical engineer must design a flange joint where two pipes are to be connected at a 45-degree angle. Which method should the engineer use to accurately represent the intersection line on a technical drawing of the two cylindrical pipes?

- Ans**
- ☐ A. Represent the intersection as a straight line in the side view
 - ☒ B. Draw the true shape of the intersection using auxiliary projection
 - ☐ C. Use only standard orthographic projection without auxiliary views
 - ☐ D. Draw a simple circle at the junction in the top view

Q.53 An engineer is tasked with creating the front view of a mechanical part. The part has a rectangular base with a vertical circular hole passing through it and a triangular prism attached on top. Which of the following best describes what will be visible in the front view?

- Ans**
- ☐ A. The outline of triangular prism and circular hole will be visible in front view only
 - ☐ B. Only the rectangular base outline will be visible in the front view drawing
 - ☐ C. Only the triangular prism will be clearly visible in the front view drawing
 - ☒ D. The outline of rectangular base and triangular prism will be visible but hole is not shown

Q.54 PJAE is related to JOWH in a certain way based on the English alphabetical order. In the same way, OIVC is related to INRF. To which of the following is NEZF related to following the same logic?

- Ans**
- ☒ A. HJVI
 - ☐ B. IJVJ
 - ☐ C. HKVJ
 - ☐ D. IKUH

Q.55 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☐ A. DJ – GM
 - ☐ B. AF – DI
 - ☒ C. CH – EK
 - ☐ D. BG – EJ

Q.56 When a moving car suddenly applies brakes, its kinetic energy is transformed mainly into which form of energy?

- Ans**
- ☐ A. Sound energy
 - ☐ B. Light energy
 - ☐ C. Potential energy
 - ☒ D. Heat energy

Q.57 O, P, Q, U and V have different heights. Only three people have heights between V and Q. P is taller than U but shorter than O. V is taller than Q. How many people are shorter than P?

- Ans**
- ☐ A. One
 - ☒ B. Two
 - ☐ C. Four
 - ☐ D. Three

Q.58 The simple interest earned on a certain sum of money for 3 years at 15% per annum is ₹2,700. Find the sum.

- Ans**
- ☐ A. ₹8,000
 - ☐ B. ₹5,000
 - ☐ C. ₹9,000
 - ☒ D. ₹6,000

Q.59 A car travels 90 km east and then 30 km west along the same straight road. If the entire journey takes 3 hours, what is the average velocity of the car?

- Ans**
- ☐ A. 30 km/h east
 - ☒ B. 20 km/h east
 - ☐ C. 40 km/h east
 - ☐ D. 50 km/h north

Q.60 What is the main purpose of ambient air quality standards?

- Ans**
- ☐ A. To ensure air is routinely sampled to map historical pollution trends.
 - ☒ B. To set legally permissible limits for specific pollutants to protect public health.
 - ☐ C. To focus exclusively on industrial operations while ignoring other sectors.
 - ☐ D. To require all industries to reduce emissions by the exact same percentage.

Q.61 A boat sails 40 km downstream and then 40 km upstream in a river. The boat's speed in still water is 12 km/hr and the speed of the stream is 4 km/hr. How much time does the boat take to cover the entire distance (both upstream and downstream)?

- Ans**
- ☐ A. 8 hours
 - ☐ B. 6 hours
 - ☒ C. 7.5 hours
 - ☐ D. 10 hours

Q.62 If 'A' stands for '+', 'B' stands for '−', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

$$31 \text{ B } 35 \text{ D } 7 \text{ A } 9 \text{ C } 2 = ?$$

- Ans**
- ☒ A. 44
 - ☐ B. 42
 - ☐ C. 46
 - ☐ D. 48

Q.63 Which integrated strategy best addresses soil pollution, falling crop yields, and low microbial activity near an industrial zone?

- Ans**
- ☒ A. Control industrial waste for sustainability.
 - ☐ B. Reforestation in nearby urban centers.
 - ☐ C. Expand urban areas into farmland.
 - ☐ D. Ban all regional chemical fertilizers.

Q.64 Which of the following best describes a key environmental concern associated with improper disposal of e-waste?

- Ans**
- ☐ A. Increased recycling rates of precious metals
 - ☐ B. Enhanced biodegradation of plastics
 - ☒ C. Release of toxic metals into soil and water
 - ☐ D. Release of greenhouse gases from decomposition

Q.65 An engineer is tasked with creating a hollow cone for a machine part, where the wall thickness must be consistent and the slant height is critical for assembly. Which factor is most important to ensure the cone will fit correctly in the final design?

- Ans**
- ☐ A. Prioritizing uniform wall thickness over all other features
 - ☐ B. Matching only the overall height of the cone
 - ☒ C. Ensuring the slant height matches the assembly requirement
 - ☐ D. Focusing only on base diameter for precise fit

Q.66 Which is the most important safety check before operating any machine in a workshop?

- Ans**
- ☐ A. Wipe the machine with a dry cloth before use
 - ☒ B. Inspect the machine for loose or damaged parts
 - ☐ C. Check if the machine is plugged in properly
 - ☐ D. Ensure the machine area is properly illuminated

Q.67 Which of the following statements correctly describes average velocity and its SI unit?

- Ans**
- ☐ A. Average velocity is the total displacement divided by total time, and its unit is kilometer per hour.
 - ☐ B. Average velocity is the total distance divided by total time, and its unit is kilometer per hour.
 - ☐ C. Average velocity is the total distance divided by total time, and its unit is meter per second.
 - ☒ D. Average velocity is the total displacement divided by total time, and its unit is meter per second.

Q.68 Which approach most effectively reduces both nitrogen and phosphorus concentrations during wastewater treatment?

- Ans**
- ☒ A. Biological and chemical nutrient removal
 - ☐ B. Primary sedimentation with extended aeration
 - ☐ C. UV disinfection following secondary treatment
 - ☐ D. Surface-flow constructed wetlands

Q.69 A pendulum takes 60 seconds to complete 24 oscillations. If its length is increased and it now takes 72 seconds for the same number of oscillations, what has happened to its time period?

- Ans**
- ☐ A. It has decreased to 2.0 seconds
 - ☐ B. It remains at 2.5 seconds
 - ☒ C. It has increased to 3.0 seconds
 - ☐ D. It has decreased to 1.5 seconds

Q.70 A conical tent has a base radius of 14 m and a height of 48 m. How many cubic meters of air can it hold? (Use $\pi = \frac{22}{7}$)

- Ans**
- ☒ A. 9568
 - ☒ B. 9856
 - ☒ C. 9865
 - ☒ D. 8956

Q.71 Which feature is a requirement of the BIS drawing standard in engineering drawings?

- Ans**
- ☒ A. Freehand sketches without scale
 - ☒ B. Title block with specific information
 - ☒ C. Margin lines of random width
 - ☒ D. Use of colored pencils for clarity

Q.72 Which of the following is both, an input and output device?

- Ans**
- ☒ A. Touchscreen monitor
 - ☒ B. Projector
 - ☒ C. Keyboard
 - ☒ D. Printer

Q.73 If 'A' stands for '+', 'B' stands for 'x', 'C' stands for '+' and 'D' stands for '-', what will come in place of the question mark '?' in the following equation?

14 A 30 B 45 C 15 D 9 = ?

- Ans**
- ☒ A. 27
 - ☒ B. 25
 - ☒ C. 28
 - ☒ D. 29

Q.74 A car travels 60 km north in 2 hours, then 40 km south in the next 1 hour. What is the car's average velocity over the entire trip?

- Ans**
- ☒ A. 20 km/h south
 - ☒ B. 6.7 km/h north
 - ☒ C. 0 km/h
 - ☒ D. 33.3 km/h north

Q.75 A runner completes one lap of a 200 meter circular track in 50 seconds. What is the average speed of the runner?

- Ans**
- ☒ A. 3 meter per second
 - ☒ B. 4 meter per second
 - ☒ C. 3.5 meter per second
 - ☒ D. 4.5 meter per second

Q.76 A laboratory record shows a distance of 0.004 kilometers between two points. How should this be written in SI units of length for a scientific report?

- Ans**
- ☒ A. 4000 mm
 - ☒ B. 0.4 m
 - ☒ C. 4 m
 - ☒ D. 400 cm

Q.77 An engineering student is tasked with creating a detailed side view of a complex machine part for an assembly drawing. Which approach will most accurately represent all features visible from the side while avoiding hidden overlaps or misinterpretations?

- Ans**
- ☐ A. Use only hidden lines for representing features on the far side in the view
 - ☐ B. Sketch the side view freely without using projections from the main view
 - ☐ C. Include all features even those not visible from the selected side view
 - ☒ D. Project all visible elements from the side and omit hidden features unless needed

Q.78 What is the simplified value of the expression $\left[\frac{\cos A}{(1 - \tan A)} \right] + \left[\frac{\sin A}{(1 - \cot A)} \right]$?

- Ans**
- ☒ A. $\cos A + \sin A$
 - ☐ B. 0
 - ☐ C. 1
 - ☐ D. $\sin A - \cos A$

Q.79 Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right.

(Left) Z @ B R J # D * Q A M S % P L V O U S N T W Z (Right)

How many such symbols are there, each of which is immediately preceded by a letter and also immediately followed by a letter?

- Ans**
- ☒ A. Four
 - ☐ B. None
 - ☐ C. Three
 - ☐ D. Two

Q.80 Which line symbol is commonly used in engineering drawings to represent a hidden edge that is not directly visible?

- Ans**
- ☐ A. Zigzag line
 - ☐ B. Solid thick line
 - ☐ C. Chain thin line
 - ☒ D. Dashed line

Q.81 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. Only three boxes are kept above S. Exactly one box is kept between T and S. Exactly three boxes are kept between T and U, and U is kept somewhere above S. V is kept immediately below U. W is kept at one of the places above P. Q is not kept immediately above or below T. Based on the given information, which box is kept at the lowermost position?

- Ans**
- ☐ A. S
 - ☐ B. V
 - ☒ C. P
 - ☐ D. Q

Q.82 What is the typical temperature range covered by a laboratory thermometer used in school experiments?

- Ans**
- ☐ A. Zero to two hundred degrees Celsius
 - ☐ B. Minus fifty to fifty degrees Celsius
 - ☐ C. Thirty five to forty two degrees Celsius
 - ☒ D. Minus ten to one hundred and ten degrees Celsius

Q.83 Three pipes A, B and C can fill a tank in 12 hours, 18 hours and 24 hours, respectively. A leak at the bottom can empty the full tank in 36 hours. If all the pipes are opened together, in how many hours will the tank be filled? (Round off your answer to two decimal places.)

- Ans ☒ A. 6.55 hours
☐ B. 9.45 hours
☐ C. 3.33 hours
☐ D. 5.56 hours

Q.84 The circumference of the base of a solid right circular cylinder is 88 cm and its height is 150 cm. What is the volume (in cm^3) of the cylinder?

$$\left(\text{Take } \pi = \frac{22}{7} \right)$$

- Ans ☒ A. 92400
☐ B. 92550
☐ C. 92450
☐ D. 92500

Q.85 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some glasses are spoons.
All spoons are forks.

Conclusions:

(I) Some glasses are forks.
(II) All forks are spoons.

- Ans ☐ A. Both conclusions (I) and (II) follow
☐ B. Neither conclusion (I) nor (II) follows
☒ C. Only conclusion (I) follows
☐ D. Only conclusion (II) follows

Q.86 A diamond ring costs ₹85,000. Its price is reduced first by 11% and then by 4% on the reduced price. Find the final price of the ring after both discounts.

- Ans ☐ A. ₹73,624
☐ B. ₹72,604
☐ C. ₹74,624
☒ D. ₹72,624

Q.87 A car of mass 1200 kg accelerates from rest to a speed of 20 m/s on a straight road. If the kinetic energy gained by the car is completely due to the work done by the engine, which of the following best represents the total kinetic energy acquired by the car at this speed?

- Ans ☒ A. 240,000 joules
☐ B. 24,000 joules
☐ C. 480,000 joules
☐ D. 12,000 joules

Q.88 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

BIP : EMU
GNU : JRZ

- Ans
- ☒ A. XDE : PON
 - ☒ B. CGW : NHT
 - ☒ C. FMT : IQY
 - ☒ D. VCD : GRD

Q.89 A roller coaster at the top of its track has maximum potential energy. As it descends and speeds up, what principle explains why the sum of its kinetic and potential energies remains constant if we ignore friction and air resistance?

- Ans
- ☒ A. Principle of inertia
 - ☒ B. Principle of superposition
 - ☒ C. Law of conservation of energy
 - ☒ D. Law of inertia

Q.90 Three workers, X, Y, and Z, can complete a certain job in 10 days, 12 days, and 15 days, respectively. Determine the number of days required for them to complete the job when they work together.

- Ans
- ☒ A. 6 days
 - ☒ B. 8 days
 - ☒ C. 4 days
 - ☒ D. 5 days

Q.91 G is the mother of Y. Y is the sister of V. S is the father of L. L is the husband of V. How is G related to S?

- Ans
- ☒ A. Son's wife's sister
 - ☒ B. Mother's mother
 - ☒ C. Son's wife
 - ☒ D. Son's wife's mother

Q.92 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Shreya related to Mahak if 'Shreya + Dev - Taran × Harshit % Mahak'?

- Ans
- ☒ A. Father's sister
 - ☒ B. Mother's mother
 - ☒ C. Father's mother
 - ☒ D. Mother's sister

Q.93 In how many years will a sum of ₹16,000 at 10% per annum compounded semi-annually become ₹18,522?

- Ans
- ☒ A. 1.5 years
 - ☒ B. 2.5 years
 - ☒ C. 2 years
 - ☒ D. 1 year

Q.94 In a spreadsheet application, a user selects a range of cells and presses Ctrl + C, followed by Ctrl + V in a different worksheet. What happens to the data?

- Ans**
- ☒ A. The selected cells are copied to the new worksheet.
 - ☐ B. The selected cells are deleted from the original worksheet.
 - ☐ C. The selected cells are moved to the new worksheet.
 - ☐ D. The selected cells are saved to a new file.

Q.95 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UMD ZQG EUJ JYM ?

- Ans**
- ☒ A. OCP
 - ☐ B. PDP
 - ☐ C. NDO
 - ☐ D. NBQ

Q.96 A sum of ₹420 is divided among A, B, C, and D such that: $A : B = 4 : x$, $B : C = x : 7$, $C : D = 6 : (x - 3)$. If B and C together get ₹210, find the value of x.

- Ans**
- ☐ A. 53
 - ☐ B. 42
 - ☒ C. 39
 - ☐ D. 27

Q.97 What is an email used for?

- Ans**
- ☒ A. Sending messages
 - ☐ B. File storage
 - ☐ C. Creating documents
 - ☐ D. Data processing

Q.98 Refer to the given letter series and answer the question that follows. Counting to be done from left to right.

(Left) B F O P P S Q A L M K A W X S N U Q J O M Y (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☐ A. 4
 - ☐ B. 7
 - ☐ C. 6
 - ☒ D. 5

Q.99 What is the primary function of a fire hydrant in a workplace safety system?

- Ans**
- ☐ A. Detecting smoke and warning employees
 - ☒ B. Supplying large quantities of water to fight fires
 - ☐ C. Activating fire alarms automatically in emergencies
 - ☐ D. Removing hazardous fumes from the area

Q.100 Below are given two sets of numbers. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

10 - 100 - 50 - 25; 2 - 4 - 2 - 1

- Ans**
- ☐ A. 12 - 144 - 62 - 31
 - ☐ B. 8 - 64 - 32 - 14
 - ☐ C. 5 - 25 - 15 - 7
 - ☒ D. 4 - 16 - 8 - 4

Section : **PART-B**

Q.1 Which kind of drill is mainly used to enlarge an existing hole rather than create a new one?

- Ans**
- ☐ A. Center drill
 - ☐ B. Twist drill
 - ☒ C. Core drill
 - ☐ D. Spade drill

Q.2 Which method is often used to bend a flat bar accurately in a workshop without damaging its surface finish?

- Ans**
- ☐ A. Striking the bar with a hammer repeatedly
 - ☒ B. Using a bending block and applying uniform pressure
 - ☐ C. Clamping in a vice and twisting the bar
 - ☐ D. Heating the bar and then quenching in water

Q.3 A screw thread is specified as M12 × 1.75. What does 'M12' represent in this specification?

- Ans**
- ☐ A. Thread angle of twelve degrees
 - ☒ B. Major diameter of twelve millimeters
 - ☐ C. Minor diameter of twelve millimeters
 - ☐ D. Pitch of twelve millimeters

Q.4 A steel spring in a machine is compressed when a load is applied. When the load is removed, the spring returns to its original shape and length without any permanent deformation. Which mechanical property of the material is responsible for this behavior?

- Ans**
- ☐ A. Hardness
 - ☐ B. Brittleness
 - ☐ C. Plasticity
 - ☒ D. Elasticity

Q.5 In a pneumatic system, why is an air receiver tank placed after the compressor and before the distribution lines?

- Ans**
- ☒ A. To store compressed air and maintain pressure stability
 - ☐ B. To lubricate pneumatic tools in operation cycles
 - ☐ C. To reduce energy consumption of air compressor
 - ☐ D. To filter out dust particles from compressed air

Q.6 Which of the following best describes the main function of a solid pulley in power transmission systems?

- Ans**
- ☒ A. It transmits rotary motion between shafts using a belt
 - ☐ B. It changes the direction of motion in gear systems
 - ☐ C. It is used to connect electrical circuits in machines
 - ☐ D. It increases the force applied to the driven shaft

Q.7 In a bolt drawing, which line type is typically used to show the hidden portion of the thread inside a drilled hole?

- Ans**
- ☒ A. Dashed lines representing hidden details
 - ☐ B. Wavy lines showing internal details
 - ☐ C. Chain lines indicating center paths
 - ☐ D. Solid thick lines for visible outlines

Q.8 During the installation of a flat belt pulley system, which feature on the pulley face helps maintain the belt in the center during operation?

- Ans**
- ☐ A. A flat face with no curvature at all
 - ☒ B. A slightly convex shape across the pulley face
 - ☐ C. An entirely rough surface with no shape change
 - ☐ D. A slightly concave shape across the pulley face

Q.9 In a transition fit sketch, what does the overlapping region of tolerance zones represent?

- Ans**
- ☐ A. The maximum possible clearance between hole and shaft
 - ☒ B. The range in which either clearance or interference may occur
 - ☐ C. The minimum possible clearance between hole and shaft
 - ☐ D. The exact basic size of the mating components

Q.10 An engineer selects an M8 screw for assembling two steel plates. Which value indicates the nominal diameter in the specification M8 x 1.25 x 40?

- Ans**
- ☐ A. 1.25 mm
 - ☐ B. 40 mm
 - ☒ C. 8 mm
 - ☐ D. 16 mm

Q.11 Which feature should be included in a free hand sketch of a flat file used in the workshop?

- Ans**
- ☒ A. The tapered edge should be shown clearly in the sketch
 - ☐ B. The round handle should be shown clearly in the sketch
 - ☐ C. The curved blade should be shown clearly in the sketch
 - ☐ D. The serrated body should be shown clearly in the sketch

Q.12 Aluminium oxide abrasive is produced from:

- Ans**
- ☐ A. Iron ore
 - ☐ B. Copper ore
 - ☒ C. Bauxite ore
 - ☐ D. Zinc ore

Q.13 While assembling a pneumatic press, which valve type should be chosen to precisely manage the speed of the cylinder during operation?

- Ans**
- ☐ A. Directional control valve
 - ☐ B. Shuttle valve
 - ☒ C. Flow control valve
 - ☐ D. Pressure reducing valve

Q.14 Which tool is most suitable for tightening and loosening pipes in pipe fitting work?

- Ans**
- ☐ A. Hacksaw
 - ☐ B. Screwdriver
 - ☒ C. Pipe wrench
 - ☐ D. Adjustable spanner

Q.15 Which of the following is an example of a personal safety sign commonly used in a workshop environment?

- Ans**
- ☐ A. Emergency exit sign
 - ☒ B. Wear safety goggles symbol
 - ☐ C. Fire extinguisher location sign
 - ☐ D. First aid box sign

Q.16 Which situation requires the use of a castle nut as a locking device on a machine part?

- Ans**
- ☐ A. When frequent removal of the nut is required
 - ☐ B. When the nut is used only for adjustment
 - ☐ C. When a spring washer is enough to hold the nut
 - ☒ D. When a split pin is needed to prevent nut loosening

Q.17 Which of the following describes the main function of a double-acting cylinder in pneumatic systems used in workshop equipment?

- Ans**
- ☐ A. It uses spring force to return the piston after extension
 - ☒ B. It provides controlled force in both directions for movement
 - ☐ C. It creates a vacuum inside the cylinder for retraction
 - ☐ D. It only delivers force in one direction with air pressure

Q.18 Which feature of a pipe vice improves its ability to hold pipes during threading operations?

- Ans**
- ☐ A. Replaceable wooden jaws
 - ☐ B. Flat smooth jaw plates
 - ☐ C. Rubber padding
 - ☒ D. Serrated gripping surfaces

Q.19 Which is the primary constructional feature responsible for the greater impact energy of a sledge hammer compared with ordinary hammers?

- Ans**
- ☒ A. Greater head mass combined with longer handle producing higher striking momentum
 - ☐ B. Extended handle leverage increasing swing radius during forceful striking operations
 - ☐ C. Balanced head geometry improving directional stability during heavy impact striking
 - ☐ D. Solid forged head construction improving energy transfer during repeated heavy blows

Q.20 Which part of a depth gauge rests on the reference surface while taking a measurement?

- Ans**
- ☐ A. Vernier scale
 - ☐ B. Lock screw
 - ☐ C. Spindle
 - ☒ D. Base

Q.21 In an electro-pneumatic control system for a workshop machine, which component directly converts electrical energy into linear mechanical motion to operate a pneumatic valve?

- Ans**
- ☐ A. The pilot air signal from the compressor
 - ☒ B. The solenoid coil inside the valve assembly
 - ☐ C. The pressure switch attached to the manifold
 - ☐ D. The control relay in the circuit panel

Q.22 Why are calipers generally used along with a steel rule in workshop measurement?

- Ans**
- ☐ A. Because calipers cannot hold the dimension
 - ☒ B. Because calipers do not have a graduated scale
 - ☐ C. Because caliper replaces steel rule in machining
 - ☐ D. Because calipers cannot touch the workpiece directly

Q.23 Which of the following best describes a common use of a protractor in the ITI Fitter trade?

- Ans**
- ☐ A. Checking the thickness of material
 - ☐ B. Drawing parallel lines on metal surfaces
 - ☒ C. Measuring and marking angles on workpieces
 - ☐ D. Marking the center of a hole on a plate

Q.24 Which aspect must be checked first when interpreting the representation of a countersunk rivet in a workshop assembly drawing?

- Ans**
- ☒ A. The type of head illustrated in the sectional view
 - ☐ B. The rivet material specified in the notes
 - ☐ C. The method of insertion shown in the drawing
 - ☐ D. The rivet shank length dimensioned

Q.25 What do you call the sloping surface connecting the crest and root of a thread?

- Ans**
- ☒ A. Flank
 - ☐ B. Root
 - ☐ C. Crest
 - ☐ D. Major diameter

Q.26 Which feature in tolerance diagrams visually indicates transition fit?

- Ans**
- ☐ A. Completely separated tolerance zones of hole and shaft
 - ☒ B. Overlapping tolerance zones of hole and shaft relative to zero line
 - ☐ C. Shaft tolerance zone entirely above hole tolerance zone
 - ☐ D. Hole tolerance zone entirely above shaft tolerance zone

Q.27 Which type of gear has two sets of teeth inclined in opposite directions to form a 'V' shape on the same gear wheel?

- Ans**
- ☐ A. A bevel gear with conical teeth cut to transmit angular motion.
 - ☒ B. A herringbone gear with V-shaped teeth formed by opposing angles.
 - ☐ C. A worm gear with screw-like teeth designed to mesh with a wheel.
 - ☐ D. A spur gear with straight teeth cut parallel to the center axis.

Q.28 In improved white metal bearings, the thin white metal layer is usually supported by:

- Ans**
- ☒ A. A steel backing
 - ☐ B. A wooden backing
 - ☐ C. A brass backing
 - ☐ D. A cast iron backing

Q.29 In a fabrication unit, noisy operation is observed in a gear train using parallel shaft connections. If the goal is to minimize noise and axial force in future installations, which gear should be recommended?

- Ans**
- ☒ A. Helical gear for reduced noise but presence of axial force
 - ☒ B. Herringbone gear for smooth and quiet operation with no axial force
 - ☒ C. Spur gear for basic power transmission with higher noise levels
 - ☒ D. Bevel gear for changing shaft direction in noisy applications

Q.30 Which statement best explains how elasticity affects the behavior of a metal rod when a force is applied to it?

- Ans**
- ☒ A. Elasticity allows the rod to return to its original shape after the force is removed.
 - ☒ B. Elasticity prevents the rod from deforming under any force.
 - ☒ C. Elasticity causes permanent deformation in the rod after the force is applied.
 - ☒ D. Elasticity increases the hardness of the rod when a force is applied.

Q.31 While setting up a cross belt drive in a workshop, what practical disadvantage might be observed compared to an open belt drive system?

- Ans**
- ☒ A. The cross belt drive experiences increased wear due to belt rubbing and twisting
 - ☒ B. The cross belt drive improves pulley alignment and reduces power loss significantly
 - ☒ C. The cross belt drive requires less frequent maintenance than open belt drive systems
 - ☒ D. The cross belt drive reduces vibration and operates more quietly than open belt drive

Q.32 A technician is troubleshooting a circuit that is not working properly. The measured voltage across a resistor is much lower than expected, even though the power supply is functioning and all connections appear intact. Which of the following is the most likely cause?

- Ans**
- ☒ A. There is a high resistance connection or partial break in wiring path
 - ☒ B. The resistor is shorted out by a parallel path
 - ☒ C. The power supply is providing insufficient current to the circuit load
 - ☒ D. The resistor value is too small for proper circuit operation conditions

Q.33 A lifting system has equal number of pulleys in upper and lower blocks, with the upper block fixed and the lower block movable. A single rope passes around all the pulleys and a load is attached to the lower block. If the number of pulleys is 4, what will be the velocity ratio (VR)?

- Ans**
- ☒ A. 2
 - ☒ B. 16
 - ☒ C. 4
 - ☒ D. 8

Q.34 During the assembly of a pneumatic circuit for a machine, the FRL unit is mounted upstream of all control valves. What is the purpose of placing the FRL unit at this location in a workshop's air supply line?

- Ans**
- ☒ A. To supply compressed air at a constant temperature to all actuators in the system
 - ☒ B. To ensure that all downstream components receive cleaned, regulated, and lubricated air
 - ☒ C. To provide lubrication only to the last pneumatic tool in the workshop line
 - ☒ D. To isolate specific actuators from the main line during maintenance operations

Q.35 While assembling two mild steel plates using dowel pins, which method ensures the most accurate alignment without relying on visual inspection?

- Ans**
- ☒ A. Holding plates together with spring clamps only
 - ☒ B. Measuring edge distances with a steel scale
 - ☒ C. Applying chalk to mark direct contact points
 - ☒ D. Using a jig with reference holes for positioning

Q.36 Which solder is most suitable for joining electrical wires in a control panel without damaging sensitive electronic components?

- Ans**
- ☒ A. Resin core solder
 - ☐ B. Silver solder
 - ☐ C. Solid wire plumbing solder
 - ☐ D. Acid core solder

Q.37 In a thrust bearing, the load acts along which direction in relation to the shaft axis?

- Ans**
- ☐ A. Perpendicular to the shaft axis
 - ☐ B. Along a circular path
 - ☒ C. Parallel to the shaft axis
 - ☐ D. In a random direction

Q.38 What is the primary purpose of a straight peen hammer in workshop operations?

- Ans**
- ☒ A. To shape metal along a direction parallel to the hammer handle axis
 - ☐ B. To cut metal sheets into required shapes
 - ☐ C. To measure the thickness of metal components precisely
 - ☐ D. To hold workpieces firmly during machining operations

Q.39 Which combination of root gap and bevel angle is most suitable for preparing a butt joint to ensure proper weld penetration in metal joining?

- Ans**
- ☐ A. A root gap of 1 mm and a bevel angle of 30 degrees
 - ☐ B. A root gap of 3 mm and a bevel angle of 20 degrees
 - ☒ C. A root gap of 2 mm and a bevel angle of 60 degrees
 - ☐ D. A root gap of 0.5 mm and a bevel angle of 45 degrees

Q.40 On which part of the lathe are the chucks and faceplates mounted?

- Ans**
- ☐ A. Tailstock
 - ☒ B. Spindle
 - ☐ C. Bed
 - ☐ D. Carriage

Q.41 Which type of bearing material is commonly referred to as Babbitt metal?

- Ans**
- ☒ A. Tin-based white metal
 - ☐ B. Antimony-hardened cast iron
 - ☐ C. Lead-coated steel alloy
 - ☐ D. Copper-based bearing alloy

Q.42 Ductility of a material refers to the ability of the material to:

- Ans**
- ☐ A. Resist surface indentation
 - ☒ B. Undergo plastic deformation before fracture
 - ☐ C. Return to its original shape after unloading
 - ☐ D. Conduct heat efficiently

Q.43 What distinguishes a shell reamer from a solid reamer?

- Ans**
- ☐ A. Shell reamer is used for soft materials only
 - ☒ B. Shell reamer lacks an integral shank
 - ☐ C. Shell reamer has spiral flutes only
 - ☐ D. Shell reamer is always adjustable

Q.44 What is the main use of a warding file?

- Ans**
- ☐ A. Diameter checking
 - ☐ B. Thread cutting
 - ☐ C. Surface polishing
 - ☒ D. Narrow filing

Q.45 Which property is most closely related to fusibility?

- Ans**
- ☐ A. Density
 - ☐ B. Thermal expansion
 - ☐ C. Electrical resistance
 - ☒ D. Melting point

Q.46 Which is the first step in the Five S concept used for workplace organization?

- Ans**
- ☐ A. Standardize
 - ☒ B. Sort
 - ☐ C. Shine
 - ☐ D. Set in order

Q.47 An AC welding transformer typically reduces the mains voltage to an open-circuit voltage ranging between:

- Ans**
- ☐ A. 10 to 20 volts
 - ☒ B. 40 to 100 volts
 - ☐ C. 200 to 250 volts
 - ☐ D. 120 to 180 volts

Q.48 Why is crowning provided on the face of a flat belt pulley in workshop machinery?

- Ans**
- ☐ A. It reduces the overall diameter of the pulley
 - ☒ B. It helps keep the flat belt centered during rotation
 - ☐ C. It decreases the thickness of the belt used
 - ☐ D. It significantly increases friction between belt and pulley

Q.49 When creating an orthographic projection of a rectangular block on a drawing sheet, which reference plane is used to project the top view accurately?

- Ans**
- ☒ A. Horizontal plane is used for projecting the top view
 - ☐ B. Profile plane is used for projecting the top view
 - ☐ C. Vertical plane is used for projecting the top view
 - ☐ D. Auxiliary plane is used for projecting the top view

Q.50 What is the purpose of the threading dial indicator during thread cutting?

- Ans**
- ☐ A. To indicate spindle speed during thread cutting
 - ☐ B. To synchronize spindle speed with feed rate during threading
 - ☐ C. To confirm depth of cut during threading operation
 - ☒ D. To indicate carriage position relative to leadscrew rotation

Q.51 Which of the following is an example of a lever?

- Ans**
- ☐ A. A hydraulic jack used for lifting heavy vehicles
 - ☒ B. A crowbar used to lift a heavy object
 - ☐ C. A pulley with a rope
 - ☐ D. A screw holding two boards together

Q.52 In a standard hand tap set used for internal threading, how can a plug (bottoming) tap be identified quickly?

- Ans**
- ☐ A. By four rings marked on the shank
 - ☐ B. By two rings marked on the shank
 - ☐ C. By one ring marked on the shank
 - ☒ D. By three rings marked on the shank

Q.53 How can the operator minimize the risk of tool collision with clamps during faceplate operations?

- Ans**
- ☐ A. By increasing spindle speed
 - ☐ B. By tightening clamps more firmly
 - ☐ C. By using longer cutting tools
 - ☒ D. By planning the tool path before machining

Q.54 Which of the following best describes the primary use of a pillar file in fitting work?

- Ans**
- ☐ A. Enlarging round holes in metal
 - ☐ B. Removing material from curved surfaces
 - ☐ C. Sharpening saw blades for cutting
 - ☒ D. Shaping flat surfaces and slots with parallel sides

Q.55 Which cutting tool material would lose effectiveness the fastest when used for continuous high-speed machining of steel?

- Ans**
- ☐ A. Cast alloy steel
 - ☐ B. High-speed steel (HSS)
 - ☐ C. Ceramic tool material
 - ☒ D. Carbon tool steel

Q.56 Tightening of the cap screw produces:

- Ans**
- ☐ A. Sliding motion
 - ☒ B. Clamping action
 - ☐ C. Cutting action
 - ☐ D. Rotational motion

Q.57 A machine in the workshop suddenly stops working and emits smoke during a critical operation. As the shift supervisor, which immediate action best demonstrates proper emergency management for system failure response?

- Ans**
- ☐ A. Notify the maintenance team immediately and await further assistance.
 - ☒ B. Shut down the machine immediately and activate emergency ventilation.
 - ☐ C. Begin repairing the machine immediately to restore normal operation.
 - ☐ D. Evacuate the work area immediately and leave the smoke unchecked.

Q.58 Which of the following welding methods joins metals by melting the base materials at the joint?

- Ans**
- ☐ A. Pressure welding
 - ☒ B. Fusion welding
 - ☐ C. Solid-state welding
 - ☐ D. Resistance welding

Q.59 A material that can withstand pressure, bending, and pulling forces without breaking is said to possess:

- Ans**
- ✔ A. Tenacity
 - ✘ B. Brittleness
 - ✘ C. Elasticity
 - ✘ D. Hardness

Q.60 Which main structural component supports the spindle in a pillar-type drilling machine?

- Ans**
- ✘ A. Belt cover
 - ✘ B. Table
 - ✔ C. Column
 - ✘ D. Foot pedal

Q.61 To check the accuracy of a spirit level, after taking the first reading, the level is rotated by:

- Ans**
- ✘ A. 45 degrees slight tilt
 - ✘ B. Full circular rotation
 - ✔ C. 180 degrees end-to-end
 - ✘ D. 90 degrees sideways turn

Q.62 A manufacturer needs to choose a metal for producing thin, complex-shaped sheets that must withstand bending and hammering without cracking. Which property should the manufacturer prioritize when selecting the material?

- Ans**
- ✘ A. Ductility
 - ✘ B. Hardness
 - ✔ C. Malleability
 - ✘ D. Brittleness

Q.63 In comparison with ball bearings of the same size, roller bearings can carry:

- Ans**
- ✔ A. Higher radial load
 - ✘ B. No radial load
 - ✘ C. Equal radial load
 - ✘ D. Lower radial load

Q.64 How is the grip size of a footprint wrench adjusted to suit different pipe diameters?

- Ans**
- ✘ A. By sliding an adjustable collar along the full length of the strap
 - ✔ B. By placing the pivot pin into different holes of the solid handle
 - ✘ C. By replacing the jaw insert with a different standardised size piece
 - ✘ D. By tightening a thumb-screw located on the side of the handle

Q.65 Which property of ceramic tool materials is most beneficial during dry machining operations?

- Ans**
- ✘ A. High toughness
 - ✔ B. High resistance to heat
 - ✘ C. Ease of sharpening
 - ✘ D. Low cost

Q.66 During the overhaul of a workshop drilling machine, what is the most appropriate initial step to ensure safety before any maintenance activity?

- Ans**
- ✘ A. Check accuracy of spindle alignment using dial indicator
 - ✔ B. Isolate power supply and secure moving parts
 - ✘ C. Remove dust and debris from the work area
 - ✘ D. Lubricate all gears and sliding surfaces thoroughly

Q.67 If a pneumatic system must alternate the air supply between two actuators based on manual control, which valve classification best suits this function?

- Ans**
- ☐ A. Pressure relief valve
 - ☐ B. Flow control valve
 - ☒ C. Directional control valve
 - ☐ D. Non-return valve

Q.68 A fitter is tasked with marking accurate parallel lines on a metal plate before cutting. He must select a divider with tips made of a suitable material for this job. Which divider tip material would be most appropriate to use to avoid rapid wear and ensure precise marking on the metal surface?

- Ans**
- ☐ A. Aluminum tips
 - ☐ B. High carbon steel tips
 - ☐ C. Brass tips
 - ☒ D. Hardened steel tips

Q.69 Which of the following elements is NOT normally present in high-speed steel?

- Ans**
- ☐ A. Tungsten
 - ☐ B. Vanadium
 - ☒ C. Nickel
 - ☐ D. Chromium

Q.70 A machine part is manufactured with a surface area of 169 square millimeters. If the unit is changed to square centimeters, what is the square root of the surface area in the new unit?

- Ans**
- ☒ A. 1.3
 - ☐ B. 0.13
 - ☐ C. 169
 - ☐ D. 13

Q.71 Which part of an outside micrometer remains fixed and supports the workpiece during measurement?

- Ans**
- ☐ A. Ratchet stop
 - ☒ B. Anvil
 - ☐ C. Spindle
 - ☐ D. Thimble

Q.72 What is the main reason for using a shuttle valve instead of a two-way valve in a system with two independent control points for a single actuator?

- Ans**
- ☐ A. A shuttle valve allows only one control point to function at a time by blocking the other.
 - ☐ B. A shuttle valve discharges air from both control points when either is activated.
 - ☐ C. A shuttle valve interlocks the signals from two control points to prevent simultaneous operation.
 - ☒ D. A shuttle valve enables actuator operation from either control point without signal interference or loss.

Q.73 Which advantage of a D.C. welding generator allows control of heat distribution between the electrode and the base metal?

- Ans**
- ☒ A. Polarity selection capability
 - ☐ B. Electrode coating selection
 - ☐ C. Welding cable insulation
 - ☐ D. Cooling fan operation

Q.74 Which feature most distinguishes a GI pipe from other common types of pipes used in pipe fitting?

- Ans**
- ☐ A. It is made from copper for high conductivity
 - ☒ B. It is coated with a layer of zinc to prevent rusting
 - ☐ C. It is made from plastic and is lightweight
 - ☐ D. It is lined with rubber for flexibility

Q.75 What is the primary purpose of carrying out routine maintenance on workshop equipment?

- Ans**
- ☒ A. To ensure consistent performance and minimize downtime
 - ☐ B. To replace old machines with new equipment
 - ☐ C. To modify equipment design for new tasks
 - ☐ D. To increase production speed beyond design limits

Railway BABA



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	9:30 AM - 12:00 PM
Subject	ALP Stage 2 Heat Engine

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 A conical tent has a base radius of 14 m and a height of 48 m. How many cubic meters of air can it hold? (Use $\pi = \frac{22}{7}$)

- Ans
- ☒ A. 9865
 - ☒ B. 9568
 - ☒ C. 8956
 - ☒ D. 9856

Q.2 When a moving car suddenly applies brakes, its kinetic energy is transformed mainly into which form of energy?

- Ans
- ☒ A. Heat energy
 - ☒ B. Potential energy
 - ☒ C. Light energy
 - ☒ D. Sound energy

Q.3 A father distributed two different amounts among his sons P, Q, R and S. First amount was distributed in the ratio 5 : 4 : 3 : 2 and the second amount was distributed in the ratio 6 : 7 : 8 : 9. If the second amount is thrice the first amount, then which son will get the maximum amount?

- Ans
- ☒ A. R
 - ☒ B. S
 - ☒ C. P
 - ☒ D. Q

Q.4 A roller coaster at the top of its track has maximum potential energy. As it descends and speeds up, what principle explains why the sum of its kinetic and potential energies remains constant if we ignore friction and air resistance?

- Ans
- ☒ A. Principle of superposition
 - ☒ B. Law of inertia
 - ☒ C. Law of conservation of energy
 - ☒ D. Principle of inertia

Q.5 What is the typical temperature range covered by a laboratory thermometer used in school experiments?

- Ans**
- ☒ A. Thirty five to forty two degrees Celsius
 - ☒ B. Zero to two hundred degrees Celsius
 - ☒ C. Minus ten to one hundred and ten degrees Celsius
 - ☒ D. Minus fifty to fifty degrees Celsius

Q.6 What is the primary function of a fire hydrant in a workplace safety system?

- Ans**
- ☒ A. Supplying large quantities of water to fight fires
 - ☒ B. Detecting smoke and warning employees
 - ☒ C. Activating fire alarms automatically in emergencies
 - ☒ D. Removing hazardous fumes from the area

Q.7 If 'A' stands for '+', 'B' stands for '-', 'C' stands for 'x' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

$$31 \text{ B } 35 \text{ D } 7 \text{ A } 9 \text{ C } 2 = ?$$

- Ans**
- ☒ A. 48
 - ☒ B. 42
 - ☒ C. 44
 - ☒ D. 46

Q.8 In this question, a group of numbers/symbols is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer. If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	6	1	&	3	%	8	+	4	#	7	@	5	2	\$
Code	R	V	G	D	S	C	T	L	F	W	H	U	Y	N

Conditions:

- (i) If the first element is a symbol and the last element is an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and last elements are to be coded as ©.
- (iii) If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?
+ 6 \$ 2 7

- Ans**
- ☒ A. STMWV
 - ☒ B. WSNYT
 - ☒ C. TSNWW
 - ☒ D. WRNYT

Q.9 Below are given two sets of numbers. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

$$10 - 100 - 50 - 25; 2 - 4 - 2 - 1$$

- Ans**
- ☒ A. 8 - 64 - 32 - 14
 - ☒ B. 5 - 25 - 15 - 7
 - ☒ C. 4 - 16 - 8 - 4
 - ☒ D. 12 - 144 - 62 - 31

Q.10 An engineer is tasked with creating a hollow cone for a machine part, where the wall thickness must be consistent and the slant height is critical for assembly. Which factor is most important to ensure the cone will fit correctly in the final design?

- Ans**
- ☒ A. Prioritizing uniform wall thickness over all other features
 - ☒ B. Ensuring the slant height matches the assembly requirement
 - ☒ C. Focusing only on base diameter for precise fit
 - ☒ D. Matching only the overall height of the cone

Q.11 Which of the following scenarios best demonstrates the conversion of chemical energy to mechanical energy?

- Ans**
- ☒ A. A stone falls off a table to the ground
 - ☒ B. A runner uses stored energy from food to sprint forward
 - ☒ C. A stretched rubber band snaps back to its original shape
 - ☒ D. A flashlight turns on after inserting new batteries

Q.12 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer. Among the five poles—I, N, C, H, and L—each having a different height, which pole is the tallest?

(I) I is shorter than N but taller than C. C is taller than only one pole.
(II) H is taller than L.

- Ans**
- ☒ A. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☒ B. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ C. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☒ D. Both statements I and II together are NOT sufficient to answer the question

Q.13 A worker's hand is at risk of injury from a mechanical shearing action. Which situation best describes a shearing hazard?

- Ans**
- ☒ A. A hand caught between a moving blade and a fixed machine surface during operation
 - ☒ B. A hand becoming entangled in a rotating machine shaft during operation
 - ☒ C. A hand sliding repeatedly across a rough abrasive machine surface during work
 - ☒ D. A hand touching a hot metallic machine surface during maintenance activity

Q.14 A thermometer shows a reading of 37 degrees Celsius. What is the corresponding temperature in Kelvin?

- Ans**
- ☒ A. 310 K
 - ☒ B. 320 K
 - ☒ C. 300 K
 - ☒ D. 270 K

Q.15 What is the main purpose of ambient air quality standards?

- Ans**
- ☒ A. To require all industries to reduce emissions by the exact same percentage.
 - ☒ B. To focus exclusively on industrial operations while ignoring other sectors.
 - ☒ C. To ensure air is routinely sampled to map historical pollution trends.
 - ☒ D. To set legally permissible limits for specific pollutants to protect public health.

Q.16 What is the best description of the purpose of multi-view drawing in engineering drawing?

- Ans**
- ☒ A. To represent different sides of an object clearly on a flat surface
 - ☒ B. To show different colors of an object for better visual appearance
 - ☒ C. To view an object from only one direction
 - ☒ D. To present the object in a single three-dimensional visual form only

Q.17 A laboratory record shows a distance of 0.004 kilometers between two points. How should this be written in SI units of length for a scientific report?

- Ans**
- ☒ A. 400 cm
 - ☒ B. 4 m
 - ☒ C. 0.4 m
 - ☒ D. 4000 mm

Q.18 If a scooter travels at a constant speed of 25 km per hour, how far will it travel in 4 hours?

- Ans**
- ☒ A. 100 km
 - ☒ B. 120 km
 - ☒ C. 75 km
 - ☒ D. 80 km

Q.19 Which statement best describes a 'point' in engineering drawing?

- Ans**
- ☒ A. A point is a short line segment used to mark measurements.
 - ☒ B. A point is the intersection of two lines and always has measurable length.
 - ☒ C. A point represents a small area with both length and width.
 - ☒ D. A point indicates a precise location but has no size, length, or width.

Q.20 When using a hand file during fitting operations, which action demonstrates adherence to tool safety protocols?

- Ans**
- ☒ A. Fitting a proper handle securely to the tang
 - ☒ B. Filing above shoulder height for better leverage
 - ☒ C. Applying excessive downward force when filing
 - ☒ D. Holding the file near its tang during filing work

Q.21 What is the simplified value of the expression $\left[\frac{\cos A}{(1 - \tan A)} \right] + \left[\frac{\sin A}{(1 - \cot A)} \right]$?

- Ans**
- ☒ A. 0
 - ☒ B. $\cos A + \sin A$
 - ☒ C. 1
 - ☒ D. $\sin A - \cos A$

Q.22 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

QOI 5, OMG 10, MKE 15, KIC 20, ?

- Ans**
- ☒ A. IHS 23
 - ☒ B. IGA 25
 - ☒ C. HIZ 30
 - ☒ D. JHZ 24

Q.23 E, F, G, H, L and M live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live above G. Only two people live between L and E. Only two people live between M and G. E lives below G but above F. How many people live below H?

- Ans**
- ☒ A. Three
 - ☒ B. Two
 - ☒ C. One
 - ☒ D. Four

- Q.24** Which is the most important safety check before operating any machine in a workshop?
- Ans**
- ☐ A. Check if the machine is plugged in properly
 - ☐ B. Ensure the machine area is properly illuminated
 - ☒ C. Inspect the machine for loose or damaged parts
 - ☐ D. Wipe the machine with a dry cloth before use

- Q.25** There are two types of silver–copper alloys. The first alloy contains $93\frac{1}{3}\%$ silver, while the second alloy contains $86\frac{2}{3}\%$ silver. Find the amount of the first alloy that should be mixed with some quantity of the second alloy to obtain a 100 kg mixture containing 90% silver.
- Ans**
- ☐ A. 45 kg
 - ☐ B. 52 kg
 - ☐ C. 48 kg
 - ☒ D. 50 kg

- Q.26** G is the mother of Y. Y is the sister of V. S is the father of L. L is the husband of V. How is G related to S?
- Ans**
- ☐ A. Son's wife
 - ☐ B. Mother's mother
 - ☒ C. Son's wife's mother
 - ☐ D. Son's wife's sister

- Q.27** P, Q, R, S and T have different ages. T is elder than only one person. S is elder than P but younger than Q. R is elder than Q. Who is the youngest?
- Ans**
- ☐ A. S
 - ☐ B. R
 - ☐ C. Q
 - ☒ D. P

- Q.28** A diamond ring costs ₹85,000. Its price is reduced first by 11% and then by 4% on the reduced price. Find the final price of the ring after both discounts.
- Ans**
- ☐ A. ₹72,604
 - ☐ B. ₹74,624
 - ☐ C. ₹73,624
 - ☒ D. ₹72,624

- Q.29** Two students move identical boxes through a distance of 10 m. Student A applies a force of 50 N, while Student B applies a force of 100 N. What is the difference in the work done by the two students?
- Ans**
- ☐ A. 0 J
 - ☒ B. 500 J
 - ☐ C. 1000 J
 - ☐ D. 50 J

- Q.30** Solve the system of equations:
- $$\begin{aligned} -3x + 2y - z &= -1, & 6x - 6y + 7z &= -7, & 3x - 4y + 4z &= -6 \end{aligned}$$
- Ans**
- ☐ A. $x=2, y=1, z=-3$
 - ☒ B. $x=2, y=2, z=-1$
 - ☐ C. $x=-2, y=2, z=11$
 - ☐ D. $x=1, y=2, z=2$

Q.31 Which of the following is both, an input and output device?

- Ans**
- ☐ A. Keyboard
 - ☐ B. Printer
 - ☒ C. Touchscreen monitor
 - ☐ D. Projector

Q.32 A mechanical engineer must design a flange joint where two pipes are to be connected at a 45-degree angle. Which method should the engineer use to accurately represent the intersection line on a technical drawing of the two cylindrical pipes?

- Ans**
- ☐ A. Represent the intersection as a straight line in the side view
 - ☐ B. Use only standard orthographic projection without auxiliary views
 - ☒ C. Draw the true shape of the intersection using auxiliary projection
 - ☐ D. Draw a simple circle at the junction in the top view

Q.33 An engineering student is tasked with creating a detailed side view of a complex machine part for an assembly drawing. Which approach will most accurately represent all features visible from the side while avoiding hidden overlaps or misinterpretations?

- Ans**
- ☒ A. Project all visible elements from the side and omit hidden features unless needed
 - ☐ B. Use only hidden lines for representing features on the far side in the view
 - ☐ C. Sketch the side view freely without using projections from the main view
 - ☐ D. Include all features even those not visible from the selected side view

Q.34 If $\left(x + \frac{1}{x}\right) = 3$, find the value of $\left(x^3 + \frac{1}{x^3}\right)$.

- Ans**
- ☐ A. 20
 - ☐ B. 15
 - ☒ C. 18
 - ☐ D. 16

Q.35 What should come in place of the question mark (?) in the given series?

74, 83, 101, 128, ?, 209

- Ans**
- ☐ A. 155
 - ☐ B. 146
 - ☒ C. 164
 - ☐ D. 176

Q.36 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

BIP : EMU
GNU : JRZ

- Ans**
- ☐ A. CGW : NHT
 - ☐ B. XDE : PON
 - ☐ C. VCD : GRD
 - ☒ D. FMT : IQY

Q.37 The circumference of the base of a solid right circular cylinder is 88 cm and its height is 150 cm. What is the volume (in cm^3) of the cylinder?

$$\left(\text{Take } \pi = \frac{22}{7} \right)$$

- Ans
- ☐ A. 92550
 - ☐ B. 92500
 - ☒ C. 92400
 - ☐ D. 92450

Q.38 Find the LCM of 72, 78, and 90.

- Ans
- ☐ A. 4250
 - ☒ B. 4680
 - ☐ C. 4120
 - ☐ D. 4280

Q.39 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some glasses are spoons.
All spoons are forks.

Conclusions:

(I) Some glasses are forks.
(II) All forks are spoons.

- Ans
- ☐ A. Neither conclusion (I) nor (II) follows
 - ☐ B. Both conclusions (I) and (II) follow
 - ☐ C. Only conclusion (II) follows
 - ☒ D. Only conclusion (I) follows

Q.40 Which integrated strategy best addresses soil pollution, falling crop yields, and low microbial activity near an industrial zone?

- Ans
- ☐ A. Reforestation in nearby urban centers.
 - ☒ B. Control industrial waste for sustainability.
 - ☐ C. Expand urban areas into farmland.
 - ☐ D. Ban all regional chemical fertilizers.

Q.41 In a spreadsheet application, a user selects a range of cells and presses Ctrl + C, followed by Ctrl + V in a different worksheet. What happens to the data?

- Ans
- ☐ A. The selected cells are moved to the new worksheet.
 - ☒ B. The selected cells are copied to the new worksheet.
 - ☐ C. The selected cells are deleted from the original worksheet.
 - ☐ D. The selected cells are saved to a new file.

Q.42 Which approach most effectively reduces both nitrogen and phosphorus concentrations during wastewater treatment?

- Ans
- ☐ A. UV disinfection following secondary treatment
 - ☒ B. Biological and chemical nutrient removal
 - ☐ C. Surface-flow constructed wetlands
 - ☐ D. Primary sedimentation with extended aeration

Q.43 Refer to the following letter and symbol series and answer the question that follows.
Counting to be done from left to right.

(Left) Z @ B R J # D * Q A M S % P L V O U S N T W Z (Right)

How many such symbols are there, each of which is immediately preceded by a letter and also immediately followed by a letter?

- Ans
- ☒ A. Two
 - ☒ B. None
 - ☒ C. Three
 - ☒ D. Four

Q.44 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans
- ☒ A. AF – DI
 - ☒ B. CH – EK
 - ☒ C. BG – EJ
 - ☒ D. DJ – GM

Q.45 Which of the following best defines 'work' in physics?

- Ans
- ☒ A. Work is done when a force moves an object in the direction of the force.
 - ☒ B. Work is done when energy is stored in an object.
 - ☒ C. Work is done whenever a force is applied, regardless of movement.
 - ☒ D. Work is done if a force acts at any angle to the motion.

Q.46 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between X and Z when counted from the right of X. Only two people sit between Z and D. Only three people sit between X and B. A sits to the immediate left of C.
Who sits third to the left of Y?

- Ans
- ☒ A. Z
 - ☒ B. C
 - ☒ C. A
 - ☒ D. X

Q.47 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Among five people – A, B, C, D, and E – who is the tallest?

(I) A is taller than B. B is taller than C.

(II) D is taller than E.

- Ans
- ☒ A. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ B. Both statements I and II together are NOT sufficient to answer the question.
 - ☒ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☒ D. Data in statement I alone is sufficient to answer the question while data in statement II is not

Q.48 A train X crosses a man who is sitting in another train Y, which is moving in the opposite direction, in 8 seconds. However, when both trains are moving in the same direction, train X takes 20 seconds to pass the same man. If the length of train X is 360 meters and the length of train Y (in which the man is sitting) is 240 meters, what is the speed of train Y?

- Ans
- ☒ A. 45.3 km/h
 - ☒ B. 48.6 km/h
 - ☒ C. 46.5 km/h
 - ☒ D. 45.8 km/h

Q.49 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements: All girls are hens. No hen is a cat.

Conclusion (I): No girl is a cat.

Conclusion (II): Some cats are hens.

- Ans**
- ☒ A. Neither conclusion (I) nor (II) follows
 - ☒ B. Both conclusions (I) and (II) follow
 - ☒ C. Only conclusion (II) follows
 - ☒ D. Only conclusion (I) follows

Q.50 Three workers, X, Y, and Z, can complete a certain job in 10 days, 12 days, and 15 days, respectively. Determine the number of days required for them to complete the job when they work together.

- Ans**
- ☒ A. 4 days
 - ☒ B. 6 days
 - ☒ C. 5 days
 - ☒ D. 8 days

Q.51 In how many years will a sum of ₹16,000 at 10% per annum compounded semi-annually become ₹18,522?

- Ans**
- ☒ A. 1.5 years
 - ☒ B. 2 years
 - ☒ C. 1 year
 - ☒ D. 2.5 years

Q.52 A runner completes one lap of a 200 meter circular track in 50 seconds. What is the average speed of the runner?

- Ans**
- ☒ A. 4 meter per second
 - ☒ B. 4.5 meter per second
 - ☒ C. 3.5 meter per second
 - ☒ D. 3 meter per second

Q.53 A boat sails 40 km downstream and then 40 km upstream in a river. The boat's speed in still water is 12 km/hr and the speed of the stream is 4 km/hr. How much time does the boat take to cover the entire distance (both upstream and downstream)?

- Ans**
- ☒ A. 6 hours
 - ☒ B. 10 hours
 - ☒ C. 7.5 hours
 - ☒ D. 8 hours

Q.54 In a certain code language, 'KING' is coded as '9713' and 'ITCH' is coded as '2945'. What is the code for 'I' in the given code language?

- Ans**
- ☒ A. 7
 - ☒ B. 9
 - ☒ C. 4
 - ☒ D. 2

Q.55 Which property of a fuse wire ensures it melts quickly when excess current flows?

- Ans**
- ☒ A. Low melting point
 - ☒ B. High electrical resistance
 - ☒ C. Thick wire
 - ☒ D. High melting point

Q.56 A trader buys 187 pens at ₹23 each. During transportation, 7 pens get damaged and cannot be sold. He sells the remaining pens at ₹27 each. Find his profit percentage. (rounded off to one decimal place)

- Ans**
- ☒ A. 12.6%
 - ☒ B. 13.0%
 - ☒ C. 13.7%
 - ☒ D. 14.1%

Q.57 If 'A' stands for '+', 'B' stands for '−', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

28 A 16 C 3 B 12 D 4 = ?

- Ans**
- ☒ A. 71
 - ☒ B. 70
 - ☒ C. 73
 - ☒ D. 72

Q.58 PJAE is related to JOWH in a certain way based on the English alphabetical order. In the same way, OIVC is related to INRF. To which of the following is NEZF related to following the same logic?

- Ans**
- ☒ A. IKUH
 - ☒ B. HJVI
 - ☒ C. HKVJ
 - ☒ D. IJVJ

Q.59 An object has a mass of 10 kilograms. How does its weight on the Moon compare to its weight on Earth?

- Ans**
- ☒ A. The object weighs zero on the Moon
 - ☒ B. The object weighs more on the Moon than on Earth
 - ☒ C. The object weighs the same on both the Moon and Earth
 - ☒ D. The object weighs less on the Moon than on Earth

Q.60 Namia is facing the west. She turns left and walks 15 m. She turns left and walks 25 m. She again turns left and walks 40 m. She finally turns left and walks 40 m to reach home. In which direction is her home with respect to the starting point?

- Ans**
- ☒ A. South-East
 - ☒ B. South-West
 - ☒ C. North-West
 - ☒ D. North-East

Q.61 The average of 8 numbers is 45. If one number, 59, is removed, what will the new average be?

- Ans**
- ☒ A. 42
 - ☒ B. 43
 - ☒ C. 41.5
 - ☒ D. 42.5

Q.62 If the mean of the following data is 40, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	30	27	44	29	X

- Ans ☒ A. 82
☒ B. 99
☒ C. 93
☒ D. 98

Q.63 A trader marks an article 25% above its cost price. He allows a discount of 10% on the marked price. After giving the discount, he makes a profit of ₹180 on the article. What is the cost price of the article?

- Ans ☒ A. ₹1,440
☒ B. ₹1,380
☒ C. ₹1,260
☒ D. ₹1,200

Q.64 Which of the following best describes a key environmental concern associated with improper disposal of e-waste?

- Ans ☒ A. Release of toxic metals into soil and water
☒ B. Enhanced biodegradation of plastics
☒ C. Increased recycling rates of precious metals
☒ D. Release of greenhouse gases from decomposition

Q.65 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UMD ZQG EUJ JYM ?

- Ans ☒ A. PDP
☒ B. OCP
☒ C. NDO
☒ D. NBQ

Q.66 The simple interest earned on a certain sum of money for 3 years at 15% per annum is ₹2,700. Find the sum.

- Ans ☒ A. ₹6,000
☒ B. ₹8,000
☒ C. ₹5,000
☒ D. ₹9,000

Q.67 Which of the following statements correctly reflects the characteristics of a Local Area Network (LAN) and the role of Ethernet within it?

- Ans ☒ A. Ethernet in a LAN provides low-speed data transfer and connects users over public Internet infrastructure.
☒ B. A LAN always requires Gigabit Ethernet to function and is insecure because it allows open access to all network devices.
☒ C. Ethernet is a standard that governs how devices in a LAN communicate via wired connections, supporting speeds from 10 Mbps to 1000 Mbps.
☒ D. LANs are designed for long-distance communication and use Ethernet primarily for wireless data exchange.

Q.68 Simplify: $60 - \{(-8) \times (-16 - 19 - 2)\} \div [5 \times \{2 + (-1) \times (-1)\}]$

Ans

☐ A. $\frac{594}{15}$

☐ B. $\frac{614}{15}$

☐ C. $\frac{608}{15}$

☒ D. $\frac{604}{15}$

Q.69 Which feature is a requirement of the BIS drawing standard in engineering drawings?

Ans ☒ A. Title block with specific information

☐ B. Use of colored pencils for clarity

☐ C. Freehand sketches without scale

☐ D. Margin lines of random width

Q.70 Which of the following statements correctly describes average velocity and its SI unit?

Ans ☐ A. Average velocity is the total displacement divided by total time, and its unit is kilometer per hour.

☒ B. Average velocity is the total displacement divided by total time, and its unit is meter per second.

☐ C. Average velocity is the total distance divided by total time, and its unit is meter per second.

☐ D. Average velocity is the total distance divided by total time, and its unit is kilometer per hour.

Q.71 A sample of water is heated from 15 degrees Celsius to 35 degrees Celsius. What is the temperature change in Kelvin?

Ans ☐ A. The temperature change is 50 K.

☐ B. The temperature change is 30 K.

☒ C. The temperature change is 20 K.

☐ D. The temperature change is 15 K.

Q.72 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. Only three boxes are kept above S. Exactly one box is kept between T and S. Exactly three boxes are kept between T and U, and U is kept somewhere above S. V is kept immediately below U. W is kept at one of the places above P. Q is not kept immediately above or below T. Based on the given information, which box is kept at the lowermost position?

Ans ☐ A. Q

☐ B. S

☐ C. V

☒ D. P

Q.73 A pendulum takes 60 seconds to complete 24 oscillations. If its length is increased and it now takes 72 seconds for the same number of oscillations, what has happened to its time period?

Ans ☒ A. It has increased to 3.0 seconds

☐ B. It remains at 2.5 seconds

☐ C. It has decreased to 1.5 seconds

☐ D. It has decreased to 2.0 seconds

Q.74 Which line symbol is commonly used in engineering drawings to represent a hidden edge that is not directly visible?

- Ans**
- ☒ A. Zigzag line
 - ☒ B. Solid thick line
 - ☒ C. Dashed line
 - ☒ D. Chain thin line

Q.75 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☒ A. QK-VA
 - ☒ B. WQ-CG
 - ☒ C. EY-KO
 - ☒ D. TN-ZD

Q.76 A car travels 60 km north in 2 hours, then 40 km south in the next 1 hour. What is the car's average velocity over the entire trip?

- Ans**
- ☒ A. 0 km/h
 - ☒ B. 20 km/h south
 - ☒ C. 6.7 km/h north
 - ☒ D. 33.3 km/h north

Q.77 Which component makes up the largest proportion of Earth's atmosphere by volume?

- Ans**
- ☒ A. Argon
 - ☒ B. Nitrogen
 - ☒ C. Oxygen
 - ☒ D. Carbon dioxide

Q.78 A shopkeeper marks a product 75% above cost price and offers two successive discounts of 30% and 40%. What is the profit or loss percentage?

- Ans**
- ☒ A. 26.5% loss
 - ☒ B. 22.6% profit
 - ☒ C. 15.7% profit
 - ☒ D. 20.9% profit

Q.79 A sum of ₹420 is divided among A, B, C, and D such that: $A : B = 4 : x$, $B : C = x : 7$, $C : D = 6 : (x - 3)$. If B and C together get ₹210, find the value of x.

- Ans**
- ☒ A. 39
 - ☒ B. 27
 - ☒ C. 53
 - ☒ D. 42

Q.80 A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q such that OQ = 12 cm. What is the length of PQ?

- Ans**
- ☒ A. $\sqrt{107}$ cm
 - ☒ B. $\sqrt{97}$ cm
 - ☒ C. $\sqrt{117}$ cm
 - ☒ D. $\sqrt{119}$ cm

Q.81 O, P, Q, U and V have different heights. Only three people have heights between V and Q. P is taller than U but shorter than O. V is taller than Q. How many people are shorter than P?

- Ans**
- ☐ A. Four
 - ☐ B. Three
 - ☒ C. Two
 - ☐ D. One

Q.82 What is an email used for?

- Ans**
- ☐ A. Creating documents
 - ☐ B. File storage
 - ☒ C. Sending messages
 - ☐ D. Data processing

Q.83 In third angle projection, where is the object placed relative to the plane of projection?

- Ans**
- ☐ A. The object is placed in the second quadrant
 - ☐ B. The object is placed in the fourth quadrant
 - ☒ C. The object is placed in the third quadrant
 - ☐ D. The object is placed in the first quadrant

Q.84 Three pipes A, B and C can fill a tank in 12 hours, 18 hours and 24 hours, respectively. A leak at the bottom can empty the full tank in 36 hours. If all the pipes are opened together, in how many hours will the tank be filled? (Round off your answer to two decimal places.)

- Ans**
- ☒ A. 6.55 hours
 - ☐ B. 5.56 hours
 - ☐ C. 9.45 hours
 - ☐ D. 3.33 hours

Q.85 What should come in place of the question mark (?) in the given series?

98, 104, 116, 134, 158, ?

- Ans**
- ☒ A. 188
 - ☐ B. 186
 - ☐ C. 190
 - ☐ D. 184

Q.86 An engineer uses fault tree analysis to assess a machine-related injury in a factory. Which step should be taken first according to standard procedure?

- Ans**
- ☐ A. Validate the analysis using workplace data
 - ☐ B. Establish preventive measures to control risks
 - ☐ C. List all possible causes of failures
 - ☒ D. Define the top event representing the injury

Q.87 The median of the following data is :
25, 15, 23, 25, 17, 27, 20, 18, 24, 30, 19, 28, 35, 10, 31, 40

- Ans**
- ☐ A. 25
 - ☐ B. 23.5
 - ☐ C. 20.5
 - ☒ D. 24.5

Q.88 If Rohan's income increases by 20% and his expenditure increases by 10%, then his savings increase by ₹1,200. If his original income was ₹12,000, what was his original expenditure? (Assume that savings = income – expenditure.)

- Ans**
- ☐ A. ₹10,000
 - ☐ B. ₹9,000
 - ☒ C. ₹12,000
 - ☐ D. ₹11,000

Q.89 Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) A T D E B R C L M Q O N P J M Q E A O Z W F U K S L (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☒ A. 3
 - ☐ B. 0
 - ☐ C. 1
 - ☐ D. 2

Q.90 Refer to the given letter series and answer the question that follows. Counting to be done from left to right.

(Left) B F O P P S Q A L M K A W X S N U Q J O M Y (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☐ A. 4
 - ☐ B. 7
 - ☐ C. 6
 - ☒ D. 5

Q.91 A cyclist covers 120 meters in 16 seconds on a straight road, then immediately covers 180 meters in 24 seconds on a similar road segment. What is the average speed of the cyclist during the entire journey?

- Ans**
- ☒ A. 7.5 meters per second
 - ☐ B. 8.0 meters per second
 - ☐ C. 7.0 meters per second
 - ☐ D. 6.5 meters per second

Q.92 A car of mass 1200 kg accelerates from rest to a speed of 20 m/s on a straight road. If the kinetic energy gained by the car is completely due to the work done by the engine, which of the following best represents the total kinetic energy acquired by the car at this speed?

- Ans**
- ☐ A. 480,000 joules
 - ☐ B. 24,000 joules
 - ☐ C. 12,000 joules
 - ☒ D. 240,000 joules

Q.93 What do touch gestures in Microsoft Windows allow users to do?

- Ans**
- ☐ A. Connect external devices
 - ☐ B. Increase screen brightness
 - ☐ C. Type faster on the keyboard
 - ☒ D. Perform actions using finger movements

Q.94 16 is related to 260 following a certain logic. Following the same logic, 25 is related to 630. To which of the following is 9 related, following the same logic?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☒ A. 729
 - ☒ B. 732
 - ☒ C. 78
 - ☒ D. 84

Q.95 If 'A' stands for '+', 'B' stands for 'x', 'C' stands for '+' and 'D' stands for '-', what will come in place of the question mark '?' in the following equation?

14 A 30 B 45 C 15 D 9 = ?

- Ans**
- ☒ A. 29
 - ☒ B. 25
 - ☒ C. 28
 - ☒ D. 27

Q.96 An engineer is tasked with creating the front view of a mechanical part. The part has a rectangular base with a vertical circular hole passing through it and a triangular prism attached on top. Which of the following best describes what will be visible in the front view?

- Ans**
- ☒ A. The outline of triangular prism and circular hole will be visible in front view only
 - ☒ B. Only the rectangular base outline will be visible in the front view drawing
 - ☒ C. The outline of rectangular base and triangular prism will be visible but hole is not shown
 - ☒ D. Only the triangular prism will be clearly visible in the front view drawing

Q.97 A car travels 90 km east and then 30 km west along the same straight road. If the entire journey takes 3 hours, what is the average velocity of the car?

- Ans**
- ☒ A. 40 km/h east
 - ☒ B. 20 km/h east
 - ☒ C. 50 km/h north
 - ☒ D. 30 km/h east

Q.98 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A x B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Shreya related to Mahak if 'Shreya + Dev - Taran x Harshit % Mahak'?

- Ans**
- ☒ A. Father's mother
 - ☒ B. Father's sister
 - ☒ C. Mother's mother
 - ☒ D. Mother's sister

Q.99 A car travels on a highway, and its odometer records a reading of 180 km at 8:00 am and 240 km at 9:30 am. Based on this information, which statement best describes the car's average speed during this interval?

- Ans**
- ☒ A. The car's average speed is 180 km per hour since that was the odometer reading at 8:00 am.
 - ☒ B. The car's average speed is 60 km per hour based only on the change in odometer readings.
 - ☒ C. The car's average speed is 240 km per hour since that was the odometer reading at 9:30 am.
 - ☒ D. The car's average speed is 40 km per hour as calculated from the odometer readings and time interval.

Q.100 Which situation best describes an entanglement hazard in a mechanical workshop?

- Ans**
- ☒ A. Finger cut by a sharp edge
 - ☒ B. Hand pinched between gears
 - ☒ C. Loose clothing caught in a rotating shaft
 - ☒ D. Gloves worn near hot surfaces

Section : **PART-B**

Q.1 What impact does lock-up clutch engagement have on fuel consumption?

- Ans**
- ☒ A. Reduces fuel economy by increasing losses
 - ☒ B. Improves fuel economy by reducing slippage
 - ☒ C. Increases slippage and fuel consumption
 - ☒ D. No effect on fuel economy

Q.2 Ferrous metals generally contain major amounts of:

- Ans**
- ☒ A. Iron
 - ☒ B. Aluminium
 - ☒ C. Zinc
 - ☒ D. Copper

Q.3 A technician needs to improve the efficiency of combustion in a petrol engine. Which adjustment related to the spark plug could help achieve this goal?

- Ans**
- ☒ A. Increasing the amount of engine current
 - ☒ B. Ensuring correct spark plug gap for proper ignition
 - ☒ C. Modifying the spark plug's diameter
 - ☒ D. Adjusting the exhaust valve opening duration

Q.4 In a vernier caliper, the small scale that slides along the main scale is called:

- Ans**
- ☒ A. Vernier scale
 - ☒ B. Pitch scale
 - ☒ C. Angular scale
 - ☒ D. Limit gauge scale

Q.5 Where should an ammeter be connected in a circuit to measure current accurately?

- Ans**
- ☒ A. With a resistor in parallel
 - ☒ B. In series with the load
 - ☒ C. In parallel with the load
 - ☒ D. Across the supply terminals

Q.6 Which functional characteristic of soft hammers makes them most suitable for use during marking and assembly operations involving finished or precision surfaces?

- Ans**
- ☒ A. Hardened striking surface enabling accurate indentation during marking with centre punches
 - ☒ B. Ability to deform upon impact thereby preventing surface damage to marked or assembled components
 - ☒ C. High rigidity of hammer face ensuring maximum force transmission during heavy forging operations
 - ☒ D. Elevated mass concentration providing deeper penetration effect during high-energy striking tasks

Q.7 What is the main goal of safety legislation in a workshop?

- Ans**
- ☐ A. To promote hazardous tasks in the workshop
 - ☐ B. To reduce equipment quality in the workshop
 - ☒ C. To protect workers from accidents and injuries
 - ☐ D. To increase production speed in the workshop

Q.8 In a workshop, a mechanic needs to determine the length of the diagonal support for a rectangular metal plate with sides of 9 cm and 12 cm. Which value represents the correct length of the diagonal support needed?

- Ans**
- ☐ A. 16 cm
 - ☐ B. 14 cm
 - ☐ C. 13.5 cm
 - ☒ D. 15 cm

Q.9 In a conventional petrol engine assembly, which of the following locking devices is used to secure the connecting rod fasteners against loosening?

- Ans**
- ☐ A. Plain washers fitted beneath the connecting rod bolt heads
 - ☒ B. Tab washers or lock plates fitted with connecting rod nuts
 - ☐ C. Spring washers used as the only locking arrangement
 - ☐ D. Circlips installed in the connecting rod bearing housing

Q.10 A technician is selecting a cylinder material for a petrol engine. Which property is most important for ensuring long service life?

- Ans**
- ☐ A. Moderate strength and easy machinability
 - ☒ B. High thermal conductivity and wear resistance
 - ☐ C. Low density and high electrical conductivity
 - ☐ D. High specific heat and low cost

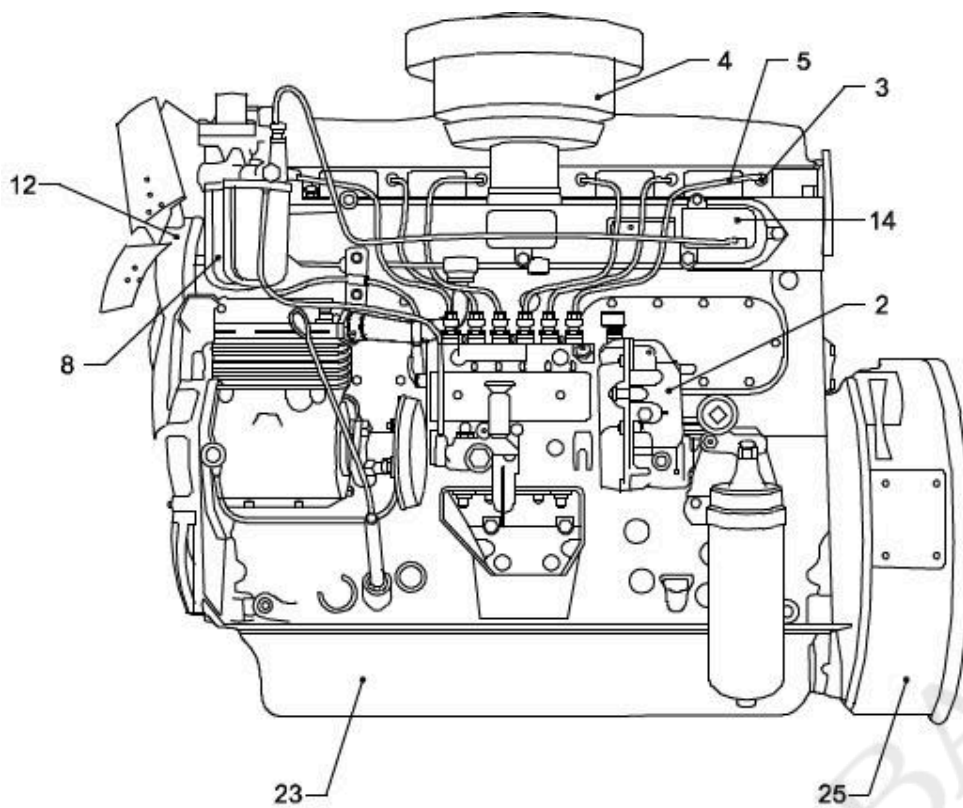
Q.11 Where are leaf springs most commonly used in vehicle suspension systems?

- Ans**
- ☐ A. They are commonly used in the front suspension of small and medium vehicles like cars
 - ☐ B. They are commonly used in the front suspension of motorcycles and bicycles
 - ☐ C. They are commonly used in the steering mechanism of all kinds of vehicles
 - ☒ D. They are commonly used in the rear suspension of trucks and commercial vehicles

Q.12 What is the primary function of the flute in a drill?

- Ans**
- ☐ A. To reduce the weight of drill
 - ☐ B. To add decorative features in drill
 - ☐ C. To hold the drill in place
 - ☒ D. To provide path for chip removal

Q.13 What is the name of the part marked as No. 2 in the engine diagram?



- Ans
- ☒ A. Air cleaner
 - ☒ B. F.I. Pump
 - ☒ C. Cylinder block
 - ☒ D. Fuel injector

Q.14 The fuel injector in a direct-injection diesel engine is generally positioned near the centre of the cylinder head primarily to:

- Ans
- ☒ A. Reduce cylinder head deformation by balancing combustion pressure on the casting
 - ☒ B. Improve coolant circulation around the combustion chamber while minimizing thermal stresses
 - ☒ C. Increase valve opening duration by providing symmetrical valve train geometry
 - ☒ D. Ensure uniform fuel distribution throughout the combustion chamber for efficient combustion

Q.15 Which material offers an optimal combination of toughness and ease of machining for the big end bearings of a diesel engine?

- Ans
- ☒ A. Aluminium alloy
 - ☒ B. Bronze
 - ☒ C. Copper-lead alloy
 - ☒ D. Cast iron

Q.16 What is the purpose of the Electronic Control Unit (ECU) using signals from the transmission fluid temperature sensor?

- Ans
- ☒ A. To cool the high-voltage battery
 - ☒ B. To adjust tire pressure automatically
 - ☒ C. To prevent shifting when fluid is too cold
 - ☒ D. To dim dashboard lights at night

Q.17 A magnetic core carries a magnetic flux of 0.02 Wb. If the cross-sectional area of the core is kept the same, which action will most directly increase the magnetic flux?

- Ans
- ☒ A. Using a material with higher resistance
 - ☒ B. Increasing the air gap in the magnetic path
 - ☒ C. Decreasing the magnetizing current
 - ☒ D. Increasing the number of turns of current carrying coil in the magnetic core

Q.18 When evaluating surface plate construction for use in a humid environment, which factor is most important to consider?

- Ans**
- ☐ A. Color of the plate prevents moisture absorption
 - ☐ B. Surface plate weight determines performance in humidity
 - ☐ C. Visible surface markings ensure accuracy in humidity
 - ☒ D. Material should resist corrosion and moisture effects

Q.19 If air enters the hydraulic brake lines, what is the most likely effect on brake performance?

- Ans**
- ☐ A. The brakes do not require brake fluid when air is present
 - ☐ B. The brakes generate less heat and cool faster
 - ☐ C. The brakes work more effectively with air in the lines
 - ☒ D. The brakes become less effective due to compressibility of air

Q.20 What is the primary purpose of using a neutral flame in gas welding?

- Ans**
- ☐ A. To cause the surface hardening through carburization.
 - ☐ B. To promote oxidation and strengthen the weld joint.
 - ☒ C. To avoid oxidation and carburization of welded metal.
 - ☐ D. To increase the carbon content of the welded metal.

Q.21 Which type of current changes both magnitude and direction at definite intervals?

- Ans**
- ☐ A. Leakage current
 - ☒ B. Alternating current
 - ☐ C. Direct current
 - ☐ D. Static current

Q.22 A copper wire has a resistance of 3 Ω and carries a current of 4 A. What is the power loss in the wire due to heating?

- Ans**
- ☐ A. 36 W
 - ☐ B. 7 W
 - ☒ C. 48 W
 - ☐ D. 12 W

Q.23 Which metal is a primary component of most soft solders used in electrical work?

- Ans**
- ☐ A. Aluminum
 - ☐ B. Nickel
 - ☐ C. Copper
 - ☒ D. Tin

Q.24 Which of the following is NOT a correct use of a chain line in engineering drawings?

- Ans**
- ☐ A. To mark the path of a section
 - ☒ B. To show the outer boundary of an object
 - ☐ C. To indicate a surface to be machined
 - ☐ D. To represent a part for heat treatment

Q.25 What value of inductor should be connected in parallel with a series combination of 4 H and 2 H so that the effective inductance of the circuit is 3 H?

- Ans**
- ☐ A. 2 H
 - ☐ B. 9 H
 - ☒ C. 6 H
 - ☐ D. 3 H

Q.26 How does wear on turbine blades affect the performance of a fluid coupling?

- Ans**
- ☐ A. Decreases engine temperature permanently
 - ☐ B. Reduces heat dissipation capability
 - ☐ C. Causes loss of hydraulic fluid from the coupling
 - ☒ D. Decreases power transmission efficiency

Q.27 Which part does the cylinder sleeve protect from direct contact with combustion gases?

- Ans**
- ☒ A. Engine block
 - ☐ B. Piston
 - ☐ C. Connecting rod
 - ☐ D. Crankshaft

Q.28 What is a primary challenge associated with increasing the compression ratio in internal combustion engines?

- Ans**
- ☐ A. Increased engine lubrication
 - ☐ B. Reduced fuel injection pressure
 - ☒ C. Higher risk of engine knocking
 - ☐ D. Lower engine temperature

Q.29 How does piston movement during the intake stroke affect the cylinder pressure?

- Ans**
- ☒ A. Cylinder pressure decreases as piston moves down
 - ☐ B. Cylinder pressure increases as piston moves up
 - ☐ C. Cylinder pressure increases as piston moves down
 - ☐ D. Cylinder pressure stays constant as piston moves up

Q.30 After setting a sine bar with slip gauges and placing the workpiece, which operation is performed to verify correct angle setting?

- Ans**
- ☐ A. Mark surface using scribe for checking
 - ☒ B. Sweep surface with dial test indicator tool
 - ☐ C. Rotate sine bar to different position again
 - ☐ D. Measure angle using standard protractor scale

Q.31 Which of the following materials is commonly used for making cylinder head gaskets in petrol engines?

- Ans**
- ☐ A. Cast iron
 - ☐ B. Copper and zinc alloy
 - ☒ C. Asbestos-based composite
 - ☐ D. Paper reinforced with resin

Q.32 Which tap type should NOT be used to initiate a new thread in a hole?

- Ans**
- ☒ A. Bottoming tap
 - ☐ B. Plug tap
 - ☐ C. Taper tap
 - ☐ D. Intermediate tap

Q.33 What distinguishes a wet sleeve from a dry sleeve in a diesel engine?

- Ans**
- ☒ A. Wet sleeve is surrounded by coolant, dry sleeve is not
 - ☐ B. Wet sleeve is smaller than dry sleeve
 - ☐ C. Wet sleeve is made of plastic, dry sleeve is metal
 - ☐ D. Wet sleeve is fixed permanently, dry sleeve is removable

Q.34 Which of the following materials is welded using an oxy-acetylene oxidizing flame to minimize zinc vaporization?

- Ans**
- ☐ A. Cast iron
 - ☐ B. Aluminum
 - ☐ C. Stainless steel
 - ☒ D. Brass

Q.35 If a file is too short for a given job, what is the most likely result during use?

- Ans**
- ☒ A. Uneven surface finish and excess wear on the file
 - ☐ B. Improves accuracy and provides better control
 - ☐ C. Prevents bending and ensures file durability
 - ☐ D. Greater filing efficiency and faster completion

Q.36 Which welding technique is best suited for precise and clean joining of thin sheet metal panels in automobile body fabrication?

- Ans**
- ☐ A. Forge welding
 - ☐ B. Submerged arc welding
 - ☐ C. Friction welding
 - ☒ D. Resistance spot welding

Q.37 Two magnetic paths are made of the same material and have the same cross-sectional area. Path X has length 0.1 m, and Path Y has length 0.3 m. Which statement is correct about their reluctances?

- Ans**
- ☐ A. Path Y has one-third the reluctance of Path X
 - ☐ B. Path X has greater reluctance because shorter length increases reluctance
 - ☐ C. Both paths have the same reluctance because they are made of the same material
 - ☒ D. Path Y has three times the reluctance of Path X

Q.38 Which operation cannot be performed efficiently with a half round file?

- Ans**
- ☐ A. Finishing a flat edge
 - ☐ B. Filing a rounded groove
 - ☐ C. Smoothing an inside curve
 - ☒ D. Sharpening a saw blade

Q.39 Which process commonly uses the oxy acetylene system in metalworking applications?

- Ans**
- ☒ A. Cutting thick metal sheets in fabrication workshops
 - ☐ B. Soldering thin wires in electronics manufacturing
 - ☐ C. Arc welding stainless steel in electrical industries
 - ☐ D. Annealing glass rods in laboratory settings

Q.40 A technician needs to inspect the internal diameter of a cylinder bore with high accuracy. Which combination of components in a dial bore gauge ensures accurate measurement and effective alignment inside the bore?

- Ans**
- ☐ A. Mentions a digital display, measuring tape, and stationary handle.
 - ☒ B. A dial indicator, interchangeable anvils, and a spring-loaded plunger.
 - ☐ C. Includes the micrometer head, steel rule, and rubber grip to hold.
 - ☐ D. Features a fixed anvil, locking screw, and a sliding vernier scale

Q.41 What does the magnetic permeability of a material represent?

- Ans**
- ☐ A. The ability of a material to resist the flow of electric current
 - ☐ B. The ability of a material to oppose the flow of magnetic flux
 - ☒ C. The ability of a material to allow magnetic flux to pass through it
 - ☐ D. The ability of a material to store energy in an electric field

Q.42 What is the main purpose of the Ackerman angle in a steering system?

- Ans**
- ☒ A. To ensure correct turning of wheels during a turn
 - ☐ B. To increase the turning radius of the vehicle
 - ☐ C. To reduce the steering ratio for quick response
 - ☐ D. To change the caster angle of the front wheels

Q.43 What is the primary reason for ensuring the tap is aligned correctly with the hole when tapping?

- Ans**
- ☐ A. To reduce the tapping speed significantly
 - ☐ B. To increase the amount of cutting fluid used
 - ☐ C. To allow the use of improperly sharpened tap
 - ☒ D. To produce accurate and straight threads

Q.44 What would most likely happen if the carburettor-type air cleaner is clogged with dirt?

- Ans**
- ☐ A. Stable engine operation with no effect
 - ☐ B. It will lead to increased exhaust back-pressure
 - ☐ C. Improved combustion efficiency due to higher pressure
 - ☒ D. It will lead to rich fuel mixture

Q.45 Which situation on the road clearly demonstrates the usefulness of the lock-up feature?

- Ans**
- ☒ A. Driving on a highway at constant speed
 - ☐ B. Accelerating hard from a standstill
 - ☐ C. Reversing into a parking space
 - ☐ D. Frequent stop-and-go city driving

Q.46 Which combination of components are essential for both the cooling and lubrication of a petrol engine?

- Ans**
- ☐ A. Carburetor and alternator
 - ☒ B. Radiator and oil pump
 - ☐ C. Distributor and fuel pump
 - ☐ D. Air cleaner and ignition coil

Q.47 What is the SI unit of magnetic flux?

- Ans**
- ☐ A. Tesla
 - ☒ B. Weber
 - ☐ C. Henry
 - ☐ D. Joule

Q.48 Which of the following components is primarily responsible for supporting the weight of the vehicle chassis in a suspension system?

- Ans**
- ☐ A. Suspension control arm
 - ☐ B. Shock absorber
 - ☒ C. Leaf spring assembly
 - ☐ D. Stabilizer (anti-roll) bar

Q.49 Which dimensioning method is used when the accumulation of tolerances has no effect on the function of the component?

- Ans**
- ☐ A. Baseline dimensioning
 - ☐ B. Reference dimensioning
 - ☐ C. Parallel dimensioning
 - ☒ D. Chain dimensioning

Q.50 A V-type petrol engine is characterized by which of the following features?

- Ans**
- ☒ A. Cylinders are grouped around a central crankshaft
 - ☒ B. Cylinders are arranged in two banks at an angle
 - ☒ C. All cylinders are in a single straight row
 - ☒ D. Cylinders are positioned opposite each other

Q.51 Which part of a taper shank drill ensures accurate alignment in the machine spindle?

- Ans**
- ☒ A. Body length
 - ☒ B. Flute
 - ☒ C. Tapered end
 - ☒ D. Point angle

Q.52 In a vernier caliper, 50 vernier scale divisions coincide with 49 main scale divisions. If one main scale division is 1 mm, what is the least count?

- Ans**
- ☒ A. 0.04 mm
 - ☒ B. 0.05 mm
 - ☒ C. 0.01 mm
 - ☒ D. 0.02 mm

Q.53 Which engine component is most directly affected by improper piston-to-cylinder clearance?

- Ans**
- ☒ A. Crankshaft bearing surface
 - ☒ B. Cylinder wall surface
 - ☒ C. Camshaft surface
 - ☒ D. Fuel injector surface

Q.54 Which characteristic should an ideal diesel combustion chamber have?

- Ans**
- ☒ A. Delays ignition timing with voltage
 - ☒ B. Increases cooling losses significantly
 - ☒ C. Reduces intake air pressure drastically
 - ☒ D. Promotes complete combustion process

Q.55 Why is an ammeter always connected in series with the load while measuring current in a circuit?

- Ans**
- ☒ A. Because it stores charge before displaying the reading
 - ☒ B. Because it must carry same current as load for correct measurement
 - ☒ C. Because it increases the supply voltage across the load
 - ☒ D. Because it has very high resistance and blocks excess current

Q.56 What is the primary function of a check valve during the pressure stroke?

- Ans**
- ☒ A. To allow fluid to enter the lines
 - ☒ B. To increase line temperature
 - ☒ C. To block fluid from entering the lines
 - ☒ D. To generate electrical signals

Q.57 A 2 kW electric heater operates for 45 minutes on its rated supply. How much electrical energy does it consume?

- Ans**
- ☒ A. 5.4 kWh
 - ☒ B. 0.75 kWh
 - ☒ C. 90 kWh
 - ☒ D. 1.5 kWh

Q.58 What is the role of the locking mechanism on a micrometer depth gauge?

- Ans**
- ☒ A. To secure the measuring rod
 - ☐ B. To rotate the thimble
 - ☐ C. To display the measurement
 - ☐ D. To control the base position

Q.59 What is the primary importance of frequent inspection of the vibration damper for proper engine functioning?

- Ans**
- ☐ A. To maintain correct piston clearance
 - ☒ B. To ensure effective vibration absorption
 - ☐ C. To verify exhaust emission levels
 - ☐ D. To check proper fuel delivery

Q.60 How does a Continuously Variable Transmission (CVT) system achieve reverse operation compared to forward?

- Ans**
- ☐ A. It keeps the metal belt stationary during reversing
 - ☒ B. It reverses the direction of the output pulley rotation
 - ☐ C. It changes the input pulley diameter to its minimum
 - ☐ D. It increases engine speed to maximum

Q.61 In which scenario would plastic gears be more appropriate than metal gears in a machine?

- Ans**
- ☐ A. Plastic gears are ideal for high-load machinery due to their strength.
 - ☒ B. Plastic gears are used in low-load devices where quiet operation is important.
 - ☐ C. Plastic gears are preferred in high-temperature machines for better performance.
 - ☐ D. Plastic gears are necessary in vehicle transmissions for improved durability.

Q.62 For ISO metric threads, the depth of thread (theoretical) is approximately:

- Ans**
- ☐ A. $1.273 \times$ pitch value of the thread system
 - ☐ B. $0.960 \times$ pitch value of the thread system
 - ☒ C. $0.613 \times$ pitch value of the thread system
 - ☐ D. $0.500 \times$ pitch value of the thread system

Q.63 Which problems may arise in engine performance due to excessive piston ring clearance?

- Ans**
- ☐ A. Increases the strength of the piston assembly
 - ☒ B. Loss of compression and reduced engine efficiency
 - ☐ C. Improves combustion pressure and fuel economy
 - ☐ D. Completely prevents oil consumption in the engine

Q.64 How does the base of a micrometer depth gauge differ from that of a standard micrometer?

- Ans**
- ☐ A. It is circular to fit different holes
 - ☒ B. It is flat and wide for stability on surfaces
 - ☐ C. It is tapered for narrow slots
 - ☐ D. It is C-shaped for hand grip

Q.65 Which method joins metals primarily by applying mechanical force at elevated temperature without filler material?

- Ans**
- ☐ A. Fusion welding
 - ☐ B. Soldering
 - ☐ C. Brazing
 - ☒ D. Pressure welding

Q.66 Which mallet feature is important for its use in sheet metal work?

- Ans**
- ☒ A. A head made of wood or rubber
 - ☐ B. A heated striking face
 - ☐ C. A built-in measuring scale
 - ☐ D. A sharp steel cutting edge

Q.67 Which statement best explains why both inlet and exhaust valves remain closed during the power stroke of a diesel engine?

- Ans**
- ☒ A. To confine high-pressure combustion gases and convert their energy into useful work
 - ☐ B. To increase the duration of fuel injection before the piston reaches Bottom Dead Centre
 - ☐ C. To improve lubrication of the valve guides by reducing exhaust gas temperature
 - ☐ D. To allow maximum heat transfer from the cylinder head to the piston crown

Q.68 What is the main purpose of an extension line in engineering drawing?

- Ans**
- ☐ A. To show hidden features in a component
 - ☒ B. To indicate the limits of a feature being dimensioned
 - ☐ C. To mark the boundary of a drawing sheet
 - ☐ D. To specify the required surface finish

Q.69 Why is it important to maintain a slightly convex hammer face rather than a perfectly flat one?

- Ans**
- ☒ A. It reduces glancing blows and improves accuracy
 - ☐ B. It increases the hardness of the hammer
 - ☐ C. It improves heat resistance
 - ☐ D. It reduces tool weight and helps maintain the posture

Q.70 In the master cylinder, which port gets sealed when the brake pedal is applied?

- Ans**
- ☐ A. relief port
 - ☐ B. intake port
 - ☐ C. outlet valve
 - ☒ D. bypass port

Q.71 What is a possible outcome if ATF is not cooled properly during operation over time?

- Ans**
- ☐ A. The ATF will last longer than expected
 - ☐ B. The transmission will self-adjust to conditions
 - ☒ C. A complete rebuild of the transmission may be needed
 - ☐ D. Internal parts are cleaned by hot fluid

Q.72 Why is it important to avoid overheating non-ferrous metals during soldering?

- Ans**
- ☐ A. It improves electrical conductivity
 - ☒ B. It can cause warping or oxidation
 - ☐ C. It increases solder wettability
 - ☐ D. It strengthens the joint

Q.73 Which type of seal is most commonly used to prevent oil leakage in a gearbox where the rotating shaft passes through the housing?

- Ans**
- ☐ A. Gland packing.
 - ☒ B. Radial lip seal.
 - ☐ C. O-ring seal.
 - ☐ D. Mechanical face seal.

Q.74 Which process involves joining two metals by melting them at the joint?

- Ans**
- ☐ A. Riveting
 - ☐ B. Brazing
 - ☐ C. Soldering
 - ☒ D. Welding

Q.75 A resistor has a voltage drop of 18 V and carries a current of 3 A. What is its resistance?

- Ans**
- ☐ A. 15 Ω
 - ☒ B. 6 Ω
 - ☐ C. 1/6 Ω
 - ☐ D. 54 Ω

Railway BABA



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	9:30 AM - 12:00 PM
Subject	ALP Stage 2 Machinist

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 A roller coaster at the top of its track has maximum potential energy. As it descends and speeds up, what principle explains why the sum of its kinetic and potential energies remains constant if we ignore friction and air resistance?

- Ans**
- ☒ A. Law of inertia
 - ☒ B. Principle of inertia
 - ☒ C. Law of conservation of energy
 - ☒ D. Principle of superposition

Q.2 A thermometer shows a reading of 37 degrees Celsius. What is the corresponding temperature in Kelvin?

- Ans**
- ☒ A. 270 K
 - ☒ B. 300 K
 - ☒ C. 310 K
 - ☒ D. 320 K

Q.3 A mechanical engineer must design a flange joint where two pipes are to be connected at a 45-degree angle. Which method should the engineer use to accurately represent the intersection line on a technical drawing of the two cylindrical pipes?

- Ans**
- ☒ A. Represent the intersection as a straight line in the side view
 - ☒ B. Use only standard orthographic projection without auxiliary views
 - ☒ C. Draw the true shape of the intersection using auxiliary projection
 - ☒ D. Draw a simple circle at the junction in the top view

Q.4 What is the simplified value of the expression $\left[\frac{\cos A}{(1 - \tan A)} \right] + \left[\frac{\sin A}{(1 - \cot A)} \right]$?

- Ans**
- ☒ A. 0
 - ☒ B. $\sin A - \cos A$
 - ☒ C. 1
 - ☒ D. $\cos A + \sin A$

Q.5 Which of the following statements correctly reflects the characteristics of a Local Area Network (LAN) and the role of Ethernet within it?

Ans ☒ A. Ethernet is a standard that governs how devices in a LAN communicate via wired connections, supporting speeds from 10 Mbps to 1000 Mbps.

☒ B. Ethernet in a LAN provides low-speed data transfer and connects users over public Internet infrastructure.

☒ C. LANs are designed for long-distance communication and use Ethernet primarily for wireless data exchange.

☒ D. A LAN always requires Gigabit Ethernet to function and is insecure because it allows open access to all network devices.

Q.6 P, Q, R, S and T have different ages. T is elder than only one person. S is elder than P but younger than Q. R is elder than Q. Who is the youngest?

Ans ☒ A. Q

☒ B. S

☒ C. P

☒ D. R

Q.7 What should come in place of the question mark (?) in the given series?

74, 83, 101, 128, ?, 209

Ans ☒ A. 155

☒ B. 146

☒ C. 176

☒ D. 164

Q.8 Which approach most effectively reduces both nitrogen and phosphorus concentrations during wastewater treatment?

Ans ☒ A. Biological and chemical nutrient removal

☒ B. Surface-flow constructed wetlands

☒ C. UV disinfection following secondary treatment

☒ D. Primary sedimentation with extended aeration

Q.9 Which integrated strategy best addresses soil pollution, falling crop yields, and low microbial activity near an industrial zone?

Ans ☒ A. Expand urban areas into farmland.

☒ B. Control industrial waste for sustainability.

☒ C. Ban all regional chemical fertilizers.

☒ D. Reforestation in nearby urban centers.

Q.10 If Rohan's income increases by 20% and his expenditure increases by 10%, then his savings increase by ₹1,200. If his original income was ₹12,000, what was his original expenditure? (Assume that savings = income – expenditure.)

Ans ☒ A. ₹10,000

☒ B. ₹9,000

☒ C. ₹12,000

☒ D. ₹11,000

Q.11 There are two types of silver–copper alloys. The first alloy contains $93\frac{1}{3}\%$ silver, while the second alloy contains $86\frac{2}{3}\%$ silver. Find the amount of the first alloy that should be mixed with some quantity of the second alloy to obtain a 100 kg mixture containing 90% silver.

Ans ☒ A. 48 kg

☒ B. 52 kg

☒ C. 45 kg

☒ D. 50 kg

Q.12 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some glasses are spoons.

All spoons are forks.

Conclusions:

(I) Some glasses are forks.

(II) All forks are spoons.

- Ans
- ☐ A. Only conclusion (II) follows
 - ☐ B. Both conclusions (I) and (II) follow
 - ☒ C. Only conclusion (I) follows
 - ☐ D. Neither conclusion (I) nor (II) follows

Q.13 If 'A' stands for '+', 'B' stands for '-', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

$$28 \text{ A } 16 \text{ C } 3 \text{ B } 12 \text{ D } 4 = ?$$

- Ans
- ☐ A. 70
 - ☒ B. 73
 - ☐ C. 72
 - ☐ D. 71

Q.14 Simplify: $60 - \{(-8) \times (-16 - 19 - 2)\} \div [5 \times \{2 + (-1) \times (-1)\}]$

- Ans
- ☐ A. $\frac{614}{15}$
 - ☐ B. $\frac{594}{15}$
 - ☒ C. $\frac{604}{15}$
 - ☐ D. $\frac{608}{15}$

Q.15 E, F, G, H, L and M live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live above G. Only two people live between L and E. Only two people live between M and G. E lives below G but above F. How many people live below H?

- Ans
- ☐ A. Four
 - ☒ B. Three
 - ☐ C. One
 - ☐ D. Two

Q.16 A worker's hand is at risk of injury from a mechanical shearing action. Which situation best describes a shearing hazard?

- Ans
- ☐ A. A hand becoming entangled in a rotating machine shaft during operation
 - ☐ B. A hand touching a hot metallic machine surface during maintenance activity
 - ☐ C. A hand sliding repeatedly across a rough abrasive machine surface during work
 - ☒ D. A hand caught between a moving blade and a fixed machine surface during operation

Q.17 If the mean of the following data is 40, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	30	27	44	29	X

- Ans
- ☐ A. 93
 - ☐ B. 98
 - ☐ C. 99
 - ☒ D. 82

Q.18 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements: All girls are hens. No hen is a cat.

Conclusion (I): No girl is a cat.

Conclusion (II): Some cats are hens.

- Ans
- ☒ A. Only conclusion (I) follows
 - ☐ B. Both conclusions (I) and (II) follow
 - ☐ C. Neither conclusion (I) nor (II) follows
 - ☐ D. Only conclusion (II) follows

Q.19 Which of the following scenarios best demonstrates the conversion of chemical energy to mechanical energy?

- Ans
- ☐ A. A stretched rubber band snaps back to its original shape
 - ☐ B. A flashlight turns on after inserting new batteries
 - ☒ C. A runner uses stored energy from food to sprint forward
 - ☐ D. A stone falls off a table to the ground

Q.20 G is the mother of Y. Y is the sister of V. S is the father of L. L is the husband of V. How is G related to S?

- Ans
- ☐ A. Son's wife
 - ☐ B. Son's wife's sister
 - ☐ C. Mother's mother
 - ☒ D. Son's wife's mother

Q.21 Three workers, X, Y, and Z, can complete a certain job in 10 days, 12 days, and 15 days, respectively. Determine the number of days required for them to complete the job when they work together.

- Ans
- ☐ A. 6 days
 - ☒ B. 4 days
 - ☐ C. 8 days
 - ☐ D. 5 days

Q.22 What do touch gestures in Microsoft Windows allow users to do?

- Ans
- ☐ A. Type faster on the keyboard
 - ☐ B. Connect external devices
 - ☒ C. Perform actions using finger movements
 - ☐ D. Increase screen brightness

Q.23 16 is related to 260 following a certain logic. Following the same logic, 25 is related to 630. To which of the following is 9 related, following the same logic?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☒ A. 729
 - ☒ B. 84
 - ☒ C. 78
 - ☒ D. 732

Q.24 A car travels 90 km east and then 30 km west along the same straight road. If the entire journey takes 3 hours, what is the average velocity of the car?

- Ans**
- ☒ A. 20 km/h east
 - ☒ B. 30 km/h east
 - ☒ C. 40 km/h east
 - ☒ D. 50 km/h north

Q.25 An engineer is tasked with creating the front view of a mechanical part. The part has a rectangular base with a vertical circular hole passing through it and a triangular prism attached on top. Which of the following best describes what will be visible in the front view?

- Ans**
- ☒ A. Only the triangular prism will be clearly visible in the front view drawing
 - ☒ B. The outline of triangular prism and circular hole will be visible in front view only
 - ☒ C. Only the rectangular base outline will be visible in the front view drawing
 - ☒ D. The outline of rectangular base and triangular prism will be visible but hole is not shown

Q.26 Which line symbol is commonly used in engineering drawings to represent a hidden edge that is not directly visible?

- Ans**
- ☒ A. Chain thin line
 - ☒ B. Zigzag line
 - ☒ C. Solid thick line
 - ☒ D. Dashed line

Q.27 In a certain code language,
A + B means 'A is the mother of B',
A – B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Shreya related to Mahak if 'Shreya + Dev – Taran × Harshit % Mahak'?

- Ans**
- ☒ A. Father's mother
 - ☒ B. Father's sister
 - ☒ C. Mother's sister
 - ☒ D. Mother's mother

Q.28 What is an email used for?

- Ans**
- ☒ A. File storage
 - ☒ B. Data processing
 - ☒ C. Creating documents
 - ☒ D. Sending messages

Q.29 What is the primary function of a fire hydrant in a workplace safety system?

- Ans
- ☐ A. Removing hazardous fumes from the area
 - ☐ B. Activating fire alarms automatically in emergencies
 - ☐ C. Detecting smoke and warning employees
 - ☒ D. Supplying large quantities of water to fight fires

Q.30 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans
- ☐ A. WQ-CG
 - ☒ B. QK-VA
 - ☐ C. TN-ZD
 - ☐ D. EY-KO

Q.31 If $\left(x + \frac{1}{x}\right) = 3$, find the value of $\left(x^3 + \frac{1}{x^3}\right)$.

- Ans
- ☐ A. 16
 - ☐ B. 15
 - ☐ C. 20
 - ☒ D. 18

Q.32 Which of the following is both, an input and output device?

- Ans
- ☒ A. Touchscreen monitor
 - ☐ B. Projector
 - ☐ C. Keyboard
 - ☐ D. Printer

Q.33 In this question, a group of numbers/symbols is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer. If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	6	1	&	3	%	8	+	4	#	7	@	5	2	\$
Code	R	V	G	D	S	C	T	L	F	W	H	U	Y	N

Conditions:

- (i) If the first element is a symbol and the last element is an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and last elements are to be coded as @.
- (iii) If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?
+ 6 \$ 2 7

- Ans
- ☐ A. STMWV
 - ☒ B. WRNYT
 - ☐ C. TSNWW
 - ☐ D. WSNYT

Q.34 In a spreadsheet application, a user selects a range of cells and presses Ctrl + C, followed by Ctrl + V in a different worksheet. What happens to the data?

- Ans
- ☒ A. The selected cells are copied to the new worksheet.
 - ☐ B. The selected cells are deleted from the original worksheet.
 - ☐ C. The selected cells are moved to the new worksheet.
 - ☐ D. The selected cells are saved to a new file.

Q.35 PJAE is related to JOWH in a certain way based on the English alphabetical order. In the same way, OIVC is related to INRF. To which of the following is NEZF related to following the same logic?

- Ans**
- ☐ A. HKVJ
 - ☒ B. HJVI
 - ☐ C. IJVJ
 - ☐ D. IKUH

Q.36 When a moving car suddenly applies brakes, its kinetic energy is transformed mainly into which form of energy?

- Ans**
- ☒ A. Heat energy
 - ☐ B. Sound energy
 - ☐ C. Light energy
 - ☐ D. Potential energy

Q.37 A shopkeeper marks a product 75% above cost price and offers two successive discounts of 30% and 40%. What is the profit or loss percentage?

- Ans**
- ☐ A. 22.6% profit
 - ☐ B. 20.9% profit
 - ☐ C. 15.7% profit
 - ☒ D. 26.5% loss

Q.38 Which of the following statements correctly describes average velocity and its SI unit?

- Ans**
- ☒ A. Average velocity is the total displacement divided by total time, and its unit is meter per second.
 - ☐ B. Average velocity is the total distance divided by total time, and its unit is kilometer per hour.
 - ☐ C. Average velocity is the total distance divided by total time, and its unit is meter per second.
 - ☐ D. Average velocity is the total displacement divided by total time, and its unit is kilometer per hour.

Q.39 A trader buys 187 pens at ₹23 each. During transportation, 7 pens get damaged and cannot be sold. He sells the remaining pens at ₹27 each. Find his profit percentage. (rounded off to one decimal place)

- Ans**
- ☐ A. 14.1%
 - ☐ B. 12.6%
 - ☒ C. 13.0%
 - ☐ D. 13.7%

Q.40 The average of 8 numbers is 45. If one number, 59, is removed, what will the new average be?

- Ans**
- ☐ A. 42.5
 - ☒ B. 43
 - ☐ C. 42
 - ☐ D. 41.5

Q.41 In third angle projection, where is the object placed relative to the plane of projection?

- Ans**
- ☐ A. The object is placed in the first quadrant
 - ☐ B. The object is placed in the second quadrant
 - ☐ C. The object is placed in the fourth quadrant
 - ☒ D. The object is placed in the third quadrant

Q.42 What is the best description of the purpose of multi-view drawing in engineering drawing?

- Ans**
- ☐ A. To show different colors of an object for better visual appearance
 - ☐ B. To present the object in a single three-dimensional visual form only
 - ☒ C. To represent different sides of an object clearly on a flat surface
 - ☐ D. To view an object from only one direction

Q.43 Which property of a fuse wire ensures it melts quickly when excess current flows?

- Ans**
- ☐ A. Thick wire
 - ☒ B. Low melting point
 - ☐ C. High melting point
 - ☐ D. High electrical resistance

Q.44 What is the typical temperature range covered by a laboratory thermometer used in school experiments?

- Ans**
- ☒ A. Minus ten to one hundred and ten degrees Celsius
 - ☐ B. Zero to two hundred degrees Celsius
 - ☐ C. Thirty five to forty two degrees Celsius
 - ☐ D. Minus fifty to fifty degrees Celsius

Q.45 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UMD ZQG EUJ JYM ?

- Ans**
- ☐ A. NBQ
 - ☐ B. PDP
 - ☐ C. NDO
 - ☒ D. OCP

Q.46 Which situation best describes an entanglement hazard in a mechanical workshop?

- Ans**
- ☐ A. Finger cut by a sharp edge
 - ☐ B. Hand pinched between gears
 - ☒ C. Loose clothing caught in a rotating shaft
 - ☐ D. Gloves worn near hot surfaces

Q.47 Which component makes up the largest proportion of Earth's atmosphere by volume?

- Ans**
- ☐ A. Argon
 - ☒ B. Nitrogen
 - ☐ C. Carbon dioxide
 - ☐ D. Oxygen

Q.48 Two students move identical boxes through a distance of 10 m. Student A applies a force of 50 N, while Student B applies a force of 100 N. What is the difference in the work done by the two students?

- Ans**
- ☐ A. 1000 J
 - ☐ B. 50 J
 - ☒ C. 500 J
 - ☐ D. 0 J

Q.49 Which feature is a requirement of the BIS drawing standard in engineering drawings?

Ans ☒ A. Freehand sketches without scale

☒ B. Use of colored pencils for clarity

☒ C. Title block with specific information

☒ D. Margin lines of random width

Q.50 Refer to the following letter and symbol series and answer the question that follows.
Counting to be done from left to right.

(Left) Z @ B R J # D * Q A M S % P L V O U S N T W Z (Right)

How many such symbols are there, each of which is immediately preceded by a letter and also immediately followed by a letter?

Ans ☒ A. Two

☒ B. None

☒ C. Four

☒ D. Three

Q.51 Namia is facing the west. She turns left and walks 15 m. She turns left and walks 25 m. She again turns left and walks 40 m. She finally turns left and walks 40 m to reach home. In which direction is her home with respect to the starting point?

Ans ☒ A. North-East

☒ B. South-West

☒ C. South-East

☒ D. North-West

Q.52 If a scooter travels at a constant speed of 25 km per hour, how far will it travel in 4 hours?

Ans ☒ A. 100 km

☒ B. 120 km

☒ C. 80 km

☒ D. 75 km

Q.53 What should come in place of the question mark (?) in the given series?

98, 104, 116, 134, 158, ?

Ans ☒ A. 186

☒ B. 184

☒ C. 188

☒ D. 190

Q.54 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between X and Z when counted from the right of X. Only two people sit between Z and D. Only three people sit between X and B. A sits to the immediate left of C.

Who sits third to the left of Y?

Ans ☒ A. C

☒ B. Z

☒ C. A

☒ D. X

Q.55 Solve the system of equations:
 $-3x + 2y - z = -1$, $6x - 6y + 7z = -7$, $3x - 4y + 4z = -6$

- Ans
- ☐ A. $x=1, y=2, z=2$
 - ☐ B. $x=2, y=1, z=-3$
 - ☒ C. $x=2, y=2, z=-1$
 - ☐ D. $x=-2, y=2, z=11$

Q.56 Refer to the given letter series and answer the question that follows. Counting to be done from left to right.

(Left) B F O P P S Q A L M K A W X S N U Q J O M Y (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans
- ☐ A. 6
 - ☒ B. 5
 - ☐ C. 4
 - ☐ D. 7

Q.57 A sample of water is heated from 15 degrees Celsius to 35 degrees Celsius. What is the temperature change in Kelvin?

- Ans
- ☐ A. The temperature change is 50 K.
 - ☐ B. The temperature change is 15 K.
 - ☒ C. The temperature change is 20 K.
 - ☐ D. The temperature change is 30 K.

Q.58 The median of the following data is :
25, 15, 23, 25, 17, 27, 20, 18, 24, 30, 19, 28, 35, 10, 31, 40

- Ans
- ☐ A. 25
 - ☒ B. 24.5
 - ☐ C. 20.5
 - ☐ D. 23.5

Q.59 A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q such that OQ = 12 cm. What is the length of PQ?

- Ans
- ☐ A. $\sqrt{97}$ cm
 - ☐ B. $\sqrt{117}$ cm
 - ☒ C. $\sqrt{119}$ cm
 - ☐ D. $\sqrt{107}$ cm

Q.60 A conical tent has a base radius of 14 m and a height of 48 m. How many cubic meters of air can it hold? (Use $\pi = \frac{22}{7}$)

- Ans
- ☐ A. 8956
 - ☐ B. 9865
 - ☐ C. 9568
 - ☒ D. 9856

Q.61 An object has a mass of 10 kilograms. How does its weight on the Moon compare to its weight on Earth?

- Ans**
- ☒ A. The object weighs less on the Moon than on Earth
 - ☐ B. The object weighs the same on both the Moon and Earth
 - ☐ C. The object weighs more on the Moon than on Earth
 - ☐ D. The object weighs zero on the Moon

Q.62 A car of mass 1200 kg accelerates from rest to a speed of 20 m/s on a straight road. If the kinetic energy gained by the car is completely due to the work done by the engine, which of the following best represents the total kinetic energy acquired by the car at this speed?

- Ans**
- ☐ A. 12,000 joules
 - ☐ B. 480,000 joules
 - ☒ C. 240,000 joules
 - ☐ D. 24,000 joules

Q.63 Which is the most important safety check before operating any machine in a workshop?

- Ans**
- ☐ A. Wipe the machine with a dry cloth before use
 - ☐ B. Check if the machine is plugged in properly
 - ☐ C. Ensure the machine area is properly illuminated
 - ☒ D. Inspect the machine for loose or damaged parts

Q.64 When using a hand file during fitting operations, which action demonstrates adherence to tool safety protocols?

- Ans**
- ☐ A. Holding the file near its tang during filing work
 - ☐ B. Filing above shoulder height for better leverage
 - ☒ C. Fitting a proper handle securely to the tang
 - ☐ D. Applying excessive downward force when filing

Q.65 The simple interest earned on a certain sum of money for 3 years at 15% per annum is ₹2,700. Find the sum.

- Ans**
- ☐ A. ₹9,000
 - ☐ B. ₹5,000
 - ☐ C. ₹8,000
 - ☒ D. ₹6,000

Q.66 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

BIP : EMU
GNU : JRZ

- Ans**
- ☐ A. XDE : PON
 - ☒ B. FMT : IQY
 - ☐ C. VCD : GRD
 - ☐ D. CGW : NHT

Q.67 A car travels 60 km north in 2 hours, then 40 km south in the next 1 hour. What is the car's average velocity over the entire trip?

- Ans**
- ☐ A. 33.3 km/h north
 - ☐ B. 0 km/h
 - ☒ C. 6.7 km/h north
 - ☐ D. 20 km/h south

Q.68 A train X crosses a man who is sitting in another train Y, which is moving in the opposite direction, in 8 seconds. However, when both trains are moving in the same direction, train X takes 20 seconds to pass the same man. If the length of train X is 360 meters and the length of train Y (in which the man is sitting) is 240 meters, what is the speed of train Y?

- Ans**
- ☐ A. 45.8 km/h
 - ☐ B. 46.5 km/h
 - ☒ C. 48.6 km/h
 - ☐ D. 45.3 km/h

Q.69 Which of the following best describes a key environmental concern associated with improper disposal of e-waste?

- Ans**
- ☒ A. Release of toxic metals into soil and water
 - ☐ B. Release of greenhouse gases from decomposition
 - ☐ C. Increased recycling rates of precious metals
 - ☐ D. Enhanced biodegradation of plastics

Q.70 A boat sails 40 km downstream and then 40 km upstream in a river. The boat's speed in still water is 12 km/hr and the speed of the stream is 4 km/hr. How much time does the boat take to cover the entire distance (both upstream and downstream)?

- Ans**
- ☐ A. 10 hours
 - ☐ B. 6 hours
 - ☒ C. 7.5 hours
 - ☐ D. 8 hours

Q.71 An engineering student is tasked with creating a detailed side view of a complex machine part for an assembly drawing. Which approach will most accurately represent all features visible from the side while avoiding hidden overlaps or misinterpretations?

- Ans**
- ☐ A. Sketch the side view freely without using projections from the main view
 - ☐ B. Use only hidden lines for representing features on the far side in the view
 - ☐ C. Include all features even those not visible from the selected side view
 - ☒ D. Project all visible elements from the side and omit hidden features unless needed

Q.72 A pendulum takes 60 seconds to complete 24 oscillations. If its length is increased and it now takes 72 seconds for the same number of oscillations, what has happened to its time period?

- Ans**
- ☒ A. It has increased to 3.0 seconds
 - ☐ B. It remains at 2.5 seconds
 - ☐ C. It has decreased to 1.5 seconds
 - ☐ D. It has decreased to 2.0 seconds

Q.73 A laboratory record shows a distance of 0.004 kilometers between two points. How should this be written in SI units of length for a scientific report?

- Ans**
- ☒ A. 4 m
 - ☐ B. 400 cm
 - ☐ C. 4000 mm
 - ☐ D. 0.4 m

Q.74 A sum of ₹420 is divided among A, B, C, and D such that: $A : B = 4 : x$, $B : C = x : 7$, $C : D = 6 : (x - 3)$. If B and C together get ₹210, find the value of x.

- Ans**
- ☒ A. 39
 - ☐ B. 53
 - ☐ C. 27
 - ☐ D. 42

Q.75 A runner completes one lap of a 200 meter circular track in 50 seconds. What is the average speed of the runner?

- Ans**
- ✓ A. 4 meter per second
 - ✗ B. 3 meter per second
 - ✗ C. 4.5 meter per second
 - ✗ D. 3.5 meter per second

Q.76 The circumference of the base of a solid right circular cylinder is 88 cm and its height is 150 cm. What is the volume (in cm^3) of the cylinder?

(Take $\pi = \frac{22}{7}$)

- Ans**
- ✗ A. 92450
 - ✓ B. 92400
 - ✗ C. 92500
 - ✗ D. 92550

Q.77 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

QOI 5, OMG 10, MKE 15, KIC 20, ?

- Ans**
- ✗ A. IHS 23
 - ✗ B. JHZ 24
 - ✗ C. HIZ 30
 - ✓ D. IGA 25

Q.78 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Among five people – A, B, C, D, and E – who is the tallest?

(I) A is taller than B. B is taller than C.

(II) D is taller than E.

- Ans**
- ✓ A. Both statements I and II together are NOT sufficient to answer the question.
 - ✗ B. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ✗ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ✗ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.79 O, P, Q, U and V have different heights. Only three people have heights between V and Q. P is taller than U but shorter than O. V is taller than Q. How many people are shorter than P?

- Ans**
- ✗ A. Four
 - ✗ B. One
 - ✗ C. Three
 - ✓ D. Two

Q.80 If 'A' stands for '+', 'B' stands for 'x', 'C' stands for '+' and 'D' stands for '-', what will come in place of the question mark '?' in the following equation?

14 A 30 B 45 C 15 D 9 = ?

- Ans**
- ✗ A. 28
 - ✗ B. 25
 - ✓ C. 27
 - ✗ D. 29

Q.81 Find the LCM of 72, 78, and 90.

- Ans**
- ✓ A. 4680
 - ✗ B. 4280
 - ✗ C. 4120
 - ✗ D. 4250

Q.82 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer. Among the five poles—I, N, C, H, and L—each having a different height, which pole is the tallest?

(I) I is shorter than N but taller than C. C is taller than only one pole.

(II) H is taller than L.

- Ans**
- ✓ A. Both statements I and II together are NOT sufficient to answer the question
 - ✗ B. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ✗ C. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ✗ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.83 An engineer is tasked with creating a hollow cone for a machine part, where the wall thickness must be consistent and the slant height is critical for assembly. Which factor is most important to ensure the cone will fit correctly in the final design?

- Ans**
- ✓ A. Ensuring the slant height matches the assembly requirement
 - ✗ B. Prioritizing uniform wall thickness over all other features
 - ✗ C. Matching only the overall height of the cone
 - ✗ D. Focusing only on base diameter for precise fit

Q.84 A diamond ring costs ₹85,000. Its price is reduced first by 11% and then by 4% on the reduced price. Find the final price of the ring after both discounts.

- Ans**
- ✗ A. ₹74,624
 - ✓ B. ₹72,624
 - ✗ C. ₹72,604
 - ✗ D. ₹73,624

Q.85 A trader marks an article 25% above its cost price. He allows a discount of 10% on the marked price. After giving the discount, he makes a profit of ₹180 on the article. What is the cost price of the article?

- Ans**
- ✓ A. ₹1,440
 - ✗ B. ₹1,380
 - ✗ C. ₹1,260
 - ✗ D. ₹1,200

Q.86 What is the main purpose of ambient air quality standards?

- Ans**
- ✓ A. To set legally permissible limits for specific pollutants to protect public health.
 - ✗ B. To require all industries to reduce emissions by the exact same percentage.
 - ✗ C. To ensure air is routinely sampled to map historical pollution trends.
 - ✗ D. To focus exclusively on industrial operations while ignoring other sectors.

Q.87 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. Only three boxes are kept above S. Exactly one box is kept between T and S. Exactly three boxes are kept between T and U, and U is kept somewhere above S. V is kept immediately below U. W is kept at one of the places above P. Q is not kept immediately above or below T. Based on the given information, which box is kept at the lowermost position?

- Ans**
- ☒ A. Q
 - ☒ B. P
 - ☒ C. S
 - ☒ D. V

Q.88 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☒ A. DJ – GM
 - ☒ B. AF – DI
 - ☒ C. BG – EJ
 - ☒ D. CH – EK

Q.89 In how many years will a sum of ₹16,000 at 10% per annum compounded semi-annually become ₹18,522?

- Ans**
- ☒ A. 1.5 years
 - ☒ B. 2 years
 - ☒ C. 1 year
 - ☒ D. 2.5 years

Q.90 Below are given two sets of numbers. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

10 - 100 - 50 - 25; 2 - 4 - 2 - 1

- Ans**
- ☒ A. 5 - 25 - 15 - 7
 - ☒ B. 4 - 16 - 8 - 4
 - ☒ C. 8 - 64 - 32 - 14
 - ☒ D. 12 - 144 - 62 - 31

Q.91 An engineer uses fault tree analysis to assess a machine-related injury in a factory. Which step should be taken first according to standard procedure?

- Ans**
- ☒ A. Define the top event representing the injury
 - ☒ B. Validate the analysis using workplace data
 - ☒ C. Establish preventive measures to control risks
 - ☒ D. List all possible causes of failures

Q.92 A father distributed two different amounts among his sons P, Q, R and S. First amount was distributed in the ratio 5 : 4 : 3 : 2 and the second amount was distributed in the ratio 6 : 7 : 8 : 9. If the second amount is thrice the first amount, then which son will get the maximum amount?

- Ans**
- ☒ A. P
 - ☒ B. S
 - ☒ C. Q
 - ☒ D. R

Q.93 Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) A T D E B R C L M Q O N P J M Q E A O Z W F U K S L (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans
- ☐ A. 1
 - ☐ B. 0
 - ☐ C. 2
 - ☒ D. 3

Q.94 A car travels on a highway, and its odometer records a reading of 180 km at 8:00 am and 240 km at 9:30 am. Based on this information, which statement best describes the car's average speed during this interval?

- Ans
- ☐ A. The car's average speed is 180 km per hour since that was the odometer reading at 8:00 am.
 - ☐ B. The car's average speed is 60 km per hour based only on the change in odometer readings.
 - ☒ C. The car's average speed is 40 km per hour as calculated from the odometer readings and time interval.
 - ☐ D. The car's average speed is 240 km per hour since that was the odometer reading at 9:30 am.

Q.95 Three pipes A, B and C can fill a tank in 12 hours, 18 hours and 24 hours, respectively. A leak at the bottom can empty the full tank in 36 hours. If all the pipes are opened together, in how many hours will the tank be filled? (Round off your answer to two decimal places.)

- Ans
- ☐ A. 3.33 hours
 - ☐ B. 9.45 hours
 - ☒ C. 6.55 hours
 - ☐ D. 5.56 hours

Q.96 If 'A' stands for '+', 'B' stands for '−', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

31 B 35 D 7 A 9 C 2 = ?

- Ans
- ☒ A. 44
 - ☐ B. 46
 - ☐ C. 48
 - ☐ D. 42

Q.97 A cyclist covers 120 meters in 16 seconds on a straight road, then immediately covers 180 meters in 24 seconds on a similar road segment. What is the average speed of the cyclist during the entire journey?

- Ans
- ☐ A. 6.5 meters per second
 - ☐ B. 7.0 meters per second
 - ☒ C. 7.5 meters per second
 - ☐ D. 8.0 meters per second

Q.98 In a certain code language, 'KING' is coded as '9713' and 'ITCH' is coded as '2945'. What is the code for 'I' in the given code language?

- Ans
- ☐ A. 4
 - ☐ B. 7
 - ☒ C. 9
 - ☐ D. 2

Q.99 Which of the following best defines 'work' in physics?

- Ans**
- ☐ A. Work is done whenever a force is applied, regardless of movement.
 - ☐ B. Work is done when energy is stored in an object.
 - ☐ C. Work is done if a force acts at any angle to the motion.
 - ☒ D. Work is done when a force moves an object in the direction of the force.

Q.100 Which statement best describes a 'point' in engineering drawing?

- Ans**
- ☒ A. A point indicates a precise location but has no size, length, or width.
 - ☐ B. A point is the intersection of two lines and always has measurable length.
 - ☐ C. A point represents a small area with both length and width.
 - ☐ D. A point is a short line segment used to mark measurements.

Section : **PART-B**

Q.1 Which of the following best describes the main advantage of using temporary clamps in CNC VMC work-holding?

- Ans**
- ☐ A. They provide the strongest possible holding force during machining
 - ☐ B. They eliminate the need for aligning the workpiece before machining
 - ☐ C. They are permanently attached to the machine table for stability
 - ☒ D. They allow quick setup changes and reusability for different jobs

Q.2 Which of the following best defines 'downtime' in manufacturing?

- Ans**
- ☐ A. A period during which operators take scheduled breaks
 - ☒ B. A period during which machines are not in production
 - ☐ C. A period during which routine maintenance is performed
 - ☐ D. A period during which machines achieve maximum output

Q.3 What is the defining characteristic of multi-point cutting tools?

- Ans**
- ☐ A. Used for end cutting action
 - ☐ B. Having single cutting edge
 - ☒ C. Having more than one cutting edge
 - ☐ D. Used for side cutting action

Q.4 Which statement about the distance from the center in a spiral compared to that in a helix is true?

- Ans**
- ☐ A. Helix's radius shrinks inward
 - ☒ B. Spiral's radius changes, helix's radius stays same
 - ☐ C. Both have constant radii
 - ☐ D. Both radii increase

Q.5 Dark lines are observed on the surface of a ground workpiece after finishing. What is the most likely cause of these burn marks during the grinding operation?

- Ans**
- ☒ A. Wheel is too hard for the material
 - ☐ B. Wheel speed is too slow
 - ☐ C. Sufficient coolant flow
 - ☐ D. Wheel is too soft for the material

Q.6 A file is not removing material efficiently. What is the likely cause?

- Ans**
- ☐ A. File is painted
 - ☐ B. File is too light weight
 - ☐ C. Handle is too long
 - ☒ D. Teeth are clogged with debris

Q.7 Which protective equipment is essential during a system failure response?

- Ans**
- ☐ A. Regular cotton gloves
 - ☐ B. Workshop caps
 - ☒ C. Insulated gloves
 - ☐ D. Aprons

Q.8 Which of the following statements best describes the vertical milling attachment?

- Ans**
- ☐ A. It offers automatic indexing operation
 - ☒ B. It converts horizontal to vertical spindle orientation
 - ☐ C. It provides rotary table movement
 - ☐ D. It enables gear cutting on horizontal machines

Q.9 Given the ratio 3:4::6:8, which operation verifies the proportion?

- Ans**
- ☒ A. $3 \times 8 = 6 \times 4$
 - ☐ B. $3 - 4 = 6 - 8$
 - ☐ C. $3 + 8 = 6 + 4$
 - ☐ D. $3/8 = 6/4$

Q.10 If you replaced a left-hand helix with a right-hand helix in a reversing motion device, what problem might occur?

- Ans**
- ☒ A. Thread may loosen
 - ☐ B. Thread binds more
 - ☐ C. Thread stays tight
 - ☐ D. Thread changes pitch

Q.11 What is the formula used to calculate the hourly depreciation of a machine?

- Ans**
- ☐ A. $(\text{Cost of Machine} + \text{Scrap Value}) \div \text{Total Machine Working Hours}$
 - ☐ B. $(\text{Cost of Machine} - \text{Replacement Cost}) \div \text{Total Machine Working Hours}$
 - ☐ C. $(\text{Cost of Machine} \div \text{Scrap Value}) \times \text{Total Machine Working Hours}$
 - ☒ D. $(\text{Cost of Machine} - \text{Scrap Value}) \div \text{Total Machine Working Hours}$

Q.12 In a three-wire method of thread measurement, wires are selected based on the thread pitch. What may result from using wires larger than the calculated size?

- Ans**
- ☐ A. The wires will provide a tighter fit and better results
 - ☒ B. The wires will not fit properly, leading to inaccurate measurement
 - ☐ C. The wires will measure the root diameter instead of the pitch diameter
 - ☐ D. The measurement will be more accurate due to increased contact area

Q.13 What is the primary purpose of entering workpiece offset data in the CNC VMC console during setup?

- Ans**
- ☐ A. To adjust the spindle speed for the operation of the machining process
 - ☐ B. To calibrate the coolant flow rate during machining process
 - ☐ C. To set the tool length value for the current tool for machining process
 - ☒ D. To define the position of the workpiece origin for machining process

Q.14 During the setup of a CNC lathe for a first part check, the machinist is instructed to use the single-block mode. What is the primary reason for activating single-block mode at this stage?

- Ans**
- ☐ A. To optimize spindle speed automatically
 - ☐ B. To monitor the machine motion for vibrations only
 - ☒ C. To verify each program block individually for errors
 - ☐ D. To check the coolant flow rate during operation

Q.15 Why is centre punching necessary on curved or cylindrical surfaces?

- Ans**
- ☒ A. Drill bit tends to slip more easily on curved surfaces
 - ☐ B. Curved surfaces always contain soft metal layers
 - ☐ C. Curved surfaces increase drilling speed automatically
 - ☐ D. Curved surfaces reduce hardness of metals

Q.16 In a cylindrical grinding operation, an operator needs to remove material from the entire surface of a short, stepped workpiece in a single pass. Which method should be selected for efficient operation?

- Ans**
- ☒ A. Plunge grinding with stationary table
 - ☐ B. Traverse grinding with reciprocating table
 - ☐ C. Creep feed grinding for cylindrical surfaces
 - ☐ D. Centerless grinding for long parts

Q.17 A CNC machine is programmed to move the tool from point X (10, 20) to point Y (50, 60) using linear interpolation. What will be the nature of the tool path between these two points ?

- Ans**
- ☒ A. The tool will move in a straight-line path connecting point X and point Y.
 - ☐ B. The tool will move in an arc trajectory from point X to point Y.
 - ☐ C. The tool will move step-by-step, first along the X-axis and then along the Y-axis.
 - ☐ D. The tool will follow a curved path between the two points.

Q.18 What is generally done after drawing the two strokes of an arrowhead?

- Ans**
- ☐ A. The enclosed space is shaded with random marks
 - ☐ B. The enclosed space is removed by erasing lines
 - ☐ C. The enclosed space is left completely empty
 - ☒ D. The enclosed space is neatly filled and darkened

Q.19 The pilot diameter in a piloted counterbore is designed to match which feature?

- Ans**
- ☐ A. The length of the counterbore
 - ☐ B. The diameter of the fastener head
 - ☐ C. The shank diameter
 - ☒ D. The diameter of the existing hole

Q.20 While setting up a CNC lathe for a new job, it is observed that the tool tip does not align with the programmed workpiece zero point after changing to a longer tool. Which parameter should be adjusted in the machine controller to ensure accurate machining dimensions?

- Ans**
- ☐ A. Feed rate adjustment
 - ☐ B. Spindle speed setting
 - ☒ C. Tool length offset value
 - ☐ D. Coolant flow rate

Q.21 If a drawing specifies a fillet weld with unequal leg lengths, what must the welder ensure during fabrication?

- Ans**
- ☒ A. Produce a finished fillet weld with both legs matching the specified lengths.
 - ☐ B. Substitute the specified fillet weld with a standard butt joint configuration.
 - ☐ C. Disregard the required leg measurements and focus entirely on the weld throat.
 - ☐ D. Fabricate the weld with equal leg dimensions regardless of drawing guidelines.

Q.22 A detailed drawing includes a note: M12 x 1.75. What does the 1.75 specify in screw thread representation?

- Ans**
- ☐ A. The major diameter of the screw thread
 - ☒ B. The pitch of the thread in millimeters
 - ☐ C. The total length of the threaded portion
 - ☐ D. The thread angle measured in degrees

Q.23 Which condition would most likely cause uneven lubrication in a splash lubrication system?

- Ans**
- ☐ A. Using clean oil in the reservoir for lubrication system
 - ☒ B. Improper alignment of the ring oiler with the oil level
 - ☐ C. Maintaining proper oil viscosity for smooth circulation
 - ☐ D. Maintaining correct shaft rotation for oil distribution

Q.24 A workshop facing repeated incidents of misplaced hazardous materials should prioritize which advanced housekeeping measure?

- Ans**
- ☐ A. Posting warning notices around designated hazardous storage
 - ☐ B. Switching to sealed material containers with safety labeling
 - ☒ C. Establishing color-coded storage with end-of-shift inspections
 - ☐ D. Providing handling instruction programs for workshop employees

Q.25 Which measuring method is used to examine the concentric alignment of a chuck mounted on a back plate?

- Ans**
- ☐ A. Using feeler guage
 - ☒ B. Using Dial indicator
 - ☐ C. Visual inspection by the eyes
 - ☐ D. Using calipers

Q.26 Which of the following tasks is NOT suitable for a bench-type drilling machine?

- Ans**
- ☐ A. Making holes in thin plastic sheets
 - ☒ B. Drilling large diameter holes in heavy beams
 - ☐ C. Performing counter-sinking operations on light workpieces
 - ☐ D. Drilling small holes in sheet metals

Q.27 While preparing a hardened plain carbon steel die, a machinist must ensure uniform grain structure and relieve internal stresses before hardening. Which sequence of heat treatments should be followed to achieve this?

- Ans**
- ☐ A. Direct quenching without prior normalization
 - ☒ B. Normalizing followed by quenching
 - ☐ C. Spheroidizing followed by tempering
 - ☐ D. Annealing followed by quenching

Q.28 Which of the following best describes the main difference between annealing and normalizing in heat treatment?

- Ans**
- ☒ A. Annealing hardens mild steel, while normalizing softens stain-less steel
 - ☒ B. Annealing cools metal slowly in furnace, while normalizing cools metal in air
 - ☒ C. Annealing uses water quenching, while normalizing uses oil quenching
 - ☒ D. Annealing is used after welding, while normalizing is used before welding

Q.29 Which of the following tool angles affects chip flow during turning operations?

- Ans**
- ☒ A. Clearance angle
 - ☒ B. Relief angle
 - ☒ C. Point angle
 - ☒ D. Rake angle

Q.30 Which operation most benefits from using a V-block with a clamp?

- Ans**
- ☒ A. Filing flat surfaces
 - ☒ B. Grinding a rectangular plate
 - ☒ C. Drilling a hole through a round bar
 - ☒ D. Measuring internal diameter

Q.31 A precise gear tooth profile is to be cut on a milling machine. Which milling attachment should be selected to accurately divide the workpiece for this operation?

- Ans**
- ☒ A. Vertical milling attachment
 - ☒ B. Dividing head attachment
 - ☒ C. Slotting attachment
 - ☒ D. Rotary table attachment

Q.32 What is the main reason for wearing gloves when giving first aid for bleeding?

- Ans**
- ☒ A. To help stop the bleeding
 - ☒ B. To keep hands free from dirt
 - ☒ C. To protect against infection
 - ☒ D. To make hands feel comfortable

Q.33 While calculating plate cam motion, which parameter is essential for determining the displacement of the follower at any given cam rotation angle?

- Ans**
- ☒ A. The distance from the camshaft center to the cam profile at a specific angle
 - ☒ B. The hardness of the tip of the follower used in the cam mechanism
 - ☒ C. The material used to manufacture the plate cam
 - ☒ D. The spindle rotation on which the cam is attached

Q.34 What is the primary function of feedback devices in CNC machines?

- Ans**
- ☒ A. To lubricate moving machine parts at friction points
 - ☒ B. To store CNC programs as a memory in tape
 - ☒ C. To monitor and report actual position to the control unit
 - ☒ D. To supply power to the servo motors for optimum speed

Q.35 As the angle increases beyond 45 degrees, what happens to the tangent value?

- Ans**
- ☒ A. Tangent value becomes zero
 - ☒ B. Tangent value remains constant
 - ☒ C. Tangent value increases above 1
 - ☒ D. Tangent value decreases below 1

Q.36 During installation of a new spindle head on a vertical milling machine, what is the most critical step to ensure reliable operation and long-term accuracy?

- Ans**
- ☒ A. Tightening all spindle head mounting bolts uniformly
 - ☒ B. Aligning the spindle head precisely with the vertical machine axis
 - ☒ C. Adjusting the table longitudinal stops for travel limits
 - ☒ D. Lubricating the spindle quill and machine parts after installation

Q.37 When comparing piloted counterbore and countersink tools, which statement is correct?

- Ans**
- ☒ A. Piloted counterbores create conical holes, while countersinks create flat-bottomed holes.
 - ☒ B. Piloted counterbores create flat-bottomed holes, while countersinks create conical holes.
 - ☒ C. Both piloted counterbores and countersinks create only tapered holes.
 - ☒ D. Both piloted counterbores and countersinks create only through-holes.

Q.38 What is one limitation of using the tailstock offset method for taper turning in terms of workpiece setup?

- Ans**
- ☒ A. It requires use of rapid feed during the turning operation process
 - ☒ B. It requires the workpiece to be held strictly between centers
 - ☒ C. It requires use of a special chuck for mounting workpiece
 - ☒ D. It requires swiveling of the compound rest during setup work

Q.39 Why are V-blocks often used in pairs when supporting long cylindrical workpieces?

- Ans**
- ☒ A. To measure thickness of the workpiece
 - ☒ B. To provide balanced support and alignment
 - ☒ C. To increase cutting speed
 - ☒ D. To reduce the cost of fixtures

Q.40 Which application is most suitable for a triangular file?

- Ans**
- ☒ A. Sharpening saw teeth
 - ☒ B. Polishing flat surfaces
 - ☒ C. Boring holes
 - ☒ D. Cutting threads

Q.41 Before starting the grinding operation, an operator inspects the wheel for safe operation. Which check is most critical to prevent wheel burst accidents?

- Ans**
- ☒ A. Ensure the wheel dresser remains sharp and properly cleaned
 - ☒ B. Check the coolant system carefully for leaks around the machine area
 - ☒ C. Conduct a ring test to check for cracks before mounting the wheel
 - ☒ D. Verify the tailstock pressure is set to manufacturer recommendations

Q.42 If the spindle speed is doubled but the wheel diameter remains the same, what happens to the cutting speed in grinding?

- Ans**
- ☒ A. The cutting speed will be reduced to half
 - ☒ B. The cutting speed will remain the same
 - ☒ C. The cutting speed will become four times
 - ☒ D. The cutting speed will also be double

Q.43 A machinist attempts to adjust the vertical height of a table by using saddle in a milling machine. What mistake is being made?

- Ans**
- ☒ A. Saddle does not provide vertical movement
 - ☒ B. Saddle does not support worktable
 - ☒ C. Saddle is fixed to column
 - ☒ D. Saddle controls spindle speed

Q.44 During CNC lathe setup, the spindle speed override is set to 50%. What advantage does this provide to the operator?

- Ans**
- ☒ A. It sets the feed rate for roughing operation
 - ☒ B. It allows safer observation during trial cutting
 - ☒ C. It automatically finishes the part up to final length
 - ☒ D. It selects the correct tool set for the job

Q.45 In marking operations, a V-block is mainly used to:

- Ans**
- ☒ A. Measure diameter directly
 - ☒ B. Mark centres of round bars
 - ☒ C. Measure surface roughness
 - ☒ D. Support square plates

Q.46 Which of the following is a direct benefit of using absolute programming in CNC VMC operations?

- Ans**
- ☒ A. Faster spindle speed
 - ☒ B. Shorter programs
 - ☒ C. Less setup time
 - ☒ D. Easier error detection

Q.47 Why is interchangeability important in mass production according to Bureau of Indian Standards (BIS) guidelines?

- Ans**
- ☒ A. It guarantees zero defects in every manufactured part
 - ☒ B. It allows replacement of parts without custom adjustments
 - ☒ C. It ensures all parts are made with zero tolerances
 - ☒ D. It ensures all parts are made from identical materials

Q.48 Which standard recommends the use of single-stroke lettering in engineering drawings?

- Ans**
- ☒ A. IS : 1234-1999
 - ☒ B. IS : 9609-2001
 - ☒ C. BS : 8888-2010
 - ☒ D. ISO : 9001-2000

Q.49 A machine has an original cost of 100,000, scrap value of 10,000, and total working hours of 10,000. What is its hourly depreciation?

- Ans**
- ☒ A. 10
 - ☒ B. 12
 - ☒ C. 11
 - ☒ D. 9

Q.50 In piloted counterbore nomenclature, what does the term 'body' refer to?

- Ans**
- ☒ A. The cutting portion that enlarges the hole
 - ☒ B. The cylindrical guide at the tip
 - ☒ C. The threaded part for attachment
 - ☒ D. The handle

Q.51 Which characteristic is NOT commonly linked with ceramic cutting tool materials?

- Ans**
- ☒ A. High toughness
 - ☒ B. Heat resistance
 - ☒ C. High hardness
 - ☒ D. Wear resistance

Q.52 A machinist needs to slot multiple identical parts quickly. Which machine vice feature best supports efficient, repeatable clamping?

- Ans**
- ☐ A. Fixed jaw only vice
 - ☐ B. Manual alignment indicator
 - ☐ C. Single position locking system
 - ☒ D. Quick-release jaw mechanism

Q.53 When using MPG mode on a CNC lathe, what does rotating the handwheel achieve?

- Ans**
- ☐ A. Increases spindle speed proportionally to rotation
 - ☐ B. Selects between different part programs loaded
 - ☒ C. Moves the selected machine axis in small increments
 - ☐ D. Changes tool length offset values in the system

Q.54 What is the main function of an indexing plate in a dividing head setup?

- Ans**
- ☐ A. To clamp the workpiece
 - ☐ B. To control spindle speed
 - ☒ C. To assist in precise divisions
 - ☐ D. To hold the workpiece

Q.55 If both left-hand and right-hand angles are required to be cut on a plate in a single setup, which tool and approach is most suitable?

- Ans**
- ☒ A. Using a double angle milling cutter in a single pass
 - ☐ B. Using a single angle milling cutter with two setups
 - ☐ C. Using a side and face cutter for each angle separately
 - ☐ D. Using an end mill with repeated passes for each side

Q.56 Which file is best suited for filing internal corners?

- Ans**
- ☒ A. Triangular file
 - ☐ B. Round file
 - ☐ C. Flat file
 - ☐ D. Square file

Q.57 In a ram type slotter, what is the main function of the column?

- Ans**
- ☒ A. To support the ram and table
 - ☐ B. To provide reciprocating motion
 - ☐ C. To cut the slot
 - ☐ D. To rotate the tool

Q.58 A force of 10 newtons moves an object 2 metres. How much work is done?

- Ans**
- ☐ A. 8 joules
 - ☐ B. 12 joules
 - ☐ C. 5 joules
 - ☒ D. 20 joules

Q.59 During a CNC lathe roughing operation, excessive tool wear and uneven stock removal are observed. Which adjustment will help to improve machining consistency and tool life?

- Ans**
- ☐ A. Changing tool nose radius for a sharper edge
 - ☐ B. Applying coolant flow during operation
 - ☐ C. Increasing spindle speed during cutting
 - ☒ D. Adjusting feed and depth during cutting

Q.60 What is the main purpose of heat treatment in metals?

- Ans**
- ☐ A. To reduce the cost of metal
 - ☒ B. To improve mechanical properties
 - ☐ C. To change color of the metal
 - ☐ D. To add weight to the metal

Q.61 What is the primary factor in selecting nose radius for a single-point tool?

- Ans**
- ☐ A. Cutting speed needed
 - ☒ B. Desired surface finish
 - ☐ C. Tool material used
 - ☐ D. Chip flow direction

Q.62 A machinist needs to cut a rectangular pocket using CNC VMC. Which sequence best ensures accurate straight edges using linear interpolation?

- Ans**
- ☒ A. Program each side of the rectangle using G01 with defined start and end coordinates.
 - ☐ B. Apply G02 to create all sides of rectangle as arcs with one radius value and fixed center.
 - ☐ C. Use G03 to create all edges of rectangle as curved segments continuously with different radii.
 - ☐ D. Use G00 to move rapidly around the rectangular pocket without programming coordinates.

Q.63 A steel plate is 20 mm thick and 45 mm wide. What is the length of the diagonal across the plate?

- Ans**
- ☐ A. 45.00 mm
 - ☐ B. 47.20 mm
 - ☐ C. 51.00 mm
 - ☒ D. 49.24 mm

Q.64 In unidirectional dimensioning, how are dimensions placed on the drawing sheet?

- Ans**
- ☐ A. Dimensions are placed so they can be read from multiple edges.
 - ☒ B. Dimensions are placed so they can be read from the bottom edge.
 - ☐ C. Dimensions are placed so they can be read from random directions.
 - ☐ D. Dimensions are placed so they can be read from diagonal angles.

Q.65 If a worker cannot find a tool quickly, which principle of Five S is likely not being followed?

- Ans**
- ☐ A. Shine
 - ☐ B. Standardize
 - ☒ C. Set in order
 - ☐ D. Sort

Q.66 A machinist needs to calculate the displacement of the follower at 90° cam rotation in a plate cam with uniform velocity motion and a maximum lift of 20 mm over 180°. What will be the follower displacement at 90°?

- Ans**
- ☐ A. 20 mm
 - ☐ B. 15 mm
 - ☐ C. 5 mm
 - ☒ D. 10 mm

Q.67 Which machining problem can be minimized by correctly grinding a lathe cutting tool?

- Ans**
- ☐ A. Overheating of the lathe machine
 - ☒ B. Premature tool wear
 - ☐ C. Rusting of the tool
 - ☐ D. Vibration of lathe

Q.68 What is the main purpose of a color code in the context of lubrication management?

- Ans**
- ☐ A. To measure lubricant viscosity and performance characteristics
 - ☒ B. To identify lubricants and match them with application points
 - ☐ C. To combine different lubricants for improved machine operation
 - ☐ D. To classify equipment according to maintenance schedules

Q.69 Why is depreciation included in the machine hour rate calculation?

- Ans**
- ☐ A. It times repairs accurately
 - ☐ B. It pays operator wages
 - ☒ C. It spreads asset cost over use
 - ☐ D. It covers power expenses

Q.70 A CNC turning operation is set to cut an external metric thread on a steel workpiece. If the thread pitch and minor diameter are already specified, which parameter must be accurately programmed in the tool path to ensure the correct thread profile and depth?

- Ans**
- ☐ A. Tool nose radius compensation
 - ☐ B. Coolant flow rate adjustment
 - ☒ C. Thread depth per pass value
 - ☐ D. Spindle RPM setting

Q.71 When should an operator use the Emergency Stop button on the CNC VMC panel during machining?

- Ans**
- ☐ A. If the program requires routine process adjustment
 - ☐ B. If the program requires routine setup adjustment
 - ☒ C. If there is a risk of injury or machine damage
 - ☐ D. If the program needs editing or recalibration

Q.72 A CNC machinist completes a first part check and notes the outer diameter is correct, but the length is slightly off. What does this suggest about tool offset correction?

- Ans**
- ☐ A. The X-axis tool offset needs to be decreased
 - ☐ B. Modify the program header for new coordinates
 - ☒ C. The Z-axis tool offset needs adjustment, not the X-axis
 - ☐ D. Increase the spindle speed for better accuracy

Q.73 A measuring instrument must be selected for verifying the small diameter (d) of a finely finished Morse taper. Which option provides the most accurate and reliable measurement for this application?

- Ans**
- ☐ A. A steel rule marked in millimeters
 - ☐ B. A vernier caliper with standard jaws
 - ☐ C. A thread gauge for comparing different profiles
 - ☒ D. A micrometer calibrated for small diameters

Q.74 A machinist is grinding a 200 mm long shaft with a feed of 2 mm per revolution at a speed of 40 revolutions per minute. What is the machining time required for one pass?

- Ans**
- ☐ A. 1.0 minute
 - ☒ B. 2.5 minutes
 - ☐ C. 3.5 minutes
 - ☐ D. 4.0 minutes

Q.75 Which of the following is the primary function of lubricants in grinding operations?

- Ans**
- ☐ A. To increase rotational speed of grinding wheel
 - ☒ B. To reduce friction between tool and workpiece
 - ☐ C. To remove metallic chips from the work area
 - ☐ D. To supply the extra coolant to the workpiece

Railway BABA



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	9:30 AM - 12:00 PM
Subject	ALP Stage 2 Mechanic Diesel

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 Two students move identical boxes through a distance of 10 m. Student A applies a force of 50 N, while Student B applies a force of 100 N. What is the difference in the work done by the two students?

- Ans**
- ☒ A. 0 J
 - ☒ B. 50 J
 - ☒ C. 500 J
 - ☒ D. 1000 J

Q.2 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☒ A. QK-VA
 - ☒ B. EY-KO
 - ☒ C. WQ-CG
 - ☒ D. TN-ZD

Q.3 Namia is facing the west. She turns left and walks 15 m. She turns left and walks 25 m. She again turns left and walks 40 m. She finally turns left and walks 40 m to reach home. In which direction is her home with respect to the starting point?

- Ans**
- ☒ A. South-West
 - ☒ B. South-East
 - ☒ C. North-West
 - ☒ D. North-East

Q.4 A car travels 60 km north in 2 hours, then 40 km south in the next 1 hour. What is the car's average velocity over the entire trip?

- Ans**
- ☒ A. 20 km/h south
 - ☒ B. 6.7 km/h north
 - ☒ C. 0 km/h
 - ☒ D. 33.3 km/h north

Q.5 A father distributed two different amounts among his sons P, Q, R and S. First amount was distributed in the ratio 5 : 4 : 3 : 2 and the second amount was distributed in the ratio 6 : 7 : 8 : 9. If the second amount is thrice the first amount, then which son will get the maximum amount?

- Ans**
- ☐ A. Q
 - ☐ B. P
 - ☐ C. R
 - ☒ D. S

Q.6 Three pipes A, B and C can fill a tank in 12 hours, 18 hours and 24 hours, respectively. A leak at the bottom can empty the full tank in 36 hours. If all the pipes are opened together, in how many hours will the tank be filled? (Round off your answer to two decimal places.)

- Ans**
- ☐ A. 5.56 hours
 - ☐ B. 9.45 hours
 - ☐ C. 3.33 hours
 - ☒ D. 6.55 hours

Q.7 A conical tent has a base radius of 14 m and a height of 48 m. How many cubic meters of air can it hold? (Use $\pi = \frac{22}{7}$)

- Ans**
- ☐ A. 8956
 - ☐ B. 9568
 - ☐ C. 9865
 - ☒ D. 9856

Q.8 What is the simplified value of the expression $\left[\frac{\cos A}{(1 - \tan A)} \right] + \left[\frac{\sin A}{(1 - \cot A)} \right]$?

- Ans**
- ☐ A. 0
 - ☐ B. $\sin A - \cos A$
 - ☒ C. $\cos A + \sin A$
 - ☐ D. 1

Q.9 If $\left(x + \frac{1}{x} \right) = 3$, find the value of $\left(x^3 + \frac{1}{x^3} \right)$.

- Ans**
- ☐ A. 15
 - ☐ B. 16
 - ☒ C. 18
 - ☐ D. 20

Q.10 If a scooter travels at a constant speed of 25 km per hour, how far will it travel in 4 hours?

- Ans**
- ☐ A. 75 km
 - ☐ B. 120 km
 - ☒ C. 100 km
 - ☐ D. 80 km

Q.11 Three workers, X, Y, and Z, can complete a certain job in 10 days, 12 days, and 15 days, respectively. Determine the number of days required for them to complete the job when they work together.

- Ans**
- ☐ A. 8 days
 - ☐ B. 6 days
 - ☒ C. 4 days
 - ☐ D. 5 days

Q.12 There are two types of silver–copper alloys. The first alloy contains $93\frac{1}{3}\%$ silver, while the second alloy contains $86\frac{2}{3}\%$ silver. Find the amount of the first alloy that should be mixed with some quantity of the second alloy to obtain a 100 kg mixture containing 90% silver.

- Ans**
- ☐ A. 52 kg
 - ☐ B. 45 kg
 - ☐ C. 48 kg
 - ☒ D. 50 kg

Q.13 A roller coaster at the top of its track has maximum potential energy. As it descends and speeds up, what principle explains why the sum of its kinetic and potential energies remains constant if we ignore friction and air resistance?

- Ans**
- ☐ A. Principle of inertia
 - ☐ B. Principle of superposition
 - ☐ C. Law of inertia
 - ☒ D. Law of conservation of energy

Q.14 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

BIP : EMU
GNU : JRZ

- Ans**
- ☐ A. CGW : NHT
 - ☐ B. XDE : PON
 - ☒ C. FMT : IQY
 - ☐ D. VCD : GRD

Q.15 If Rohan's income increases by 20% and his expenditure increases by 10%, then his savings increase by ₹1,200. If his original income was ₹12,000, what was his original expenditure? (Assume that savings = income – expenditure.)

- Ans**
- ☐ A. ₹9,000
 - ☐ B. ₹11,000
 - ☒ C. ₹12,000
 - ☐ D. ₹10,000

Q.16 Which of the following statements correctly describes average velocity and its SI unit?

- Ans**
- ☐ A. Average velocity is the total displacement divided by total time, and its unit is kilometer per hour.
 - ☐ B. Average velocity is the total distance divided by total time, and its unit is meter per second.
 - ☐ C. Average velocity is the total distance divided by total time, and its unit is kilometer per hour.
 - ☒ D. Average velocity is the total displacement divided by total time, and its unit is meter per second.

Q.17 A pendulum takes 60 seconds to complete 24 oscillations. If its length is increased and it now takes 72 seconds for the same number of oscillations, what has happened to its time period?

- Ans**
- ☒ A. It has increased to 3.0 seconds
 - ☐ B. It has decreased to 2.0 seconds
 - ☐ C. It has decreased to 1.5 seconds
 - ☐ D. It remains at 2.5 seconds

Q.18 When a moving car suddenly applies brakes, its kinetic energy is transformed mainly into which form of energy?

- Ans**
- ☒ A. Heat energy
 - ☐ B. Light energy
 - ☐ C. Sound energy
 - ☐ D. Potential energy

Q.19 A trader buys 187 pens at ₹23 each. During transportation, 7 pens get damaged and cannot be sold. He sells the remaining pens at ₹27 each. Find his profit percentage. (rounded off to one decimal place)

- Ans**
- ☒ A. 14.1%
 - ☒ B. 13.7%
 - ☒ C. 13.0%
 - ☒ D. 12.6%

Q.20 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.
Among the five poles—I, N, C, H, and L—each having a different height, which pole is the tallest?
(I) I is shorter than N but taller than C. C is taller than only one pole.
(II) H is taller than L.

- Ans**
- ☒ A. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☒ B. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☒ C. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ D. Both statements I and II together are NOT sufficient to answer the question

Q.21 A diamond ring costs ₹85,000. Its price is reduced first by 11% and then by 4% on the reduced price. Find the final price of the ring after both discounts.

- Ans**
- ☒ A. ₹73,624
 - ☒ B. ₹74,624
 - ☒ C. ₹72,604
 - ☒ D. ₹72,624

Q.22 Below are given two sets of numbers. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

10 - 100 - 50 - 25; 2 - 4 - 2 - 1

- Ans**
- ☒ A. 12 - 144 - 62 - 31
 - ☒ B. 4 - 16 - 8 - 4
 - ☒ C. 5 - 25 - 15 - 7
 - ☒ D. 8 - 64 - 32 - 14

Q.23 A thermometer shows a reading of 37 degrees Celsius. What is the corresponding temperature in Kelvin?

- Ans**
- ☒ A. 300 K
 - ☒ B. 320 K
 - ☒ C. 270 K
 - ☒ D. 310 K

Q.24 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UMD ZQG EUJ JYM ?

- Ans**
- ☒ A. NBQ
 - ☒ B. NDO
 - ☒ C. OCP
 - ☒ D. PDP

Q.25 Which integrated strategy best addresses soil pollution, falling crop yields, and low microbial activity near an industrial zone?

- Ans**
- ☒ A. Reforestation in nearby urban centers.
 - ☒ B. Expand urban areas into farmland.
 - ☒ C. Control industrial waste for sustainability.
 - ☒ D. Ban all regional chemical fertilizers.

Q.26 If 'A' stands for '+', 'B' stands for '−', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

31 B 35 D 7 A 9 C 2 = ?

- Ans**
- ☒ A. 46
 - ☒ B. 42
 - ☒ C. 44
 - ☒ D. 48

Q.27 The average of 8 numbers is 45. If one number, 59, is removed, what will the new average be?

- Ans**
- ☒ A. 42.5
 - ☒ B. 43
 - ☒ C. 42
 - ☒ D. 41.5

Q.28 A worker's hand is at risk of injury from a mechanical shearing action. Which situation best describes a shearing hazard?

- Ans**
- ☒ A. A hand sliding repeatedly across a rough abrasive machine surface during work
 - ☒ B. A hand becoming entangled in a rotating machine shaft during operation
 - ☒ C. A hand touching a hot metallic machine surface during maintenance activity
 - ☒ D. A hand caught between a moving blade and a fixed machine surface during operation

Q.29 Refer to the given letter series and answer the question that follows. Counting to be done from left to right.

(Left) B F O P P S Q A L M K A W X S N U Q J O M Y (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☒ A. 6
 - ☒ B. 7
 - ☒ C. 4
 - ☒ D. 5

Q.30 O, P, Q, U and V have different heights. Only three people have heights between V and Q. P is taller than U but shorter than O. V is taller than Q. How many people are shorter than P?

- Ans**
- ☒ A. Two
 - ☒ B. Four
 - ☒ C. Three
 - ☒ D. One

Q.31 What is an email used for?

- Ans**
- ☒ A. File storage
 - ☒ B. Sending messages
 - ☒ C. Data processing
 - ☒ D. Creating documents

Q.32 If 'A' stands for '+', 'B' stands for '-', 'C' stands for 'x' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

28 A 16 C 3 B 12 D 4 = ?

- Ans
- ☐ A. 70
 - ☐ B. 71
 - ☐ C. 72
 - ☒ D. 73

Q.33 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

QOI 5, OMG 10, MKE 15, KIC 20, ?

- Ans
- ☐ A. IHS 23
 - ☐ B. JHZ 24
 - ☐ C. HIZ 30
 - ☒ D. IGA 25

Q.34 Which approach most effectively reduces both nitrogen and phosphorus concentrations during wastewater treatment?

- Ans
- ☒ A. Biological and chemical nutrient removal
 - ☐ B. Surface-flow constructed wetlands
 - ☐ C. Primary sedimentation with extended aeration
 - ☐ D. UV disinfection following secondary treatment

Q.35 Which situation best describes an entanglement hazard in a mechanical workshop?

- Ans
- ☐ A. Hand pinched between gears
 - ☐ B. Gloves worn near hot surfaces
 - ☒ C. Loose clothing caught in a rotating shaft
 - ☐ D. Finger cut by a sharp edge

Q.36 A sample of water is heated from 15 degrees Celsius to 35 degrees Celsius. What is the temperature change in Kelvin?

- Ans
- ☐ A. The temperature change is 50 K.
 - ☒ B. The temperature change is 20 K.
 - ☐ C. The temperature change is 15 K.
 - ☐ D. The temperature change is 30 K.

Q.37 An engineer uses fault tree analysis to assess a machine-related injury in a factory. Which step should be taken first according to standard procedure?

- Ans
- ☐ A. Establish preventive measures to control risks
 - ☐ B. Validate the analysis using workplace data
 - ☒ C. Define the top event representing the injury
 - ☐ D. List all possible causes of failures

Q.38 A car of mass 1200 kg accelerates from rest to a speed of 20 m/s on a straight road. If the kinetic energy gained by the car is completely due to the work done by the engine, which of the following best represents the total kinetic energy acquired by the car at this speed?

- Ans
- ☒ A. 240,000 joules
 - ☐ B. 480,000 joules
 - ☐ C. 24,000 joules
 - ☐ D. 12,000 joules

Q.39 In a certain code language, 'KING' is coded as '9713' and 'ITCH' is coded as '2945'. What is the code for 'I' in the given code language?

- Ans
- ☒ A. 9
 - ☐ B. 7
 - ☐ C. 2
 - ☐ D. 4

Q.40 The circumference of the base of a solid right circular cylinder is 88 cm and its height is 150 cm. What is the volume (in cm^3) of the cylinder?

$\left(\text{Take } \pi = \frac{22}{7} \right)$

- Ans
- ☐ A. 92500
 - ☐ B. 92450
 - ☐ C. 92550
 - ☒ D. 92400

Q.41 PJAE is related to JOWH in a certain way based on the English alphabetical order. In the same way, OIVC is related to INRF. To which of the following is NEZF related to following the same logic?

- Ans
- ☐ A. IJVJ
 - ☐ B. HKVJ
 - ☐ C. IKUH
 - ☒ D. HJVI

Q.42 A trader marks an article 25% above its cost price. He allows a discount of 10% on the marked price. After giving the discount, he makes a profit of ₹180 on the article. What is the cost price of the article?

- Ans
- ☐ A. ₹1,380
 - ☒ B. ₹1,440
 - ☐ C. ₹1,200
 - ☐ D. ₹1,260

Q.43 What is the best description of the purpose of multi-view drawing in engineering drawing?

- Ans
- ☐ A. To view an object from only one direction
 - ☐ B. To present the object in a single three-dimensional visual form only
 - ☐ C. To show different colors of an object for better visual appearance
 - ☒ D. To represent different sides of an object clearly on a flat surface

Q.44 Solve the system of equations:

$$-3x + 2y - z = -1, 6x - 6y + 7z = -7, 3x - 4y + 4z = -6$$

- Ans
- ☒ A. $x=2, y=2, z=-1$
 - ☐ B. $x=1, y=2, z=2$
 - ☐ C. $x=-2, y=2, z=11$
 - ☐ D. $x=2, y=1, z=-3$

Q.45 A sum of ₹420 is divided among A, B, C, and D such that: $A : B = 4 : x$, $B : C = x : 7$, $C : D = 6 : (x - 3)$. If B and C together get ₹210, find the value of x.

- Ans**
- ☐ A. 27
 - ☐ B. 53
 - ☒ C. 39
 - ☐ D. 42

Q.46 A laboratory record shows a distance of 0.004 kilometers between two points. How should this be written in SI units of length for a scientific report?

- Ans**
- ☐ A. 400 cm
 - ☒ B. 4 m
 - ☐ C. 4000 mm
 - ☐ D. 0.4 m

Q.47 A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q such that $OQ = 12$ cm. What is the length of PQ?

- Ans**
- ☐ A. $\sqrt{117}$ cm
 - ☐ B. $\sqrt{107}$ cm
 - ☒ C. $\sqrt{119}$ cm
 - ☐ D. $\sqrt{97}$ cm

Q.48 In a spreadsheet application, a user selects a range of cells and presses Ctrl + C, followed by Ctrl + V in a different worksheet. What happens to the data?

- Ans**
- ☐ A. The selected cells are saved to a new file.
 - ☒ B. The selected cells are copied to the new worksheet.
 - ☐ C. The selected cells are moved to the new worksheet.
 - ☐ D. The selected cells are deleted from the original worksheet.

Q.49 Which of the following is both, an input and output device?

- Ans**
- ☐ A. Keyboard
 - ☐ B. Printer
 - ☒ C. Touchscreen monitor
 - ☐ D. Projector

Q.50 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☐ A. DJ – GM
 - ☒ B. CH – EK
 - ☐ C. AF – DI
 - ☐ D. BG – EJ

Q.51 A train X crosses a man who is sitting in another train Y, which is moving in the opposite direction, in 8 seconds. However, when both trains are moving in the same direction, train X takes 20 seconds to pass the same man. If the length of train X is 360 meters and the length of train Y (in which the man is sitting) is 240 meters, what is the speed of train Y?

- Ans**
- ☒ A. 48.6 km/h
 - ☐ B. 45.3 km/h
 - ☐ C. 45.8 km/h
 - ☐ D. 46.5 km/h

Q.52 The median of the following data is :
25, 15, 23, 25, 17, 27, 20, 18, 24, 30, 19, 28, 35, 10, 31, 40

- Ans**
- ☐ A. 23.5
 - ☒ B. 24.5
 - ☐ C. 20.5
 - ☐ D. 25

Q.53 An engineering student is tasked with creating a detailed side view of a complex machine part for an assembly drawing. Which approach will most accurately represent all features visible from the side while avoiding hidden overlaps or misinterpretations?

- Ans**
- ☐ A. Include all features even those not visible from the selected side view
 - ☐ B. Sketch the side view freely without using projections from the main view
 - ☐ C. Use only hidden lines for representing features on the far side in the view
 - ☒ D. Project all visible elements from the side and omit hidden features unless needed

Q.54 Find the LCM of 72, 78, and 90.

- Ans**
- ☐ A. 4120
 - ☐ B. 4250
 - ☐ C. 4280
 - ☒ D. 4680

Q.55 Which of the following best defines 'work' in physics?

- Ans**
- ☐ A. Work is done whenever a force is applied, regardless of movement.
 - ☐ B. Work is done if a force acts at any angle to the motion.
 - ☐ C. Work is done when energy is stored in an object.
 - ☒ D. Work is done when a force moves an object in the direction of the force.

Q.56 What is the typical temperature range covered by a laboratory thermometer used in school experiments?

- Ans**
- ☒ A. Minus ten to one hundred and ten degrees Celsius
 - ☐ B. Zero to two hundred degrees Celsius
 - ☐ C. Thirty five to forty two degrees Celsius
 - ☐ D. Minus fifty to fifty degrees Celsius

Q.57 A car travels 90 km east and then 30 km west along the same straight road. If the entire journey takes 3 hours, what is the average velocity of the car?

- Ans**
- ☐ A. 50 km/h north
 - ☐ B. 40 km/h east
 - ☒ C. 20 km/h east
 - ☐ D. 30 km/h east

Q.58 A runner completes one lap of a 200 meter circular track in 50 seconds. What is the average speed of the runner?

- Ans**
- ☒ A. 4 meter per second
 - ☐ B. 3.5 meter per second
 - ☐ C. 4.5 meter per second
 - ☐ D. 3 meter per second

Q.59 Which property of a fuse wire ensures it melts quickly when excess current flows?

- Ans**
- ☐ A. High electrical resistance
 - ☒ B. Low melting point
 - ☐ C. High melting point
 - ☐ D. Thick wire

Q.60 P, Q, R, S and T have different ages. T is elder than only one person. S is elder than P but younger than Q. R is elder than Q. Who is the youngest?

- Ans**
- ☒ A. P
 - ☐ B. Q
 - ☐ C. R
 - ☐ D. S

Q.61 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some glasses are spoons.
All spoons are forks.

Conclusions:

(I) Some glasses are forks.
(II) All forks are spoons.

- Ans**
- ☒ A. Only conclusion (I) follows
 - ☐ B. Neither conclusion (I) nor (II) follows
 - ☐ C. Both conclusions (I) and (II) follow
 - ☐ D. Only conclusion (II) follows

Q.62 Which of the following statements correctly reflects the characteristics of a Local Area Network (LAN) and the role of Ethernet within it?

- Ans**
- ☒ A. Ethernet is a standard that governs how devices in a LAN communicate via wired connections, supporting speeds from 10 Mbps to 1000 Mbps.
 - ☐ B. LANs are designed for long-distance communication and use Ethernet primarily for wireless data exchange.
 - ☐ C. A LAN always requires Gigabit Ethernet to function and is insecure because it allows open access to all network devices.
 - ☐ D. Ethernet in a LAN provides low-speed data transfer and connects users over public Internet infrastructure.

Q.63 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Among five people – A, B, C, D, and E – who is the tallest?

(I) A is taller than B. B is taller than C.
(II) D is taller than E.

- Ans**
- ☐ A. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ B. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☒ C. Both statements I and II together are NOT sufficient to answer the question.
 - ☐ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.64 What is the primary function of a fire hydrant in a workplace safety system?

- Ans**
- ☐ A. Removing hazardous fumes from the area
 - ☐ B. Detecting smoke and warning employees
 - ☒ C. Supplying large quantities of water to fight fires
 - ☐ D. Activating fire alarms automatically in emergencies

Q.65 A boat sails 40 km downstream and then 40 km upstream in a river. The boat's speed in still water is 12 km/hr and the speed of the stream is 4 km/hr. How much time does the boat take to cover the entire distance (both upstream and downstream)?

- Ans**
- ☐ A. 8 hours
 - ☒ B. 7.5 hours
 - ☐ C. 10 hours
 - ☐ D. 6 hours

Q.66 What should come in place of the question mark (?) in the given series?

74, 83, 101, 128, ?, 209

- Ans
- ☐ A. 155
 - ☐ B. 176
 - ☒ C. 164
 - ☐ D. 146

Q.67 An object has a mass of 10 kilograms. How does its weight on the Moon compare to its weight on Earth?

- Ans
- ☐ A. The object weighs more on the Moon than on Earth
 - ☐ B. The object weighs the same on both the Moon and Earth
 - ☐ C. The object weighs zero on the Moon
 - ☒ D. The object weighs less on the Moon than on Earth

Q.68 16 is related to 260 following a certain logic. Following the same logic, 25 is related to 630. To which of the following is 9 related, following the same logic?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans
- ☐ A. 732
 - ☐ B. 729
 - ☒ C. 84
 - ☐ D. 78

Q.69 When using a hand file during fitting operations, which action demonstrates adherence to tool safety protocols?

- Ans
- ☐ A. Applying excessive downward force when filing
 - ☐ B. Holding the file near its tang during filing work
 - ☒ C. Fitting a proper handle securely to the tang
 - ☐ D. Filing above shoulder height for better leverage

Q.70 The simple interest earned on a certain sum of money for 3 years at 15% per annum is ₹2,700. Find the sum.

- Ans
- ☐ A. ₹5,000
 - ☐ B. ₹9,000
 - ☐ C. ₹8,000
 - ☒ D. ₹6,000

Q.71 Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right.

(Left) Z @ B R J # D * Q A M S % P L V O U S N T W Z (Right)

How many such symbols are there, each of which is immediately preceded by a letter and also immediately followed by a letter?

- Ans
- ☒ A. Four
 - ☐ B. Two
 - ☐ C. None
 - ☐ D. Three

Q.72 Which line symbol is commonly used in engineering drawings to represent a hidden edge that is not directly visible?

- Ans
- ☒ A. Dashed line
 - ☐ B. Chain thin line
 - ☐ C. Solid thick line
 - ☐ D. Zigzag line

Q.73 If 'A' stands for '+', 'B' stands for 'x', 'C' stands for '+' and 'D' stands for '-', what will come in place of the question mark '?' in the following equation?

$$14 \text{ A } 30 \text{ B } 45 \text{ C } 15 \text{ D } 9 = ?$$

- Ans
- ☒ A. 27
 - ☐ B. 28
 - ☐ C. 29
 - ☐ D. 25

Q.74 Which statement best describes a 'point' in engineering drawing?

- Ans
- ☒ A. A point indicates a precise location but has no size, length, or width.
 - ☐ B. A point is the intersection of two lines and always has measurable length.
 - ☐ C. A point is a short line segment used to mark measurements.
 - ☐ D. A point represents a small area with both length and width.

Q.75 What is the main purpose of ambient air quality standards?

- Ans
- ☐ A. To ensure air is routinely sampled to map historical pollution trends.
 - ☒ B. To set legally permissible limits for specific pollutants to protect public health.
 - ☐ C. To focus exclusively on industrial operations while ignoring other sectors.
 - ☐ D. To require all industries to reduce emissions by the exact same percentage.

Q.76 In how many years will a sum of ₹16,000 at 10% per annum compounded semi-annually become ₹18,522?

- Ans
- ☐ A. 1 year
 - ☒ B. 1.5 years
 - ☐ C. 2 years
 - ☐ D. 2.5 years

Q.77 Which of the following best describes a key environmental concern associated with improper disposal of e-waste?

- Ans
- ☒ A. Release of toxic metals into soil and water
 - ☐ B. Release of greenhouse gases from decomposition
 - ☐ C. Increased recycling rates of precious metals
 - ☐ D. Enhanced biodegradation of plastics

Q.78 Simplify: $60 - \{(-8) \times (-16 - 19 - 2)\} \div [5 \times \{2 + (-1) \times (-1)\}]$

- Ans
- ☐ A. $\frac{608}{15}$
 - ☐ B. $\frac{614}{15}$
 - ☒ C. $\frac{604}{15}$
 - ☐ D. $\frac{594}{15}$

Q.79 Which component makes up the largest proportion of Earth's atmosphere by volume?

Ans ☒ A. Argon

☒ B. Carbon dioxide

☒ C. Nitrogen

☒ D. Oxygen

Q.80 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Shreya related to Mahak if 'Shreya + Dev - Taran × Harshit % Mahak'?

Ans ☒ A. Father's sister

☒ B. Father's mother

☒ C. Mother's mother

☒ D. Mother's sister

Q.81 A shopkeeper marks a product 75% above cost price and offers two successive discounts of 30% and 40%. What is the profit or loss percentage?

Ans ☒ A. 26.5% loss

☒ B. 22.6% profit

☒ C. 15.7% profit

☒ D. 20.9% profit

Q.82 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between X and Z when counted from the right of X. Only two people sit between Z and D. Only three people sit between X and B. A sits to the immediate left of C. Who sits third to the left of Y?

Ans ☒ A. X

☒ B. C

☒ C. A

☒ D. Z

Q.83 A car travels on a highway, and its odometer records a reading of 180 km at 8:00 am and 240 km at 9:30 am. Based on this information, which statement best describes the car's average speed during this interval?

Ans ☒ A. The car's average speed is 40 km per hour as calculated from the odometer readings and time interval.

☒ B. The car's average speed is 180 km per hour since that was the odometer reading at 8:00 am.

☒ C. The car's average speed is 60 km per hour based only on the change in odometer readings.

☒ D. The car's average speed is 240 km per hour since that was the odometer reading at 9:30 am.

Q.84 G is the mother of Y. Y is the sister of V. S is the father of L. L is the husband of V. How is G related to S?

Ans ☒ A. Mother's mother

☒ B. Son's wife's mother

☒ C. Son's wife's sister

☒ D. Son's wife

Q.85 In third angle projection, where is the object placed relative to the plane of projection?

Ans ☒ A. The object is placed in the third quadrant

☒ B. The object is placed in the first quadrant

☒ C. The object is placed in the fourth quadrant

☒ D. The object is placed in the second quadrant

Q.86 Which is the most important safety check before operating any machine in a workshop?

- Ans**
- ☐ A. Wipe the machine with a dry cloth before use
 - ☒ B. Inspect the machine for loose or damaged parts
 - ☐ C. Ensure the machine area is properly illuminated
 - ☐ D. Check if the machine is plugged in properly

Q.87 In this question, a group of numbers/symbols is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer. If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	6	1	&	3	%	8	+	4	#	7	@	5	2	\$
Code	R	V	G	D	S	C	T	L	F	W	H	U	Y	N

Conditions:

- (i) If the first element is a symbol and the last element is an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and last elements are to be coded as ©.
- (iii) If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?

+ 6 \$ 2 7

- Ans**
- ☐ A. WSNYT
 - ☐ B. TSNWW
 - ☐ C. STMWV
 - ☒ D. WRNYT

Q.88 If the mean of the following data is 40, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	30	27	44	29	X

- Ans**
- ☒ A. 82
 - ☐ B. 98
 - ☐ C. 99
 - ☐ D. 93

Q.89 Which of the following scenarios best demonstrates the conversion of chemical energy to mechanical energy?

- Ans**
- ☐ A. A stone falls off a table to the ground
 - ☐ B. A stretched rubber band snaps back to its original shape
 - ☐ C. A flashlight turns on after inserting new batteries
 - ☒ D. A runner uses stored energy from food to sprint forward

Q.90 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements: All girls are hens. No hen is a cat.

Conclusion (I): No girl is a cat.

Conclusion (II): Some cats are hens.

- Ans**
- ☐ A. Only conclusion (II) follows
 - ☐ B. Both conclusions (I) and (II) follow
 - ☒ C. Only conclusion (I) follows
 - ☐ D. Neither conclusion (I) nor (II) follows

Q.91 What should come in place of the question mark (?) in the given series?

98, 104, 116, 134, 158, ?

- Ans**
- ☐ A. 184
 - ☐ B. 186
 - ☒ C. 188
 - ☐ D. 190

Q.92 A mechanical engineer must design a flange joint where two pipes are to be connected at a 45-degree angle. Which method should the engineer use to accurately represent the intersection line on a technical drawing of the two cylindrical pipes?

- Ans**
- ☐ A. Use only standard orthographic projection without auxiliary views
 - ☐ B. Draw a simple circle at the junction in the top view
 - ☒ C. Draw the true shape of the intersection using auxiliary projection
 - ☐ D. Represent the intersection as a straight line in the side view

Q.93 What do touch gestures in Microsoft Windows allow users to do?

- Ans**
- ☐ A. Connect external devices
 - ☒ B. Perform actions using finger movements
 - ☐ C. Increase screen brightness
 - ☐ D. Type faster on the keyboard

Q.94 A cyclist covers 120 meters in 16 seconds on a straight road, then immediately covers 180 meters in 24 seconds on a similar road segment. What is the average speed of the cyclist during the entire journey?

- Ans**
- ☐ A. 6.5 meters per second
 - ☐ B. 7.0 meters per second
 - ☐ C. 8.0 meters per second
 - ☒ D. 7.5 meters per second

Q.95 Which feature is a requirement of the BIS drawing standard in engineering drawings?

- Ans**
- ☐ A. Use of colored pencils for clarity
 - ☒ B. Title block with specific information
 - ☐ C. Freehand sketches without scale
 - ☐ D. Margin lines of random width

Q.96 Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) A T D E B R C L M Q O N P J M Q E A O Z W F U K S L (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☒ A. 3
 - ☐ B. 0
 - ☐ C. 1
 - ☐ D. 2

Q.97 An engineer is tasked with creating a hollow cone for a machine part, where the wall thickness must be consistent and the slant height is critical for assembly. Which factor is most important to ensure the cone will fit correctly in the final design?

- Ans**
- ☐ A. Prioritizing uniform wall thickness over all other features
 - ☐ B. Focusing only on base diameter for precise fit
 - ☒ C. Ensuring the slant height matches the assembly requirement
 - ☐ D. Matching only the overall height of the cone

Q.98 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. Only three boxes are kept above S. Exactly one box is kept between T and S. Exactly three boxes are kept between T and U, and U is kept somewhere above S. V is kept immediately below U. W is kept at one of the places above P. Q is not kept immediately above or below T. Based on the given information, which box is kept at the lowermost position?

- Ans**
- ☒ A. P
 - ☐ B. V
 - ☐ C. S
 - ☐ D. Q

Q.99 E, F, G, H, L and M live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live above G. Only two people live between L and E. Only two people live between M and G. E lives below G but above F. How many people live below H?

- Ans**
- ☐ A. One
 - ☒ B. Three
 - ☐ C. Four
 - ☐ D. Two

Q.100 An engineer is tasked with creating the front view of a mechanical part. The part has a rectangular base with a vertical circular hole passing through it and a triangular prism attached on top. Which of the following best describes what will be visible in the front view?

- Ans**
- ☐ A. Only the triangular prism will be clearly visible in the front view drawing
 - ☐ B. Only the rectangular base outline will be visible in the front view drawing
 - ☐ C. The outline of triangular prism and circular hole will be visible in front view only
 - ☒ D. The outline of rectangular base and triangular prism will be visible but hole is not shown

Section : PART-B

Q.1 What is a direct mechanical reason for low power generation in a diesel engine?

- Ans**
- ☐ A. Damaged fan belt
 - ☐ B. Faulty alternator
 - ☒ C. Worn piston rings
 - ☐ D. Incorrect coolant level

Q.2 Which component works directly with engine valves to manage air and exhaust flow in a diesel engine?

- Ans**
- ☐ A. The crankshaft
 - ☐ B. The fuel injector
 - ☐ C. The flywheel
 - ☒ D. The camshaft

Q.3 In the context of diesel engines, which of the following best describes the primary objective of emission standards?

- Ans**
- ☐ A. Increase smoke emission
 - ☐ B. Reduce engine power
 - ☐ C. Increase fuel wastage
 - ☒ D. Reduce pollution levels

Q.4 Which component is commonly used in evaporative emission control systems to store fuel vapors temporarily?

- Ans**
- ☐ A. Air filter case housing
 - ☒ B. Activated charcoal canister
 - ☐ C. Radiator expansion tank
 - ☐ D. Oil separator ball valve

Q.5 A technician observes that after a diesel engine runs for several hours, the vehicle's exhaust sound becomes much louder and a strong smell is detected at the tail pipe. What is the most probable function of the muffler being compromised in this situation?

- Ans**
- ☐ A. To convert exhaust gases and neutralize pollutants
 - ☐ B. To redirect exhaust gases and control flow only
 - ☒ C. To silence exhaust noise and cool gases before exit
 - ☐ D. To regulate exhaust back pressure for engine braking

Q.6 Which part of the Vernier caliper slides along the main scale for measurement?

- Ans**
- ☐ A. Lower jaw
 - ☐ B. Lock screw
 - ☐ C. Depth rod
 - ☒ D. Vernier scale

Q.7 During maintenance, a supervisor asks the role of a turbocharger when atmospheric pressure is low. How does it help the engine?

- Ans**
- ☐ A. It regulates the coolant flow to the engine
 - ☐ B. It supplies extra fuel to the engine
 - ☐ C. It lowers the engine noise produced
 - ☒ D. It supplies sufficient air to the engine

Q.8 In what way does contrast marking contribute to workshop safety?

- Ans**
- ☐ A. Increases oil spillage
 - ☐ B. Raises cutting speed
 - ☒ C. Minimizes chance of miscuts
 - ☐ D. Decreases lighting needs

Q.9 In an alternator stator, how are the windings typically connected in lightweight stator units?

- Ans**
- ☒ A. Star connected
 - ☐ B. Delta connected
 - ☐ C. Series connected
 - ☐ D. Parallel connected

Q.10 Which property makes particulates from diesel engines particularly harmful in urban environments?

- Ans**
- ☐ A. Particulates dissolve rapidly in water near cities
 - ☐ B. Particulates settle quickly on ground surfaces
 - ☐ C. Particulates neutralize when exposed to sunlight
 - ☒ D. Particulates remain suspended in air for long periods

Q.11 In which operation would a single-acting cylinder most likely provide the greatest efficiency?

- Ans**
- ☐ A. Opening and closing a heavy gate
 - ☒ B. Ejecting finished components from a machine
 - ☐ C. Regulating hydraulic fluid flow
 - ☐ D. Extending and retracting a tool holder

Q.12 An industrial diesel engine fitted with an automatic shutdown system begins to overheat. Which stopping method will the system typically initiate to ensure rapid and safe engine stoppage?

- Ans**
- ☒ A. Cutting the fuel supply via solenoid valve action
 - ☐ B. Disconnecting the starter motor circuit fully
 - ☐ C. Blocking the air intake using a shutoff flap
 - ☐ D. Engaging the decompression lever automatically

Q.13 Which tool is most appropriate for marking parts before removing them during diesel engine dismantling to ensure correct reassembly?

- Ans**
- ☐ A. A metal brush.
 - ☐ B. A barrette file.
 - ☐ C. An adjustable wrench.
 - ☒ D. A center punch.

Q.14 Where is the timing belt or timing chain generally located in a typical engine layout?

- Ans**
- ☒ A. Front section of the engine
 - ☐ B. Middle section of the engine
 - ☐ C. Top section of the engine
 - ☐ D. Bottom section of the engine

Q.15 Which practice helps maintain the accuracy of a steel rule during daily use?

- Ans**
- ☐ A. Measure hot metal parts
 - ☐ B. Wash after every use
 - ☐ C. Oil every hour of use
 - ☒ D. Avoid dropping on floor

Q.16 A customer complains about sluggish acceleration at low speeds in a diesel vehicle with a fixed-geometry turbocharger. How does a variable geometry turbocharger address this issue?

- Ans**
- ☒ A. By altering turbine geometry to create boost at low speed
 - ☐ B. By reducing exhaust manifold pressure at idle
 - ☐ C. By raising exhaust gas temperature automatically
 - ☐ D. By increasing fuel supply at low engine speeds

Q.17 A mechanic inspects a diesel engine and finds the oil level indicator shows the oil is just at the 'Low' mark after running the engine for several hours. What is the most appropriate professional action to ensure engine protection?

- Ans**
- ☐ A. Add oil until the stick is overfilled beyond Full mark
 - ☐ B. Check the oil again without adding oil to confirm reading
 - ☐ C. Continue running the engine until next scheduled maintenance
 - ☒ D. Add oil until the level reaches the Full mark as indicated

Q.18 In a battery, the electrolyte conducts electricity through movement of:

- Ans**
- ☐ A. Neutral atoms only
 - ☐ B. Magnetic domains
 - ☐ C. Free electrons only
 - ☒ D. Ions

Q.19 Which factor is most important when selecting the material for main bearings in diesel engines?

- Ans**
- ☐ A. Good machinability
 - ☐ B. Low manufacturing cost
 - ☒ C. Ability to withstand cyclic loads
 - ☐ D. High thermal conductivity

Q.20 If a flat chisel is used instead of a center punch before drilling, what problem might occur?

- Ans**
- ☐ A. Drill will make a larger hole
 - ☒ B. Drill bit may slip off the spot
 - ☐ C. Drill will cut faster
 - ☐ D. Workpiece will become softer

Q.21 Which of the following has both magnitude and direction, making it a vector quantity?

- Ans**
- ☐ A. Distance
 - ☐ B. Speed
 - ☒ C. Velocity
 - ☐ D. Time

Q.22 In a training scenario, a student is asked about the correct sequence in a forced feed system. Which order best reflects the movement of fuel from the tank to the combustion chamber?

- Ans**
- ☒ A. Fuel passes from tank to water separator, through filters, to injection pump, then injectors
 - ☐ B. Fuel bypasses filters, moves directly from tank to injectors, then to combustion chamber
 - ☐ C. Fuel moves from injection pump to filters, then to tank, finally to injectors
 - ☐ D. Fuel travels from injectors to water separator, then to tank, finally to combustion chamber

Q.23 Which bearing applications in diesel engines make use of bronze materials?

- Ans**
- ☐ A. Camshaft bearings
 - ☒ B. Bushings
 - ☐ C. Connecting rod bearings
 - ☐ D. Main bearings

Q.24 Which engine part must work closely with the connecting rod to produce rotational movement?

- Ans**
- ☐ A. Fuel injector
 - ☐ B. Oil filter
 - ☒ C. Crankshaft
 - ☐ D. Cylinder head

Q.25 The voltage regulator controls alternator voltage by varying the current flow to the:

- Ans**
- ☐ A. Stator
 - ☐ B. Battery
 - ☐ C. Ammeter
 - ☒ D. Rotor

Q.26 Which components are connected to each end of the alternator rotor's field winding?

Ans ☒ A. Slip rings

☐ B. Iron poles

☐ C. Diodes

☐ D. Bearings

Q.27 Which type of line is typically used to represent centre lines in engineering drawings?

Ans ☐ A. Continuous thin line

☒ B. Chain thin line

☐ C. Chain thick

☐ D. Dashed thin line

Q.28 When selecting a drill bit for making precise holes in a hard metal workpiece, which feature should be prioritized to ensure accuracy and tool life?

Ans ☒ A. Drill bits need appropriate point angles and must be HSS or carbide.

☐ B. The drill bit should be made up of carbon steel and have a flat tip.

☐ C. The drill bit should have a long flute length and no coating at all.

☐ D. The drill bit must have a decorative coating and short overall length.

Q.29 What is the main function of a direction control valve in a hydraulic system?

Ans ☐ A. To filter contaminants from fluid

☐ B. To adjust fluid temperature

☐ C. To regulate system pressure

☒ D. To control the path of fluid flow

Q.30 In a gravity feed system, what action causes fuel to start moving from the tank to the engine?

Ans ☒ A. Releasing the fuel cock allows fuel to flow downward

☐ B. Activating the pump starts the fuel flow upward

☐ C. Heating the fuel tank initiates fuel movement

☐ D. Pressurizing the fuel line pushes fuel forward

Q.31 A commercial vehicle manufacturer plans to design a new city bus for frequent stop-and-go urban traffic. Which engine layout would most effectively facilitate easy passenger boarding, maximize internal space, and support rear-driven axles for better traction, given the operational requirements?

Ans ☒ A. Selecting a rear transverse engine layout for the bus design

☐ B. Selecting a rear longitudinal engine layout for the bus design

☐ C. Selecting a front longitudinal engine layout for the bus design

☐ D. Selecting a front transverse engine layout for the bus design

Q.32 An automotive technician needs to ensure the camshaft is not bent during installation. How can a dial indicator assist in this process?

Ans ☐ A. By measuring the camshaft lobe base circle diameter at a completely fixed position

☒ B. By measuring the camshaft's straightness as it is rotated and noting any deviation

☐ C. By ensuring the camshaft journals are properly lubricated prior to the installation

☐ D. By verifying the camshaft achieves the specified torque value after final tightening

Q.33 If a vehicle has two axles and each axle supports two wheels, what technical category does it fall under?

- Ans**
- ☐ A. It is grouped as a six-wheeler vehicle type
 - ☐ B. It is categorized as a two-wheeler vehicle type
 - ☒ C. It is classified as a four-wheeler vehicle type
 - ☐ D. It is known as a three-wheeler vehicle type

Q.34 A key advantage of using a lubricating compound in thread sealing is that it:

- Ans**
- ☐ A. Acts as a solvent for contaminants present
 - ☒ B. Prevents galling and seizing of threads
 - ☐ C. Improves thread strength significantly
 - ☐ D. Accelerates the curing of sealant used

Q.35 A diesel mechanic compares engine types and finds one where each cylinder contains two pistons attached to separate connecting rods. What operational benefit is most associated with this engine type?

- Ans**
- ☐ A. Reducing overall fuel consumption is most associated with this engine type.
 - ☐ B. Simplifying engine maintenance tasks is most associated with this engine type.
 - ☒ C. Achieving a higher power to weight ratio is most associated with this engine type.
 - ☐ D. Improving engine cooling efficiency is most associated with this engine type.

Q.36 Which of the following is a common cause of knocking noise in a diesel engine?

- Ans**
- ☐ A. Loose cylinder head bolts
 - ☐ B. Excessive engine oil
 - ☐ C. Worn out piston rings
 - ☒ D. Incorrect fuel injection timing

Q.37 In a parallel connection, all branches connected across the same two nodes have :

- Ans**
- ☒ A. Equal voltage
 - ☐ B. Equal power dissipation
 - ☐ C. Different currents only
 - ☐ D. Zero resistance

Q.38 Which sensor helps quiet diesel technology operate effectively?

- Ans**
- ☒ A. Crankshaft position sensor
 - ☐ B. Fuel filter clog sensor
 - ☐ C. Air intake pressure sensor
 - ☐ D. Engine oil temperature sensor

Q.39 In which application is an external gear pump commonly used in the field of hydraulics?

- Ans**
- ☐ A. Lubricating bearings in engines
 - ☒ B. Supplying oil to hydraulic systems
 - ☐ C. Compressing fuel in injectors
 - ☐ D. Transferring air in pneumatic systems

Q.40 During a batch production task, the operator must switch quickly between different sizes of workpieces. Which drill vice feature will improve efficiency without compromising holding security?

- Ans**
- ☒ A. Quick-release mechanism with adjustable jaw inserts
 - ☐ B. Elastic bands added to standard vice jaws being used
 - ☐ C. Fixed jaws with no jaw adjustment capability
 - ☐ D. Manual unscrewing of vice jaws for each workpiece change

Q.41 In engineering drawing, what is another name for a pictorial/isometric drawing?

- Ans**
- ☒ A. Three-dimensional drawing
 - ☐ B. Sectional drawing
 - ☐ C. Orthographic drawing
 - ☐ D. Dimension drawing

Q.42 A diesel engine manufacturer needs to ensure rapid and consistent coolant flow through the engine regardless of its operating temperature. Which cooling system design should be selected to meet this requirement?

- Ans**
- ☐ A. Thermosyphon system provides rapid and consistent coolant flow
 - ☐ B. Air cooling system provides rapid and consistent coolant flow
 - ☒ C. Pump circulation system provides rapid and consistent coolant flow
 - ☐ D. Water cooling system provides rapid and consistent coolant flow

Q.43 In a real-life scenario, how should a mechanic systematically diagnose and remedy persistent high engine oil pressure involving multiple possible causes?

- Ans**
- ☐ A. Clean exhaust manifold, replace air filter, and tighten cylinder head bolts
 - ☐ B. Replace coolant, inspect radiator, and adjust idle speed
 - ☐ C. Adjust fuel mixture, check battery terminals, and clean spark plugs
 - ☒ D. Check oil viscosity, inspect relief valve, clean oil filter, and verify oil pump operation

Q.44 Which of the following actions is the safest procedure if fuel is accidentally spilled in a workshop environment?

- Ans**
- ☐ A. Ignore the spilled fuel completely and allow yourself to continue working as normal.
 - ☐ B. Apply water directly to the spill area so that the fuel is immediately diluted.
 - ☐ C. Leave the spill completely unattended and deal with it only at the end of the shift.
 - ☒ D. Clean the spill using approved absorbents and dispose of it as per guidelines

Q.45 In a transformer, if primary conditions remain constant, increasing the number of turns in the secondary winding causes the secondary voltage to:

- Ans**
- ☐ A. Decrease
 - ☐ B. Remain unchanged
 - ☐ C. Become zero
 - ☒ D. Increase

Q.46 Which mechanism acts as a lever to open the engine valve when pushed by the push rod in a diesel engine?

- Ans**
- ☐ A. Camshaft mechanism
 - ☐ B. Tappet mechanism
 - ☒ C. Rocker arm mechanism
 - ☐ D. Push rod mechanism

Q.47 Which type of valves is most commonly used in diesel engine cylinder heads?

- Ans**
- ☐ A. Sleeve valve
 - ☐ B. Needle valve
 - ☐ C. Rotary valve
 - ☒ D. Poppet valve

Q.48 What should be done if a toxic dust container is full in the workshop?

- Ans**
- ☐ A. Continue using the same container
 - ☐ B. Leave the container open until convenient
 - ☐ C. Mix dust in the container with general waste
 - ☒ D. Seal and replace the container immediately

Q.49 Which of the following best defines machine efficiency?

- Ans
- ✓ A. Ratio of output to input
 - ✗ B. Ratio of input to output
 - ✗ C. Difference between input and output
 - ✗ D. Product of input and output

Q.50 Why are compression ignition engines NOT preferred for high-speed applications?

- Ans
- ✗ A. Requires a complex ignition system
 - ✗ B. Smooth operation which decreases speed
 - ✓ C. Heavier components reduce maximum speed
 - ✗ D. Produces no torque at high speeds

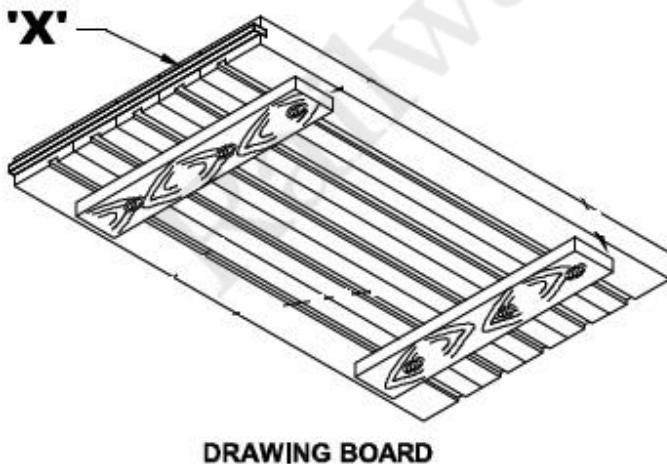
Q.51 In a single overhead camshaft diesel engine, how many camshafts are used for both intake and exhaust valves?

- Ans
- ✗ A. Three
 - ✗ B. Two
 - ✓ C. One
 - ✗ D. Four

Q.52 An engine test reveals that the feed pump supplies inconsistent amounts of fuel to the filters under varying engine speeds. What is the most likely explanation for this behavior, considering the feed pump's design and function?

- Ans
- ✓ A. The camshaft-driven feed pump varies delivery with engine speed changes.
 - ✗ B. A clogged fuel filter causes fluctuating pressure in the system.
 - ✗ C. Air entering the fuel tank causes irregular fuel supply patterns.
 - ✗ D. The injector opening pressure changes with engine temperature.

Q.53 What is the name of the part of the shorter edges of the drawing board shown in the figure that is marked with 'X'?



- Ans
- ✗ A. Battens
 - ✓ B. Ebony edge
 - ✗ C. Wooden Strips
 - ✗ D. Drawing pin

Q.54 If the battery is too weak to operate the starter motor, which starting method can be used in a suitable manual-transmission vehicle?

- Ans
- ✓ A. Starting the vehicle by push-starting.
 - ✗ B. Starting the vehicle by ignition switch.
 - ✗ C. Starting the vehicle by remote switch.
 - ✗ D. Starting the vehicle by starter motor.

Q.55 In Third Angle Projection, onto which plane is the elevation of an object projected?

- Ans**
- ☐ A. Auxiliary plane
 - ☐ B. Inclined plane
 - ☒ C. Vertical plane
 - ☐ D. Horizontal plane

Q.56 Which of the following statements correctly matches the units of mass with their respective systems?

- Ans**
- ☐ A. F.P.S system uses gram, C.G.S system uses kilogram, M.K.S system uses pound
 - ☐ B. F.P.S system uses gram, C.G.S system uses pound, M.K.S system uses kilogram
 - ☐ C. F.P.S system uses kilogram, C.G.S system uses pound, M.K.S system uses gram
 - ☒ D. F.P.S system uses pound, C.G.S system uses gram, M.K.S system uses kilogram

Q.57 Which emission standard is currently enforced for diesel vehicles to limit harmful exhaust gases in India?

- Ans**
- ☐ A. Bharat Stage III
 - ☐ B. Bharat Stage IV
 - ☐ C. Bharat Stage VII
 - ☒ D. Bharat Stage VI

Q.58 What property is primarily strengthened in alloy steels through carburizing for piston pins?

- Ans**
- ☒ A. Surface hardness
 - ☐ B. Ductility
 - ☐ C. Thermal conductivity
 - ☐ D. Corrosion resistance

Q.59 When proper safety procedures are followed, compressed air may be used for many workshop tasks. Which of the following should never be done with compressed air?

- Ans**
- ☒ A. Remove dust from clothes
 - ☐ B. Operate pneumatic tools
 - ☐ C. Clean machine surfaces
 - ☐ D. Inflate vehicle tyres

Q.60 Compression ignition engines are known for their ability to operate efficiently at which type of compression ratio?

- Ans**
- ☐ A. Medium compression ratio
 - ☐ B. Variable compression ratio
 - ☐ C. Low compression ratio
 - ☒ D. High compression ratio

Q.61 Which issue complicates the implementation of quiet diesel engines?

- Ans**
- ☐ A. Operating at lower injection pressure
 - ☐ B. Using simpler fuel lines
 - ☒ C. Precise control of injection timing
 - ☐ D. Designing larger injectors

Q.62 Why is it important for a temperature-resistant thread sealant to resist both thermal cycling and vibration in automotive environments?

- Ans**
- ☒ A. To prevent real-world leaks and seal degradation
 - ☐ B. To ensure rapid curing under cold start conditions
 - ☐ C. To withstand continuous high heat without vibration
 - ☐ D. To facilitate easy removal of components after use

Q.63 Which component typically initiates the oil splash in a splash lubrication system?

Ans ☒ A. The vibrating cylinder head

☒ B. The intake valve

☒ C. The rotating crankshaft

☒ D. The vibrating crankcase

Q.64 What happens to the armature and rotor in an electromagnetic coupling when the voltage is removed?

Ans ☒ A. The pre stressed spring separates them

☒ B. Torque remains applied

☒ C. The armature stays connected

☒ D. The magnetic force holds them together

Q.65 Which electrical component fault can completely interrupt power supply to the ignition and starter circuits, causing engine not starting?

Ans ☒ A. Main fuse blown off

☒ B. Defective brushes in starter

☒ C. Air lock in fuel system

☒ D. Defective starting relay

Q.66 A diesel mechanic observes that certain engine parts show signs of rust after a long period without maintenance. Which function of lubricating oil is most relevant in preventing this scenario, considering its role in corrosion reduction?

Ans ☒ A. Neutralizing acids produced during combustion

☒ B. Facilitating heat transfer within engine parts

☒ C. Reducing mechanical friction among moving parts

☒ D. Forming a protective barrier over metal surfaces

Q.67 A marine diesel engine is fitted with a coolant system operating under increased pressure. During operation, the engine coolant temperature rises above normal limits. What is the most likely direct consequence regarding the coolant's boiling point due to the increased system pressure?

Ans ☒ A. The boiling point of the coolant remains unchanged at all pressures.

☒ B. The coolant will boil at a lower temperature under higher pressure.

☒ C. The boiling point of the coolant decreases with system pressure.

☒ D. The boiling point of the coolant increases with system pressure.

Q.68 Which combination of materials is commonly used for the construction of a cross-cut chisel's body and edge?

Ans ☒ A. Body and edge both mild steel

☒ B. Body and edge both brass

☒ C. Body of mild steel, edge of hardened steel

☒ D. Body of hardened steel, edge of mild steel

Q.69 Which process is initiated when the cooling fan operates as designed in a diesel engine cooling system?

Ans ☒ A. Air is drawn through radiator fins, cooling engine coolant

☒ B. Electric current is increased by the alternator circuit

☒ C. Air is filtered before entering the combustion chamber

☒ D. Fuel is circulated faster through the injector pump

Q.70 A diesel engine workshop tests a radiator by measuring the temperature of water entering and exiting the radiator core during a simulated run. What finding would best confirm that the radiator is performing its intended function?

- Ans**
- ☒ A. The water entering is significantly hotter than the water exiting
 - ☐ B. The water temperature changes slightly with no significant difference
 - ☐ C. The water exiting is significantly hotter than the water entering
 - ☐ D. The water entering is the same temperature as the water exiting

Q.71 A solar cell operates on the principle of the:

- Ans**
- ☐ A. Electrochemical effect
 - ☐ B. Heating effect
 - ☐ C. Piezoelectric effect
 - ☒ D. Photovoltaic effect

Q.72 Excessive oil consumption in a diesel engine, accompanied by thick blue smoke emitting from the exhaust, most likely indicates:

- Ans**
- ☐ A. Worn out gudgeon pins
 - ☐ B. High oil level in the sump
 - ☐ C. Low coolant level
 - ☒ D. Piston rings worn out

Q.73 Which statement describes the main function of a die stock in the context of threading tools?

- Ans**
- ☐ A. It sharpens the cutting edges of dies
 - ☐ B. It measures the diameter of threads during threading operations
 - ☐ C. It cleans debris from newly cut threads
 - ☒ D. It securely holds the die to cut external threads on rods or pipes

Q.74 What is the main function of the adjustment feature on a micrometer?

- Ans**
- ☐ A. To increase the measurement range
 - ☐ B. To lock the spindle for repeated readings
 - ☒ C. To set the zero reading for accuracy
 - ☐ D. To change the scale type used

Q.75 Which type of bearings is most commonly used for supporting the crankshaft in a diesel engine?

- Ans**
- ☐ A. Needle bearing
 - ☐ B. Roller bearing
 - ☐ C. Ball bearing
 - ☒ D. Plain bearing



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	9:30 AM - 12:00 PM
Subject	ALP Stage 2 Mechanic Motor Vehicle

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 Namia is facing the west. She turns left and walks 15 m. She turns left and walks 25 m. She again turns left and walks 40 m. She finally turns left and walks 40 m to reach home. In which direction is her home with respect to the starting point?

- Ans**
- ☒ A. North-West
 - ☐ B. South-East
 - ☐ C. South-West
 - ☐ D. North-East

Q.2 Which of the following statements correctly reflects the characteristics of a Local Area Network (LAN) and the role of Ethernet within it?

- Ans**
- ☐ A. A LAN always requires Gigabit Ethernet to function and is insecure because it allows open access to all network devices.
 - ☒ B. Ethernet is a standard that governs how devices in a LAN communicate via wired connections, supporting speeds from 10 Mbps to 1000 Mbps.
 - ☐ C. Ethernet in a LAN provides low-speed data transfer and connects users over public Internet infrastructure.
 - ☐ D. LANs are designed for long-distance communication and use Ethernet primarily for wireless data exchange.

Q.3 An engineering student is tasked with creating a detailed side view of a complex machine part for an assembly drawing. Which approach will most accurately represent all features visible from the side while avoiding hidden overlaps or misinterpretations?

- Ans**
- ☐ A. Sketch the side view freely without using projections from the main view
 - ☐ B. Use only hidden lines for representing features on the far side in the view
 - ☐ C. Include all features even those not visible from the selected side view
 - ☒ D. Project all visible elements from the side and omit hidden features unless needed

Q.4 Which statement best describes a 'point' in engineering drawing?

- Ans**
- ☒ A. A point indicates a precise location but has no size, length, or width.
 - ☐ B. A point is a short line segment used to mark measurements.
 - ☐ C. A point is the intersection of two lines and always has measurable length.
 - ☐ D. A point represents a small area with both length and width.

Q.5 The average of 8 numbers is 45. If one number, 59, is removed, what will the new average be?

- Ans**
- ☐ A. 42
 - ☐ B. 41.5
 - ☐ C. 42.5
 - ☒ D. 43

Q.6 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☐ A. TN-ZD
 - ☒ B. QK-VA
 - ☐ C. WQ-CG
 - ☐ D. EY-KO

Q.7 A laboratory record shows a distance of 0.004 kilometers between two points. How should this be written in SI units of length for a scientific report?

- Ans**
- ☐ A. 0.4 m
 - ☐ B. 400 cm
 - ☒ C. 4 m
 - ☐ D. 4000 mm

Q.8 Which of the following best defines 'work' in physics?

- Ans**
- ☐ A. Work is done when energy is stored in an object.
 - ☒ B. Work is done when a force moves an object in the direction of the force.
 - ☐ C. Work is done whenever a force is applied, regardless of movement.
 - ☐ D. Work is done if a force acts at any angle to the motion.

Q.9 Which situation best describes an entanglement hazard in a mechanical workshop?

- Ans**
- ☒ A. Loose clothing caught in a rotating shaft
 - ☐ B. Hand pinched between gears
 - ☐ C. Gloves worn near hot surfaces
 - ☐ D. Finger cut by a sharp edge

Q.10 What is the primary function of a fire hydrant in a workplace safety system?

- Ans**
- ☐ A. Activating fire alarms automatically in emergencies
 - ☒ B. Supplying large quantities of water to fight fires
 - ☐ C. Removing hazardous fumes from the area
 - ☐ D. Detecting smoke and warning employees

Q.11 There are two types of silver-copper alloys. The first alloy contains $93\frac{1}{3}\%$ silver, while the second alloy contains $86\frac{2}{3}\%$ silver. Find the amount of the first alloy that should be mixed with some quantity of the second alloy to obtain a 100 kg mixture containing 90% silver.

- Ans**
- ☐ A. 52 kg
 - ☒ B. 50 kg
 - ☐ C. 48 kg
 - ☐ D. 45 kg

Q.12 Below are given two sets of numbers. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

10 - 100 - 50 - 25; 2 - 4 - 2 - 1

- Ans
- ☒ A. 12 - 144 - 62 - 31
 - ☒ B. 4 - 16 - 8 - 4
 - ☒ C. 5 - 25 - 15 - 7
 - ☒ D. 8 - 64 - 32 - 14

Q.13 A diamond ring costs ₹85,000. Its price is reduced first by 11% and then by 4% on the reduced price. Find the final price of the ring after both discounts.

- Ans
- ☒ A. ₹73,624
 - ☒ B. ₹72,604
 - ☒ C. ₹72,624
 - ☒ D. ₹74,624

Q.14 Solve the system of equations:

$$-3x + 2y - z = -1, 6x - 6y + 7z = -7, 3x - 4y + 4z = -6$$

- Ans
- ☒ A. $x=2, y=1, z=-3$
 - ☒ B. $x=2, y=2, z=-1$
 - ☒ C. $x=1, y=2, z=2$
 - ☒ D. $x=-2, y=2, z=11$

Q.15 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UMD ZQG EUJ JYM ?

- Ans
- ☒ A. NBQ
 - ☒ B. NDO
 - ☒ C. OCP
 - ☒ D. PDP

- Q.16** In this question, a group of numbers/symbols is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer. If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	6	1	&	3	%	8	+	4	#	7	@	5	2	\$
Code	R	V	G	D	S	C	T	L	F	W	H	U	Y	N

Conditions:

- (i) If the first element is a symbol and the last element is an odd number, the codes for these two (the first and the last elements) are to be interchanged.
(ii) If the first element is an odd number and the last an even number, the first and last elements are to be coded as ©.
(iii) If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?

+ 6 \$ 2 7

- Ans**  A. TSNWW
 B. WRNYT
 C. STMWV
 D. WSNYT

- Q.17** In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Among five people – A, B, C, D, and E – who is the tallest?

(I) A is taller than B. B is taller than C.

(II) D is taller than E.

- Ans**  A. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 B. Data in statement II alone is sufficient to answer the question while data in statement I is not
 C. Data in statement I alone is sufficient to answer the question while data in statement II is not
 D. Both statements I and II together are NOT sufficient to answer the question.

- Q.18** Simplify: $60 - \{(-8) \times (-16 - 19 - 2)\} \div [5 \times \{2 + (-1) \times (-1)\}]$

- Ans**  A. $\frac{604}{15}$
 B. $\frac{608}{15}$
 C. $\frac{594}{15}$
 D. $\frac{614}{15}$

- Q.19** Three workers, X, Y, and Z, can complete a certain job in 10 days, 12 days, and 15 days, respectively. Determine the number of days required for them to complete the job when they work together.

- Ans**  A. 8 days
 B. 5 days
 C. 4 days
 D. 6 days

Q.20 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. Only three boxes are kept above S. Exactly one box is kept between T and S. Exactly three boxes are kept between T and U, and U is kept somewhere above S. V is kept immediately below U. W is kept at one of the places above P. Q is not kept immediately above or below T. Based on the given information, which box is kept at the lowermost position?

- Ans**
- ☐ A. Q
 - ☐ B. V
 - ☐ C. S
 - ☒ D. P

Q.21 What is an email used for?

- Ans**
- ☐ A. Data processing
 - ☐ B. File storage
 - ☒ C. Sending messages
 - ☐ D. Creating documents

Q.22 The median of the following data is :
25, 15, 23, 25, 17, 27, 20, 18, 24, 30, 19, 28, 35, 10, 31, 40

- Ans**
- ☐ A. 25
 - ☐ B. 23.5
 - ☒ C. 24.5
 - ☐ D. 20.5

Q.23 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some glasses are spoons.
All spoons are forks.

Conclusions:

(I) Some glasses are forks.
(II) All forks are spoons.

- Ans**
- ☐ A. Both conclusions (I) and (II) follow
 - ☐ B. Only conclusion (II) follows
 - ☐ C. Neither conclusion (I) nor (II) follows
 - ☒ D. Only conclusion (I) follows

Q.24 What do touch gestures in Microsoft Windows allow users to do?

- Ans**
- ☐ A. Connect external devices
 - ☒ B. Perform actions using finger movements
 - ☐ C. Type faster on the keyboard
 - ☐ D. Increase screen brightness

Q.25 A roller coaster at the top of its track has maximum potential energy. As it descends and speeds up, what principle explains why the sum of its kinetic and potential energies remains constant if we ignore friction and air resistance?

- Ans**
- ☐ A. Principle of superposition
 - ☐ B. Principle of inertia
 - ☐ C. Law of inertia
 - ☒ D. Law of conservation of energy

- Q.26** Which is the most important safety check before operating any machine in a workshop?
- Ans** ☒ A. Ensure the machine area is properly illuminated
- ☒ B. Inspect the machine for loose or damaged parts
- ☒ C. Check if the machine is plugged in properly
- ☒ D. Wipe the machine with a dry cloth before use

- Q.27** Refer to the following letter and symbol series and answer the question that follows.
Counting to be done from left to right.

(Left) Z @ B R J # D * Q A M S % P L V O U S N T W Z (Right)

How many such symbols are there, each of which is immediately preceded by a letter and also immediately followed by a letter?

- Ans** ☒ A. Four
- ☒ B. Two
- ☒ C. None
- ☒ D. Three

- Q.28** Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans** ☒ A. CH – EK
- ☒ B. DJ – GM
- ☒ C. AF – DI
- ☒ D. BG – EJ

- Q.29** In a certain code language, 'KING' is coded as '9713' and 'ITCH' is coded as '2945'. What is the code for 'I' in the given code language?

- Ans** ☒ A. 9
- ☒ B. 4
- ☒ C. 7
- ☒ D. 2

- Q.30** Which integrated strategy best addresses soil pollution, falling crop yields, and low microbial activity near an industrial zone?

- Ans** ☒ A. Expand urban areas into farmland.
- ☒ B. Ban all regional chemical fertilizers.
- ☒ C. Control industrial waste for sustainability.
- ☒ D. Reforestation in nearby urban centers.

- Q.31** In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.
Among the five poles—I, N, C, H, and L—each having a different height, which pole is the tallest?

(I) I is shorter than N but taller than C. C is taller than only one pole.

(II) H is taller than L.

- Ans** ☒ A. Data in statement II alone is sufficient to answer the question while data in statement I is not
- ☒ B. Both statements I and II together are NOT sufficient to answer the question
- ☒ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
- ☒ D. Data in statement I alone is sufficient to answer the question while data in statement II is not

Q.32 If 'A' stands for '+', 'B' stands for '×', 'C' stands for '÷' and 'D' stands for '−', what will come in place of the question mark '?' in the following equation?

$$14 \text{ A } 30 \text{ B } 45 \text{ C } 15 \text{ D } 9 = ?$$

- Ans**
- ☐ A. 29
 - ☐ B. 28
 - ☒ C. 27
 - ☐ D. 25

Q.33 If Rohan's income increases by 20% and his expenditure increases by 10%, then his savings increase by ₹1,200. If his original income was ₹12,000, what was his original expenditure? (Assume that savings = income – expenditure.)

- Ans**
- ☐ A. ₹10,000
 - ☐ B. ₹9,000
 - ☐ C. ₹11,000
 - ☒ D. ₹12,000

Q.34 G is the mother of Y. Y is the sister of V. S is the father of L. L is the husband of V. How is G related to S?

- Ans**
- ☐ A. Son's wife
 - ☒ B. Son's wife's mother
 - ☐ C. Mother's mother
 - ☐ D. Son's wife's sister

Q.35 A worker's hand is at risk of injury from a mechanical shearing action. Which situation best describes a shearing hazard?

- Ans**
- ☐ A. A hand touching a hot metallic machine surface during maintenance activity
 - ☒ B. A hand caught between a moving blade and a fixed machine surface during operation
 - ☐ C. A hand becoming entangled in a rotating machine shaft during operation
 - ☐ D. A hand sliding repeatedly across a rough abrasive machine surface during work

Q.36 What is the main purpose of ambient air quality standards?

- Ans**
- ☐ A. To focus exclusively on industrial operations while ignoring other sectors.
 - ☐ B. To require all industries to reduce emissions by the exact same percentage.
 - ☐ C. To ensure air is routinely sampled to map historical pollution trends.
 - ☒ D. To set legally permissible limits for specific pollutants to protect public health.

Q.37 A pendulum takes 60 seconds to complete 24 oscillations. If its length is increased and it now takes 72 seconds for the same number of oscillations, what has happened to its time period?

- Ans**
- ☐ A. It has decreased to 1.5 seconds
 - ☒ B. It has increased to 3.0 seconds
 - ☐ C. It has decreased to 2.0 seconds
 - ☐ D. It remains at 2.5 seconds

Q.38 What is the best description of the purpose of multi-view drawing in engineering drawing?

- Ans**
- ☐ A. To view an object from only one direction
 - ☐ B. To show different colors of an object for better visual appearance
 - ☒ C. To represent different sides of an object clearly on a flat surface
 - ☐ D. To present the object in a single three-dimensional visual form only

Q.39 A train X crosses a man who is sitting in another train Y, which is moving in the opposite direction, in 8 seconds. However, when both trains are moving in the same direction, train X takes 20 seconds to pass the same man. If the length of train X is 360 meters and the length of train Y (in which the man is sitting) is 240 meters, what is the speed of train Y?

- Ans** ☒ A. 48.6 km/h
☐ B. 45.3 km/h
☐ C. 46.5 km/h
☐ D. 45.8 km/h

Q.40 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

BIP : EMU
GNU : JRZ

- Ans** ☐ A. XDE : PON
☐ B. CGW : NHT
☒ C. FMT : IQY
☐ D. VCD : GRD

Q.41 A boat sails 40 km downstream and then 40 km upstream in a river. The boat's speed in still water is 12 km/hr and the speed of the stream is 4 km/hr. How much time does the boat take to cover the entire distance (both upstream and downstream)?

- Ans** ☐ A. 10 hours
☐ B. 6 hours
☐ C. 8 hours
☒ D. 7.5 hours

Q.42 Three pipes A, B and C can fill a tank in 12 hours, 18 hours and 24 hours, respectively. A leak at the bottom can empty the full tank in 36 hours. If all the pipes are opened together, in how many hours will the tank be filled? (Round off your answer to two decimal places.)

- Ans** ☐ A. 9.45 hours
☒ B. 6.55 hours
☐ C. 3.33 hours
☐ D. 5.56 hours

Q.43 Find the LCM of 72, 78, and 90.

- Ans** ☐ A. 4250
☐ B. 4120
☒ C. 4680
☐ D. 4280

Q.44 Which line symbol is commonly used in engineering drawings to represent a hidden edge that is not directly visible?

- Ans** ☐ A. Chain thin line
☒ B. Dashed line
☐ C. Zigzag line
☐ D. Solid thick line

Q.45 A trader buys 187 pens at ₹23 each. During transportation, 7 pens get damaged and cannot be sold. He sells the remaining pens at ₹27 each. Find his profit percentage. (rounded off to one decimal place)

- Ans**
- ☒ A. 14.1%
 - ☒ B. 13.0%
 - ☒ C. 13.7%
 - ☒ D. 12.6%

Q.46 In how many years will a sum of ₹16,000 at 10% per annum compounded semi-annually become ₹18,522?

- Ans**
- ☒ A. 1.5 years
 - ☒ B. 2.5 years
 - ☒ C. 2 years
 - ☒ D. 1 year

Q.47 An engineer is tasked with creating a hollow cone for a machine part, where the wall thickness must be consistent and the slant height is critical for assembly. Which factor is most important to ensure the cone will fit correctly in the final design?

- Ans**
- ☒ A. Ensuring the slant height matches the assembly requirement
 - ☒ B. Prioritizing uniform wall thickness over all other features
 - ☒ C. Matching only the overall height of the cone
 - ☒ D. Focusing only on base diameter for precise fit

Q.48 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

QOI 5, OMG 10, MKE 15, KIC 20, ?

- Ans**
- ☒ A. IHS 23
 - ☒ B. IGA 25
 - ☒ C. HIZ 30
 - ☒ D. JHZ 24

Q.49 Which of the following scenarios best demonstrates the conversion of chemical energy to mechanical energy?

- Ans**
- ☒ A. A flashlight turns on after inserting new batteries
 - ☒ B. A stone falls off a table to the ground
 - ☒ C. A stretched rubber band snaps back to its original shape
 - ☒ D. A runner uses stored energy from food to sprint forward

Q.50 A father distributed two different amounts among his sons P, Q, R and S. First amount was distributed in the ratio 5 : 4 : 3 : 2 and the second amount was distributed in the ratio 6 : 7 : 8 : 9. If the second amount is thrice the first amount, then which son will get the maximum amount?

- Ans**
- ☒ A. Q
 - ☒ B. P
 - ☒ C. R
 - ☒ D. S

Q.51 A sample of water is heated from 15 degrees Celsius to 35 degrees Celsius. What is the temperature change in Kelvin?

- Ans**
- ☒ A. The temperature change is 50 K.
 - ☒ B. The temperature change is 30 K.
 - ☒ C. The temperature change is 20 K.
 - ☒ D. The temperature change is 15 K.

Q.52 A sum of ₹420 is divided among A, B, C, and D such that: $A : B = 4 : x$, $B : C = x : 7$, $C : D = 6 : (x - 3)$. If B and C together get ₹210, find the value of x.

- Ans ☒ A. 39
☐ B. 42
☐ C. 53
☐ D. 27

Q.53 O, P, Q, U and V have different heights. Only three people have heights between V and Q. P is taller than U but shorter than O. V is taller than Q. How many people are shorter than P?

- Ans ☒ A. Two
☐ B. Four
☐ C. Three
☐ D. One

Q.54 The circumference of the base of a solid right circular cylinder is 88 cm and its height is 150 cm. What is the volume (in cm^3) of the cylinder?

$\left(\text{Take } \pi = \frac{22}{7} \right)$

- Ans ☐ A. 92500
☒ B. 92400
☐ C. 92550
☐ D. 92450

Q.55 P, Q, R, S and T have different ages. T is elder than only one person. S is elder than P but younger than Q. R is elder than Q. Who is the youngest?

- Ans ☒ A. P
☐ B. S
☐ C. Q
☐ D. R

Q.56 If $\left(x + \frac{1}{x} \right) = 3$, find the value of $\left(x^3 + \frac{1}{x^3} \right)$.

- Ans ☒ A. 18
☐ B. 16
☐ C. 20
☐ D. 15

Q.57 A runner completes one lap of a 200 meter circular track in 50 seconds. What is the average speed of the runner?

- Ans ☐ A. 4.5 meter per second
☐ B. 3.5 meter per second
☐ C. 3 meter per second
☒ D. 4 meter per second

Q.58 If 'A' stands for '+', 'B' stands for '-', 'C' stands for 'x' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

$31 \text{ B } 35 \text{ D } 7 \text{ A } 9 \text{ C } 2 = ?$

- Ans ☐ A. 42
☐ B. 48
☐ C. 46
☒ D. 44

Q.59 What should come in place of the question mark (?) in the given series?

98, 104, 116, 134, 158, ?

- Ans**
- ☐ A. 186
 - ☐ B. 184
 - ☒ C. 188
 - ☐ D. 190

Q.60 E, F, G, H, L and M live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live above G. Only two people live between L and E. Only two people live between M and G. E lives below G but above F. How many people live below H?

- Ans**
- ☐ A. One
 - ☐ B. Four
 - ☐ C. Two
 - ☒ D. Three

Q.61 Refer to the given letter series and answer the question that follows. Counting to be done from left to right.

(Left) B F O P P S Q A L M K A W X S N U Q J O M Y (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☐ A. 6
 - ☐ B. 7
 - ☐ C. 4
 - ☒ D. 5

Q.62 Two students move identical boxes through a distance of 10 m. Student A applies a force of 50 N, while Student B applies a force of 100 N. What is the difference in the work done by the two students?

- Ans**
- ☐ A. 50 J
 - ☒ B. 500 J
 - ☐ C. 1000 J
 - ☐ D. 0 J

Q.63 An object has a mass of 10 kilograms. How does its weight on the Moon compare to its weight on Earth?

- Ans**
- ☒ A. The object weighs less on the Moon than on Earth
 - ☐ B. The object weighs more on the Moon than on Earth
 - ☐ C. The object weighs zero on the Moon
 - ☐ D. The object weighs the same on both the Moon and Earth

Q.64 16 is related to 260 following a certain logic. Following the same logic, 25 is related to 630. To which of the following is 9 related, following the same logic?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☒ A. 84
 - ☐ B. 78
 - ☐ C. 732
 - ☐ D. 729

Q.65 Which approach most effectively reduces both nitrogen and phosphorus concentrations during wastewater treatment?

- Ans**
- ☒ A. Biological and chemical nutrient removal
 - ☐ B. Primary sedimentation with extended aeration
 - ☐ C. Surface-flow constructed wetlands
 - ☐ D. UV disinfection following secondary treatment

Q.66 Which of the following statements correctly describes average velocity and its SI unit?

- Ans**
- ☐ A. Average velocity is the total distance divided by total time, and its unit is meter per second.
 - ☒ B. Average velocity is the total displacement divided by total time, and its unit is meter per second.
 - ☐ C. Average velocity is the total displacement divided by total time, and its unit is kilometer per hour.
 - ☐ D. Average velocity is the total distance divided by total time, and its unit is kilometer per hour.

Q.67 When a moving car suddenly applies brakes, its kinetic energy is transformed mainly into which form of energy?

- Ans**
- ☐ A. Potential energy
 - ☒ B. Heat energy
 - ☐ C. Light energy
 - ☐ D. Sound energy

Q.68 Which of the following best describes a key environmental concern associated with improper disposal of e-waste?

- Ans**
- ☒ A. Release of toxic metals into soil and water
 - ☐ B. Release of greenhouse gases from decomposition
 - ☐ C. Increased recycling rates of precious metals
 - ☐ D. Enhanced biodegradation of plastics

Q.69 PJAE is related to JOWH in a certain way based on the English alphabetical order. In the same way, OIVC is related to INRF. To which of the following is NEZF related to following the same logic?

- Ans**
- ☐ A. HKVJ
 - ☐ B. IJVJ
 - ☒ C. HJVI
 - ☐ D. IKUH

Q.70 If 'A' stands for '+', 'B' stands for '−', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

28 A 16 C 3 B 12 D 4 = ?

- Ans**
- ☒ A. 73
 - ☐ B. 71
 - ☐ C. 72
 - ☐ D. 70

Q.71 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements: All girls are hens. No hen is a cat.

Conclusion (I): No girl is a cat.

Conclusion (II): Some cats are hens.

- Ans**
- ☐ A. Neither conclusion (I) nor (II) follows
 - ☒ B. Only conclusion (I) follows
 - ☐ C. Only conclusion (II) follows
 - ☐ D. Both conclusions (I) and (II) follow

Q.72 In a spreadsheet application, a user selects a range of cells and presses Ctrl + C, followed by Ctrl + V in a different worksheet. What happens to the data?

- Ans**
- ☐ A. The selected cells are moved to the new worksheet.
 - ☒ B. The selected cells are copied to the new worksheet.
 - ☐ C. The selected cells are saved to a new file.
 - ☐ D. The selected cells are deleted from the original worksheet.

Q.73 In third angle projection, where is the object placed relative to the plane of projection?

- Ans**
- ☐ A. The object is placed in the first quadrant
 - ☐ B. The object is placed in the second quadrant
 - ☐ C. The object is placed in the fourth quadrant
 - ☒ D. The object is placed in the third quadrant

Q.74 The simple interest earned on a certain sum of money for 3 years at 15% per annum is ₹2,700. Find the sum.

- Ans**
- ☐ A. ₹9,000
 - ☐ B. ₹8,000
 - ☐ C. ₹5,000
 - ☒ D. ₹6,000

Q.75 A car travels 60 km north in 2 hours, then 40 km south in the next 1 hour. What is the car's average velocity over the entire trip?

- Ans**
- ☐ A. 20 km/h south
 - ☒ B. 6.7 km/h north
 - ☐ C. 0 km/h
 - ☐ D. 33.3 km/h north

Q.76 Which component makes up the largest proportion of Earth's atmosphere by volume?

- Ans**
- ☐ A. Oxygen
 - ☐ B. Argon
 - ☒ C. Nitrogen
 - ☐ D. Carbon dioxide

Q.77 A cyclist covers 120 meters in 16 seconds on a straight road, then immediately covers 180 meters in 24 seconds on a similar road segment. What is the average speed of the cyclist during the entire journey?

- Ans**
- ☐ A. 6.5 meters per second
 - ☐ B. 8.0 meters per second
 - ☒ C. 7.5 meters per second
 - ☐ D. 7.0 meters per second

Q.78 A trader marks an article 25% above its cost price. He allows a discount of 10% on the marked price. After giving the discount, he makes a profit of ₹180 on the article. What is the cost price of the article?

- Ans**
- ☐ A. ₹1,380
 - ☐ B. ₹1,200
 - ☐ C. ₹1,260
 - ☒ D. ₹1,440

Q.79 A thermometer shows a reading of 37 degrees Celsius. What is the corresponding temperature in Kelvin?

- Ans**
- ☐ A. 320 K
 - ☐ B. 300 K
 - ☒ C. 310 K
 - ☐ D. 270 K

Q.80 A shopkeeper marks a product 75% above cost price and offers two successive discounts of 30% and 40%. What is the profit or loss percentage?

- Ans**
- ☐ A. 20.9% profit
 - ☐ B. 15.7% profit
 - ☐ C. 22.6% profit
 - ☒ D. 26.5% loss

Q.81 A car travels 90 km east and then 30 km west along the same straight road. If the entire journey takes 3 hours, what is the average velocity of the car?

- Ans**
- ☐ A. 30 km/h east
 - ☐ B. 40 km/h east
 - ☒ C. 20 km/h east
 - ☐ D. 50 km/h north

Q.82 Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) A T D E B R C L M Q O N P J M Q E A O Z W F U K S L (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☐ A. 2
 - ☐ B. 1
 - ☒ C. 3
 - ☐ D. 0

Q.83 An engineer is tasked with creating the front view of a mechanical part. The part has a rectangular base with a vertical circular hole passing through it and a triangular prism attached on top. Which of the following best describes what will be visible in the front view?

- Ans**
- ☐ A. The outline of triangular prism and circular hole will be visible in front view only
 - ☐ B. Only the rectangular base outline will be visible in the front view drawing
 - ☒ C. The outline of rectangular base and triangular prism will be visible but hole is not shown
 - ☐ D. Only the triangular prism will be clearly visible in the front view drawing

Q.84 When using a hand file during fitting operations, which action demonstrates adherence to tool safety protocols?

- Ans**
- ☒ A. Fitting a proper handle securely to the tang
 - ☐ B. Applying excessive downward force when filing
 - ☐ C. Holding the file near its tang during filing work
 - ☐ D. Filing above shoulder height for better leverage

Q.85 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Shreya related to Mahak if 'Shreya + Dev - Taran × Harshit % Mahak'?

- Ans**
- ☒ A. Mother's mother
 - ☐ B. Father's mother
 - ☐ C. Father's sister
 - ☐ D. Mother's sister

Q.86 A car travels on a highway, and its odometer records a reading of 180 km at 8:00 am and 240 km at 9:30 am. Based on this information, which statement best describes the car's average speed during this interval?

- Ans**
- ☒ A. The car's average speed is 40 km per hour as calculated from the odometer readings and time interval.
 - ☐ B. The car's average speed is 240 km per hour since that was the odometer reading at 9:30 am.
 - ☐ C. The car's average speed is 180 km per hour since that was the odometer reading at 8:00 am.
 - ☐ D. The car's average speed is 60 km per hour based only on the change in odometer readings.

Q.87 What is the simplified value of the expression $\left[\frac{\cos A}{(1 - \tan A)} \right] + \left[\frac{\sin A}{(1 - \cot A)} \right]$?

- Ans**
- ☒ A. $\cos A + \sin A$
 - ☐ B. 1
 - ☐ C. 0
 - ☐ D. $\sin A - \cos A$

Q.88 What should come in place of the question mark (?) in the given series?

74, 83, 101, 128, ?, 209

- Ans**
- ☒ A. 164
 - ☐ B. 155
 - ☐ C. 146
 - ☐ D. 176

Q.89 A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q such that OQ = 12 cm. What is the length of PQ?

- Ans**
- ☒ A. $\sqrt{119}$ cm
 - ☐ B. $\sqrt{107}$ cm
 - ☐ C. $\sqrt{117}$ cm
 - ☐ D. $\sqrt{97}$ cm

Q.90 A car of mass 1200 kg accelerates from rest to a speed of 20 m/s on a straight road. If the kinetic energy gained by the car is completely due to the work done by the engine, which of the following best represents the total kinetic energy acquired by the car at this speed?

- Ans**
- ☐ A. 480,000 joules
 - ☐ B. 12,000 joules
 - ☒ C. 240,000 joules
 - ☐ D. 24,000 joules

Q.91 A conical tent has a base radius of 14 m and a height of 48 m. How many cubic meters of air can it hold? (Use $\pi = \frac{22}{7}$)

- Ans**
- ☐ A. 9568
 - ☒ B. 9856
 - ☐ C. 9865
 - ☐ D. 8956

Q.92 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between X and Z when counted from the right of X. Only two people sit between Z and D. Only three people sit between X and B. A sits to the immediate left of C. Who sits third to the left of Y?

- Ans**
- ☒ A. C
 - ☐ B. Z
 - ☐ C. X
 - ☐ D. A

Q.93 A mechanical engineer must design a flange joint where two pipes are to be connected at a 45-degree angle. Which method should the engineer use to accurately represent the intersection line on a technical drawing of the two cylindrical pipes?

- Ans**
- ☐ A. Represent the intersection as a straight line in the side view
 - ☒ B. Draw the true shape of the intersection using auxiliary projection
 - ☐ C. Use only standard orthographic projection without auxiliary views
 - ☐ D. Draw a simple circle at the junction in the top view

Q.94 Which feature is a requirement of the BIS drawing standard in engineering drawings?

- Ans**
- ☒ A. Title block with specific information
 - ☐ B. Use of colored pencils for clarity
 - ☐ C. Freehand sketches without scale
 - ☐ D. Margin lines of random width

Q.95 An engineer uses fault tree analysis to assess a machine-related injury in a factory. Which step should be taken first according to standard procedure?

- Ans**
- ☐ A. List all possible causes of failures
 - ☒ B. Define the top event representing the injury
 - ☐ C. Validate the analysis using workplace data
 - ☐ D. Establish preventive measures to control risks

Q.96 Which property of a fuse wire ensures it melts quickly when excess current flows?

- Ans**
- ☐ A. High electrical resistance
 - ☐ B. High melting point
 - ☒ C. Low melting point
 - ☐ D. Thick wire

Q.97 If a scooter travels at a constant speed of 25 km per hour, how far will it travel in 4 hours?

- Ans**
- ☐ A. 75 km
 - ☐ B. 80 km
 - ☒ C. 100 km
 - ☐ D. 120 km

Q.98 Which of the following is both, an input and output device?

- Ans**
- ☐ A. Keyboard
 - ☒ B. Touchscreen monitor
 - ☐ C. Printer
 - ☐ D. Projector

Q.99 If the mean of the following data is 40, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	30	27	44	29	X

- Ans**
- ☐ A. 98
 - ☒ B. 82
 - ☐ C. 93
 - ☐ D. 99

Q.100 What is the typical temperature range covered by a laboratory thermometer used in school experiments?

- Ans**
- ☐ A. Minus fifty to fifty degrees Celsius
 - ☒ B. Minus ten to one hundred and ten degrees Celsius
 - ☐ C. Zero to two hundred degrees Celsius
 - ☐ D. Thirty five to forty two degrees Celsius

Section : **PART-B**

Q.1 What happens to the vehicle's rear ride height when the rubber air cylinder is pressurized in a load-adjustable shock absorber?

- Ans**
- ☐ A. The rear ride height remains unchanged
 - ☒ B. The rear ride height increases
 - ☐ C. The rear ride height becomes uneven side to side
 - ☐ D. The rear ride height decreases

Q.2 A failure analysis shows a big-end bearing with excessive scoring and shaft damage. Which property was likely insufficient in the bearing material?

- Ans**
- ☐ A. High hardness of the bearing
 - ☐ B. Good thermal conductivity
 - ☐ C. High tensile strength of the bearing
 - ☒ D. Embeddability of the bearing material

Q.3 Which warning sign on the dashboard may indicate a seat belt pretensioner issue?

- Ans**
- ☐ A. A headlight warning flashes
 - ☒ B. A seat belt warning light remains on
 - ☐ C. An air conditioning warning appears
 - ☐ D. A radio warning message is shown

Q.4 Under what condition will the shift valve delay a gear shift in automatic transmission?

- Ans**
- ☐ A. If the vehicle is accelerating gently.
 - ☒ B. If the vehicle is accelerating quickly.
 - ☐ C. If the vehicle is in idling state.
 - ☐ D. If the vehicle is braking heavily.

Q.5 Which tool is most appropriate for checking battery terminal tightness during routine automobile maintenance?

- Ans**
- ☒ A. A spanner of correct size
 - ☐ B. A clean paintbrush
 - ☐ C. A rubber head hammer
 - ☐ D. A flathead screwdriver

Q.6 An engine consumes excessive oil and oil is found in the combustion chamber. What action should be taken?

- Ans**
- ☐ A. Remove excess oil
 - ☒ B. Replace the piston rings
 - ☐ C. Replace the main bearings
 - ☐ D. Use oil of higher viscosity

Q.7 What is the standard figure to represent a shaft in a cross-sectional engineering drawing?

- Ans**
- ☐ A. Rectangle
 - ☒ B. Circle
 - ☐ C. Square
 - ☐ D. Triangle

Q.8 When performing alternator maintenance, you replace a component that connects the rotor to the external circuit. Which part is this?

- Ans**
- ☐ A. Stator winding
 - ☐ B. Rectifier assembly
 - ☐ C. Voltage regulator
 - ☒ D. Slip rings

Q.9 A technician measures only the outside diameter of a rim. What mistake has been made in defining the rim size?

- Ans**
- ☐ A. Measured the inner circumference
 - ☐ B. Used tyre sidewall measurement
 - ☒ C. Omitted the width of the rim
 - ☐ D. Included tread depth only

Q.10 Which component directly connects the engine crankshaft to the automatic transmission in a torque converter system?

- Ans**
- ☒ A. Drive plate
 - ☐ B. Clutch
 - ☐ C. Governor
 - ☐ D. Oil pump

Q.11 What are the likely consequences of air leaking into a lift pump inlet during operation?

- Ans**
- ☐ A. Engine runs cooler
 - ☐ B. Engine power increases
 - ☒ C. Engine may run irregularly
 - ☐ D. Emissions are improved

Q.12 Which application best demonstrates the practical use of outside callipers in automotive work?

- Ans**
- ☒ A. Checking uniform shaft diameter at different locations
 - ☐ B. Measuring drilled hole depth during machining work
 - ☐ C. Marking reference lines on fabricated metal surfaces
 - ☐ D. Measuring internal bore diameter of engine cylinders

Q.13 Which symptom can indicate improper alignment of the piston assembly?

- Ans**
- ☐ A. High coolant loss from engine
 - ☐ B. Increased oil pressure reading
 - ☐ C. Fuel dilution in oil sump
 - ☒ D. Irregular wear on piston skirt

Q.14 How do some run-flat tyres support vehicle weight after a puncture?

- Ans**
- ☐ A. By containing a rubber foam insert inside the tyre
 - ☐ B. By having an extra air reservoir in the rim
 - ☒ C. By using stiffer sidewalls that can support the vehicle
 - ☐ D. By reinforcing the tread with steel mesh

Q.15 Which of the following component links both the steering arms together in the conventional steering system?

- Ans**
- ☐ A. The drag link rod links both the steering arms
 - ☐ B. The stabilizer bar links both the steering arms
 - ☐ C. The drop arm links both the steering arms
 - ☒ D. The track rod connects both the steering arms.

Q.16 In a pure intrinsic semiconductor, where is the Fermi level located?

- Ans**
- ☐ A. Inside the conduction band
 - ☒ B. Near the middle of the forbidden energy gap
 - ☐ C. Inside the valence band
 - ☐ D. Near the power supply voltage

Q.17 A technician needs to synchronize the extension speed of two hydraulic cylinders operating under different loads. Which application of flow control valves is most effective?

- Ans**
- ☐ A. Placing a flow control valve only in the return line from both cylinders
 - ☒ B. Installing flow control valves in the lines to both cylinders to balance fluid flow
 - ☐ C. Adjusting pump output to increase overall system pressure for both cylinders
 - ☐ D. Using a pressure relief valve to stabilize system pressure for both cylinders

Q.18 Which failure is most likely if the camshaft drive gears are worn out?

- Ans**
- ☐ A. Coolant will leak from the radiator
 - ☐ B. Alternator will generate excess current
 - ☐ C. Fuel delivery will be blocked
 - ☒ D. Valve timing will become inaccurate

Q.19 What is a common symptom of a failing electric vehicle battery?

- Ans**
- ☐ A. High oil consumption
 - ☐ B. Knocking engine sound
 - ☒ C. Reduced driving range
 - ☐ D. Unusual exhaust smoke

Q.20 Which scenario best demonstrates the advantage of electronic adjustable shock absorbers on different road conditions?

- Ans**
- ☒ A. Using only manual adjustments without electronics
 - ☒ B. Changing the dampening rate according to road conditions
 - ☒ C. Keeping the dampening rate unchanged regardless of speed
 - ☒ D. Maintaining a fixed soft setting for all driving conditions

Q.21 If the Engine Control Unit (ECU) detects a fault, how can the specific problem area be identified?

- Ans**
- ☒ A. By checking engine oil viscosity
 - ☒ B. By a code provided by the ECU
 - ☒ C. By checking engine spark plugs
 - ☒ D. By checking compression pressure

Q.22 Which engine cooling method removes heat by circulating a liquid around the cylinder walls and transferring it to a radiator?

- Ans**
- ☒ A. Water cooling method using liquid coolant
 - ☒ B. Oil cooling method using lubricating oil
 - ☒ C. Air cooling method using cooling fins
 - ☒ D. Exhaust cooling method using outlet gases

Q.23 A vehicle's Diagnostic Trouble Code (DTC) is read as a generic code. What does this imply about the fault?

- Ans**
- ☒ A. The issue is defined by manufacturer and not unique to the industry standards
 - ☒ B. The code is not recognized by the code reader, needs update
 - ☒ C. The issue is defined by industry standards and not unique to the manufacturer
 - ☒ D. The problem is unique to that vehicle model

Q.24 Why must the secondary pulley shaft in a **Continuously Variable Transmission (CVT) be manufactured precisely?**

- Ans**
- ☒ A. Allow flexibility during operation
 - ☒ B. Ensure accurate torque transmission
 - ☒ C. Adjust its length automatically
 - ☒ D. Resist chemical corrosion

Q.25 Why is it important to use a V block when drilling a round rod?

- Ans**
- ☒ A. It cools the workpiece
 - ☒ B. It changes the drill size
 - ☒ C. It prevents the rod from rolling
 - ☒ D. It increases drilling speed

Q.26 Why are hydraulic systems used in automobile power steering mechanisms?

- Ans**
- ☒ A. They decrease fuel consumption at high speed
 - ☒ B. They reduce driver effort when turning the wheel
 - ☒ C. They control the lighting circuits in vehicles
 - ☒ D. They increase engine speed during turns

Q.27 When using a depth micrometer, which constructional aspect helps keep the instrument stable and reduce measurement error?

- Ans**
- ☒ A. The rigid base minimizes movement during use
 - ☒ B. The thimble resists external vibrations
 - ☒ C. The ratchet stop absorbs vibration impacts
 - ☒ D. The rods stabilize the entire instrument

Q.28 What is a critical factor to consider when selecting a taper reamer for aligning two components with a tapered pin?

- Ans**
- ☐ A. Selecting the hardest available material
 - ☒ B. Matching the taper angle of the pin and reamer
 - ☐ C. Ensuring equal tool length to the pin
 - ☐ D. Matching the flute count to the pin

Q.29 If the potentiometer in the vane-type air flow sensor fails, what is a likely result?

- Ans**
- ☐ A. The ECU ignores all sensor inputs
 - ☐ B. The sensor measures fuel pressure in place of air
 - ☒ C. The ECU receives inaccurate airflow data
 - ☐ D. The injectors are directly controlled by the potentiometer

Q.30 Which impact is most directly associated with the use of extractors in a vehicle's exhaust system under sustained high engine speeds?

- Ans**
- ☐ A. Improved noise insulation in the cabin
 - ☒ B. Enhanced exhaust gas flow at high rpm
 - ☐ C. Reduced exhaust temperature during operation
 - ☐ D. Increased overall engine size

Q.31 What is the primary function of a proportioning valve in a front disc, rear drum brake system?

- Ans**
- ☐ A. To restrict fluid pressure to the front brakes during hard braking
 - ☐ B. To increase fluid pressure to the rear brakes at all times
 - ☒ C. To restrict fluid pressure to the rear brakes during hard braking
 - ☐ D. To act as a warning device for brake failure

Q.32 Which practice best ensures driver safety during road testing of vehicles after major repairs?

- Ans**
- ☒ A. Following safety checks and wearing proper gear
 - ☐ B. Depending on previous records before the road test
 - ☐ C. Inspecting vehicle systems without using safety gear
 - ☐ D. Monitoring engine sounds during the complete test

Q.33 Which state does the refrigerant enter the compressor in an automobile HVAC system?

- Ans**
- ☐ A. High-pressure gas
 - ☐ B. High-pressure liquid
 - ☐ C. Low-pressure liquid
 - ☒ D. Low-pressure gas

Q.34 What does a higher octane rating in gasoline primarily indicate about the fuel?

- Ans**
- ☒ A. It resists knocking during combustion
 - ☐ B. It improves exhaust emission quality
 - ☐ C. It boosts the fuel energy content
 - ☐ D. It increases the engine cooling effect

Q.35 Which method is recommended for safely cleaning toxic dust from vehicle components in a workshop?

- Ans**
- ☐ A. Wiping by hand with cloth
 - ☐ B. Dry sweeping with a broom
 - ☐ C. Compressed air blowing
 - ☒ D. Vacuum cleaning equipment

Q.36 What principle does the height sensor use to function in an electronically controlled air suspension system?

- Ans**
- ☐ A. Pressure principle
 - ☒ B. Electromagnetic induction principle
 - ☐ C. Thermal expansion principle
 - ☐ D. Piezoelectric effect principle

Q.37 If the centrifugal advance mechanism fails and does not advance the ignition timing, what is a likely result?

- Ans**
- ☒ A. Engine may lose power at higher speeds
 - ☐ B. Engine will run at maximum efficiency
 - ☐ C. Engine will overheat quickly
 - ☐ D. Engine may lose power at lower speeds

Q.38 Which component supplies current to the rotor windings in most alternators?

- Ans**
- ☐ A. Voltage regulator unit
 - ☐ B. Ignition switch contacts
 - ☐ C. Diodes and rectifier
 - ☒ D. Slip rings and brushes

Q.39 If a mechanic finds that the engine does not start even though the battery is fully charged, which electrical connection or component should be checked next?

- Ans**
- ☐ A. Faulty ignition switch contacts
 - ☐ B. Blown main starter fuse
 - ☒ C. Loose battery terminal
 - ☐ D. Corroded solenoid switch connection

Q.40 A mechanic is diagnosing a vehicle with poor acceleration and suspects a fuel system issue. Which test would best confirm whether incorrect fuel pressure is the cause?

- Ans**
- ☐ A. Inspect the injectors for clogging and leaks
 - ☐ B. Listen for the fuel pump sound during ignition
 - ☒ C. Measure pressure at the rail and compare to specifications
 - ☐ D. Replace the fuel filter and observe improvement

Q.41 Why is torque specification important when tightening bolts during diesel engine assembly?

- Ans**
- ☐ A. It ensures that the hand tightening alone is always sufficient for all bolts to meet torque specifications
 - ☐ B. It ensures that any arbitrary amount of torque can be applied manually to achieve bolt tightening
 - ☐ C. It ensures bolts have a clearance fit with the nuts and saves time in assembly
 - ☒ D. It ensures bolts are neither too loose nor too tight for engine safety

Q.42 Which of the following is NOT a characteristic of extension lines?

- Ans**
- ☒ A. They are drawn thicker than visible lines
 - ☐ B. They extend beyond dimension lines
 - ☐ C. They are continuous without gaps
 - ☐ D. They are thin in appearance

Q.43 A fan runs for 6 hours per day and consumes the rated power of 75 watts. How much energy will it consume in two days?

- Ans**
- ☐ A. 75 watt-hours
 - ☒ B. 900 watt-hours
 - ☐ C. 150 watt-hours
 - ☐ D. 825 watt-hours

Q.44 Which piston ring is designed to maintain proper tension and fit of other rings in the groove?

- Ans**
- ☐ A. Scraper ring
 - ☐ B. Compression ring
 - ☐ C. Oil control ring
 - ☒ D. Expander ring

Q.45 Why is emery paper preferred over sandpaper for finishing metal surfaces in marking and measuring tasks?

- Ans**
- ☐ A. Emery paper produces less friction during use
 - ☒ B. Emery paper is harder and more durable
 - ☐ C. Emery paper absorbs oil better than sand paper
 - ☐ D. Emery paper is specifically designed for cleaning wood surfaces

Q.46 When might a diesel actuator require recalibration?

- Ans**
- ☐ A. When replacing tires
 - ☐ B. After new battery is fitted
 - ☐ C. When changing engine oil
 - ☒ D. After fuel system repairs

Q.47 Which technology ensures better fuel economy and emission control in modern petrol vehicles?

- Ans**
- ☐ A. Carburettor Fuel Supply system
 - ☐ B. Common Rail Direct Injection system
 - ☐ C. Single Point Fuel Injection system
 - ☒ D. Multi Point Fuel Injection system

Q.48 Which part of a depth micrometer ensures stable positioning during measurement?

- Ans**
- ☒ A. The broad base that rests on the surface
 - ☐ B. The ratchet that applies pressure
 - ☐ C. The thimble used to rotate the spindle
 - ☐ D. The spindle that extends downward

Q.49 Which exhaust emission produced from sulphur present in automotive fuel contributes significantly to acid rain formation?

- Ans**
- ☐ A. Nitrogen oxides
 - ☐ B. Unburnt hydrocarbons
 - ☒ C. Sulphur oxides
 - ☐ D. Carbon monoxide

Q.50 Which of the following workshop observations would suggest a steering column is NOT collapsible?

- Ans**
- ☐ A. It uses an intermediate collapsible piece
 - ☒ B. It is built from one continuous solid rod
 - ☐ C. It is divided into several connected parts
 - ☐ D. It has a flexible joint near the base

Q.51 On a technical drawing, the intersection of two axes commonly represents what?

- Ans**
- ☐ A. The hole diameter
 - ☐ B. The material specification
 - ☒ C. The center point of a part
 - ☐ D. The surface finish type

Q.52 If spurt holes are blocked, what is the most likely immediate effect on engine operation?

Ans ☒ A. Rapid increase in coolant flow to cylinder walls

☒ B. Increased friction in moving engine components

☒ C. Sudden improvement in fuel combustion quality

☒ D. Immediate rise in oil pressure throughout the system

Q.53 Which tool is typically used to tighten fittings on refrigerant hoses?

Ans ☒ A. Screwdriver or tester

☒ B. Hammer or mallet

☒ C. Wrench or spanner

☒ D. File or rasp

Q.54 Which engine problem is indicated by high carbon monoxide levels in the exhaust?

Ans ☒ A. Air-fuel mixture is too rich in the engine

☒ B. Poor tire alignment during operation

☒ C. Worn spark plugs in the ignition system

☒ D. Low coolant level in the radiator

Q.55 How is the air gap between the brake pads and the disc restored when the brake is released in a floating caliper disc brake?

Ans ☒ A. By the force of the piston sealing ring

☒ B. By renewed hydraulic pressure

☒ C. By the outer brake pad spring

☒ D. By the motion of the locating studs

Q.56 How does a worn-out piston ring influence hydrocarbon emissions in the exhaust?

Ans ☒ A. Improves engine compression

☒ B. Allows unburnt fuel to enter exhaust

☒ C. Filters hydrocarbons from exhaust

☒ D. Reduces emission temperature

Q.57 A vehicle battery repeatedly becomes discharged while driving. Which charging system component is most likely faulty?

Ans ☒ A. Ignition coil producing weak spark during ignition

☒ B. Starter motor causing delayed engine cranking

☒ C. Fuel pump reducing fuel supply to the engine

☒ D. Alternator failing to charge the battery properly

Q.58 The abbreviation SMF in SMF battery refers to:

Ans ☒ A. Stored Mechanical Force

☒ B. Sealed Maintenance Free

☒ C. Semi Metallic Frame

☒ D. Standard Magnetic Fuse

Q.59 Why is it important for the oil cooler to maintain the oil at an optimal temperature range?

Ans ☒ A. To prevent the oil from changing its color during operation.

☒ B. To ensure the oil maintains proper viscosity for lubrication.

☒ C. To cool the combustion gases in the engine cylinders.

☒ D. To increase the oil level in the crankcase automatically.

Q.60 What is indicated if the parking lamp glows continuously in a vehicle with ABS and Electronic Brake-force Distribution (EBD)?

- Ans**
- ☒ A. Low Brake fluid level
 - ☒ B. Defective EBD operation
 - ☒ C. A door is left open
 - ☒ D. Normal EBD operation

Q.61 When the accelerator pedal is fully depressed, what happens during kick-down operation in an automatic transmission?

- Ans**
- ☒ A. A higher gear is selected to save fuel
 - ☒ B. A lower gear is selected to increase acceleration
 - ☒ C. The transmission is disengaged to coast
 - ☒ D. The current gear is maintained for stability

Q.62 If the secondary winding of an ignition coil has an open circuit or poor ground connection, what is the most likely effect?

- Ans**
- ☒ A. The high voltage spark will not be generated efficiently
 - ☒ B. Engine will misfire
 - ☒ C. The high voltage spark will be generated efficiently
 - ☒ D. The primary winding voltage will increase

Q.63 Why is it important for the thermostat to begin opening at a specific temperature during engine operation?

- Ans**
- ☒ A. Ensures engine reaches and maintains optimal temperature
 - ☒ B. Closes only when temperature exceeds safe limit
 - ☒ C. Permits random coolant flow regardless of heat
 - ☒ D. Allows thermostat to remain fully open at all times

Q.64 Which of the following is a sign of a faulty starter solenoid?

- Ans**
- ☒ A. Engine cranks faster than normal
 - ☒ B. Strong fuel smell during ignition
 - ☒ C. Clicking sound but engine does not turn over
 - ☒ D. Dashboard lights are brighter than normal

Q.65 Which part of the rack and pinion steering system is responsible for moving the rack?

- Ans**
- ☒ A. The steering wheel
 - ☒ B. The wheels
 - ☒ C. The track-rod
 - ☒ D. The pinion

Q.66 If two vehicles have the same motor but one carries more passengers, which will need higher tractive effort on the same road?

- Ans**
- ☒ A. Vehicle with different tyre tread pattern
 - ☒ B. Vehicle with newer battery brand
 - ☒ C. Vehicle with brighter paint color
 - ☒ D. Vehicle with more passengers

Q.67 To improve both engine efficiency and emission control in a diesel engine, which piston ring function must be prioritized during maintenance?

- Ans**
- ☒ A. Maintaining piston lubrication and cooling efficiency
 - ☒ B. Improving piston alignment and minimizing noise
 - ☒ C. Ensuring proper sealing of combustion gases and oil regulation
 - ☒ D. Increasing piston speed and reducing heat build-up

Q.68 Which part connects the electric motor to the wheels in an electric vehicle?

- Ans
- ☐ A. Air conditioning unit
 - ☒ B. Transmission system
 - ☐ C. Tail light
 - ☐ D. Display panel

Q.69 Which part of a composite headlight is most likely to be made from plastic rather than glass?

- Ans
- ☐ A. Reflector
 - ☐ B. Bulb
 - ☐ C. Holder
 - ☒ D. Lens

Q.70 In a workshop calculation, you need to find the side of a square base with an area of 64 cm². What is the correct length?

- Ans
- ☒ A. The side of the base is 8 cm
 - ☐ B. The side of the base is 6 cm
 - ☐ C. The side of the base is 7 cm
 - ☐ D. The side of the base is 9 cm

Q.71 When adjusting the speed of a drilling machine, what is generally decreased for harder materials?

- Ans
- ☐ A. The feed rate of the material
 - ☐ B. The depth of the hole drilled
 - ☒ C. The rotational speed of the drill
 - ☐ D. The length of the drill tool

Q.72 Which type of vehicle commonly uses **Liquefied Petroleum Gas (LPG)** as its primary fuel source?

- Ans
- ☐ A. Heavy trucks
 - ☒ B. City taxi cabs
 - ☐ C. High-performance sports cars
 - ☐ D. Agricultural tractors

Q.73 A technician lifts a box using a hoist. What type of energy is primarily involved in lifting?

- Ans
- ☐ A. Chemical energy
 - ☐ B. Electrical energy
 - ☒ C. Potential energy
 - ☐ D. Kinetic energy

Q.74 Which unit assists the clutch in performing gear shifts in automatic transmissions?

- Ans
- ☐ A. Planetary gear sets
 - ☐ B. Steering column linkage
 - ☐ C. Brake pad system
 - ☒ D. Torque converter assembly

Q.75 A ballast resistor is used in a circuit to:

- Ans
- ☒ A. Limit circuit current to a safe value
 - ☐ B. Convert AC into DC
 - ☐ C. Increase supply voltage
 - ☐ D. Store electrical energy

Railway BABA



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	9:30 AM - 12:00 PM
Subject	ALP Stage 2 Mechanic Tractor

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 A trader marks an article 25% above its cost price. He allows a discount of 10% on the marked price. After giving the discount, he makes a profit of ₹180 on the article. What is the cost price of the article?

Ans ☒ A. ₹1,260

☒ B. ₹1,380

☒ C. ₹1,440

☒ D. ₹1,200

Q.2 Below are given two sets of numbers. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

10 - 100 - 50 - 25; 2 - 4 - 2 - 1

Ans ☒ A. 4 - 16 - 8 - 4

☒ B. 5 - 25 - 15 - 7

☒ C. 12 - 144 - 62 - 31

☒ D. 8 - 64 - 32 - 14

Q.3 Which of the following is both, an input and output device?

Ans ☒ A. Printer

☒ B. Keyboard

☒ C. Projector

☒ D. Touchscreen monitor

Q.4 A cyclist covers 120 meters in 16 seconds on a straight road, then immediately covers 180 meters in 24 seconds on a similar road segment. What is the average speed of the cyclist during the entire journey?

Ans ☒ A. 7.0 meters per second

☒ B. 7.5 meters per second

☒ C. 6.5 meters per second

☒ D. 8.0 meters per second

Q.5 Which of the following scenarios best demonstrates the conversion of chemical energy to mechanical energy?

- Ans**
- ☒ A. A runner uses stored energy from food to sprint forward
 - ☐ B. A stretched rubber band snaps back to its original shape
 - ☐ C. A stone falls off a table to the ground
 - ☐ D. A flashlight turns on after inserting new batteries

Q.6 Which of the following statements correctly reflects the characteristics of a Local Area Network (LAN) and the role of Ethernet within it?

- Ans**
- ☐ A. Ethernet in a LAN provides low-speed data transfer and connects users over public Internet infrastructure.
 - ☐ B. A LAN always requires Gigabit Ethernet to function and is insecure because it allows open access to all network devices.
 - ☐ C. LANs are designed for long-distance communication and use Ethernet primarily for wireless data exchange.
 - ☒ D. Ethernet is a standard that governs how devices in a LAN communicate via wired connections, supporting speeds from 10 Mbps to 1000 Mbps.

Q.7 What is the typical temperature range covered by a laboratory thermometer used in school experiments?

- Ans**
- ☐ A. Minus fifty to fifty degrees Celsius
 - ☒ B. Minus ten to one hundred and ten degrees Celsius
 - ☐ C. Zero to two hundred degrees Celsius
 - ☐ D. Thirty five to forty two degrees Celsius

Q.8 If 'A' stands for '+', 'B' stands for '−', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

$$31 \text{ B } 35 \text{ D } 7 \text{ A } 9 \text{ C } 2 = ?$$

- Ans**
- ☒ A. 44
 - ☐ B. 42
 - ☐ C. 48
 - ☐ D. 46

Q.9 A thermometer shows a reading of 37 degrees Celsius. What is the corresponding temperature in Kelvin?

- Ans**
- ☐ A. 300 K
 - ☐ B. 270 K
 - ☐ C. 320 K
 - ☒ D. 310 K

Q.10 A sum of ₹420 is divided among A, B, C, and D such that: $A : B = 4 : x$, $B : C = x : 7$, $C : D = 6 : (x - 3)$. If B and C together get ₹210, find the value of x.

- Ans**
- ☒ A. 39
 - ☐ B. 42
 - ☐ C. 27
 - ☐ D. 53

Q.11 Which of the following best defines 'work' in physics?

- Ans**
- ☐ A. Work is done whenever a force is applied, regardless of movement.
 - ☒ B. Work is done when a force moves an object in the direction of the force.
 - ☐ C. Work is done if a force acts at any angle to the motion.
 - ☐ D. Work is done when energy is stored in an object.

Q.12 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans
- ☒ A. CH – EK
 - ☐ B. BG – EJ
 - ☐ C. AF – DI
 - ☐ D. DJ – GM

Q.13 A father distributed two different amounts among his sons P, Q, R and S. First amount was distributed in the ratio 5 : 4 : 3 : 2 and the second amount was distributed in the ratio 6 : 7 : 8 : 9. If the second amount is thrice the first amount, then which son will get the maximum amount?

- Ans
- ☐ A. R
 - ☐ B. P
 - ☐ C. Q
 - ☒ D. S

Q.14 Three pipes A, B and C can fill a tank in 12 hours, 18 hours and 24 hours, respectively. A leak at the bottom can empty the full tank in 36 hours. If all the pipes are opened together, in how many hours will the tank be filled? (Round off your answer to two decimal places.)

- Ans
- ☐ A. 5.56 hours
 - ☒ B. 6.55 hours
 - ☐ C. 9.45 hours
 - ☐ D. 3.33 hours

Q.15 A pendulum takes 60 seconds to complete 24 oscillations. If its length is increased and it now takes 72 seconds for the same number of oscillations, what has happened to its time period?

- Ans
- ☐ A. It remains at 2.5 seconds
 - ☐ B. It has decreased to 1.5 seconds
 - ☒ C. It has increased to 3.0 seconds
 - ☐ D. It has decreased to 2.0 seconds

Q.16 G is the mother of Y. Y is the sister of V. S is the father of L. L is the husband of V. How is G related to S?

- Ans
- ☐ A. Son's wife's sister
 - ☐ B. Son's wife
 - ☐ C. Mother's mother
 - ☒ D. Son's wife's mother

Q.17 An object has a mass of 10 kilograms. How does its weight on the Moon compare to its weight on Earth?

- Ans
- ☐ A. The object weighs the same on both the Moon and Earth
 - ☒ B. The object weighs less on the Moon than on Earth
 - ☐ C. The object weighs zero on the Moon
 - ☐ D. The object weighs more on the Moon than on Earth

Q.18 The simple interest earned on a certain sum of money for 3 years at 15% per annum is ₹2,700. Find the sum.

- Ans
- ☐ A. ₹9,000
 - ☒ B. ₹6,000
 - ☐ C. ₹5,000
 - ☐ D. ₹8,000

Q.19 Which of the following statements correctly describes average velocity and its SI unit?

- Ans**
- ☐ A. Average velocity is the total distance divided by total time, and its unit is kilometer per hour.
 - ☐ B. Average velocity is the total displacement divided by total time, and its unit is kilometer per hour.
 - ☒ C. Average velocity is the total displacement divided by total time, and its unit is meter per second.
 - ☐ D. Average velocity is the total distance divided by total time, and its unit is meter per second.

Q.20 If a scooter travels at a constant speed of 25 km per hour, how far will it travel in 4 hours?

- Ans**
- ☐ A. 120 km
 - ☒ B. 100 km
 - ☐ C. 75 km
 - ☐ D. 80 km

Q.21 An engineer is tasked with creating the front view of a mechanical part. The part has a rectangular base with a vertical circular hole passing through it and a triangular prism attached on top. Which of the following best describes what will be visible in the front view?

- Ans**
- ☐ A. Only the rectangular base outline will be visible in the front view drawing
 - ☐ B. Only the triangular prism will be clearly visible in the front view drawing
 - ☒ C. The outline of rectangular base and triangular prism will be visible but hole is not shown
 - ☐ D. The outline of triangular prism and circular hole will be visible in front view only

Q.22 An engineering student is tasked with creating a detailed side view of a complex machine part for an assembly drawing. Which approach will most accurately represent all features visible from the side while avoiding hidden overlaps or misinterpretations?

- Ans**
- ☐ A. Sketch the side view freely without using projections from the main view
 - ☐ B. Include all features even those not visible from the selected side view
 - ☐ C. Use only hidden lines for representing features on the far side in the view
 - ☒ D. Project all visible elements from the side and omit hidden features unless needed

Q.23 The median of the following data is :
25, 15, 23, 25, 17, 27, 20, 18, 24, 30, 19, 28, 35, 10, 31, 40

- Ans**
- ☐ A. 25
 - ☒ B. 24.5
 - ☐ C. 23.5
 - ☐ D. 20.5

Q.24 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UMD ZQG EUJ JYM ?

- Ans**
- ☐ A. NDO
 - ☒ B. OCP
 - ☐ C. PDP
 - ☐ D. NBQ

Q.25 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between X and Z when counted from the right of X. Only two people sit between Z and D. Only three people sit between X and B. A sits to the immediate left of C. Who sits third to the left of Y?

- Ans**
- ☐ A. A
 - ☐ B. Z
 - ☐ C. X
 - ☒ D. C

Q.26 Which feature is a requirement of the BIS drawing standard in engineering drawings?

Ans ☒ A. Title block with specific information

☒ B. Margin lines of random width

☒ C. Use of colored pencils for clarity

☒ D. Freehand sketches without scale

Q.27 A diamond ring costs ₹85,000. Its price is reduced first by 11% and then by 4% on the reduced price. Find the final price of the ring after both discounts.

Ans ☒ A. ₹72,624

☒ B. ₹73,624

☒ C. ₹74,624

☒ D. ₹72,604

Q.28 What is the primary function of a fire hydrant in a workplace safety system?

Ans ☒ A. Detecting smoke and warning employees

☒ B. Supplying large quantities of water to fight fires

☒ C. Removing hazardous fumes from the area

☒ D. Activating fire alarms automatically in emergencies

Q.29 If 'A' stands for '+', 'B' stands for '−', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

28 A 16 C 3 B 12 D 4 = ?

Ans ☒ A. 70

☒ B. 72

☒ C. 71

☒ D. 73

Q.30 Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right.

(Left) Z @ B R J # D * Q A M S % P L V O U S N T W Z (Right)

How many such symbols are there, each of which is immediately preceded by a letter and also immediately followed by a letter?

Ans ☒ A. None

☒ B. Four

☒ C. Three

☒ D. Two

Q.31 Which statement best describes a 'point' in engineering drawing?

Ans ☒ A. A point indicates a precise location but has no size, length, or width.

☒ B. A point represents a small area with both length and width.

☒ C. A point is a short line segment used to mark measurements.

☒ D. A point is the intersection of two lines and always has measurable length.

Q.32 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Shreya related to Mahak if 'Shreya + Dev - Taran × Harshit % Mahak'?

- Ans ☒ A. Mother's mother
☐ B. Father's mother
☐ C. Mother's sister
☐ D. Father's sister

Q.33 A car travels 60 km north in 2 hours, then 40 km south in the next 1 hour. What is the car's average velocity over the entire trip?

- Ans ☒ A. 6.7 km/h north
☐ B. 33.3 km/h north
☐ C. 20 km/h south
☐ D. 0 km/h

Q.34 What is the simplified value of the expression $\left[\frac{\cos A}{(1 - \tan A)} \right] + \left[\frac{\sin A}{(1 - \cot A)} \right]$?

- Ans ☒ A. $\cos A + \sin A$
☐ B. $\sin A - \cos A$
☐ C. 1
☐ D. 0

Q.35 Which is the most important safety check before operating any machine in a workshop?

- Ans ☐ A. Ensure the machine area is properly illuminated
☒ B. Inspect the machine for loose or damaged parts
☐ C. Check if the machine is plugged in properly
☐ D. Wipe the machine with a dry cloth before use

Q.36 O, P, Q, U and V have different heights. Only three people have heights between V and Q. P is taller than U but shorter than O. V is taller than Q.
How many people are shorter than P?

- Ans ☐ A. Three
☐ B. Four
☒ C. Two
☐ D. One

Q.37 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

QOI 5, OMG 10, MKE 15, KIC 20, ?

- Ans ☐ A. HIZ 30
☐ B. JHZ 24
☐ C. IHS 23
☒ D. IGA 25

Q.38 What should come in place of the question mark (?) in the given series?

74, 83, 101, 128, ?, 209

- Ans ☒ A. 164
☐ B. 155
☐ C. 176
☐ D. 146

Q.39 If the mean of the following data is 40, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	30	27	44	29	X

- Ans
- ☐ A. 93
 - ☒ B. 82
 - ☐ C. 99
 - ☐ D. 98

Q.40 When using a hand file during fitting operations, which action demonstrates adherence to tool safety protocols?

- Ans
- ☐ A. Holding the file near its tang during filing work
 - ☒ B. Fitting a proper handle securely to the tang
 - ☐ C. Applying excessive downward force when filing
 - ☐ D. Filing above shoulder height for better leverage

Q.41 What is the main purpose of ambient air quality standards?

- Ans
- ☒ A. To set legally permissible limits for specific pollutants to protect public health.
 - ☐ B. To require all industries to reduce emissions by the exact same percentage.
 - ☐ C. To focus exclusively on industrial operations while ignoring other sectors.
 - ☐ D. To ensure air is routinely sampled to map historical pollution trends.

Q.42 What is an email used for?

- Ans
- ☐ A. File storage
 - ☒ B. Sending messages
 - ☐ C. Creating documents
 - ☐ D. Data processing

Q.43 The average of 8 numbers is 45. If one number, 59, is removed, what will the new average be?

- Ans
- ☐ A. 41.5
 - ☐ B. 42.5
 - ☐ C. 42
 - ☒ D. 43

Q.44 A conical tent has a base radius of 14 m and a height of 48 m. How many cubic meters of air can it hold? (Use $\pi = \frac{22}{7}$)

- Ans
- ☐ A. 9865
 - ☐ B. 8956
 - ☐ C. 9568
 - ☒ D. 9856

Q.45 16 is related to 260 following a certain logic. Following the same logic, 25 is related to 630. To which of the following is 9 related, following the same logic?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans
- ☐ A. 78
 - ☐ B. 732
 - ☒ C. 84
 - ☐ D. 729

Q.46 A car travels 90 km east and then 30 km west along the same straight road. If the entire journey takes 3 hours, what is the average velocity of the car?

- Ans
- ☐ A. 30 km/h east
 - ☐ B. 50 km/h north
 - ☐ C. 40 km/h east
 - ☒ D. 20 km/h east

Q.47 If 'A' stands for '+', 'B' stands for 'x', 'C' stands for '+' and 'D' stands for '-', what will come in place of the question mark '?' in the following equation?

$$14 \text{ A } 30 \text{ B } 45 \text{ C } 15 \text{ D } 9 = ?$$

- Ans
- ☐ A. 28
 - ☐ B. 25
 - ☒ C. 27
 - ☐ D. 29

Q.48 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Among five people – A, B, C, D, and E – who is the tallest?

(I) A is taller than B. B is taller than C.

(II) D is taller than E.

- Ans
- ☐ A. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☐ B. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☐ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☒ D. Both statements I and II together are NOT sufficient to answer the question.

Q.49 If $\left(x + \frac{1}{x}\right) = 3$, find the value of $\left(x^3 + \frac{1}{x^3}\right)$.

- Ans
- ☐ A. 16
 - ☒ B. 18
 - ☐ C. 20
 - ☐ D. 15

Q.50 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements: All girls are hens. No hen is a cat.

Conclusion (I): No girl is a cat.

Conclusion (II): Some cats are hens.

- Ans
- ☐ A. Both conclusions (I) and (II) follow
 - ☐ B. Only conclusion (II) follows
 - ☐ C. Neither conclusion (I) nor (II) follows
 - ☒ D. Only conclusion (I) follows

Q.51 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans
- ☐ A. EY-KO
 - ☒ B. QK-VA
 - ☐ C. TN-ZD
 - ☐ D. WQ-CG

Q.52 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some glasses are spoons.

All spoons are forks.

Conclusions:

(I) Some glasses are forks.

(II) All forks are spoons.

- Ans**
- ☒ A. Both conclusions (I) and (II) follow
 - ☒ B. Only conclusion (I) follows
 - ☒ C. Neither conclusion (I) nor (II) follows
 - ☒ D. Only conclusion (II) follows

Q.53 A worker's hand is at risk of injury from a mechanical shearing action. Which situation best describes a shearing hazard?

- Ans**
- ☒ A. A hand sliding repeatedly across a rough abrasive machine surface during work
 - ☒ B. A hand caught between a moving blade and a fixed machine surface during operation
 - ☒ C. A hand becoming entangled in a rotating machine shaft during operation
 - ☒ D. A hand touching a hot metallic machine surface during maintenance activity

Q.54 PJAE is related to JOWH in a certain way based on the English alphabetical order. In the same way, OIVC is related to INRF. To which of the following is NEZF related to following the same logic?

- Ans**
- ☒ A. IJVJ
 - ☒ B. HKVJ
 - ☒ C. IKUH
 - ☒ D. HJVI

Q.55 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. Only three boxes are kept above S. Exactly one box is kept between T and S. Exactly three boxes are kept between T and U, and U is kept somewhere above S. V is kept immediately below U. W is kept at one of the places above P. Q is not kept immediately above or below T. Based on the given information, which box is kept at the lowermost position?

- Ans**
- ☒ A. V
 - ☒ B. S
 - ☒ C. Q
 - ☒ D. P

Q.56 Solve the system of equations:

$$-3x + 2y - z = -1, 6x - 6y + 7z = -7, 3x - 4y + 4z = -6$$

- Ans**
- ☒ A. $x=2, y=2, z=-1$
 - ☒ B. $x=2, y=1, z=-3$
 - ☒ C. $x=-2, y=2, z=11$
 - ☒ D. $x=1, y=2, z=2$

Q.57 A car of mass 1200 kg accelerates from rest to a speed of 20 m/s on a straight road. If the kinetic energy gained by the car is completely due to the work done by the engine, which of the following best represents the total kinetic energy acquired by the car at this speed?

- Ans**
- ☐ A. 480,000 joules
 - ☒ B. 240,000 joules
 - ☐ C. 24,000 joules
 - ☐ D. 12,000 joules

Q.58 A car travels on a highway, and its odometer records a reading of 180 km at 8:00 am and 240 km at 9:30 am. Based on this information, which statement best describes the car's average speed during this interval?

- Ans**
- ☐ A. The car's average speed is 240 km per hour since that was the odometer reading at 9:30 am.
 - ☐ B. The car's average speed is 180 km per hour since that was the odometer reading at 8:00 am.
 - ☒ C. The car's average speed is 40 km per hour as calculated from the odometer readings and time interval.
 - ☐ D. The car's average speed is 60 km per hour based only on the change in odometer readings.

Q.59 In a spreadsheet application, a user selects a range of cells and presses Ctrl + C, followed by Ctrl + V in a different worksheet. What happens to the data?

- Ans**
- ☐ A. The selected cells are saved to a new file.
 - ☐ B. The selected cells are deleted from the original worksheet.
 - ☒ C. The selected cells are copied to the new worksheet.
 - ☐ D. The selected cells are moved to the new worksheet.

Q.60 What is the best description of the purpose of multi-view drawing in engineering drawing?

- Ans**
- ☒ A. To represent different sides of an object clearly on a flat surface
 - ☐ B. To show different colors of an object for better visual appearance
 - ☐ C. To present the object in a single three-dimensional visual form only
 - ☐ D. To view an object from only one direction

Q.61 Which integrated strategy best addresses soil pollution, falling crop yields, and low microbial activity near an industrial zone?

- Ans**
- ☐ A. Ban all regional chemical fertilizers.
 - ☐ B. Expand urban areas into farmland.
 - ☐ C. Reforestation in nearby urban centers.
 - ☒ D. Control industrial waste for sustainability.

Q.62 There are two types of silver–copper alloys. The first alloy contains $93\frac{1}{3}\%$ silver, while the second alloy contains $86\frac{2}{3}\%$ silver. Find the amount of the first alloy that should be mixed with some quantity of the second alloy to obtain a 100 kg mixture containing 90% silver.

- Ans**
- ☐ A. 52 kg
 - ☐ B. 48 kg
 - ☒ C. 50 kg
 - ☐ D. 45 kg

Q.63 What do touch gestures in Microsoft Windows allow users to do?

- Ans**
- ☐ A. Increase screen brightness
 - ☐ B. Connect external devices
 - ☒ C. Perform actions using finger movements
 - ☐ D. Type faster on the keyboard

- Q.64** In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer. Among the five poles—I, N, C, H, and L—each having a different height, which pole is the tallest?
(I) I is shorter than N but taller than C. C is taller than only one pole.
(II) H is taller than L.
- Ans** ☒ A. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
☒ B. Both statements I and II together are NOT sufficient to answer the question
☒ C. Data in statement I alone is sufficient to answer the question while data in statement II is not
☒ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.65 What should come in place of the question mark (?) in the given series?

98, 104, 116, 134, 158, ?

- Ans** ☒ A. 188
☒ B. 186
☒ C. 184
☒ D. 190

Q.66 Which of the following best describes a key environmental concern associated with improper disposal of e-waste?

- Ans** ☒ A. Enhanced biodegradation of plastics
☒ B. Release of greenhouse gases from decomposition
☒ C. Increased recycling rates of precious metals
☒ D. Release of toxic metals into soil and water

Q.67 In how many years will a sum of ₹16,000 at 10% per annum compounded semi-annually become ₹18,522?

- Ans** ☒ A. 1 year
☒ B. 1.5 years
☒ C. 2.5 years
☒ D. 2 years

Q.68 In a certain code language, 'KING' is coded as '9713' and 'ITCH' is coded as '2945'. What is the code for 'I' in the given code language?

- Ans** ☒ A. 7
☒ B. 2
☒ C. 9
☒ D. 4

Q.69 Which approach most effectively reduces both nitrogen and phosphorus concentrations during wastewater treatment?

- Ans** ☒ A. Surface-flow constructed wetlands
☒ B. Biological and chemical nutrient removal
☒ C. Primary sedimentation with extended aeration
☒ D. UV disinfection following secondary treatment

Q.70 An engineer uses fault tree analysis to assess a machine-related injury in a factory. Which step should be taken first according to standard procedure?

- Ans** ☒ A. Validate the analysis using workplace data
☒ B. Define the top event representing the injury
☒ C. Establish preventive measures to control risks
☒ D. List all possible causes of failures

Q.71 A sample of water is heated from 15 degrees Celsius to 35 degrees Celsius. What is the temperature change in Kelvin?

- Ans**
- ☒ A. The temperature change is 30 K.
 - ☒ B. The temperature change is 20 K.
 - ☒ C. The temperature change is 15 K.
 - ☒ D. The temperature change is 50 K.

Q.72 Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) A T D E B R C L M Q O N P J M Q E A O Z W F U K S L (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☒ A. 3
 - ☒ B. 0
 - ☒ C. 2
 - ☒ D. 1

Q.73 A runner completes one lap of a 200 meter circular track in 50 seconds. What is the average speed of the runner?

- Ans**
- ☒ A. 3 meter per second
 - ☒ B. 4.5 meter per second
 - ☒ C. 3.5 meter per second
 - ☒ D. 4 meter per second

Q.74 A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q such that OQ = 12 cm. What is the length of PQ?

- Ans**
- ☒ A. $\sqrt{119}$ cm
 - ☒ B. $\sqrt{117}$ cm
 - ☒ C. $\sqrt{97}$ cm
 - ☒ D. $\sqrt{107}$ cm

Q.75 When a moving car suddenly applies brakes, its kinetic energy is transformed mainly into which form of energy?

- Ans**
- ☒ A. Light energy
 - ☒ B. Sound energy
 - ☒ C. Heat energy
 - ☒ D. Potential energy

Q.76 A boat sails 40 km downstream and then 40 km upstream in a river. The boat's speed in still water is 12 km/hr and the speed of the stream is 4 km/hr. How much time does the boat take to cover the entire distance (both upstream and downstream)?

- Ans**
- ☒ A. 7.5 hours
 - ☒ B. 8 hours
 - ☒ C. 10 hours
 - ☒ D. 6 hours

Q.77 E, F, G, H, L and M live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live above G. Only two people live between L and E. Only two people live between M and G. E lives below G but above F. How many people live below H?

- Ans**
- ☐ A. Four
 - ☐ B. One
 - ☐ C. Two
 - ☒ D. Three

Q.78 If Rohan's income increases by 20% and his expenditure increases by 10%, then his savings increase by ₹1,200. If his original income was ₹12,000, what was his original expenditure? (Assume that savings = income – expenditure.)

- Ans**
- ☒ A. ₹12,000
 - ☐ B. ₹10,000
 - ☐ C. ₹9,000
 - ☐ D. ₹11,000

Q.79 A shopkeeper marks a product 75% above cost price and offers two successive discounts of 30% and 40%. What is the profit or loss percentage?

- Ans**
- ☐ A. 22.6% profit
 - ☐ B. 15.7% profit
 - ☐ C. 20.9% profit
 - ☒ D. 26.5% loss

Q.80 Which situation best describes an entanglement hazard in a mechanical workshop?

- Ans**
- ☐ A. Finger cut by a sharp edge
 - ☐ B. Hand pinched between gears
 - ☒ C. Loose clothing caught in a rotating shaft
 - ☐ D. Gloves worn near hot surfaces

Q.81 Find the LCM of 72, 78, and 90.

- Ans**
- ☒ A. 4680
 - ☐ B. 4250
 - ☐ C. 4120
 - ☐ D. 4280

Q.82 Which property of a fuse wire ensures it melts quickly when excess current flows?

- Ans**
- ☒ A. Low melting point
 - ☐ B. Thick wire
 - ☐ C. High melting point
 - ☐ D. High electrical resistance

Q.83 Refer to the given letter series and answer the question that follows. Counting to be done from left to right.

(Left) B F O P P S Q A L M K A W X S N U Q J O M Y (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☒ A. 5
 - ☐ B. 6
 - ☐ C. 4
 - ☐ D. 7

Q.84 A train X crosses a man who is sitting in another train Y, which is moving in the opposite direction, in 8 seconds. However, when both trains are moving in the same direction, train X takes 20 seconds to pass the same man. If the length of train X is 360 meters and the length of train Y (in which the man is sitting) is 240 meters, what is the speed of train Y?

- Ans**
- ☐ A. 45.3 km/h
 - ☐ B. 46.5 km/h
 - ☒ C. 48.6 km/h
 - ☐ D. 45.8 km/h

Q.85 A laboratory record shows a distance of 0.004 kilometers between two points. How should this be written in SI units of length for a scientific report?

- Ans**
- ☐ A. 0.4 m
 - ☐ B. 4000 mm
 - ☒ C. 4 m
 - ☐ D. 400 cm

Q.86 P, Q, R, S and T have different ages. T is elder than only one person. S is elder than P but younger than Q. R is elder than Q. Who is the youngest?

- Ans**
- ☐ A. Q
 - ☒ B. P
 - ☐ C. R
 - ☐ D. S

Q.87 Which line symbol is commonly used in engineering drawings to represent a hidden edge that is not directly visible?

- Ans**
- ☐ A. Zigzag line
 - ☒ B. Dashed line
 - ☐ C. Chain thin line
 - ☐ D. Solid thick line

Q.88 Two students move identical boxes through a distance of 10 m. Student A applies a force of 50 N, while Student B applies a force of 100 N. What is the difference in the work done by the two students?

- Ans**
- ☐ A. 0 J
 - ☐ B. 1000 J
 - ☒ C. 500 J
 - ☐ D. 50 J

Q.89 Namia is facing the west. She turns left and walks 15 m. She turns left and walks 25 m. She again turns left and walks 40 m. She finally turns left and walks 40 m to reach home. In which direction is her home with respect to the starting point?

- Ans**
- ☐ A. North-East
 - ☐ B. South-West
 - ☐ C. South-East
 - ☒ D. North-West

Q.90 A trader buys 187 pens at ₹23 each. During transportation, 7 pens get damaged and cannot be sold. He sells the remaining pens at ₹27 each. Find his profit percentage. (rounded off to one decimal place)

- Ans**
- ☐ A. 14.1%
 - ☐ B. 13.7%
 - ☐ C. 12.6%
 - ☒ D. 13.0%

Q.91 Three workers, X, Y, and Z, can complete a certain job in 10 days, 12 days, and 15 days, respectively. Determine the number of days required for them to complete the job when they work together.

- Ans**
- ✓ A. 4 days
 - ✗ B. 8 days
 - ✗ C. 6 days
 - ✗ D. 5 days

Q.92 Simplify: $60 - \{(-8) \times (-16 - 19 - 2)\} \div [5 \times \{2 + (-1) \times (-1)\}]$

- Ans**
- ✓ A. $\frac{604}{15}$
 - ✗ B. $\frac{594}{15}$
 - ✗ C. $\frac{608}{15}$
 - ✗ D. $\frac{614}{15}$

Q.93 A roller coaster at the top of its track has maximum potential energy. As it descends and speeds up, what principle explains why the sum of its kinetic and potential energies remains constant if we ignore friction and air resistance?

- Ans**
- ✓ A. Law of conservation of energy
 - ✗ B. Law of inertia
 - ✗ C. Principle of inertia
 - ✗ D. Principle of superposition

Q.94 In this question, a group of numbers/symbols is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer. If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	6	1	&	3	%	8	+	4	#	7	@	5	2	\$
Code	R	V	G	D	S	C	T	L	F	W	H	U	Y	N

Conditions:

- (i) If the first element is a symbol and the last element is an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and last elements are to be coded as ©.
- (iii) If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?

+ 6 \$ 2 7

- Ans**
- ✗ A. STMWV
 - ✓ B. WRNYT
 - ✗ C. TSNWW
 - ✗ D. WSNYT

Q.95 An engineer is tasked with creating a hollow cone for a machine part, where the wall thickness must be consistent and the slant height is critical for assembly. Which factor is most important to ensure the cone will fit correctly in the final design?

- Ans**
- ✗ A. Prioritizing uniform wall thickness over all other features
 - ✗ B. Focusing only on base diameter for precise fit
 - ✓ C. Ensuring the slant height matches the assembly requirement
 - ✗ D. Matching only the overall height of the cone

Q.96 Which component makes up the largest proportion of Earth's atmosphere by volume?

Ans ☒ A. Argon

☒ B. Nitrogen

☒ C. Oxygen

☒ D. Carbon dioxide

Q.97 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

BIP : EMU
GNU : JRZ

Ans ☒ A. FMT : IQY

☒ B. VCD : GRD

☒ C. XDE : PON

☒ D. CGW : NHT

Q.98 The circumference of the base of a solid right circular cylinder is 88 cm and its height is 150 cm. What is the volume (in cm³) of the cylinder?

$\left(\text{Take } \pi = \frac{22}{7} \right)$

Ans ☒ A. 92500

☒ B. 92450

☒ C. 92550

☒ D. 92400

Q.99 In third angle projection, where is the object placed relative to the plane of projection?

Ans ☒ A. The object is placed in the third quadrant

☒ B. The object is placed in the fourth quadrant

☒ C. The object is placed in the first quadrant

☒ D. The object is placed in the second quadrant

Q.100 A mechanical engineer must design a flange joint where two pipes are to be connected at a 45-degree angle. Which method should the engineer use to accurately represent the intersection line on a technical drawing of the two cylindrical pipes?

Ans ☒ A. Represent the intersection as a straight line in the side view

☒ B. Use only standard orthographic projection without auxiliary views

☒ C. Draw a simple circle at the junction in the top view

☒ D. Draw the true shape of the intersection using auxiliary projection

Section : PART-B

Q.1 A digital multimeter measures current by developing a proportional voltage across a:

Ans ☒ A. Transformer winding

☒ B. Relay coil

☒ C. Shunt resistance

☒ D. Capacitor plate

Q.2 Which symptom indicates the presence of bad brake fluid?

Ans ☒ A. Sudden steering stiffness

☒ B. Soft or spongy brake pedal

☒ C. Rapid loss of tire pressure

☒ D. Increase in engine knocking sound

Q.3 Which of these conditions can cause reading errors in a dial indicator?

- Ans**
- ☒ A. Parallax error
 - ☐ B. Zero error elimination
 - ☐ C. Automatic error correction
 - ☐ D. Magnetic field immunity

Q.4 If a force acts on a body but no displacement occurs, the work done is:

- Ans**
- ☐ A. Maximum
 - ☐ B. Negative always
 - ☐ C. Infinite
 - ☒ D. Zero

Q.5 How does the construction of multilayer metallic gaskets benefit their use in engines with frequent load changes?

- Ans**
- ☐ A. They provide insulation from engine heat
 - ☒ B. They compensate for flange movement during operation
 - ☐ C. They reduce the need for joint lubrication
 - ☐ D. They prevent corrosion of fasteners

Q.6 What is typically achieved by using a lower gear in a tractor manual transmission?

- Ans**
- ☒ A. Increased torque at the wheels
 - ☐ B. Decreased torque and higher speed
 - ☐ C. Lower engine temperature
 - ☐ D. Increased fuel tank capacity

Q.7 Which statement correctly differentiates heat and temperature based on their SI units?

- Ans**
- ☐ A. Both heat and temperature are measured in kelvin
 - ☒ B. Heat is measured in joule while temperature is measured in kelvin
 - ☐ C. Both heat and temperature are measured in joule
 - ☐ D. Heat is measured in kelvin while temperature is measured in joule

Q.8 What could happen if incompatible brake fluids are mixed in a tractor?

- Ans**
- ☐ A. Cooling system may overheat rapidly
 - ☐ B. Engine oil pressure may drop sharply
 - ☒ C. Seals may be damaged and braking performance may be reduced
 - ☐ D. Hydraulic lift arms may move slowly

Q.9 Which of the following best describes the relationship between the radiator pressure cap and coolant loss prevention?

- Ans**
- ☒ A. It keeps coolant from boiling and escaping as vapor
 - ☐ B. It blocks debris from entering the radiator
 - ☐ C. It restricts airflow into the engine compartment
 - ☐ D. It adds coolant to the reservoir automatically

Q.10 In an NPN transistor operating in cut-off region, what happens to the collector current?

- Ans**
- ☐ A. Collector current becomes half of the rated value
 - ☐ B. Collector current reaches maximum value
 - ☒ C. Collector current becomes zero or only leakage current flows
 - ☐ D. Collector current continuously increases with temperature

Q.11 How does MoRTH (Ministry of Road Transport and Highways) impact the safety of road users in India?

- Ans**
- ☐ A. Inspecting railway tracks for safety
 - ☐ B. Regulating vehicle insurance companies
 - ☒ C. Implementing road safety measures
 - ☐ D. Issuing driving licenses to citizens

Q.12 In third angle projection, the object lies:

- Ans**
- ☐ A. Above Horizontal Plane (H.P.) and in front of Vertical Plane (V.P.)
 - ☒ B. Below Horizontal Plane (H.P.) and behind Vertical Plane (V.P.)
 - ☐ C. Above Horizontal Plane (H.P.) and behind Vertical Plane (V.P.)
 - ☐ D. Below Horizontal Plane (H.P.) and in front of Vertical Plane (V.P.)

Q.13 Which innovation most significantly increased mass production in the early automobile industry?

- Ans**
- ☐ A. Steam-powered engines
 - ☐ B. Handcrafted carriages
 - ☐ C. Wooden chassis frames
 - ☒ D. Moving assembly line

Q.14 Why is a gear type oil pump used more commonly than a plunger type in diesel engines?

- Ans**
- ☐ A. Plunger type cannot withstand high temperatures
 - ☒ B. Gear type offers continuous and reliable flow
 - ☐ C. Gear type is more suitable for small engines
 - ☐ D. Plunger type operates at lower speeds

Q.15 When refueling a hot diesel engine, what is the safest practice?

- Ans**
- ☐ A. Add fuel quickly to avoid delays
 - ☐ B. Open radiator cap before refueling
 - ☐ C. Refuel with engine running to save time
 - ☒ D. Allow the engine to cool before refueling

Q.16 A worker notices clutter blocking an emergency exit. What is the best immediate course of action according to good housekeeping practices?

- Ans**
- ☐ A. Wait for a supervisor to give instructions
 - ☐ B. Move the clutter to another part of the workshop
 - ☒ C. Remove the clutter and report the hazard
 - ☐ D. Ignore the clutter and continue working

Q.17 Which component transmits power from the engine to implements in a power tiller?

- Ans**
- ☐ A. Front stand
 - ☒ B. Power take off shaft
 - ☐ C. Steering lever
 - ☐ D. Main clutch lever

Q.18 A tractor operator notices that the wheels are not turning equally when steering. Which component is likely malfunctioning?

- Ans**
- ☐ A. Fuel pump is not maintaining pressure properly
 - ☐ B. Axle lubrication is insufficient for smooth motion
 - ☒ C. A linkage may not be transmitting motion correctly
 - ☐ D. Steering wheel grip has worn out over time

Q.19 Two ideal capacitors of 6 μF and 3 μF are connected in series. Their equivalent capacitance is:

- Ans**
- ☐ A. 18 μF
 - ☒ B. 2 μF
 - ☐ C. 1 μF
 - ☐ D. 9 μF

Q.20 Which type of tyre tread pattern has teeth-like edges?

- Ans**
- ☐ A. Lug tread
 - ☐ B. Diamond tread
 - ☒ C. Saw tooth tread
 - ☐ D. Highway tread

Q.21 What is the remedy for a loose drive belt causing charging problems?

- Ans**
- ☐ A. Replace battery terminal
 - ☐ B. Replace stator winding
 - ☒ C. Adjust belt tension
 - ☐ D. Tighten wheel bolts

Q.22 How does the differential lock affect the motion of the drive wheels?

- Ans**
- ☐ A. It automatically adjusts air pressure in the tires
 - ☐ B. It makes one drive wheel rotate in reverse
 - ☒ C. It forces both drive wheels to rotate at the same speed
 - ☐ D. It causes one wheel to stop rotating in all cases

Q.23 What does the compensation port in a master cylinder do during brake release?

- Ans**
- ☐ A. Seals the piston from dust
 - ☒ B. Releases pressure to the reservoir
 - ☐ C. Closes to block air entry
 - ☐ D. Opens to maintain fluid level

Q.24 A mechanic is repairing a gearbox and finds the original gasket is missing. Which approach would best replace the function of the missing gasket?

- Ans**
- ☐ A. Wrap with adhesive tape around the joint
 - ☒ B. Apply liquid gasket material to the mating faces
 - ☐ C. Use grease instead of a sealing material
 - ☐ D. Tighten the bolts as much as possible for fit

Q.25 In a tractor hydraulic system, where would you typically use a 2-2 way valve?

- Ans**
- ☐ A. For pressure-compensated flow division
 - ☒ B. For simple on/off fluid control applications
 - ☐ C. For proportional direction control
 - ☐ D. For controlling multiple actuators simultaneously

Q.26



Which type of bar section is represented in the given figure?

- Ans
- ☒ A. Channel bar section
 - ☐ B. Circular bar section
 - ☐ C. Flat bar section
 - ☐ D. Angle bar section

Q.27 How does the ball and socket joint contribute to the durability of a tractor's steering system?

- Ans
- ☐ A. Prevents any movement in the steering assembly
 - ☐ B. Increases friction for better grip in steering
 - ☒ C. Reduces wear by allowing free movement under load
 - ☐ D. Locks the steering components in place

Q.28 Why should piston rings be checked for cracks before fitting?

- Ans
- ☐ A. To reduce friction during operation
 - ☒ B. To avoid premature engine failure
 - ☐ C. To prevent carbon buildup on rings
 - ☐ D. To ensure smooth piston rotation

Q.29 Valve overlap in diesel engines is primarily used to:

- Ans
- ☒ A. Improve scavenging and cylinder filling
 - ☐ B. Decrease temperature in the cylinder
 - ☐ C. Clean the spark plugs automatically
 - ☐ D. Lubricate the crankshaft bearings

Q.30 Which of the following is a correct use of a centre punch during layout work?

- Ans
- ☐ A. Sharpening tool edges
 - ☐ B. Measuring sheet thickness
 - ☐ C. Tightening bolts and nuts
 - ☒ D. Creating indentation for drill bit

Q.31 What is a non-functional dimension?

- Ans
- ☐ A. A hidden dimension used in sectional views
 - ☐ B. A dimension essential for assembly operation
 - ☒ C. A dimension not essential for the function of the component
 - ☐ D. A dimension related only to colour finishing

Q.32 Which of the following does the camshaft use to convert rotational motion into linear motion for valve operation?

- Ans
- ☒ A. Cam lobes
 - ☐ B. Bearings
 - ☐ C. Pulleys
 - ☐ D. Gears

Q.33 Which feature distinguishes a centre punch from a prick punch in terms of construction?

- Ans**
- ☐ A. Knurled hand grip
 - ☒ B. Blunter point angle
 - ☐ C. Steel material body
 - ☐ D. Longer overall length

Q.34 Which factor has contributed most significantly to the growth of the tractor industry in India in recent years?

- Ans**
- ☒ A. Mechanization of agriculture has increased
 - ☐ B. Urbanization has remained constant
 - ☐ C. Manual labor availability has declined
 - ☐ D. Export demand for tractors has decreased

Q.35 A workshop must finish ceramic parts with extremely tight tolerances and mirror-like surfaces. Which lapping abrasive should be chosen?

- Ans**
- ☐ A. Silicon carbide cream
 - ☐ B. Aluminum oxide powder
 - ☒ C. Diamond paste
 - ☐ D. Boron carbide slurry

Q.36 Why are tractor wheels often larger at the rear compared to those at the front?

- Ans**
- ☐ A. To reduce load on the engine
 - ☒ B. To improve stability and traction
 - ☐ C. To decrease tyre wear in fields
 - ☐ D. To enhance steering precision

Q.37 According to IS:1444-1989, which drawing board designation has size 1500 × 1000 × 25 mm?

- Ans**
- ☐ A. D1
 - ☒ B. D0
 - ☐ C. D2
 - ☐ D. D3

Q.38 Why is glass wool preferred over other materials for absorptive mufflers?

- Ans**
- ☐ A. Reflects sound waves efficiently
 - ☐ B. Prevents corrosion of the muffler shell
 - ☐ C. Acts as a filter for exhaust gases
 - ☒ D. Resists high temperatures

Q.39 Which cooling system is least suitable for use in areas with high humidity?

- Ans**
- ☐ A. Air cooling system
 - ☒ B. Evaporative cooling system
 - ☐ C. Dry cooling system
 - ☐ D. Liquid cooling system

Q.40 A student marks a line with a scribe, but the line is barely visible. What might be the most likely cause?

- Ans**
- ☐ A. Metal surface is too oily
 - ☒ B. Scribe tip is blunt or worn out
 - ☐ C. Measuring tape was used instead
 - ☐ D. Ruler engravings are faint

Q.41 In overhead transmission lines, insulators are used to:

- Ans**
- ☒ A. Prevent leakage current to earth
 - ☐ B. Increase conductor current
 - ☐ C. Produce magnetic shielding
 - ☐ D. Reduce conductor resistance

Q.42 Which of the following is NOT an effect of heat?

- Ans**
- ☐ A. Change in state
 - ☐ B. Change in temperature
 - ☒ C. Change in gravitational force
 - ☐ D. Change in size

Q.43 Which valve must close tightly to ensure proper compression in a diesel engine?

- Ans**
- ☐ A. Only inlet valve
 - ☐ B. Only exhaust valve
 - ☐ C. Only fuel injector
 - ☒ D. Both Inlet and exhaust valves

Q.44 Which maintenance problem is linked to overloading tractor implements during field work?

- Ans**
- ☐ A. Slower battery discharge rate
 - ☒ B. Frequent bolt loosening in joints
 - ☐ C. Cleaner hydraulic fluid lines
 - ☐ D. Lower grease consumption rates

Q.45 Which application is most suitable for brazed joints rather than welded joints in industrial manufacturing?

- Ans**
- ☒ A. Brazed joints are ideal for joining thin-walled copper tubes.
 - ☐ B. Brazed joints are ideal for fusing thick aluminum sheets.
 - ☐ C. Brazed joints are ideal for connecting heavy steel plates.
 - ☐ D. Brazed joints are ideal for assembling large cast iron components.

Q.46 What causes ignition in a compression ignition engine?

- Ans**
- ☐ A. External flame
 - ☐ B. Spark plug activation
 - ☒ C. High temperature of compressed air
 - ☐ D. Low temperature of compressed air

Q.47 When smoothing a rough metal surface, which file type would provide a faster finish?

- Ans**
- ☐ A. Rasp file
 - ☒ B. Double cut file
 - ☐ C. Triangular file
 - ☐ D. Single cut file

Q.48 What is the suggested remedy for a faulty regulator in an alternator?

- Ans**
- ☒ A. Replace
 - ☐ B. Tighten
 - ☐ C. Rectify
 - ☐ D. Lubricate

Q.49 Which statement best describes the construction of a double ended hydraulic cylinder?

Ans ☒ A. Contains two pistons in one tube assembly

☒ B. Has a rod only on one side of the cylinder

☒ C. Uses a single central seal for both chambers

☒ D. Has piston rods extending from both sides of the cylinder

Q.50 If you must recommend a fit up inspection step for a complex joint in gas welding, which would ensure the highest joint integrity?

Ans ☒ A. Inspecting only the joint surface cleanliness

☒ B. Checking only the alignment of pieces

☒ C. Checking both alignment and uniform gap

☒ D. Measuring only the uniformity of gap

Q.51 When troubleshooting oil pressure drops, why should the oil filter be inspected?

Ans ☒ A. A filter can control coolant circulation

☒ B. A filter can affect alternator output

☒ C. A blocked filter can cause low oil pressure

☒ D. A filter can cause air leaks in tires

Q.52 A control circuit must implement the logic function $Y = (A \cdot B) + C$. How should the switches be connected?

Ans ☒ A. Switches A and B are wired in series, and this entire branch is wired in parallel with Switch C.

☒ B. Switches A and B are wired in parallel, and this entire branch is wired in series with Switch C.

☒ C. All three switches (A, B, and C) must be wired in a single common parallel block.

☒ D. All three switches (A, B, and C) must be wired in a continuous single series line.

Q.53 Why do cushion springs help reduce wear on clutch components?

Ans ☒ A. They increase the thickness of clutch plates

☒ B. They improve the heat resistance of the clutch

☒ C. They reduce the need for lubrication

☒ D. They distribute engagement force more evenly

Q.54 The hitching device mainly helps in:

Ans ☒ A. Wheel balancing

☒ B. Fuel injection

☒ C. Engine lubrication

☒ D. Implement attachment

Q.55 Why are bearing shells designed with a specific thickness and shape in diesel engines?

Ans ☒ A. To increase coolant speed

☒ B. To ensure proper load distribution

☒ C. To maximize fuel injection

☒ D. To optimize exhaust gas flow

Q.56 In a practical scenario, why might a technician choose a reactive muffler over an absorptive one?

Ans ☒ A. It is more effective at reducing low-frequency engine sounds

☒ B. It increases engine power output

☒ C. It needs less maintenance over time

☒ D. It lasts longer in high-temperature environments

Q.57 A student needs to drill several identical holes in a metal plate using a bench drilling machine. Which feature would help achieve consistent results?

- Ans**
- ☐ A. Adjusting the table height for each hole
 - ☒ B. Using the depth stop to control drilling depth
 - ☐ C. Changing the drill bit after each hole
 - ☐ D. Varying the feed pressure continuously

Q.58 Which part of the Vernier caliper is used to measure inside diameters?

- Ans**
- ☐ A. Depth rod
 - ☐ B. Locking screw
 - ☒ C. Upper jaws
 - ☐ D. Lower jaws

Q.59 During discharging of lead acid battery, which substance is formed at both battery plates?

- Ans**
- ☐ A. Lead bromide
 - ☐ B. Lead carbonate
 - ☒ C. Lead sulfate
 - ☐ D. Lead acetate

Q.60 Which front axle type allows the wheels to move up and down independently to adapt to uneven ground?

- Ans**
- ☒ A. Oscillating front axle
 - ☐ B. Rigid front axle
 - ☐ C. Four-wheel drive front axle
 - ☐ D. Adjustable front axle

Q.61 In a real-life workshop scenario, how could improper use of a drill vice affect the outcome of a drilling operation?

- Ans**
- ☒ A. It may result in inaccurate holes and potential safety hazards
 - ☐ B. It increases the spindle speed automatically
 - ☐ C. It extends the life of the drill bit significantly
 - ☐ D. It makes the drilling machine operate more quietly

Q.62 A fitter is required to file the inner curvature of a pipe and its flat edge. Which file is most suitable?

- Ans**
- ☐ A. Flat file
 - ☐ B. Round file
 - ☐ C. Needle file
 - ☒ D. Half round file

Q.63 What safety concern is associated with a faulty high-pressure diesel fuel line?

- Ans**
- ☒ A. Risk of fuel spray
 - ☐ B. Coolant leakage risk
 - ☐ C. Risk of electrical short circuit
 - ☐ D. Emission of engine noise

Q.64 Which material is commonly used to manufacture diesel tanks in automobiles?

- Ans**
- ☐ A. Zinc
 - ☒ B. Mild steel
 - ☐ C. Copper
 - ☐ D. Cast iron

Q.65 A screw extractor failed to remove a broken screw because the hole was drilled off-center. What is the main risk in this situation?

- Ans**
- ☐ A. Breaking the screw extractor
 - ☐ B. Sticking the extraction tool
 - ☐ C. Softening the broken screw
 - ☒ D. Damaging the original threaded hole

Q.66 Which part supports the camshaft inside the engine block?

- Ans**
- ☐ A. Gears support the camshaft inside the engine block.
 - ☐ B. Springs support the camshaft inside the engine block.
 - ☒ C. Bearings support the camshaft inside the engine block.
 - ☐ D. Pulleys support the camshaft inside the engine block.

Q.67 Which process is directly managed by the camshaft in a diesel engine?

- Ans**
- ☐ A. Spark generation
 - ☐ B. Fuel atomization
 - ☒ C. Valve actuation
 - ☐ D. Coolant circulation

Q.68 In a tractor power tiller, which configuration is most likely to minimize power loss during transmission from the engine to wheel?

- Ans**
- ☒ A. Direct shaft drive with constant mesh gearing
 - ☐ B. Hydraulic transfer using single circuit fluid
 - ☐ C. Chain drive with variable pitch sprockets
 - ☐ D. Belt drive with adjustable tension pulleys

Q.69 How does the diameter of an exhaust pipe affect engine performance and efficiency?

- Ans**
- ☐ A. Larger size increases brake power
 - ☐ B. Smaller size improves air filtration
 - ☒ C. Proper size maintains optimal gas flow
 - ☐ D. Any size functions equally well

Q.70 What is the fraction form of $87\frac{1}{2}\%$?

- Ans**
- ☐ A. $\frac{15}{16}$
 - ☒ B. $\frac{7}{8}$
 - ☐ C. $\frac{5}{6}$
 - ☐ D. $\frac{11}{12}$

Q.71 A technician notices excessive smoke from a diesel engine. Which Electronic Control Unit (ECU)-related issue could cause this?

- Ans**
- ☐ A. Low tire pressure level
 - ☐ B. Faulty alternator output
 - ☐ C. Blocked air filter system
 - ☒ D. Incorrect fuel delivery

Q.72 Which sequence correctly represents the four-stroke cycle in a spark ignition engine?

- Ans**
- ☐ A. Suction, power, compression, exhaust
 - ☐ B. Suction, exhaust, compression, power
 - ☒ C. Suction, compression, power, exhaust
 - ☐ D. Suction, compression, exhaust, power

Q.73 What is the normal condition of the ignition warning lamp after the engine starts?

- Ans**
- ☐ A. It changes colour repeatedly
 - ☐ B. It continues glowing brightly
 - ☐ C. It flashes continuously
 - ☒ D. It turns off if charging is normal

Q.74 Which part works together with the camshaft to achieve variable valve timing?

- Ans**
- ☒ A. The valve actuator mechanism
 - ☐ B. The valve spring stiffness
 - ☐ C. The valve magnetic mechanism
 - ☐ D. The valve lubrication system

Q.75 While giving first aid for a suspected fracture, what is the most critical step before moving the injured person?

- Ans**
- ☐ A. Apply cold packs to reduce swelling
 - ☐ B. Check for bleeding and bandage the wound
 - ☒ C. Immobilize the injured area with a splint or support
 - ☐ D. Ask the person to move the injured part



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	9:30 AM - 12:00 PM
Subject	ALP Stage 2 Millwright Mechanic Machine Tool Maintenance

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 A car travels on a highway, and its odometer records a reading of 180 km at 8:00 am and 240 km at 9:30 am. Based on this information, which statement best describes the car's average speed during this interval?

- Ans** ☒ A. The car's average speed is 40 km per hour as calculated from the odometer readings and time interval.
- ☒ B. The car's average speed is 60 km per hour based only on the change in odometer readings.
- ☒ C. The car's average speed is 240 km per hour since that was the odometer reading at 9:30 am.
- ☒ D. The car's average speed is 180 km per hour since that was the odometer reading at 8:00 am.

Q.2 Find the LCM of 72, 78, and 90.

- Ans** ☒ A. 4680
- ☒ B. 4280
- ☒ C. 4120
- ☒ D. 4250

Q.3 P, Q, R, S and T have different ages. T is elder than only one person. S is elder than P but younger than Q. R is elder than Q. Who is the youngest?

- Ans** ☒ A. R
- ☒ B. P
- ☒ C. Q
- ☒ D. S

Q.4 An engineer uses fault tree analysis to assess a machine-related injury in a factory. Which step should be taken first according to standard procedure?

- Ans** ☒ A. Define the top event representing the injury
- ☒ B. List all possible causes of failures
- ☒ C. Validate the analysis using workplace data
- ☒ D. Establish preventive measures to control risks

Q.5 What should come in place of the question mark (?) in the given series?

74, 83, 101, 128, ?, 209

- Ans**
- ☐ A. 155
 - ☐ B. 176
 - ☒ C. 164
 - ☐ D. 146

Q.6 Which of the following statements correctly describes average velocity and its SI unit?

- Ans**
- ☐ A. Average velocity is the total distance divided by total time, and its unit is kilometer per hour.
 - ☐ B. Average velocity is the total distance divided by total time, and its unit is meter per second.
 - ☒ C. Average velocity is the total displacement divided by total time, and its unit is meter per second.
 - ☐ D. Average velocity is the total displacement divided by total time, and its unit is kilometer per hour.

Q.7 What is an email used for?

- Ans**
- ☐ A. Data processing
 - ☐ B. File storage
 - ☐ C. Creating documents
 - ☒ D. Sending messages

Q.8 Which of the following best describes a key environmental concern associated with improper disposal of e-waste?

- Ans**
- ☐ A. Release of greenhouse gases from decomposition
 - ☐ B. Enhanced biodegradation of plastics
 - ☒ C. Release of toxic metals into soil and water
 - ☐ D. Increased recycling rates of precious metals

Q.9 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Among five people – A, B, C, D, and E – who is the tallest?

(I) A is taller than B. B is taller than C.

(II) D is taller than E.

- Ans**
- ☒ A. Both statements I and II together are NOT sufficient to answer the question.
 - ☐ B. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☐ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ D. Data in statement I alone is sufficient to answer the question while data in statement II is not

Q.10 A train X crosses a man who is sitting in another train Y, which is moving in the opposite direction, in 8 seconds. However, when both trains are moving in the same direction, train X takes 20 seconds to pass the same man. If the length of train X is 360 meters and the length of train Y (in which the man is sitting) is 240 meters, what is the speed of train Y?

- Ans**
- ☒ A. 48.6 km/h
 - ☐ B. 45.8 km/h
 - ☐ C. 46.5 km/h
 - ☐ D. 45.3 km/h

Q.11 A roller coaster at the top of its track has maximum potential energy. As it descends and speeds up, what principle explains why the sum of its kinetic and potential energies remains constant if we ignore friction and air resistance?

- Ans**
- ☐ A. Law of inertia
 - ☐ B. Principle of superposition
 - ☒ C. Law of conservation of energy
 - ☐ D. Principle of inertia

Q.12 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Shreya related to Mahak if 'Shreya + Dev - Taran × Harshit % Mahak'?

- Ans**
- ☐ A. Mother's sister
 - ☐ B. Father's mother
 - ☐ C. Father's sister
 - ☒ D. Mother's mother

Q.13 Which component makes up the largest proportion of Earth's atmosphere by volume?

- Ans**
- ☐ A. Argon
 - ☐ B. Carbon dioxide
 - ☐ C. Oxygen
 - ☒ D. Nitrogen

Q.14 Refer to the following letter and symbol series and answer the question that follows.
Counting to be done from left to right.

(Left) Z @ B R J # D * Q A M S % P L V O U S N T W Z (Right)

How many such symbols are there, each of which is immediately preceded by a letter and also immediately followed by a letter?

- Ans**
- ☐ A. None
 - ☒ B. Four
 - ☐ C. Two
 - ☐ D. Three

Q.15 If 'A' stands for '+', 'B' stands for '−', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

31 B 35 D 7 A 9 C 2 = ?

- Ans**
- ☒ A. 44
 - ☐ B. 48
 - ☐ C. 42
 - ☐ D. 46

Q.16 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

QOI 5, OMG 10, MKE 15, KIC 20, ?

- Ans**
- ☐ A. JHZ 24
 - ☐ B. HIZ 30
 - ☐ C. IHS 23
 - ☒ D. IGA 25

Q.17 A shopkeeper marks a product 75% above cost price and offers two successive discounts of 30% and 40%. What is the profit or loss percentage?

- Ans**
- ☐ A. 20.9% profit
 - ☐ B. 22.6% profit
 - ☒ C. 26.5% loss
 - ☐ D. 15.7% profit

Q.18 Which integrated strategy best addresses soil pollution, falling crop yields, and low microbial activity near an industrial zone?

- Ans**
- ☐ A. Expand urban areas into farmland.
 - ☐ B. Reforestation in nearby urban centers.
 - ☒ C. Control industrial waste for sustainability.
 - ☐ D. Ban all regional chemical fertilizers.

Q.19 A trader marks an article 25% above its cost price. He allows a discount of 10% on the marked price. After giving the discount, he makes a profit of ₹180 on the article. What is the cost price of the article?

- Ans**
- ☐ A. ₹1,260
 - ☒ B. ₹1,440
 - ☐ C. ₹1,200
 - ☐ D. ₹1,380

Q.20 A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q such that OQ = 12 cm. What is the length of PQ?

- Ans**
- ☐ A. $\sqrt{117}$ cm
 - ☐ B. $\sqrt{107}$ cm
 - ☐ C. $\sqrt{97}$ cm
 - ☒ D. $\sqrt{119}$ cm

Q.21 If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−', what will come in place of the question mark '?' in the following equation?

$$14 \text{ A } 30 \text{ B } 45 \text{ C } 15 \text{ D } 9 = ?$$

- Ans**
- ☐ A. 29
 - ☐ B. 25
 - ☒ C. 27
 - ☐ D. 28

Q.22 A car travels 90 km east and then 30 km west along the same straight road. If the entire journey takes 3 hours, what is the average velocity of the car?

- Ans**
- ☐ A. 50 km/h north
 - ☒ B. 20 km/h east
 - ☐ C. 30 km/h east
 - ☐ D. 40 km/h east

Q.23 PJAE is related to JOWH in a certain way based on the English alphabetical order. In the same way, OIVC is related to INRF. To which of the following is NEZF related to following the same logic?

- Ans**
- ☐ A. IJVJ
 - ☐ B. HKVJ
 - ☒ C. HJVI
 - ☐ D. IKUH

Q.24 A boat sails 40 km downstream and then 40 km upstream in a river. The boat's speed in still water is 12 km/hr and the speed of the stream is 4 km/hr. How much time does the boat take to cover the entire distance (both upstream and downstream)?

- Ans**
- ☐ A. 10 hours
 - ☒ B. 7.5 hours
 - ☐ C. 8 hours
 - ☐ D. 6 hours

Q.25 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

BIP : EMU
GNU : JRZ

- Ans
- ☒ A. VCD : GRD
 - ☒ B. FMT : IQY
 - ☒ C. CGW : NHT
 - ☒ D. XDE : PON

Q.26 Which line symbol is commonly used in engineering drawings to represent a hidden edge that is not directly visible?

- Ans
- ☒ A. Solid thick line
 - ☒ B. Chain thin line
 - ☒ C. Zigzag line
 - ☒ D. Dashed line

Q.27 A cyclist covers 120 meters in 16 seconds on a straight road, then immediately covers 180 meters in 24 seconds on a similar road segment. What is the average speed of the cyclist during the entire journey?

- Ans
- ☒ A. 8.0 meters per second
 - ☒ B. 7.0 meters per second
 - ☒ C. 6.5 meters per second
 - ☒ D. 7.5 meters per second

Q.28 An engineering student is tasked with creating a detailed side view of a complex machine part for an assembly drawing. Which approach will most accurately represent all features visible from the side while avoiding hidden overlaps or misinterpretations?

- Ans
- ☒ A. Project all visible elements from the side and omit hidden features unless needed
 - ☒ B. Include all features even those not visible from the selected side view
 - ☒ C. Sketch the side view freely without using projections from the main view
 - ☒ D. Use only hidden lines for representing features on the far side in the view

Q.29 What is the simplified value of the expression $\left[\frac{\cos A}{(1 - \tan A)} \right] + \left[\frac{\sin A}{(1 - \cot A)} \right]$?

- Ans
- ☒ A. 1
 - ☒ B. 0
 - ☒ C. $\sin A - \cos A$
 - ☒ D. $\cos A + \sin A$

Q.30 A diamond ring costs ₹85,000. Its price is reduced first by 11% and then by 4% on the reduced price. Find the final price of the ring after both discounts.

- Ans
- ☒ A. ₹72,624
 - ☒ B. ₹72,604
 - ☒ C. ₹74,624
 - ☒ D. ₹73,624

- Q.31** In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.
Among the five poles—I, N, C, H, and L—each having a different height, which pole is the tallest?
(I) I is shorter than N but taller than C. C is taller than only one pole.
(II) H is taller than L.
- Ans** ☒ A. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
☒ B. Data in statement II alone is sufficient to answer the question while data in statement I is not
☒ C. Data in statement I alone is sufficient to answer the question while data in statement II is not
☒ D. Both statements I and II together are NOT sufficient to answer the question

Q.32 Which property of a fuse wire ensures it melts quickly when excess current flows?

- Ans** ☒ A. Low melting point
☒ B. High electrical resistance
☒ C. High melting point
☒ D. Thick wire

Q.33 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between X and Z when counted from the right of X. Only two people sit between Z and D. Only three people sit between X and B. A sits to the immediate left of C.
Who sits third to the left of Y?

- Ans** ☒ A. X
☒ B. C
☒ C. A
☒ D. Z

Q.34 If 'A' stands for '+', 'B' stands for '−', 'C' stands for '×' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

$$28 \text{ A } 16 \text{ C } 3 \text{ B } 12 \text{ D } 4 = ?$$

- Ans** ☒ A. 73
☒ B. 71
☒ C. 72
☒ D. 70

Q.35 A runner completes one lap of a 200 meter circular track in 50 seconds. What is the average speed of the runner?

- Ans** ☒ A. 3 meter per second
☒ B. 3.5 meter per second
☒ C. 4.5 meter per second
☒ D. 4 meter per second

Q.36 Which of the following statements correctly reflects the characteristics of a Local Area Network (LAN) and the role of Ethernet within it?

- Ans** ☒ A. Ethernet is a standard that governs how devices in a LAN communicate via wired connections, supporting speeds from 10 Mbps to 1000 Mbps.
☒ B. A LAN always requires Gigabit Ethernet to function and is insecure because it allows open access to all network devices.
☒ C. LANs are designed for long-distance communication and use Ethernet primarily for wireless data exchange.
☒ D. Ethernet in a LAN provides low-speed data transfer and connects users over public Internet infrastructure.

Q.37 In a certain code language, 'KING' is coded as '9713' and 'ITCH' is coded as '2945'. What is the code for 'I' in the given code language?

- Ans**
- ☐ A. 7
 - ☐ B. 2
 - ☒ C. 9
 - ☐ D. 4

Q.38 An engineer is tasked with creating the front view of a mechanical part. The part has a rectangular base with a vertical circular hole passing through it and a triangular prism attached on top. Which of the following best describes what will be visible in the front view?

- Ans**
- ☐ A. The outline of triangular prism and circular hole will be visible in front view only
 - ☐ B. Only the rectangular base outline will be visible in the front view drawing
 - ☐ C. Only the triangular prism will be clearly visible in the front view drawing
 - ☒ D. The outline of rectangular base and triangular prism will be visible but hole is not shown

Q.39 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. Only three boxes are kept above S. Exactly one box is kept between T and S. Exactly three boxes are kept between T and U, and U is kept somewhere above S. V is kept immediately below U. W is kept at one of the places above P. Q is not kept immediately above or below T. Based on the given information, which box is kept at the lowermost position?

- Ans**
- ☐ A. V
 - ☒ B. P
 - ☐ C. Q
 - ☐ D. S

Q.40 Three workers, X, Y, and Z, can complete a certain job in 10 days, 12 days, and 15 days, respectively. Determine the number of days required for them to complete the job when they work together.

- Ans**
- ☐ A. 8 days
 - ☐ B. 6 days
 - ☒ C. 4 days
 - ☐ D. 5 days

Q.41 Three pipes A, B and C can fill a tank in 12 hours, 18 hours and 24 hours, respectively. A leak at the bottom can empty the full tank in 36 hours. If all the pipes are opened together, in how many hours will the tank be filled? (Round off your answer to two decimal places.)

- Ans**
- ☐ A. 9.45 hours
 - ☐ B. 5.56 hours
 - ☒ C. 6.55 hours
 - ☐ D. 3.33 hours

Q.42 The average of 8 numbers is 45. If one number, 59, is removed, what will the new average be?

- Ans**
- ☐ A. 41.5
 - ☐ B. 42
 - ☒ C. 43
 - ☐ D. 42.5

Q.43 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements: All girls are hens. No hen is a cat.

Conclusion (I): No girl is a cat.

Conclusion (II): Some cats are hens.

- Ans**
- ☒ A. Only conclusion (I) follows
 - ☐ B. Neither conclusion (I) nor (II) follows
 - ☐ C. Both conclusions (I) and (II) follow
 - ☐ D. Only conclusion (II) follows

Q.44 16 is related to 260 following a certain logic. Following the same logic, 25 is related to 630. To which of the following is 9 related, following the same logic?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☐ A. 78
 - ☒ B. 84
 - ☐ C. 732
 - ☐ D. 729

Q.45 E, F, G, H, L and M live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live above G. Only two people live between L and E. Only two people live between M and G. E lives below G but above F. How many people live below H?

- Ans**
- ☐ A. Four
 - ☐ B. Two
 - ☐ C. One
 - ☒ D. Three

Q.46 Which of the following scenarios best demonstrates the conversion of chemical energy to mechanical energy?

- Ans**
- ☐ A. A flashlight turns on after inserting new batteries
 - ☐ B. A stretched rubber band snaps back to its original shape
 - ☒ C. A runner uses stored energy from food to sprint forward
 - ☐ D. A stone falls off a table to the ground

Q.47 A conical tent has a base radius of 14 m and a height of 48 m. How many cubic meters of air can it hold? (Use $\pi = \frac{22}{7}$)

- Ans**
- ☐ A. 9568
 - ☐ B. 9865
 - ☒ C. 9856
 - ☐ D. 8956

Q.48 In third angle projection, where is the object placed relative to the plane of projection?

- Ans**
- ☒ A. The object is placed in the third quadrant
 - ☐ B. The object is placed in the first quadrant
 - ☐ C. The object is placed in the second quadrant
 - ☐ D. The object is placed in the fourth quadrant

Q.49 If the mean of the following data is 40, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	30	27	44	29	X

- Ans
- ☐ A. 99
 - ☐ B. 93
 - ☐ C. 98
 - ☒ D. 82

Q.50 Which situation best describes an entanglement hazard in a mechanical workshop?

- Ans
- ☒ A. Loose clothing caught in a rotating shaft
 - ☐ B. Hand pinched between gears
 - ☐ C. Gloves worn near hot surfaces
 - ☐ D. Finger cut by a sharp edge

Q.51 What do touch gestures in Microsoft Windows allow users to do?

- Ans
- ☐ A. Increase screen brightness
 - ☒ B. Perform actions using finger movements
 - ☐ C. Type faster on the keyboard
 - ☐ D. Connect external devices

Q.52 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some glasses are spoons.
All spoons are forks.

Conclusions:

(I) Some glasses are forks.
(II) All forks are spoons.

- Ans
- ☒ A. Only conclusion (I) follows
 - ☐ B. Only conclusion (II) follows
 - ☐ C. Both conclusions (I) and (II) follow
 - ☐ D. Neither conclusion (I) nor (II) follows

Q.53 When a moving car suddenly applies brakes, its kinetic energy is transformed mainly into which form of energy?

- Ans
- ☐ A. Potential energy
 - ☐ B. Light energy
 - ☐ C. Sound energy
 - ☒ D. Heat energy

Q.54 If $\left(x + \frac{1}{x}\right) = 3$, find the value of $\left(x^3 + \frac{1}{x^3}\right)$.

- Ans
- ☒ A. 18
 - ☐ B. 15
 - ☐ C. 20
 - ☐ D. 16

Q.55 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☐ A. BG – EJ
 - ☐ B. DJ – GM
 - ☐ C. AF – DI
 - ☒ D. CH – EK

Q.56 Which approach most effectively reduces both nitrogen and phosphorus concentrations during wastewater treatment?

- Ans**
- ☐ A. Primary sedimentation with extended aeration
 - ☐ B. UV disinfection following secondary treatment
 - ☒ C. Biological and chemical nutrient removal
 - ☐ D. Surface-flow constructed wetlands

Q.57 A laboratory record shows a distance of 0.004 kilometers between two points. How should this be written in SI units of length for a scientific report?

- Ans**
- ☒ A. 4 m
 - ☐ B. 0.4 m
 - ☐ C. 4000 mm
 - ☐ D. 400 cm

Q.58 If Rohan's income increases by 20% and his expenditure increases by 10%, then his savings increase by ₹1,200. If his original income was ₹12,000, what was his original expenditure? (Assume that savings = income – expenditure.)

- Ans**
- ☐ A. ₹11,000
 - ☒ B. ₹12,000
 - ☐ C. ₹9,000
 - ☐ D. ₹10,000

Q.59 A car of mass 1200 kg accelerates from rest to a speed of 20 m/s on a straight road. If the kinetic energy gained by the car is completely due to the work done by the engine, which of the following best represents the total kinetic energy acquired by the car at this speed?

- Ans**
- ☒ A. 240,000 joules
 - ☐ B. 480,000 joules
 - ☐ C. 24,000 joules
 - ☐ D. 12,000 joules

Q.60 A thermometer shows a reading of 37 degrees Celsius. What is the corresponding temperature in Kelvin?

- Ans**
- ☐ A. 320 K
 - ☐ B. 300 K
 - ☒ C. 310 K
 - ☐ D. 270 K

Q.61 Which of the following is both, an input and output device?

- Ans**
- ☐ A. Printer
 - ☒ B. Touchscreen monitor
 - ☐ C. Keyboard
 - ☐ D. Projector

Q.62 Which of the following best defines 'work' in physics?

- Ans**
- ☐ A. Work is done whenever a force is applied, regardless of movement.
 - ☐ B. Work is done if a force acts at any angle to the motion.
 - ☐ C. Work is done when energy is stored in an object.
 - ☒ D. Work is done when a force moves an object in the direction of the force.

Q.63 G is the mother of Y. Y is the sister of V. S is the father of L. L is the husband of V. How is G related to S?

- Ans**
- ☒ A. Son's wife's mother
 - ☐ B. Mother's mother
 - ☐ C. Son's wife's sister
 - ☐ D. Son's wife

Q.64 A car travels 60 km north in 2 hours, then 40 km south in the next 1 hour. What is the car's average velocity over the entire trip?

- Ans**
- ☒ A. 6.7 km/h north
 - ☐ B. 0 km/h
 - ☐ C. 20 km/h south
 - ☐ D. 33.3 km/h north

Q.65 What is the main purpose of ambient air quality standards?

- Ans**
- ☒ A. To set legally permissible limits for specific pollutants to protect public health.
 - ☐ B. To focus exclusively on industrial operations while ignoring other sectors.
 - ☐ C. To require all industries to reduce emissions by the exact same percentage.
 - ☐ D. To ensure air is routinely sampled to map historical pollution trends.

Q.66 The median of the following data is :
25, 15, 23, 25, 17, 27, 20, 18, 24, 30, 19, 28, 35, 10, 31, 40

- Ans**
- ☐ A. 23.5
 - ☒ B. 24.5
 - ☐ C. 25
 - ☐ D. 20.5

Q.67 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☐ A. TN-ZD
 - ☐ B. EY-KO
 - ☒ C. QK-VA
 - ☐ D. WQ-CG

Q.68 A mechanical engineer must design a flange joint where two pipes are to be connected at a 45-degree angle. Which method should the engineer use to accurately represent the intersection line on a technical drawing of the two cylindrical pipes?

- Ans**
- ☐ A. Draw a simple circle at the junction in the top view
 - ☐ B. Use only standard orthographic projection without auxiliary views
 - ☒ C. Draw the true shape of the intersection using auxiliary projection
 - ☐ D. Represent the intersection as a straight line in the side view

Q.69 What is the best description of the purpose of multi-view drawing in engineering drawing?

- Ans**
- ☐ A. To show different colors of an object for better visual appearance
 - ☐ B. To present the object in a single three-dimensional visual form only
 - ☐ C. To view an object from only one direction
 - ☒ D. To represent different sides of an object clearly on a flat surface

Q.70 Refer to the given letter series and answer the question that follows. Counting to be done from left to right.

(Left) B F O P P S Q A L M K A W X S N U Q J O M Y (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☒ A. 5
 - ☐ B. 6
 - ☐ C. 4
 - ☐ D. 7

Q.71 Two students move identical boxes through a distance of 10 m. Student A applies a force of 50 N, while Student B applies a force of 100 N. What is the difference in the work done by the two students?

- Ans**
- ☒ A. 500 J
 - ☐ B. 1000 J
 - ☐ C. 0 J
 - ☐ D. 50 J

Q.72 A sample of water is heated from 15 degrees Celsius to 35 degrees Celsius. What is the temperature change in Kelvin?

- Ans**
- ☐ A. The temperature change is 30 K.
 - ☐ B. The temperature change is 15 K.
 - ☒ C. The temperature change is 20 K.
 - ☐ D. The temperature change is 50 K.

Q.73 Simplify: $60 - \{(-8) \times (-16 - 19 - 2)\} \div [5 \times \{2 + (-1) \times (-1)\}]$

- Ans**
- ☐ A. $\frac{594}{15}$
 - ☒ B. $\frac{604}{15}$
 - ☐ C. $\frac{608}{15}$
 - ☐ D. $\frac{614}{15}$

Q.74 What should come in place of the question mark (?) in the given series?

98, 104, 116, 134, 158, ?

- Ans**
- ☐ A. 184
 - ☒ B. 188
 - ☐ C. 190
 - ☐ D. 186

Q.75 What is the primary function of a fire hydrant in a workplace safety system?

- Ans
- ☐ A. Activating fire alarms automatically in emergencies
 - ☒ B. Supplying large quantities of water to fight fires
 - ☐ C. Detecting smoke and warning employees
 - ☐ D. Removing hazardous fumes from the area

Q.76 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UMD ZQG EUJ JYM ?

- Ans
- ☐ A. NDO
 - ☒ B. OCP
 - ☐ C. PDP
 - ☐ D. NBQ

Q.77 An engineer is tasked with creating a hollow cone for a machine part, where the wall thickness must be consistent and the slant height is critical for assembly. Which factor is most important to ensure the cone will fit correctly in the final design?

- Ans
- ☐ A. Prioritizing uniform wall thickness over all other features
 - ☐ B. Matching only the overall height of the cone
 - ☐ C. Focusing only on base diameter for precise fit
 - ☒ D. Ensuring the slant height matches the assembly requirement

Q.78 If a scooter travels at a constant speed of 25 km per hour, how far will it travel in 4 hours?

- Ans
- ☐ A. 80 km
 - ☒ B. 100 km
 - ☐ C. 75 km
 - ☐ D. 120 km

Q.79 The simple interest earned on a certain sum of money for 3 years at 15% per annum is ₹2,700. Find the sum.

- Ans
- ☐ A. ₹9,000
 - ☒ B. ₹6,000
 - ☐ C. ₹5,000
 - ☐ D. ₹8,000

Q.80 Solve the system of equations:

$$-3x + 2y - z = -1, 6x - 6y + 7z = -7, 3x - 4y + 4z = -6$$

- Ans
- ☐ A. $x=1, y=2, z=2$
 - ☐ B. $x=2, y=1, z=-3$
 - ☐ C. $x=-2, y=2, z=11$
 - ☒ D. $x=2, y=2, z=-1$

Q.81 A pendulum takes 60 seconds to complete 24 oscillations. If its length is increased and it now takes 72 seconds for the same number of oscillations, what has happened to its time period?

- Ans
- ☒ A. It has increased to 3.0 seconds
 - ☐ B. It remains at 2.5 seconds
 - ☐ C. It has decreased to 1.5 seconds
 - ☐ D. It has decreased to 2.0 seconds

Q.82 Namia is facing the west. She turns left and walks 15 m. She turns left and walks 25 m. She again turns left and walks 40 m. She finally turns left and walks 40 m to reach home. In which direction is her home with respect to the starting point?

- Ans**
- ☐ A. South-East
 - ☐ B. North-East
 - ☐ C. South-West
 - ☒ D. North-West

Q.83 When using a hand file during fitting operations, which action demonstrates adherence to tool safety protocols?

- Ans**
- ☐ A. Filing above shoulder height for better leverage
 - ☐ B. Applying excessive downward force when filing
 - ☐ C. Holding the file near its tang during filing work
 - ☒ D. Fitting a proper handle securely to the tang

Q.84 A father distributed two different amounts among his sons P, Q, R and S. First amount was distributed in the ratio 5 : 4 : 3 : 2 and the second amount was distributed in the ratio 6 : 7 : 8 : 9. If the second amount is thrice the first amount, then which son will get the maximum amount?

- Ans**
- ☐ A. Q
 - ☐ B. P
 - ☒ C. S
 - ☐ D. R

Q.85 What is the typical temperature range covered by a laboratory thermometer used in school experiments?

- Ans**
- ☐ A. Zero to two hundred degrees Celsius
 - ☐ B. Minus fifty to fifty degrees Celsius
 - ☐ C. Thirty five to forty two degrees Celsius
 - ☒ D. Minus ten to one hundred and ten degrees Celsius

Q.86 An object has a mass of 10 kilograms. How does its weight on the Moon compare to its weight on Earth?

- Ans**
- ☐ A. The object weighs zero on the Moon
 - ☒ B. The object weighs less on the Moon than on Earth
 - ☐ C. The object weighs more on the Moon than on Earth
 - ☐ D. The object weighs the same on both the Moon and Earth

Q.87 In a spreadsheet application, a user selects a range of cells and presses Ctrl + C, followed by Ctrl + V in a different worksheet. What happens to the data?

- Ans**
- ☐ A. The selected cells are deleted from the original worksheet.
 - ☒ B. The selected cells are copied to the new worksheet.
 - ☐ C. The selected cells are moved to the new worksheet.
 - ☐ D. The selected cells are saved to a new file.

Q.88 Which is the most important safety check before operating any machine in a workshop?

- Ans**
- ☐ A. Ensure the machine area is properly illuminated
 - ☒ B. Inspect the machine for loose or damaged parts
 - ☐ C. Check if the machine is plugged in properly
 - ☐ D. Wipe the machine with a dry cloth before use

Q.89 A trader buys 187 pens at ₹23 each. During transportation, 7 pens get damaged and cannot be sold. He sells the remaining pens at ₹27 each. Find his profit percentage. (rounded off to one decimal place)

- Ans**
- ☒ A. 12.6%
 - ☒ B. 13.0%
 - ☒ C. 13.7%
 - ☒ D. 14.1%

Q.90 A worker's hand is at risk of injury from a mechanical shearing action. Which situation best describes a shearing hazard?

- Ans**
- ☒ A. A hand becoming entangled in a rotating machine shaft during operation
 - ☒ B. A hand touching a hot metallic machine surface during maintenance activity
 - ☒ C. A hand caught between a moving blade and a fixed machine surface during operation
 - ☒ D. A hand sliding repeatedly across a rough abrasive machine surface during work

Q.91 Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) A T D E B R C L M Q O N P J M Q E A O Z W F U K S L (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☒ A. 2
 - ☒ B. 1
 - ☒ C. 0
 - ☒ D. 3

Q.92 In this question, a group of numbers/symbols is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer. If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	6	1	&	3	%	8	+	4	#	7	@	5	2	\$
Code	R	V	G	D	S	C	T	L	F	W	H	U	Y	N

Conditions:

- (i) If the first element is a symbol and the last element is an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and last elements are to be coded as ©.
- (iii) If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?

+ 6 \$ 2 7

- Ans**
- ☒ A. WSNYT
 - ☒ B. TSNWW
 - ☒ C. STMWV
 - ☒ D. WRNYT

Q.93 O, P, Q, U and V have different heights. Only three people have heights between V and Q. P is taller than U but shorter than O. V is taller than Q. How many people are shorter than P?

- Ans**
- ☒ A. One
 - ☒ B. Three
 - ☒ C. Four
 - ☒ D. Two

Q.94 Below are given two sets of numbers. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

10 - 100 - 50 - 25; 2 - 4 - 2 - 1

- Ans
- ☐ A. 12 - 144 - 62 - 31
 - ☒ B. 4 - 16 - 8 - 4
 - ☐ C. 5 - 25 - 15 - 7
 - ☐ D. 8 - 64 - 32 - 14

Q.95 A sum of ₹420 is divided among A, B, C, and D such that: $A : B = 4 : x$, $B : C = x : 7$, $C : D = 6 : (x - 3)$. If B and C together get ₹210, find the value of x.

- Ans
- ☐ A. 42
 - ☐ B. 27
 - ☒ C. 39
 - ☐ D. 53

Q.96 In how many years will a sum of ₹16,000 at 10% per annum compounded semi-annually become ₹18,522?

- Ans
- ☐ A. 1 year
 - ☒ B. 1.5 years
 - ☐ C. 2.5 years
 - ☐ D. 2 years

Q.97 Which feature is a requirement of the BIS drawing standard in engineering drawings?

- Ans
- ☐ A. Use of colored pencils for clarity
 - ☐ B. Margin lines of random width
 - ☐ C. Freehand sketches without scale
 - ☒ D. Title block with specific information

Q.98 There are two types of silver-copper alloys. The first alloy contains $93\frac{1}{3}\%$ silver, while the second alloy contains $86\frac{2}{3}\%$ silver. Find the amount of the first alloy that should be mixed with some quantity of the second alloy to obtain a 100 kg mixture containing 90% silver.

- Ans
- ☐ A. 45 kg
 - ☒ B. 50 kg
 - ☐ C. 48 kg
 - ☐ D. 52 kg

Q.99 Which statement best describes a 'point' in engineering drawing?

- Ans
- ☐ A. A point is a short line segment used to mark measurements.
 - ☐ B. A point is the intersection of two lines and always has measurable length.
 - ☒ C. A point indicates a precise location but has no size, length, or width.
 - ☐ D. A point represents a small area with both length and width.

Q.100 The circumference of the base of a solid right circular cylinder is 88 cm and its height is 150 cm. What is the volume (in cm³) of the cylinder?

$$\left(\text{Take } \pi = \frac{22}{7} \right)$$

- Ans**
- ☐ A. 92450
 - ☐ B. 92500
 - ☒ C. 92400
 - ☐ D. 92550

Section : **PART-B**

Q.1 What needs to be checked when a threaded pipe connection becomes loose after cutting?

- Ans**
- ☐ A. Type of tap used
 - ☒ B. Die adjustment setting
 - ☐ C. Cutting speed applied
 - ☐ D. Amount of lubricant used

Q.2 Which type of operation is most commonly performed on a vertical milling machine?

- Ans**
- ☒ A. Face milling of flat surfaces
 - ☐ B. Slot milling with side cutters
 - ☐ C. Angular milling with swivelling head
 - ☐ D. End milling of narrow profiles

Q.3 Which specification parameter is most critical for ensuring a flat belt fits properly on pulleys in a power transmission system?

- Ans**
- ☐ A. The material of the belt
 - ☐ B. The thickness of the belt
 - ☐ C. The pitch length of the belt
 - ☒ D. The width of the belt

Q.4 In a mechanical workshop, what is the main purpose of wearing safety goggles while operating grinding machines?

- Ans**
- ☐ A. To prevent hearing loss from loud equipment
 - ☐ B. To reduce inhalation of dust particles
 - ☒ C. To protect the eyes from flying debris and sparks
 - ☐ D. To avoid electric shock from faulty wiring

Q.5 A maintenance engineer observes that the input and output shafts in a gearbox are neither parallel nor intersecting and there is a need for smooth, quiet operation under high loads. Which gear arrangement is most suitable in this context?

- Ans**
- ☒ A. Hypoid gear
 - ☐ B. Spiral bevel gear
 - ☐ C. Helical gear
 - ☐ D. Worm gear

Q.6 Which cutting tool material is most appropriate for high-speed CNC machining of hard metals?

- Ans**
- ☐ A. Cast iron
 - ☒ B. Cemented carbide
 - ☐ C. High-speed steel
 - ☐ D. Tool steel

Q.7 In the British Standard system, how is the tolerance zone typically represented in diagrams?

- Ans**
- ☐ A. As a horizontal line representing measured dimension of component
 - ☒ B. As a region located relative to the zero line representing basic size
 - ☐ C. As an average value obtained from repeated dimensional readings
 - ☐ D. As a numerical value representing the machining allowance

Q.8 A lathe machine is being installed in a new workshop. Which of the following must be checked first to ensure proper installation according to standard maintenance practices?

- Ans**
- ☐ A. Filling with recommended lubricant
 - ☒ B. Foundation level and alignment
 - ☐ C. Checking electrical wiring
 - ☐ D. Trial running and observation

Q.9 In a fabrication sketch, which line correctly indicates the edge of a mounting bracket that is visible from the front view?

- Ans**
- ☒ A. Object line
 - ☐ B. Dimension line
 - ☐ C. Hidden line
 - ☐ D. Center line

Q.10 Which symbol is used to indicate a pressure source in pneumatic drawings?

- Ans**
- ☐ A. Square
 - ☐ B. Rectangle
 - ☐ C. Triangle
 - ☒ D. Circle

Q.11 Where should the measuring probe be placed to obtain reliable vibration readings for bearing condition monitoring?

- Ans**
- ☐ A. On the machine foundation away from all rotating mechanical components
 - ☐ B. Directly on the rotating shaft during normal machine operating conditions
 - ☐ C. Loosely against the protective guard covering the rotating machine assembly
 - ☒ D. Firmly on the bearing housing near the monitored bearing location

Q.12 A maintenance team noticed an increase in machine breakdowns and wants to reduce unplanned stoppages. Which of the following actions supports total productive maintenance principles?

- Ans**
- ☐ A. Reducing operator involvement in upkeep
 - ☐ B. Assigning repairs only after breakdown
 - ☒ C. Scheduling routine checks for all machines
 - ☐ D. Allowing machines to run until failure

Q.13 Which component in a PLC architecture is primarily responsible for executing control instructions and managing logic operations?

- Ans**
- ☐ A. Output Module
 - ☒ B. Central Processing Unit (CPU)
 - ☐ C. Input Module
 - ☐ D. Power Supply

Q.14 What safety feature is designed to shield the operator from fragments in case a grinding wheel breaks on a pedestal grinder?

- Ans**
- ☒ A. Wheel guard
 - ☐ B. Base
 - ☐ C. Tool rest
 - ☐ D. Motor cover

Q.15 During routine inspection, an engineer notices a grooved nut applied on a shaft with a missing set screw. What is the most likely risk associated with this condition?

- Ans**
- ☐ A. The threads will experience reduced wear
 - ☐ B. The nut may seize onto the shaft
 - ☒ C. The nut may loosen due to vibration or movement
 - ☐ D. The nut will transmit more torque to the shaft

Q.16 Why is the root of a screw thread often rounded in high-stress applications?

- Ans**
- ☐ A. To improve thread fit
 - ☒ B. To reduce stress concentration
 - ☐ C. To increase holding power
 - ☐ D. To reduce friction

Q.17 A maintenance team finds that predictive maintenance alerts from a cloud-based dashboard are delayed by several hours. All smart sensors and PLCs on the production line show normal operation with no device errors. Which connectivity issue is most likely causing this delay?

- Ans**
- ☐ A. Outdated firmware on smart sensors causing local data loss
 - ☐ B. Incorrect PLC address configuration in local controllers
 - ☐ C. Sensor power supply fluctuations affecting sensor readings
 - ☒ D. Unstable internet connection between factory network and cloud

Q.18 Which tool is commonly used for lifting heavy stone blocks during foundation erection in mechanical engineering works?

- Ans**
- ☐ A. Wedge bolt
 - ☐ B. Expansion bolt
 - ☐ C. Eye bolt
 - ☒ D. Lewis bolt

Q.19 What key synchronization challenge arises in systems using multiple 5 by 2 valves for controlling different actuators?

- Ans**
- ☐ A. Avoiding mixing of supply and exhaust air
 - ☒ B. Ensuring all valves operate in correct sequence
 - ☐ C. Matching all valve cycle times for safety
 - ☐ D. Preventing excessive pressure drop across all valves

Q.20 Which modification would reduce the force output of a pneumatic actuator without altering supply pressure or stroke length?

- Ans**
- ☐ A. Change mounting style
 - ☐ B. Shorten the stroke length
 - ☒ C. Decrease the piston diameter
 - ☐ D. Use a longer piston rod

Q.21 Which part of a fan system is most susceptible to vibration-related damage during surge conditions?

- Ans**
- ☐ A. Electrical wiring
 - ☐ B. Blades assembly
 - ☐ C. Housing
 - ☒ D. Bearings and shaft assembly

Q.22 Before lifting a heavy machine with a chain pulley block, which action should be performed first to ensure safety?

- Ans**
- ☐ A. Secure the load properly using ropes only before lifting
 - ☐ B. Apply suitable lubricants to the machine before lifting
 - ☒ C. Inspect all lifting equipment for any visible defects
 - ☐ D. Position all workers directly under the load during lifting

Q.23 A maintenance technician observes a cloudy or milky appearance in an oil sample taken from a hydraulic system. Which condition is most likely indicated by the lubricant analysis?

- Ans**
- ☐ A. Excessive viscosity loss has occurred in the oil
 - ☐ B. Oxidation has degraded the hydraulic oil significantly
 - ☐ C. Thermal degradation has increased oil acidity
 - ☒ D. Water contamination is present in the hydraulic oil

Q.24 For a hypoid gear set transmitting power at 90° with an offset, what is the main advantage over straight bevel gears?

- Ans**
- ☐ A. Quieter operation at all speeds compared to straight bevel gears.
 - ☐ B. Capability to function with intersecting axes at higher speeds.
 - ☒ C. Transmits power between non-intersecting axes with high torque.
 - ☐ D. Lower initial cost for equivalent size and torque rating.

Q.25 What is the common cause of fluid leakage from a pump shaft seal after maintenance?

- Ans**
- ☒ A. Improper installation of gland packing
 - ☐ B. Misaligned coupling
 - ☐ C. Excessive discharge pressure
 - ☐ D. Presence of air lock in pump

Q.26 A resistor has the color bands Yellow, Violet, Brown, and Silver. What resistance value is indicated by this color code?

- Ans**
- ☐ A. 47 kilo ohm $\pm 20\%$
 - ☒ B. 470 ohm $\pm 10\%$
 - ☐ C. 47 ohm $\pm 10\%$
 - ☐ D. 470 ohm $\pm 5\%$

Q.27 How does reducing the supply air pressure to a pneumatic actuator affect its performance if all other factors remain constant?

- Ans**
- ☐ A. Increases the stroke length
 - ☐ B. Increases the actuator speed
 - ☒ C. Reduces the force output
 - ☐ D. Actuator to move a greater distance

Q.28 Which rigging safety strategy should be emphasized when lifting a delicate piece of machinery?

- Ans**
- ☒ A. Use padding at sling contact points
 - ☐ B. Place slings directly on machine edges
 - ☐ C. Use a thicker sling for extra strength
 - ☐ D. Lift the machine quickly to reduce risk

Q.29 In a lever-operated compressor servicing tool (Class 1 lever), if the load arm length is decreased while the effort arm length is kept constant, what will be the effect on its mechanical advantage?

- Ans**
- ☐ A. Mechanical advantage decreases
 - ☐ B. Mechanical advantage remains unchanged
 - ☐ C. Mechanical advantage becomes zero
 - ☒ D. Mechanical advantage increases

Q.30 Which component of an industrial automation system directly converts physical parameters into electrical signals for processing?

- Ans**
- ☐ A. Actuator
 - ☐ B. Controller
 - ☒ C. Sensor
 - ☐ D. Human Machine Interface (HMI)

Q.31 If the 6th division of the vernier scale coincides with a main scale division, the vernier reading is:
[Take least count = 0.1 mm]

- Ans**
- ☒ A. 0.6 mm
 - ☐ B. 0.006 mm
 - ☐ C. 6 mm
 - ☐ D. 0.06 mm

Q.32 A maintenance drawing shows a tapped hole in the base plate of a machine support system. In the plan view, dashed lines are used to represent the major diameter of the thread. What does this indicate?

- Ans**
- ☐ A. The thread is a decorative groove unrelated to fastening.
 - ☒ B. The thread is internal and hidden within the base plate.
 - ☐ C. The thread is a partial thread cut only on the lower half of the fastener.
 - ☐ D. The thread is external and fully visible on the fastener shaft.

Q.33 What is the main function of a flat key in mechanical fasteners?

- Ans**
- ☐ A. To prevent axial movement of the shaft
 - ☐ B. To act as a sealing device between components
 - ☐ C. To align the shaft with the hub precisely
 - ☒ D. To transmit rotational force from the shaft to the hub

Q.34 When dimensioning in a crowded or narrow space on a drawing, which of the following arrowhead types is commonly used to avoid confusion with overlapping lines?

- Ans**
- ☐ A. Closed filled arrow head
 - ☐ B. Double dot terminator
 - ☒ C. Oblique stroke terminator
 - ☐ D. Open arrow head

Q.35 Which operation is NOT suitable for a single cut file?

- Ans**
- ☒ A. Heavy stock removal
 - ☐ B. Truing flat surfaces
 - ☐ C. Deburring edges
 - ☐ D. Fine finishing

Q.36 In a 2-input AND gate used as an enable control circuit, which logic signal must be applied to the enable input to allow pulses to pass through?

- Ans**
- ☐ A. A high-impedance open circuit connection
 - ☐ B. An alternating signal that matches the pulse frequency exactly
 - ☒ C. A constant logic HIGH (1) signal
 - ☐ D. A constant logic LOW (0) signal

Q.37 Calculate the area of an irregular plot using the Trapezoidal Rule, given the offsets are 2 m, 4 m, 3 m, and 5 m at an equal spacing of 1 m.

- Ans**
- ☐ A. 7 m²
 - ☐ B. 12 m²
 - ☐ C. 9.5 m²
 - ☒ D. 10.5 m²

Q.38 Which part of the belt conveyor supports and guides the belt along its path?

- Ans**
- ☒ A. Idler rollers
 - ☐ B. Drive pulley
 - ☐ C. Motor
 - ☐ D. Gearbox

Q.39 A workshop mixes coolant concentrate and water in a 3:2 ratio for a machine cooling system. If the total mixture required is 25 liters, how many liters of coolant concentrate are required?

- Ans**
- ☒ A. 15 liters
 - ☐ B. 12.5 liters
 - ☐ C. 17 liters
 - ☐ D. 10 liters

Q.40 A compressor motor in a workshop is connected to a 240 V supply through a wiring system with a total resistance of 2 ohms. If the motor draws 12 A during operation, what is the voltage measured at the motor terminals?

- Ans**
- ☐ A. 228 V
 - ☒ B. 216 V
 - ☐ C. 192 V
 - ☐ D. 240 V

Q.41 What is the relationship between axis limit switches and the machine zero point in a CNC machine?

- Ans**
- ☒ A. Limit switches help protect the machine zero location
 - ☐ B. Limit switches determine tool length offset
 - ☐ C. Limit switches control spindle speed
 - ☐ D. Limit switches set workpiece zero automatically

Q.42 In an oxy-acetylene cutting torch, which part is responsible for blending oxygen and acetylene before the gases reach the nozzle?

- Ans**
- ☒ A. Mixer chamber
 - ☐ B. Oxygen control valve
 - ☐ C. Flashback arrestor
 - ☐ D. Welding tip

Q.43 While interpreting the drawing of a double-riveted butt joint with equal-width butt straps, which feature indicates a zig-zag riveting arrangement?

- Ans**
- ☐ A. Each plate shows a single rivet row along the joint line
 - ☐ B. Both butt straps extend equally across the joint section
 - ☒ C. Rivet centers in adjacent rows are offset by half the pitch
 - ☐ D. Rivet centerlines in successive rows remain perfectly aligned

Q.44 If a Profibus-DP network in PLC, at 12 Mbps allows only 100 meters per segment, what is the maximum total network length if three segments are connected with repeaters?

- Ans**
- ☐ A. 400 meters
 - ☐ B. 1200 meters
 - ☒ C. 300 meters
 - ☐ D. 200 meters

Q.45 What is a critical operator action after completing an Auto mode cycle?

- Ans**
- ☒ A. Inspecting the finished part for quality assurance
 - ☐ B. Immediately rerunning the same program
 - ☐ C. Starting the next program without checks
 - ☐ D. Ignoring the finished part and moving on

Q.46 A V-belt is specified by its cross-sectional dimensions. Which pair best represents these dimensions?

- Ans**
- ☐ A. Only thickness
 - ☐ B. Only width
 - ☒ C. Width and depth
 - ☐ D. Length and width

Q.47 A welder is preparing to perform arc welding on mild steel plates. Which parameter should be set initially to ensure a stable arc and proper penetration?

- Ans**
- ☐ A. Travel speed
 - ☐ B. Arc length
 - ☒ C. Current setting
 - ☐ D. Electrode angle

Q.48 An engineer is inspecting a batch of bolts in a manufacturing unit. To quickly check if these bolts conform to a specific pitch and profile, which instrument should the engineer use?

- Ans**
- ☐ A. Snap gauge
 - ☒ B. Thread gauge
 - ☐ C. Plug gauge
 - ☐ D. Ring gauge

Q.49 What could most likely cause a pneumatic actuator to move in an irregular or jerky manner?

- Ans**
- ☐ A. Incorrect mounting on the frame
 - ☐ B. Short circuit in electrical wiring
 - ☒ C. Moisture or debris in the air supply
 - ☐ D. Lack of grease in actuator gears

Q.50 In a PLC STL, the sequence LD I2.0, AND I2.1, ORN I2.2, = Q2.0 is used. If I2.0 is ON, I2.1 is ON, and I2.2 is OFF, what does Q2.0 become?

- Ans**
- ☒ A. Q2.0 will be ON
 - ☐ B. Q2.0 will be OFF
 - ☐ C. Q2.0 will hold previous value
 - ☐ D. Q2.0 will toggle

Q.51 Which design feature is most important when upgrading a roller valve for high-cycle applications?

- Ans**
- ☐ A. Increased air flow capacity
 - ☒ B. Durable, wear-resistant material
 - ☐ C. Smaller diameter for faster actuation
 - ☐ D. Requiring higher actuation force

Q.52 An engineer suspects that wind is affecting plumb bob readings during outdoor equipment erection. Which approach best minimizes error due to wind?

- Ans**
- ☒ A. Shield the plumb bob from wind using a temporary screen
 - ☐ B. Wait for wind to stop before taking any measurement
 - ☐ C. Take multiple readings and average the values
 - ☐ D. Use a heavier plumb bob to resist wind movement

Q.53 What is the decimal equivalent of the binary number 101101?

- Ans**
- ☐ A. 47
 - ☐ B. 43
 - ☒ C. 45
 - ☐ D. 49

Q.54 Electric current in a metallic conductor is due to the flow of:

- Ans**
- ☐ A. Power
 - ☐ B. Resistance
 - ☒ C. Electrons
 - ☐ D. Voltage

Q.55 In a case where a worker suffers a minor hand injury due to slipping tools, the investigation reveals missing guards on several machines. According to safety regulations, what is the most appropriate corrective measure?

- Ans**
- ☒ A. Install and regularly inspect machine guards
 - ☐ B. Rotate staff to different workstations
 - ☐ C. Offer refresher safety training to workers
 - ☐ D. Increase supervision during operations

Q.56 What kind of improper practice most significantly reduces hacksaw blade life during cutting operations?

- Ans**
- ☐ A. Using a blade with inappropriate Teeth Per Inch for the workpiece thickness
 - ☒ B. Applying excessive cutting pressure beyond recommended limits
 - ☐ C. Operating at inconsistent stroke speed during cutting
 - ☐ D. Maintaining improper blade tension during operation

Q.57 An engineer needs to select a coupling for joining two shafts transmitting high torque with precise alignment. Which type of flange coupling is most suitable for this application?

- Ans**
- ☐ A. Muff coupling
 - ☐ B. Bush pin type flange coupling
 - ☒ C. Rigid flange coupling
 - ☐ D. Flexible flange coupling

Q.58 How does the thickness of the zinc coating on a GI pipe affect its performance?

- Ans**
- ☒ A. Increases corrosion resistance
 - ☐ B. Makes pipe more flexible
 - ☐ C. Reduces internal friction
 - ☐ D. Decreases pipe diameter

Q.59 A universal coupling is primarily used to transmit rotary motion between shafts that are:

- Ans**
- ☐ A. Parallel and collinear
 - ☒ B. Inclined to each other and not collinear
 - ☐ C. In the same axis and coplanar
 - ☐ D. Perpendicular but coplanar

Q.60 A supervisor notices that cotton waste is being disposed of with regular garbage. What is a likely consequence of this improper practice in terms of workshop safety?

- Ans**
- ☐ A. Noticeable decrease in air quality
 - ☐ B. Immediate breakdown of workshop machinery
 - ☐ C. Chemical contamination of drinking water
 - ☒ D. Increased risk of fire incidents in the workshop

Q.61 What is the primary function of a selector switch in an industrial control panel?

- Ans**
- ☐ A. Increase supply voltage
 - ☒ B. Select different operating modes
 - ☐ C. Store electrical charge
 - ☐ D. Measure electrical current

Q.62 Which pair of M codes is typically programmed before a manual tool change to stop spindle rotation and disable coolant flow?

- Ans**
- ☐ A. M03 and M08
 - ☐ B. M04 and M08
 - ☐ C. M05 and M08
 - ☒ D. M05 and M09

Q.63 In a pair of meshing gears, what must be equal at the pitch circles?

- Ans**
- ☒ A. The tangential velocities
 - ☐ B. The number of teeth
 - ☐ C. The diameters
 - ☐ D. The angular velocities

Q.64 In limits and tolerances terminology, what is meant by deviation?

Ans ☐ A. The difference between the maximum size and minimum size limits

☐ B. The theoretical dimension used as reference in engineering drawing

☒ C. The algebraic difference between a size and the corresponding basic size

☐ D. The measured dimension obtained after manufacturing process

Q.65 What effect does improper feeder design have on the formation of bridges in hopper discharge systems?

Ans ☒ A. By creating uneven flow and restricting material discharge

☐ B. By automatically crushing oversized materials

☐ C. By increasing the material flow uniformly

☐ D. By creating poor alignment between the feeder and hopper geometry

Q.66 An ITI maintenance mechanic is analyzing a steel sample heated above the upper critical temperature. Which phase is primarily present in the iron-carbon diagram at this stage?

Ans ☐ A. Cementite

☐ B. Ferrite

☒ C. Austenite

☐ D. Pearlite

Q.67 A maintenance mechanic is preparing to create a flat bearing surface at the mouth of a drilled hole on a mild steel workpiece. Which tool is specifically designed for this operation?

Ans ☒ A. Spot facing tool

☐ B. Reamer

☐ C. Counterbore tool

☐ D. Countersink tool

Q.68 What is the basic mechanism behind the working of a centrifugal pump?

Ans ☒ A. Conversion of mechanical energy into hydraulic energy

☐ B. Compression of air to increase liquid pressure

☐ C. Direct displacement of liquid using pistons

☐ D. Expansion of gas inside a sealed chamber

Q.69 An operator selects a grinding wheel for finishing a hardened steel shaft. Which grit size is most suitable for achieving a smooth surface finish in this scenario?

Ans ☐ A. Medium grit size

☐ B. Coarse grit size

☐ C. Large grit size

☒ D. Fine grit size

Q.70 In BIS notation, what does the numerical value preceding the tolerance symbol indicate?

Ans ☐ A. The difference between upper and lower limits of size

☐ B. The tolerance value obtained during inspection process

☒ C. The basic size of the component specified in the drawing

☐ D. The actual size obtained after manufacturing process

Q.71 Which control method for a 3 by 2 valve would be most appropriate in a hands-free workstation?

- Ans**
- ☐ A. Manual lever operation by hand
 - ☐ B. Automatic timer control
 - ☐ C. Push button operation by hand
 - ☒ D. Foot pedal actuation for the valve

Q.72 Why is the point of a file important for finishing operations?

- Ans**
- ☐ A. It increases tooth sharpness
 - ☐ B. It provides a comfortable grip
 - ☐ C. It absorbs vibrations
 - ☒ D. It allows access to narrow spaces

Q.73 Which machine uses a linear reciprocating cutting motion to machine flat surfaces?

- Ans**
- ☐ A. Drilling machine
 - ☒ B. Shaper machine
 - ☐ C. Milling machine
 - ☐ D. Lathe machine

Q.74 Frequent machine breakdowns primarily cause a loss of downtime under which component of Overall Equipment Effectiveness (OEE)?

- Ans**
- ☐ A. Productivity
 - ☒ B. Availability
 - ☐ C. Performance
 - ☐ D. Quality

Q.75 Which of the following tool materials is most commonly used in multi-point cutting tools like drills and milling cutters?

- Ans**
- ☒ A. High-speed steel (HSS)
 - ☐ B. Cast alloy steel
 - ☐ C. Ceramic tool material
 - ☐ D. Carbon tool steel



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	9:30 AM - 12:00 PM
Subject	ALP Stage 2 Wiremen

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q such that OQ = 12 cm. What is the length of PQ?

- Ans
- ☒ A. $\sqrt{117}$ cm
 - ☒ B. $\sqrt{119}$ cm
 - ☒ C. $\sqrt{107}$ cm
 - ☒ D. $\sqrt{97}$ cm

Q.2 A car travels on a highway, and its odometer records a reading of 180 km at 8:00 am and 240 km at 9:30 am. Based on this information, which statement best describes the car's average speed during this interval?

- Ans
- ☒ A. The car's average speed is 180 km per hour since that was the odometer reading at 8:00 am.
 - ☒ B. The car's average speed is 40 km per hour as calculated from the odometer readings and time interval.
 - ☒ C. The car's average speed is 60 km per hour based only on the change in odometer readings.
 - ☒ D. The car's average speed is 240 km per hour since that was the odometer reading at 9:30 am.

Q.3 A car of mass 1200 kg accelerates from rest to a speed of 20 m/s on a straight road. If the kinetic energy gained by the car is completely due to the work done by the engine, which of the following best represents the total kinetic energy acquired by the car at this speed?

- Ans
- ☒ A. 12,000 joules
 - ☒ B. 24,000 joules
 - ☒ C. 480,000 joules
 - ☒ D. 240,000 joules

Q.4 If 'A' stands for '+', 'B' stands for '-', 'C' stands for 'x' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

$$28 \text{ A } 16 \text{ C } 3 \text{ B } 12 \text{ D } 4 = ?$$

- Ans
- ☒ A. 73
 - ☒ B. 70
 - ☒ C. 72
 - ☒ D. 71

Q.5 Which approach most effectively reduces both nitrogen and phosphorus concentrations during wastewater treatment?

- Ans**
- ☐ A. Surface-flow constructed wetlands
 - ☐ B. Primary sedimentation with extended aeration
 - ☒ C. Biological and chemical nutrient removal
 - ☐ D. UV disinfection following secondary treatment

Q.6 When a moving car suddenly applies brakes, its kinetic energy is transformed mainly into which form of energy?

- Ans**
- ☒ A. Heat energy
 - ☐ B. Sound energy
 - ☐ C. Light energy
 - ☐ D. Potential energy

Q.7 A conical tent has a base radius of 14 m and a height of 48 m. How many cubic meters of air can it hold? (Use $\pi = \frac{22}{7}$)

- Ans**
- ☐ A. 9568
 - ☒ B. 9856
 - ☐ C. 9865
 - ☐ D. 8956

Q.8 What should come in place of the question mark (?) in the given series?

98, 104, 116, 134, 158, ?

- Ans**
- ☐ A. 186
 - ☐ B. 184
 - ☐ C. 190
 - ☒ D. 188

Q.9 Find the LCM of 72, 78, and 90.

- Ans**
- ☐ A. 4250
 - ☐ B. 4120
 - ☐ C. 4280
 - ☒ D. 4680

Q.10 Which of the following best describes a key environmental concern associated with improper disposal of e-waste?

- Ans**
- ☐ A. Increased recycling rates of precious metals
 - ☐ B. Enhanced biodegradation of plastics
 - ☒ C. Release of toxic metals into soil and water
 - ☐ D. Release of greenhouse gases from decomposition

Q.11 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between X and Z when counted from the right of X. Only two people sit between Z and D. Only three people sit between X and B. A sits to the immediate left of C. Who sits third to the left of Y?

- Ans**
- ☐ A. A
 - ☒ B. C
 - ☐ C. X
 - ☐ D. Z

Q.12 Three workers, X, Y, and Z, can complete a certain job in 10 days, 12 days, and 15 days, respectively. Determine the number of days required for them to complete the job when they work together.

- Ans**
- ☒ A. 6 days
 - ☒ B. 4 days
 - ☒ C. 5 days
 - ☒ D. 8 days

Q.13 Which of the following scenarios best demonstrates the conversion of chemical energy to mechanical energy?

- Ans**
- ☒ A. A stone falls off a table to the ground
 - ☒ B. A flashlight turns on after inserting new batteries
 - ☒ C. A runner uses stored energy from food to sprint forward
 - ☒ D. A stretched rubber band snaps back to its original shape

Q.14 What is the typical temperature range covered by a laboratory thermometer used in school experiments?

- Ans**
- ☒ A. Zero to two hundred degrees Celsius
 - ☒ B. Thirty five to forty two degrees Celsius
 - ☒ C. Minus fifty to fifty degrees Celsius
 - ☒ D. Minus ten to one hundred and ten degrees Celsius

Q.15 Two students move identical boxes through a distance of 10 m. Student A applies a force of 50 N, while Student B applies a force of 100 N. What is the difference in the work done by the two students?

- Ans**
- ☒ A. 1000 J
 - ☒ B. 50 J
 - ☒ C. 500 J
 - ☒ D. 0 J

Q.16 In this question, a group of numbers/symbols is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer. If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	6	1	&	3	%	8	+	4	#	7	@	5	2	\$
Code	R	V	G	D	S	C	T	L	F	W	H	U	Y	N

Conditions:

- (i) If the first element is a symbol and the last element is an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and last elements are to be coded as ©.
- (iii) If both the second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?
+ 6 \$ 2 7

- Ans**
- ☒ A. TSNWW
 - ☒ B. STMWV
 - ☒ C. WSNYT
 - ☒ D. WRNYT

Q.17 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements: All girls are hens. No hen is a cat.

Conclusion (I): No girl is a cat.

Conclusion (II): Some cats are hens.

- Ans**
- ☒ A. Both conclusions (I) and (II) follow
 - ☒ B. Neither conclusion (I) nor (II) follows
 - ☒ C. Only conclusion (II) follows
 - ☒ D. Only conclusion (I) follows

Q.18 When using a hand file during fitting operations, which action demonstrates adherence to tool safety protocols?

- Ans**
- ☒ A. Applying excessive downward force when filing
 - ☒ B. Fitting a proper handle securely to the tang
 - ☒ C. Filing above shoulder height for better leverage
 - ☒ D. Holding the file near its tang during filing work

Q.19 A thermometer shows a reading of 37 degrees Celsius. What is the corresponding temperature in Kelvin?

- Ans**
- ☒ A. 320 K
 - ☒ B. 310 K
 - ☒ C. 270 K
 - ☒ D. 300 K

Q.20 A father distributed two different amounts among his sons P, Q, R and S. First amount was distributed in the ratio 5 : 4 : 3 : 2 and the second amount was distributed in the ratio 6 : 7 : 8 : 9. If the second amount is thrice the first amount, then which son will get the maximum amount?

- Ans**
- ☒ A. S
 - ☒ B. P
 - ☒ C. R
 - ☒ D. Q

Q.21 Refer to the given letter series and answer the question that follows. Counting to be done from left to right.

(Left) B F O P P S Q A L M K A W X S N U Q J O M Y (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☒ A. 4
 - ☒ B. 7
 - ☒ C. 5
 - ☒ D. 6

Q.22 A pendulum takes 60 seconds to complete 24 oscillations. If its length is increased and it now takes 72 seconds for the same number of oscillations, what has happened to its time period?

- Ans**
- ☒ A. It remains at 2.5 seconds
 - ☒ B. It has increased to 3.0 seconds
 - ☒ C. It has decreased to 2.0 seconds
 - ☒ D. It has decreased to 1.5 seconds

Q.23 A mechanical engineer must design a flange joint where two pipes are to be connected at a 45-degree angle. Which method should the engineer use to accurately represent the intersection line on a technical drawing of the two cylindrical pipes?

- Ans**
- ☐ A. Use only standard orthographic projection without auxiliary views
 - ☒ B. Draw the true shape of the intersection using auxiliary projection
 - ☐ C. Draw a simple circle at the junction in the top view
 - ☐ D. Represent the intersection as a straight line in the side view

Q.24 Which line symbol is commonly used in engineering drawings to represent a hidden edge that is not directly visible?

- Ans**
- ☐ A. Chain thin line
 - ☒ B. Dashed line
 - ☐ C. Zigzag line
 - ☐ D. Solid thick line

Q.25 Which feature is a requirement of the BIS drawing standard in engineering drawings?

- Ans**
- ☐ A. Use of colored pencils for clarity
 - ☒ B. Title block with specific information
 - ☐ C. Freehand sketches without scale
 - ☐ D. Margin lines of random width

Q.26 In how many years will a sum of ₹16,000 at 10% per annum compounded semi-annually become ₹18,522?

- Ans**
- ☒ A. 1.5 years
 - ☐ B. 2 years
 - ☐ C. 2.5 years
 - ☐ D. 1 year

Q.27 A boat sails 40 km downstream and then 40 km upstream in a river. The boat's speed in still water is 12 km/hr and the speed of the stream is 4 km/hr. How much time does the boat take to cover the entire distance (both upstream and downstream)?

- Ans**
- ☐ A. 8 hours
 - ☐ B. 6 hours
 - ☒ C. 7.5 hours
 - ☐ D. 10 hours

Q.28 Which is the most important safety check before operating any machine in a workshop?

- Ans**
- ☒ A. Inspect the machine for loose or damaged parts
 - ☐ B. Check if the machine is plugged in properly
 - ☐ C. Wipe the machine with a dry cloth before use
 - ☐ D. Ensure the machine area is properly illuminated

Q.29 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer. Among the five poles—I, N, C, H, and L—each having a different height, which pole is the tallest?

- (I) I is shorter than N but taller than C. C is taller than only one pole.
(II) H is taller than L.

- Ans**
- ☐ A. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☐ B. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ C. Both statements I and II together are NOT sufficient to answer the question
 - ☐ D. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question

Q.30 A sum of ₹420 is divided among A, B, C, and D such that: $A : B = 4 : x$, $B : C = x : 7$, $C : D = 6 : (x - 3)$. If B and C together get ₹210, find the value of x.

- Ans**
- ☒ A. 39
 - ☐ B. 53
 - ☐ C. 27
 - ☐ D. 42

Q.31 What is the best description of the purpose of multi-view drawing in engineering drawing?

- Ans**
- ☐ A. To show different colors of an object for better visual appearance
 - ☐ B. To present the object in a single three-dimensional visual form only
 - ☒ C. To represent different sides of an object clearly on a flat surface
 - ☐ D. To view an object from only one direction

Q.32 A diamond ring costs ₹85,000. Its price is reduced first by 11% and then by 4% on the reduced price. Find the final price of the ring after both discounts.

- Ans**
- ☐ A. ₹74,624
 - ☐ B. ₹72,604
 - ☐ C. ₹73,624
 - ☒ D. ₹72,624

Q.33 Below are given two sets of numbers. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

10 - 100 - 50 - 25; 2 - 4 - 2 - 1

- Ans**
- ☒ A. 4 - 16 - 8 - 4
 - ☐ B. 8 - 64 - 32 - 14
 - ☐ C. 5 - 25 - 15 - 7
 - ☐ D. 12 - 144 - 62 - 31

Q.34 A shopkeeper marks a product 75% above cost price and offers two successive discounts of 30% and 40%. What is the profit or loss percentage?

- Ans**
- ☒ A. 26.5% loss
 - ☐ B. 20.9% profit
 - ☐ C. 15.7% profit
 - ☐ D. 22.6% profit

Q.35 Which statement best describes a 'point' in engineering drawing?

- Ans**
- ☐ A. A point is the intersection of two lines and always has measurable length.
 - ☒ B. A point indicates a precise location but has no size, length, or width.
 - ☐ C. A point is a short line segment used to mark measurements.
 - ☐ D. A point represents a small area with both length and width.

Q.36 A roller coaster at the top of its track has maximum potential energy. As it descends and speeds up, what principle explains why the sum of its kinetic and potential energies remains constant if we ignore friction and air resistance?

- Ans**
- ✓ A. Law of conservation of energy
 - ✗ B. Law of inertia
 - ✗ C. Principle of inertia
 - ✗ D. Principle of superposition

Q.37 E, F, G, H, L and M live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live above G. Only two people live between L and E. Only two people live between M and G. E lives below G but above F. How many people live below H?

- Ans**
- ✓ A. Three
 - ✗ B. Four
 - ✗ C. Two
 - ✗ D. One

Q.38 An engineer is tasked with creating a hollow cone for a machine part, where the wall thickness must be consistent and the slant height is critical for assembly. Which factor is most important to ensure the cone will fit correctly in the final design?

- Ans**
- ✓ A. Ensuring the slant height matches the assembly requirement
 - ✗ B. Focusing only on base diameter for precise fit
 - ✗ C. Matching only the overall height of the cone
 - ✗ D. Prioritizing uniform wall thickness over all other features

Q.39 O, P, Q, U and V have different heights. Only three people have heights between V and Q. P is taller than U but shorter than O. V is taller than Q. How many people are shorter than P?

- Ans**
- ✓ A. Two
 - ✗ B. One
 - ✗ C. Three
 - ✗ D. Four

Q.40 What is the simplified value of the expression $\left[\frac{\cos A}{(1 - \tan A)} \right] + \left[\frac{\sin A}{(1 - \cot A)} \right]$?

- Ans**
- ✓ A. $\cos A + \sin A$
 - ✗ B. $\sin A - \cos A$
 - ✗ C. 0
 - ✗ D. 1

Q.41 What should come in place of the question mark (?) in the given series?

74, 83, 101, 128, ?, 209

- Ans**
- ✓ A. 164
 - ✗ B. 155
 - ✗ C. 176
 - ✗ D. 146

Q.42 Which of the following is both, an input and output device?

- Ans**
- ✗ A. Printer
 - ✗ B. Projector
 - ✓ C. Touchscreen monitor
 - ✗ D. Keyboard

Q.43 The median of the following data is :
25, 15, 23, 25, 17, 27, 20, 18, 24, 30, 19, 28, 35, 10, 31, 40

- Ans**
- ☐ A. 20.5
 - ☐ B. 25
 - ☒ C. 24.5
 - ☐ D. 23.5

Q.44 Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

(Left) A T D E B R C L M Q O N P J M Q E A O Z W F U K S L (Right)

How many such vowels are there, each of which is immediately preceded by a consonant and also immediately followed by a consonant?

- Ans**
- ☐ A. 2
 - ☒ B. 3
 - ☐ C. 0
 - ☐ D. 1

Q.45 Which component makes up the largest proportion of Earth's atmosphere by volume?

- Ans**
- ☐ A. Carbon dioxide
 - ☐ B. Oxygen
 - ☐ C. Argon
 - ☒ D. Nitrogen

Q.46 What is the main purpose of ambient air quality standards?

- Ans**
- ☒ A. To set legally permissible limits for specific pollutants to protect public health.
 - ☐ B. To require all industries to reduce emissions by the exact same percentage.
 - ☐ C. To ensure air is routinely sampled to map historical pollution trends.
 - ☐ D. To focus exclusively on industrial operations while ignoring other sectors.

Q.47 What is an email used for?

- Ans**
- ☐ A. Data processing
 - ☒ B. Sending messages
 - ☐ C. Creating documents
 - ☐ D. File storage

Q.48 A laboratory record shows a distance of 0.004 kilometers between two points. How should this be written in SI units of length for a scientific report?

- Ans**
- ☐ A. 4000 mm
 - ☒ B. 4 m
 - ☐ C. 0.4 m
 - ☐ D. 400 cm

Q.49 A trader buys 187 pens at ₹23 each. During transportation, 7 pens get damaged and cannot be sold. He sells the remaining pens at ₹27 each. Find his profit percentage. (rounded off to one decimal place)

- Ans**
- ☒ A. 13.0%
 - ☐ B. 14.1%
 - ☐ C. 13.7%
 - ☐ D. 12.6%

Q.50 Which of the following statements correctly describes average velocity and its SI unit?

Ans ☒ A. Average velocity is the total displacement divided by total time, and its unit is kilometer per hour.

☒ B. Average velocity is the total distance divided by total time, and its unit is kilometer per hour.

☒ C. Average velocity is the total distance divided by total time, and its unit is meter per second.

☒ D. Average velocity is the total displacement divided by total time, and its unit is meter per second.

Q.51 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

Ans ☒ A. AF – DI

☒ B. CH – EK

☒ C. BG – EJ

☒ D. DJ – GM

Q.52 PJAE is related to JOWH in a certain way based on the English alphabetical order. In the same way, OIVC is related to INRF. To which of the following is NEZF related to following the same logic?

Ans ☒ A. HKVJ

☒ B. IKUH

☒ C. IJVJ

☒ D. HJVI

Q.53 A runner completes one lap of a 200 meter circular track in 50 seconds. What is the average speed of the runner?

Ans ☒ A. 3.5 meter per second

☒ B. 4 meter per second

☒ C. 3 meter per second

☒ D. 4.5 meter per second

Q.54 In third angle projection, where is the object placed relative to the plane of projection?

Ans ☒ A. The object is placed in the fourth quadrant

☒ B. The object is placed in the third quadrant

☒ C. The object is placed in the second quadrant

☒ D. The object is placed in the first quadrant

Q.55 What is the primary function of a fire hydrant in a workplace safety system?

Ans ☒ A. Detecting smoke and warning employees

☒ B. Activating fire alarms automatically in emergencies

☒ C. Removing hazardous fumes from the area

☒ D. Supplying large quantities of water to fight fires

Q.56 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

QOI 5, OMG 10, MKE 15, KIC 20, ?

Ans ☒ A. HIZ 30

☒ B. IGA 25

☒ C. IHS 23

☒ D. JHZ 24

Q.57 If a scooter travels at a constant speed of 25 km per hour, how far will it travel in 4 hours?

- Ans**
- ☐ A. 75 km
 - ☐ B. 80 km
 - ☐ C. 120 km
 - ☒ D. 100 km

Q.58 Which property of a fuse wire ensures it melts quickly when excess current flows?

- Ans**
- ☒ A. Low melting point
 - ☐ B. Thick wire
 - ☐ C. High electrical resistance
 - ☐ D. High melting point

Q.59 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☐ A. TN-ZD
 - ☐ B. EY-KO
 - ☒ C. QK-VA
 - ☐ D. WQ-CG

Q.60 G is the mother of Y. Y is the sister of V. S is the father of L. L is the husband of V. How is G related to S?

- Ans**
- ☐ A. Mother's mother
 - ☐ B. Son's wife
 - ☒ C. Son's wife's mother
 - ☐ D. Son's wife's sister

Q.61 A sample of water is heated from 15 degrees Celsius to 35 degrees Celsius. What is the temperature change in Kelvin?

- Ans**
- ☒ A. The temperature change is 20 K.
 - ☐ B. The temperature change is 15 K.
 - ☐ C. The temperature change is 50 K.
 - ☐ D. The temperature change is 30 K.

Q.62 An engineer is tasked with creating the front view of a mechanical part. The part has a rectangular base with a vertical circular hole passing through it and a triangular prism attached on top. Which of the following best describes what will be visible in the front view?

- Ans**
- ☐ A. The outline of triangular prism and circular hole will be visible in front view only
 - ☒ B. The outline of rectangular base and triangular prism will be visible but hole is not shown
 - ☐ C. Only the rectangular base outline will be visible in the front view drawing
 - ☐ D. Only the triangular prism will be clearly visible in the front view drawing

Q.63 An object has a mass of 10 kilograms. How does its weight on the Moon compare to its weight on Earth?

- Ans**
- ☒ A. The object weighs less on the Moon than on Earth
 - ☐ B. The object weighs more on the Moon than on Earth
 - ☐ C. The object weighs the same on both the Moon and Earth
 - ☐ D. The object weighs zero on the Moon

Q.64 Refer to the following letter and symbol series and answer the question that follows.
Counting to be done from left to right.

(Left) Z @ B R J # D * Q A M S % P L V O U S N T W Z (Right)

How many such symbols are there, each of which is immediately preceded by a letter and also immediately followed by a letter?

- Ans**
- ☒ A. None
 - ☒ B. Four
 - ☒ C. Three
 - ☒ D. Two

Q.65 A cyclist covers 120 meters in 16 seconds on a straight road, then immediately covers 180 meters in 24 seconds on a similar road segment. What is the average speed of the cyclist during the entire journey?

- Ans**
- ☒ A. 7.5 meters per second
 - ☒ B. 8.0 meters per second
 - ☒ C. 7.0 meters per second
 - ☒ D. 6.5 meters per second

Q.66 The simple interest earned on a certain sum of money for 3 years at 15% per annum is ₹2,700. Find the sum.

- Ans**
- ☒ A. ₹5,000
 - ☒ B. ₹8,000
 - ☒ C. ₹9,000
 - ☒ D. ₹6,000

Q.67 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

BIP : EMU
GNU : JRZ

- Ans**
- ☒ A. XDE : PON
 - ☒ B. FMT : IQY
 - ☒ C. VCD : GRD
 - ☒ D. CGW : NHT

Q.68 Three pipes A, B and C can fill a tank in 12 hours, 18 hours and 24 hours, respectively. A leak at the bottom can empty the full tank in 36 hours. If all the pipes are opened together, in how many hours will the tank be filled? (Round off your answer to two decimal places.)

- Ans**
- ☒ A. 6.55 hours
 - ☒ B. 5.56 hours
 - ☒ C. 9.45 hours
 - ☒ D. 3.33 hours

Q.69 A worker's hand is at risk of injury from a mechanical shearing action. Which situation best describes a shearing hazard?

- Ans**
- ☒ A. A hand becoming entangled in a rotating machine shaft during operation
 - ☒ B. A hand sliding repeatedly across a rough abrasive machine surface during work
 - ☒ C. A hand touching a hot metallic machine surface during maintenance activity
 - ☒ D. A hand caught between a moving blade and a fixed machine surface during operation

Q.70 If the mean of the following data is 40, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	30	27	44	29	X

- Ans
- ☐ A. 98
 - ☐ B. 93
 - ☒ C. 82
 - ☐ D. 99

Q.71 P, Q, R, S and T have different ages. T is elder than only one person. S is elder than P but younger than Q. R is elder than Q. Who is the youngest?

- Ans
- ☐ A. S
 - ☐ B. R
 - ☐ C. Q
 - ☒ D. P

Q.72 The circumference of the base of a solid right circular cylinder is 88 cm and its height is 150 cm. What is the volume (in cm^3) of the cylinder?

$\left(\text{Take } \pi = \frac{22}{7} \right)$

- Ans
- ☒ A. 92400
 - ☐ B. 92450
 - ☐ C. 92550
 - ☐ D. 92500

Q.73 If 'A' stands for '+', 'B' stands for '-', 'C' stands for 'x' and 'D' stands for '÷', then what will come in place of the question mark (?) in the following equation?

$31 \text{ B } 35 \text{ D } 7 \text{ A } 9 \text{ C } 2 = ?$

- Ans
- ☒ A. 44
 - ☐ B. 42
 - ☐ C. 48
 - ☐ D. 46

Q.74 If $\left(x + \frac{1}{x} \right) = 3$, find the value of $\left(x^3 + \frac{1}{x^3} \right)$.

- Ans
- ☐ A. 15
 - ☒ B. 18
 - ☐ C. 20
 - ☐ D. 16

Q.75 In a certain code language, 'KING' is coded as '9713' and 'ITCH' is coded as '2945'. What is the code for 'I' in the given code language?

- Ans
- ☐ A. 2
 - ☒ B. 9
 - ☐ C. 4
 - ☐ D. 7

Q.76 What do touch gestures in Microsoft Windows allow users to do?

- Ans**
- ☐ A. Connect external devices
 - ☐ B. Type faster on the keyboard
 - ☒ C. Perform actions using finger movements
 - ☐ D. Increase screen brightness

Q.77 A trader marks an article 25% above its cost price. He allows a discount of 10% on the marked price. After giving the discount, he makes a profit of ₹180 on the article. What is the cost price of the article?

- Ans**
- ☐ A. ₹1,260
 - ☐ B. ₹1,380
 - ☐ C. ₹1,200
 - ☒ D. ₹1,440

Q.78 Which of the following statements correctly reflects the characteristics of a Local Area Network (LAN) and the role of Ethernet within it?

- Ans**
- ☒ A. Ethernet is a standard that governs how devices in a LAN communicate via wired connections, supporting speeds from 10 Mbps to 1000 Mbps.
 - ☐ B. A LAN always requires Gigabit Ethernet to function and is insecure because it allows open access to all network devices.
 - ☐ C. LANs are designed for long-distance communication and use Ethernet primarily for wireless data exchange.
 - ☐ D. Ethernet in a LAN provides low-speed data transfer and connects users over public Internet infrastructure.

Q.79 An engineering student is tasked with creating a detailed side view of a complex machine part for an assembly drawing. Which approach will most accurately represent all features visible from the side while avoiding hidden overlaps or misinterpretations?

- Ans**
- ☒ A. Project all visible elements from the side and omit hidden features unless needed
 - ☐ B. Use only hidden lines for representing features on the far side in the view
 - ☐ C. Sketch the side view freely without using projections from the main view
 - ☐ D. Include all features even those not visible from the selected side view

Q.80 In this question, a question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Q. Among five people – A, B, C, D, and E – who is the tallest?
(I) A is taller than B. B is taller than C.
(II) D is taller than E.

- Ans**
- ☐ A. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ B. Both statements I and II together are NOT sufficient to answer the question.
 - ☐ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ D. Data in statement I alone is sufficient to answer the question while data in statement II is not

Q.81 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UMD ZQG EUJ JYM ?

- Ans**
- ☐ A. NBQ
 - ☐ B. PDP
 - ☒ C. OCP
 - ☐ D. NDO

Q.82 In a spreadsheet application, a user selects a range of cells and presses Ctrl + C, followed by Ctrl + V in a different worksheet. What happens to the data?

- Ans**
- ☐ A. The selected cells are deleted from the original worksheet.
 - ☐ B. The selected cells are moved to the new worksheet.
 - ☐ C. The selected cells are saved to a new file.
 - ☒ D. The selected cells are copied to the new worksheet.

Q.83 If Rohan's income increases by 20% and his expenditure increases by 10%, then his savings increase by ₹1,200. If his original income was ₹12,000, what was his original expenditure? (Assume that savings = income – expenditure.)

- Ans
- ☐ A. ₹11,000
 - ☒ B. ₹12,000
 - ☐ C. ₹10,000
 - ☐ D. ₹9,000

Q.84 A car travels 90 km east and then 30 km west along the same straight road. If the entire journey takes 3 hours, what is the average velocity of the car?

- Ans
- ☒ A. 20 km/h east
 - ☐ B. 30 km/h east
 - ☐ C. 50 km/h north
 - ☐ D. 40 km/h east

Q.85 The average of 8 numbers is 45. If one number, 59, is removed, what will the new average be?

- Ans
- ☐ A. 41.5
 - ☐ B. 42
 - ☐ C. 42.5
 - ☒ D. 43

Q.86 Solve the system of equations:

$$-3x + 2y - z = -1, 6x - 6y + 7z = -7, 3x - 4y + 4z = -6$$

- Ans
- ☐ A. $x=2, y=1, z=-3$
 - ☐ B. $x=1, y=2, z=2$
 - ☒ C. $x=2, y=2, z=-1$
 - ☐ D. $x=-2, y=2, z=11$

Q.87 In a certain code language,
A + B means 'A is the mother of B',
A – B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Shreya related to Mahak if 'Shreya + Dev – Taran × Harshit % Mahak'?

- Ans
- ☐ A. Father's mother
 - ☐ B. Father's sister
 - ☒ C. Mother's mother
 - ☐ D. Mother's sister

Q.88 Simplify: $60 - \{(-8) \times (-16 - 19 - 2)\} \div [5 \times \{2 + (-1) \times (-1)\}]$

- Ans
- ☐ A. $\frac{608}{15}$
 - ☒ B. $\frac{604}{15}$
 - ☐ C. $\frac{594}{15}$
 - ☐ D. $\frac{614}{15}$

Q.89 There are two types of silver–copper alloys. The first alloy contains $93\frac{1}{3}\%$ silver, while the second alloy contains $86\frac{2}{3}\%$ silver. Find the amount of the first alloy that should be mixed with some quantity of the second alloy to obtain a 100 kg mixture containing 90% silver.

- Ans**
- ☐ A. 48 kg
 - ☒ B. 50 kg
 - ☐ C. 52 kg
 - ☐ D. 45 kg

Q.90 An engineer uses fault tree analysis to assess a machine-related injury in a factory. Which step should be taken first according to standard procedure?

- Ans**
- ☐ A. Validate the analysis using workplace data
 - ☐ B. List all possible causes of failures
 - ☒ C. Define the top event representing the injury
 - ☐ D. Establish preventive measures to control risks

Q.91 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. Only three boxes are kept above S. Exactly one box is kept between T and S. Exactly three boxes are kept between T and U, and U is kept somewhere above S. V is kept immediately below U. W is kept at one of the places above P. Q is not kept immediately above or below T. Based on the given information, which box is kept at the lowermost position?

- Ans**
- ☐ A. V
 - ☐ B. S
 - ☒ C. P
 - ☐ D. Q

Q.92 If 'A' stands for '+', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−', what will come in place of the question mark '?' in the following equation?

$$14 \text{ A } 30 \text{ B } 45 \text{ C } 15 \text{ D } 9 = ?$$

- Ans**
- ☒ A. 27
 - ☐ B. 28
 - ☐ C. 29
 - ☐ D. 25

Q.93 Which of the following best defines 'work' in physics?

- Ans**
- ☐ A. Work is done when energy is stored in an object.
 - ☐ B. Work is done if a force acts at any angle to the motion.
 - ☒ C. Work is done when a force moves an object in the direction of the force.
 - ☐ D. Work is done whenever a force is applied, regardless of movement.

Q.94 A car travels 60 km north in 2 hours, then 40 km south in the next 1 hour. What is the car's average velocity over the entire trip?

- Ans**
- ☐ A. 0 km/h
 - ☐ B. 33.3 km/h north
 - ☐ C. 20 km/h south
 - ☒ D. 6.7 km/h north

Q.95 Namia is facing the west. She turns left and walks 15 m. She turns left and walks 25 m. She again turns left and walks 40 m. She finally turns left and walks 40 m to reach home. In which direction is her home with respect to the starting point?

- Ans**
- ☒ A. North-West
 - ☐ B. North-East
 - ☐ C. South-East
 - ☐ D. South-West

Q.96 16 is related to 260 following a certain logic. Following the same logic, 25 is related to 630. To which of the following is 9 related, following the same logic?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☐ A. 78
 - ☐ B. 729
 - ☒ C. 84
 - ☐ D. 732

Q.97 Which situation best describes an entanglement hazard in a mechanical workshop?

- Ans**
- ☒ A. Loose clothing caught in a rotating shaft
 - ☐ B. Finger cut by a sharp edge
 - ☐ C. Gloves worn near hot surfaces
 - ☐ D. Hand pinched between gears

Q.98 Which integrated strategy best addresses soil pollution, falling crop yields, and low microbial activity near an industrial zone?

- Ans**
- ☒ A. Control industrial waste for sustainability.
 - ☐ B. Expand urban areas into farmland.
 - ☐ C. Ban all regional chemical fertilizers.
 - ☐ D. Reforestation in nearby urban centers.

Q.99 A train X crosses a man who is sitting in another train Y, which is moving in the opposite direction, in 8 seconds. However, when both trains are moving in the same direction, train X takes 20 seconds to pass the same man. If the length of train X is 360 meters and the length of train Y (in which the man is sitting) is 240 meters, what is the speed of train Y?

- Ans**
- ☐ A. 45.3 km/h
 - ☐ B. 45.8 km/h
 - ☒ C. 48.6 km/h
 - ☐ D. 46.5 km/h

Q.100 Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

Some glasses are spoons.

All spoons are forks.

Conclusions:

(I) Some glasses are forks.

(II) All forks are spoons.

- Ans**
- ☐ A. Both conclusions (I) and (II) follow
 - ☐ B. Only conclusion (II) follows
 - ☒ C. Only conclusion (I) follows
 - ☐ D. Neither conclusion (I) nor (II) follows

Section : PART-B

Q.1 In a climate-controlled laboratory where aesthetics and minimal electromagnetic interference are priorities, which wiring system is most appropriate?

- Ans**
- ☐ A. Cleat wiring with ceramic cleats
 - ☐ B. Batten wiring with wooden battens
 - ☐ C. Casing-capping wiring with plastic covers
 - ☒ D. Concealed conduit wiring with non-magnetic pipes

Q.2 A factory is being constructed in an area with frequent electrical storms. The engineers must design an earthing system. Which factor is critical to prioritize in their design to ensure safety and equipment protection?

- Ans**
- ☐ A. Using a single GI pipe for earthing
 - ☐ B. Using the thickest possible earthing cable
 - ☒ C. Increasing the number of earthing rods
 - ☐ D. Placing earthing rods close together

Q.3 Why is the control circuit typically wired separately from the power circuit in electrical schematic drawings?

- Ans**
- ☒ A. To facilitate easy maintenance and identification
 - ☐ B. To reduce the cost of conductors
 - ☐ C. To increase the current carrying capacity
 - ☐ D. To combine power and control circuits

Q.4 A three-phase synchronous motor is connected to an AC supply. If the field excitation is decreased below the value required for unity power factor operation, what is the expected effect on the motor power factor?

- Ans**
- ☐ A. The motor power factor becomes zero
 - ☒ B. The power factor becomes lagging
 - ☐ C. The power factor becomes leading
 - ☐ D. The power factor remains unity

Q.5 Which symbol is used in engineering drawing to show a spot face?

- Ans**
- ☐ A. A small circle with an internal cross
 - ☐ B. A circle with a horizontal line under it
 - ☐ C. A plain rectangle with no center marks
 - ☒ D. A plain circle with no internal marks

Q.6 Select the relay type that compares currents at two points to detect faults within a protected zone.

- Ans**
- ☐ A. Inverse time overcurrent relay
 - ☐ B. Distance relay
 - ☒ C. Differential relay
 - ☐ D. Instantaneous overcurrent relay

Q.7 A DC shunt motor is running at full load. Which action will increase its speed beyond its rated value?

- Ans**
- ☐ A. Decreasing supply voltage
 - ☐ B. Increasing load on the motor
 - ☐ C. Increasing armature resistance
 - ☒ D. Decreasing field winding current

Q.8 If the current in a coil lags the voltage by 60° , what is the circuit's power factor?

- Ans**
- ☐ A. $\frac{\sqrt{3}}{2}$ leading
 - ☐ B. $\frac{\sqrt{3}}{2}$ lagging
 - ☐ C. 0.5 leading
 - ☒ D. 0.5 lagging

Q.9 Why is Relay Ladder Logic (RLL) represented in a graphical form similar to relay control circuits in programmable logic controllers (PLCs)?

- Ans**
- ☐ A. To reduce the operating voltage required by PLC hardware
 - ☐ B. To replace all electrical wiring connections inside industrial machines
 - ☐ C. To increase the memory capacity of programmable logic controllers
 - ☒ D. To make PLC programming easier for technicians familiar with relay logic troubleshooting

Q.10 Which of the following methods is used to detect an oil leak in an underground oil filled cable joint without excavation?

- Ans**
- ☐ A. Use a thermal imaging camera
 - ☐ B. Listen for unusual cable sounds
 - ☐ C. Visually inspect the joint enclosure
 - ☒ D. Monitor pressure drop in the oil system

Q.11 If three light bulbs are connected in a series circuit and one bulb burns out (opens), what happens to the remaining bulbs?

- Ans**
- ☐ A. The other bulbs continue glowing normally
 - ☐ B. The other bulbs glow dimmer
 - ☒ C. The other bulbs stop glowing
 - ☐ D. The other bulbs glow brighter

Q.12 Which component in a wiring diagram is specifically used to protect against overcurrent?

- Ans**
- ☐ A. Pushbutton symbol
 - ☐ B. Lamp symbol
 - ☐ C. Relay symbol
 - ☒ D. Fuse symbol

Q.13 What is the purpose of the Cable Sheath Continuity Test in underground cables?

- Ans**
- ☐ A. To determine the total cable length
 - ☐ B. To check the cable conductor resistance
 - ☒ C. To check if the metallic sheath or armor is continuous
 - ☐ D. To measure the cable insulation resistance

Q.14 A voltmeter is connected across an open switch in a DC circuit. One side of the switch is connected to the supply voltage, while the other side is connected to the opposite terminal of the supply through a load. Assuming an ideal voltmeter and no current flow, what voltage will the meter read?

- Ans**
- ☐ A. The voltmeter will read half the supply voltage
 - ☐ B. The voltmeter will show a fluctuating value
 - ☐ C. The voltmeter will read zero volts
 - ☒ D. The voltmeter will read the full supply voltage

Q.15 A technician needs to select a wire for connecting a 230V control circuit inside a panel. Which specification is most important for this application?

- Ans**
- ☒ A. Voltage rating and insulation quality
 - ☐ B. Current carrying capacity alone
 - ☐ C. Color code for identification
 - ☐ D. Flexibility for ease of routing

Q.16 In which situation is DC transmission preferred over AC transmission in power networks?

- Ans**
- ☐ A. For rural short transmission lines
 - ☐ B. For local substation connections
 - ☒ C. For very long-distance underwater cables
 - ☐ D. For distribution in city networks

Q.17 During the open circuit test, transformer core loss depends on _____.

- Ans**
- ☐ A. Winding resistance only
 - ☐ B. Secondary load current
 - ☐ C. Leakage reactance
 - ☒ D. Maximum core flux density

Q.18 A universal motor is brought into the workshop with the complaint of excessive sparking at the commutator under load. Which is the most likely cause to check first?

- Ans**
- ☐ A. Faulty armature windings
 - ☐ B. Shorted commutator bar
 - ☒ C. Worn out carbon brushes
 - ☐ D. Damaged field winding

Q.19 Which generator type is least suitable for constant voltage applications?

- Ans**
- ☐ A. Shunt DC Generator
 - ☐ B. Compound DC Generator
 - ☐ C. Separately Excited DC Generator
 - ☒ D. Series DC Generator

Q.20 While repairing overhead transmission lines, which type of wire joint is most suitable for joining two stranded conductors with high current carrying requirements?

- Ans**
- ☐ A. Western Union joint
 - ☒ B. Married joint
 - ☐ C. Britannia joint
 - ☐ D. Knotted tap joint

Q.21 Which type of lamp is suitable for street lighting due to its high efficiency and long life?

- Ans**
- ☒ A. Sodium vapor lamp
 - ☐ B. Incandescent lamp
 - ☐ C. Fluorescent lamp
 - ☐ D. Mercury vapor lamp

Q.22 If the resistance of an earth electrode is measured to be 6 ohms, what should be done according to IEE regulations?

- Ans**
- ☐ A. Leave the installation as it is
 - ☐ B. Use a thinner earth wire
 - ☒ C. Improve the earthing by adding more rods or pouring water
 - ☐ D. Increase the supply voltage to the circuit

Q.23 A technician receives a residential electrical installation plan and must prepare a material and cost estimate for both lighting and heating circuits. Which process should be followed according to standard electrical estimation practice?

- Ans**
- ☐ A. Prepare a single combined material list and estimate the total cost together.
 - ☐ B. Exclude minor accessories from the estimate to simplify cost calculation.
 - ☒ C. Prepare separate material lists and calculate the total cost for each circuit individually.
 - ☐ D. Estimate costs using approximate quantities for commonly used materials only.

Q.24 Which wiring system is technically unsuitable for permanent commercial electrical installations due to its temporary mechanical support arrangement and low durability?

- Ans**
- ☐ A. Casing and capping wiring system
 - ☒ B. Cleat wiring system
 - ☐ C. Conduit wiring system
 - ☐ D. Trunking wiring system

Q.25 Which safety feature in domestic appliances helps prevent electric shock by providing a path for leakage current to the ground?

- Ans**
- ☐ A. Insulation
 - ☒ B. Earthing connection
 - ☐ C. Fuse
 - ☐ D. Neutral wire

Q.26 Which of the following parameters must be tested according to quality standards before commissioning a solar power plant?

- Ans**
- ☒ A. Insulation resistance measurement
 - ☐ B. Grid voltage setting
 - ☐ C. Cable color coding
 - ☐ D. Module cleaning schedule

Q.27 If copper wire is replaced with aluminum wire in a joint, which electrical property is most significantly affected?

- Ans**
- ☐ A. Insulation strength of the conductor
 - ☒ B. Electrical resistance of the joint
 - ☐ C. Magnetic susceptibility of the joint
 - ☐ D. Magnetic permeability of the wire

Q.28 A thread gauge is best suited for which of the following tasks in an ITI fitting shop?

- Ans**
- ☐ A. Measuring the diameter of a rod
 - ☐ B. Tightening the nut of a bolt
 - ☐ C. Cleaning the debris off a thread
 - ☒ D. Checking the pitch of a thread

Q.29 An electrician is planning the wiring for a two-room house. Each room requires one ceiling light and two socket outlets. Which of the following wiring layouts provides the most efficient use of wire while maintaining safety?

- Ans**
- ☒ A. Using a ring circuit for sockets and a radial circuit for lights
 - ☐ B. Using two separate ring circuits for each room
 - ☐ C. Using a single radial circuit for all loads
 - ☐ D. Combining sockets and lights on one ring circuit

Q.30 Why is hazard communication critical in construction environments?

- Ans**
- ☐ A. It removes all potential hazards from the construction site
 - ☒ B. It helps workers understand hazards and safety precautions
 - ☐ C. It allows workers to perform tasks without protective equipment
 - ☐ D. It focuses mainly on reporting workplace accidents and incidents

Q.31 Which type of centrally monitored fire detection and alarm system is used in large commercial public buildings for fire safety?

- Ans**
- ☐ A. Manual fire alarm call point system only
 - ☐ B. Conventional heat detector alarm system
 - ☐ C. Standalone residential smoke detector units
 - ☒ D. Addressable fire detection and alarm system

Q.32 Which property of a resistor determines how much it opposes the flow of electric current in a DC circuit?

- Ans**
- ☐ A. Physical size
 - ☐ B. Power rating
 - ☒ C. Resistance value
 - ☐ D. Color code

Q.33 Before measuring current with an analog multimeter, how should the meter be connected in a circuit?

- Ans**
- ☐ A. In parallel with the load
 - ☐ B. Across the power supply
 - ☒ C. In series with the load
 - ☐ D. To earth ground

Q.34 A control panel design requires cable markers to be both flame-retardant and resistant to abrasion. Which material is best suited for this requirement?

- Ans**
- ☐ A. Clip-on plastic tags
 - ☐ B. Vinyl electrical tapes
 - ☒ C. Polyolefin heat-shrink sleeves
 - ☐ D. Self-adhesive paper labels

Q.35 The property of a material by which it regains its original shape and size after removal of the deforming force is called:

- Ans**
- ☐ A. Plasticity
 - ☒ B. Elasticity
 - ☐ C. Hardness
 - ☐ D. Brittleness

Q.36 Choose the correct sequence for erecting an overhead transmission line.

1. Foundation work
2. Tower erection
3. Conductor stringing
4. Insulator installation

- Ans**
- ☐ A. Foundation work, Conductor stringing, Tower erection, Insulator installation
 - ☐ B. Insulator installation, Foundation work, Tower erection, Conductor stringing
 - ☒ C. Foundation work, Tower erection, Insulator installation, Conductor stringing
 - ☐ D. Tower erection, Foundation work, Conductor stringing, Insulator installation

Q.37 What is a primary advantage of the Bureau of Indian Standards (BIS) codification system for steels?

- Ans**
- ☒ A. It relates steel grades to important material properties
 - ☐ B. It provides information limited to historical steel records
 - ☐ C. It relies mainly on visual methods for steel identification
 - ☐ D. It is accepted uniformly by every country worldwide

Q.38 Which of the following equipment provides surge protection in substations?

- Ans**
- ☐ A. Line isolator
 - ☒ B. Lightning arrester
 - ☐ C. Main busbar
 - ☐ D. Overcurrent relay

Q.39 While planning lighting for a machine assembly area, an engineer calculates the required number of luminaires. If the area is 60 square meters and the recommended illumination level is 300 lux, what is the total luminous flux required for the area?

- Ans**
- ☐ A. 9000 lumens
 - ☐ B. 21000 lumens
 - ☐ C. 12000 lumens
 - ☒ D. 18000 lumens

Q.40 In a series DC circuit, what happens if one component fails or becomes open-circuit?

- Ans**
- ☐ A. Current flows in reverse direction
 - ☐ B. Current bypasses the failed component
 - ☒ C. The entire circuit stops working
 - ☐ D. Current flows only through working components

Q.41 While selecting an institute for training a licensed wireman, which factor should be prioritized to ensure eligibility for the wireman permit?

- Ans**
- ☐ A. Choosing the shortest training program available
 - ☐ B. Selecting the institute closest to home
 - ☐ C. Opting for the lowest tuition fee
 - ☒ D. Selecting an accredited institute recognized by the government authority

Q.42 Which step is most crucial for enabling the collection of electric current in a silicon-based solar cell?

- Ans**
- ☐ A. Sandwiching doped and undoped wafers
 - ☒ B. Attaching metallic strips to the extreme layers
 - ☐ C. Doping wafers with impurities
 - ☐ D. Cutting silicon into thin wafers

Q.43 Which of the following is NOT a characteristic of a block diagram?

- Ans**
- ☐ A. It utilizes simple geometric blocks to represent individual critical subsystems
 - ☐ B. It highlights the functional relationships between the main system components
 - ☒ C. It includes the detailed internal construction details of individual components
 - ☐ D. It displays the overall system functions without showing complex connection paths

Q.44 What does the BIS code 2330 primarily indicate?

- Ans**
- ☒ A. It indicates a nickel steel with high nickel content
 - ☐ B. It identifies a free cutting steel grade type
 - ☐ C. It denotes a chromium steel used in engineering
 - ☐ D. It represents a plain carbon steel grade material

Q.45 What is the function of the charging controller in an AC charging system for electric vehicles?

- Ans**
- ☐ A. To select the type of charging cable used
 - ☐ B. To provide direct power to the vehicle's motor
 - ☒ C. To manage charging communication of vehicles
 - ☐ D. To control the speed of the electric vehicle

Q.46 Solar cells are also known as the building blocks of which devices?

- Ans**
- ☐ A. Batteries
 - ☒ B. Photovoltaic modules
 - ☐ C. Transformers
 - ☐ D. Electrical wires

Q.47 Which statement best describes an isolating switch?

- Ans**
- ☐ A. It is a remote-controlled hydraulic switch
 - ☐ B. It is a programmable digital switch
 - ☐ C. It is an automatic electronic switch
 - ☒ D. It is a manually operated mechanical switch

Q.48 Which condition must be met for a DC shunt generator to successfully charge a battery bank?

- Ans**
- ☐ A. The armature resistance must be maximum.
 - ☐ B. The generator terminal voltage must be equal to the battery voltage.
 - ☒ C. The generator terminal voltage must be higher than the battery voltage.
 - ☐ D. The generator field resistance must be minimum.

Q.49 Which of the following scenarios demonstrates a real-life consequence of ignoring longitude effects in solar power plant design?

- Ans**
- ☐ A. Solar panels use unsuitable materials for region
 - ☐ B. Solar panels are installed at incorrect latitude
 - ☐ C. Solar panels neglect weather monitoring input
 - ☒ D. Solar panels receive suboptimal sunlight due to misaligned tracking schedules

Q.50 Find the circumference of a circle having radius 7 cm. Use $\pi=22/7$.

- Ans**
- ☐ A. 66 cm
 - ☐ B. 88 cm
 - ☐ C. 22 cm
 - ☒ D. 44 cm

Q.51 According to the laws of electrolysis, what happens to the mass of substance deposited at an electrode if the quantity of electricity passed through the electrolyte is increased?

- Ans**
- ☒ A. The mass deposited increases
 - ☐ B. The mass deposited changes unpredictably
 - ☐ C. The mass deposited remains constant
 - ☐ D. The mass deposited decreases

Q.52 What does it mean when the galvanometer in a Wheatstone bridge shows zero deflection?

- Ans**
- ☒ A. The bridge has reached a balanced condition
 - ☐ B. The power supply is disconnected completely
 - ☐ C. Exactly three out of four resistances are identical
 - ☐ D. The bridge contains a short-circuited path

Q.53 An industrial electrician uses an insulation resistance tester on a three-core cable. The measured resistance between core and earth is 900 megaohms. What does this value indicate about the cable's insulation condition?

- Ans**
- ☐ A. The cable has severe moisture ingress and needs drying.
 - ☐ B. The insulation has broken down and needs immediate replacement.
 - ☒ C. The insulation is in good condition and safe for operation.
 - ☐ D. The cable is unsuitable for industrial environments due to low strength.

Q.54 For fitting operations on thin sheet metal, which cutting tool offers the best control and precision?

- Ans**
- ☐ A. Flat hand file
 - ☐ B. Cold chisel
 - ☒ C. Hand snips
 - ☐ D. Standard hacksaw

Q.55 Which type of substation would be strategically installed on a high-voltage transmission line to improve network reliability by isolating faults without changing voltage levels?

- Ans**
- ☐ A. Step-up transformer substation
 - ☐ B. Traction substation
 - ☐ C. Step-down transformer substation
 - ☒ D. Switching substation

Q.56 In an industrial wiring project, you must select an enclosure for outdoor use exposed to rain. Which IP code meets this requirement most appropriately?

- Ans**
- ☐ A. IP30
 - ☒ B. IP55
 - ☐ C. IP20
 - ☐ D. IP41

Q.57 Which component in a lead acid cell is specifically made by repeated charging and discharging?

- Ans**
- ☐ A. Electrolyte
 - ☐ B. Container
 - ☐ C. Separators
 - ☒ D. Plante plates

Q.58 A domestic MCCB is marked 25A, 6 kA, 230V AC. Which fault current will this MCCB safely interrupt?

- Ans**
- ☐ A. Any current at 230 V AC
 - ☒ B. Any fault current up to 6,000 A
 - ☐ C. Any overload up to 25 A
 - ☐ D. Any short-circuit above 25A

Q.59 In a Delta-star connected three-phase transformer, the phase shift between primary and secondary voltages is _____.

- Ans**
- ☐ A. 0°
 - ☐ B. 60°
 - ☐ C. 90°
 - ☒ D. 30°

Q.60 If a lighting circuit is designed for 230 V supply and one lamp is rated for 110 V, what will happen if the lamp is connected directly in parallel with other 230 V lamps?

- Ans**
- ☐ A. The 110 V lamp will operate at normal brightness
 - ☐ B. The 110 V lamp will be operate much brighter than others and continue to do so.
 - ☐ C. The 110 V lamp will be dimmer than others
 - ☒ D. The 110 V lamp will fail quickly due to overvoltage

Q.61 If an ELCB in a domestic installation trips occasionally without any apparent fault, what could be a probable reason?

- Ans**
- ☒ A. Small leakage currents from cumulative appliance insulation deterioration
 - ☐ B. Phase and neutral lines are reversed
 - ☐ C. Sudden voltage surges from the supply
 - ☐ D. Increase in total load beyond ELCB rating

Q.62 The price of a tool increased from ₹400 to ₹500. Calculate the percentage increase based on the original price.

- Ans**
- ☐ A. 20%
 - ☐ B. 30%
 - ☒ C. 25%
 - ☐ D. 35%

Q.63 An industrial PLC control panel requires compliance with electromagnetic compatibility (EMC) standards. Which design change best enhances EMC performance?

- Ans**
- ☒ A. Installing metallic cable glands and proper grounding for all entry cables
 - ☐ B. Increasing the insulation grade of all panel cables
 - ☐ C. Minimizing the variation in cable insulation color
 - ☐ D. Using plastic cable glands for all wiring entries

Q.64 When an electric vehicle is connected to a charging station, which process ensures that only authorized users can access charging services securely and efficiently?

- Ans**
- ☐ A. Collecting charging-related data through EVSE–CMS
 - ☐ B. Managing billing information through EVSE–CMS
 - ☐ C. Grid monitoring through EVSE–CMS
 - ☒ D. User authorization through EVSE–CMS

Q.65 Choose the correct sequence of steps needed when calculating the inclination angle for a solar power plant installation.

- Ans**
- ☒ A. Determine latitude, assess shading, account for seasonal changes, set panel angle
 - ☐ B. Set panel angle, determine latitude, account for seasonal changes, assess shading
 - ☐ C. Account for seasonal changes, set panel angle, assess shading, determine latitude
 - ☐ D. Assess shading, set panel angle, determine latitude, account for seasonal changes

Q.66 Why are external resistances connected to the rotor circuit of a slip ring induction motor during starting?

- Ans**
- ☐ A. To proportionally reduce the stator frequency
 - ☐ B. To completely eliminate the iron core losses
 - ☒ C. To significantly increase the starting torque
 - ☐ D. To intentionally decrease the supply voltage

Q.67 What is the purpose of using symbolic representation in engineering drawing?

- Ans**
- ☒ A. To communicate information using standardized symbols
 - ☐ B. To introduce unnecessary complexity into drawings
 - ☐ C. To decorate drawings using additional geometric shapes
 - ☐ D. To improve the decorative appearance of drawings

Q.68 In context to a cumulatively compounded DC generator, which one statement stated below defines the purpose of the series field winding?

- Ans**
- ☐ A. It provides the initial residual magnetism required to start the voltage buildup process.
 - ☐ B. It converts the alternating current induced in the armature into direct current at the terminals.
 - ☐ C. It reduces the mechanical friction of the rotor shaft during high-speed operation.
 - ☒ D. It compensates for internal voltage drops by increasing the magnetic flux as the load current increases.

Q.69 Which device is commonly used as a source of electromotive force in a simple electric circuit?

- Ans**
- ☐ A. Incandescent lamp
 - ☐ B. Electric motor
 - ☐ C. Fixed resistor
 - ☒ D. Electric battery

Q.70 If a universal motor runs smoothly at low speed but emits a high-pitched noise at high speed, what is the probable cause?

- Ans**
- ☒ A. Incorrect brush angle
 - ☐ B. Open field winding
 - ☐ C. Loose lamination stack
 - ☐ D. Faulty centrifugal switch

Q.71 Why is it important to estimate the voltage drop when determining cable size in industrial installations?

- Ans**
- ☐ A. To select the insulation color
 - ☐ B. To reduce installation cost only
 - ☐ C. To determine maximum current rating
 - ☒ D. To ensure equipment receives sufficient voltage

Q.72 In a delta-connected three-phase system, what is the relationship between line voltage and phase voltage?

- Ans**
- ☐ A. Line voltage is zero
 - ☐ B. Line voltage is twice phase voltage
 - ☐ C. Line voltage is less than phase voltage
 - ☒ D. Line voltage equals phase voltage

Q.73 A theater lighting designer must ensure that each part of the stage receives the same amount of illumination from overhead lights. If the distance between the lights and the stage is doubled, which action will maintain equal illumination across all areas, according to the laws of illumination?

- Ans**
- ☐ A. Increase the angle of incidence of the lights
 - ☒ B. Increase the luminous intensity of each light source by a factor of four
 - ☐ C. Double the luminous intensity of each light source
 - ☐ D. Use half the number of lights but keep the same intensity

Q.74 Which part of a twist drill removes chips from the hole during drilling?

- Ans**
- ☒ A. The flutes
 - ☐ B. The shank
 - ☐ C. The point
 - ☐ D. The web

Q.75 What role do designated storage areas play in factory safety and cleanliness?

- Ans**
- ☒ A. They help prevent clutter and maintain workplace order
 - ☐ B. They monitor employee tasks and work performance
 - ☐ C. They improve the speed of machine operations daily
 - ☐ D. They reduce the need for routine cleaning activities



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	2:30 PM - 5:00 PM
Subject	ALP Stage 2 Electronics Mechanic

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 Which of the following correctly states the full form of CD and the technology used to store data on it?

- Ans**
- ☒ A. Compact Drive, Optical Storage
 - ☒ B. Compact Drive, Magnetic Storage
 - ☒ C. Compact Disc, Optical Storage
 - ☒ D. Compact Disc, Magnetic Storage

Q.2 In a certain code language, 'SOIL' is coded as '1547' and 'COIL' is coded as '7124'. What is the code for 'C' in the given code language?

- Ans**
- ☒ A. 4
 - ☒ B. 2
 - ☒ C. 7
 - ☒ D. 1

Q.3 P, Q and R are three batsmen. The ratios of runs scored by them in a certain match were as follows:

$P : Q = 5 : 7$ and $Q : R = 2 : 3$.

If they scored a total of 765 runs, then find the number of runs scored by R.

- Ans**
- ☒ A. 378
 - ☒ B. 336
 - ☒ C. 357
 - ☒ D. 350

Q.4 Refer to the following letter series and answer the question that follows. (Counting to be done from left to right only.)

(Left) Q K Q N X K G G V M L A W T W K N G V (Right)

How many such consonants are there each of which is immediately preceded by a vowel and also immediately followed by a consonant?

- Ans**
- ☒ A. Two
 - ☒ B. Three
 - ☒ C. None
 - ☒ D. One

Q.5 The first shopkeeper allows two successive discounts of 3% and 7%, while a second shopkeeper allows two successive discounts of 2% and 8%. A third shopkeeper allows 10% discount on the same item. From which shopkeeper should a customer buy if the marked price is the same at the three shops?

- Ans**
- ☒ A. Buy from the first or the second shopkeeper as both are the same.
 - ☒ B. Buy from the third shopkeeper
 - ☒ C. Buy from the first shopkeeper
 - ☒ D. Buy from the second shopkeeper

Q.6 In a certain code language,
A + B means 'A is the mother of B',
A – B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Satish related to Mayank if 'Satish + Deep × Piyush – Hitesh % Mayank'?

- Ans**
- ☒ A. Father's brother's wife's sister
 - ☒ B. Father's brother's wife's mother
 - ☒ C. Mother's brother's wife's mother
 - ☒ D. Mother's brother's wife's sister

Q.7 An engineer is updating a schematic for a control panel and needs to indicate a normally closed push button. Which approach best ensures the symbol is universally understood among engineers referring to standard engineering drawings?

- Ans**
- ☒ A. Draw a hand made representation of the push button with a note explaining function
 - ☒ B. Substitute the normally closed push button symbol with a general switch symbol
 - ☒ C. Describe the normally closed push button in words within the schematic diagram clearly
 - ☒ D. Use the standardized symbol for a normally closed push button as per conventions

Q.8 A solid right circular cone is 7 cm high, and the radius of its base is 22.2 cm. It is melted and recast into a right circular cone with radius of its base 3.7 cm. Then the height (in cm) of the cone is _____.

- Ans**
- ☒ A. 159
 - ☒ B. 267
 - ☒ C. 252
 - ☒ D. 185

Q.9 Let C be a circle, and AB and DE be two chords on C such that AB = BE. In the quadrilateral ABED, let AE and BD intersect at F, $\angle DBE = 55^\circ$ and $\angle BAE = 40^\circ$. Find $\angle FED$.

- Ans**
- ☒ A. 55°
 - ☒ B. 60°
 - ☒ C. 45°
 - ☒ D. 110°

Q.10 What does the term 'HAZOP' stand for in occupational safety?

- Ans**
- ☒ A. Hazardous Operation Standard
 - ☒ B. Handling and Organizing Safety
 - ☒ C. Hazard and Operability Study
 - ☒ D. Hazardous Operations Safety

Q.11 Which type of personal protective equipment is most suitable for tasks involving airborne chemical particles in confined spaces?

- Ans**
- ☐ A. Body protection with flame-retardant suits
 - ☐ B. Hand protection using chemical-resistant gloves
 - ☐ C. Head protection with industrial-grade hard hats
 - ☒ D. Respiratory protection devices such as half-face masks

Q.12 12 is related to 1730 following a certain logic. Following the same logic, 13 is related to 2199. To which of the given options is 11 related, following the same logic?
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☐ A. 1443
 - ☐ B. 1543
 - ☒ C. 1333
 - ☐ D. 1433

Q.13 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table.
Only two people sit between Y and C when counted from the left of C. D sits third to the left of B. A sits to the immediate right of B. A sits second to the left of Y. Z is not an immediate neighbor of D.
Who sits third to the right of X?

- Ans**
- ☐ A. C
 - ☐ B. Y
 - ☐ C. D
 - ☒ D. A

Q.14 Which tool safety measure best prevents injuries when cleaning a workshop lathe after use?

- Ans**
- ☐ A. Blowing chips away with compressed air around the lathe
 - ☐ B. Wiping metal chips using bare hands directly
 - ☒ C. Using a brush to remove metal chips from the lathe
 - ☐ D. Using a rag to remove metal dust from the lathe

Q.15 Which intervention most effectively reduces ground-level pollutant concentrations during a winter temperature inversion?

- Ans**
- ☐ A. Increasing surface temperatures near emission sources
 - ☐ B. Reducing local wind speed to minimize horizontal dispersion
 - ☒ C. Enhancing vertical air mixing through artificial turbulence
 - ☐ D. Elevating emission sources above inversion layers

Q.16 Why is a room thermometer generally mounted vertically on a wall?

- Ans**
- ☒ A. It ensures accurate reading by keeping the bulb exposed to room air.
 - ☐ B. It helps the thermometer measure body temperature faster.
 - ☐ C. It protects the thermometer from breaking easily.
 - ☐ D. It prevents the liquid from freezing inside the thermometer.

Q.17 The mean of 11 numbers is 10.9. If the mean of the first 6 numbers is 10.5 and the mean of the last 6 numbers is 11.4, then find the 6th number.

- Ans**
- ☐ A. 11
 - ☒ B. 11.5
 - ☐ C. 10.5
 - ☐ D. 10

Q.18 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☒ A. RL-SN
 - ☐ B. PJ-QK
 - ☐ C. HB-IC
 - ☐ D. FZ-GA

Q.19 What is the primary role of the Central Processing Unit (CPU) in a computer system?

- Ans**
- ☐ A. To manage network connections
 - ☐ B. To display output on the screen
 - ☒ C. To execute program instructions
 - ☐ D. To store long-term data

Q.20 If the mean of the following data is 45, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	23	30	31	45	X

- Ans**
- ☐ A. 180
 - ☐ B. 188
 - ☐ C. 162
 - ☒ D. 160

Q.21 Refer to the given letter series and answer the question that follows. Counting to be done from left to right only.

(Left) H S A N D D I A D F P A J O S K I O Z O T X (Right)

How many such consonants are there, each of which is immediately preceded by a consonant and also immediately followed by a vowel?

- Ans**
- ☒ A. Four
 - ☐ B. Five
 - ☐ C. Six
 - ☐ D. Three

Q.22 Which of the following statements best describes a triangle as used in engineering drawing?

- Ans**
- ☐ A. A triangle is a polygon with four straight sides and four angles.
 - ☒ B. A triangle is a polygon with three straight sides and three angles.
 - ☐ C. A triangle is a polygon having three curved sides.
 - ☐ D. A triangle must always have all sides of equal length.

Q.23 Refer to the given letter series and answer the question that follows.

(Left) A X T N K R Q K C P S I D F J U D O R G Z M B E L (Right)

How many letters are there in the English alphabetical series between the letter that is fourth from the right end and the letter that is third from the left end of the series?

- Ans**
- ☐ A. 5
 - ☐ B. 3
 - ☒ C. 6
 - ☐ D. 4

Q.24 Pipes A and B can fill an entire tank in 8 hours and 12 hours, respectively. The water tank is one-fourth full. If both the pipes are opened together, then how long will it take to fill the remaining part of the tank?

- Ans**
- ☐ A. 3 hours 6 minutes
 - ☐ B. 3 hours 26 minutes
 - ☐ C. 3 hours 16 minutes
 - ☒ D. 3 hours 36 minutes

Q.25 An astronaut weighs 600 N on Earth. During a moon mission, she performs an experiment to measure her weight on the moon. Which value is closest to her expected weight on the moon, and why?

- Ans**
- ☒ A. 100 N, because the Moon's gravity is about one-sixth of Earth's.
 - ☐ B. 200 N, because the Moon's gravity is about one-third of Earth's.
 - ☐ C. 600 N, because a person's weight remains unchanged on the Moon.
 - ☐ D. 300 N, because the Moon's gravity is about one-half of Earth's.

Q.26 Why does restricting certain chemical refrigerants effectively reduce damage to the ozone layer?

- Ans**
- ☒ A. Refrigerants release substances that catalyze ozone breakdown.
 - ☐ B. Refrigerants increase oxygen production, supporting ozone recovery.
 - ☐ C. Refrigerants contain particles that absorb harmful UV light.
 - ☐ D. Refrigerants emit greenhouse gases that warm the stratosphere.

Q.27 Simplify the following expression.

$$11 \text{ of } 7 + 125 \div 5 + 99 \div 11 \times 7 - 17 \text{ of } 7 + 7 \times 6 - (91 \div 7 + 7 \times 5)$$

- Ans**
- ☐ A. 36
 - ☐ B. 48
 - ☐ C. 44
 - ☒ D. 40

Q.28 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

MDB PHE SLH VPK ?

- Ans**
- ☒ A. YTN
 - ☐ B. ZUO
 - ☐ C. XSM
 - ☐ D. ZTM

Q.29 Which one of the following statements correctly describes a characteristic of WANs?

- Ans**
- ☐ A. WANs are always public networks managed solely by Internet Service Providers (ISPs).
 - ☐ B. WANs typically use only wireless media to connect distant LANs.
 - ☐ C. WANs are limited to connecting devices within a radius of 1 to 2 km.
 - ☒ D. WANs can be built by connecting multiple LANs via wired or wireless links.

Q.30 What information does a kilometer stone provide to travelers on a road?

- Ans**
- ☒ A. Distance from a reference point
 - ☐ B. Direction of travel
 - ☐ C. Speed of the vehicle
 - ☐ D. Time taken to reach destination

Q.31 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

ZOT - TLP
NIL - HFH

- Ans
- ☐ A. ABD - VZZ
 - ☐ B. VZZ - BCD
 - ☐ C. BOC - VZT
 - ☒ D. BCD - VZZ

Q.32 If the height of an object is doubled while its mass remains constant, its gravitational potential energy will be:

- Ans
- ☐ A. halved
 - ☐ B. decreased to one-fourth
 - ☐ C. unchanged
 - ☒ D. doubled

Q.33 Which statement best describes how the mass and speed of an object affect its kinetic energy?

- Ans
- ☐ A. An object with less mass and lower speed will have more kinetic energy.
 - ☐ B. An object with greater mass but lower speed will have more kinetic energy.
 - ☐ C. An object with same mass but higher speed will have less kinetic energy.
 - ☒ D. An object with greater mass and higher speed will have more kinetic energy.

Q.34 Which factor increases the amount of heat produced in a wire when an electric current flows through it for a fixed time?

- Ans
- ☐ A. Decreasing the length of the wire
 - ☐ B. Reducing the current in the wire
 - ☐ C. Making the wire thicker
 - ☒ D. Increasing the resistance of the wire

Q.35 Which of the following best describes the function of a speedometer in a vehicle?

- Ans
- ☒ A. It displays the current speed at which the vehicle is moving.
 - ☐ B. It measures the total distance the vehicle has traveled.
 - ☐ C. It calculates the average speed over a journey.
 - ☐ D. It shows the rate at which the vehicle's speed changes.

Q.36 The salary of a person is increased by 10%, 20% and 25% successively in three consecutive years. Find the overall percentage increase in the salary at the end of the third year.

- Ans
- ☒ A. 65%
 - ☐ B. 60%
 - ☐ C. 30%
 - ☐ D. 50%

Q.37 If 2 is subtracted from each odd digit and 2 is added to each even digit in the number 235234796423, what will be the sum of the digits that are third from the left and third from the right?

- Ans
- ☐ A. 6
 - ☐ B. 7
 - ☒ C. 9
 - ☐ D. 8

Q.38 A plane parallel to the base divides a cone of height 40 cm into two parts. If the volume of the upper smaller cone formed is $\frac{1}{64}$ of the volume of the original cone, calculate the height of the plane from the base of the cone.

- Ans**
- ☐ A. 20 cm
 - ☐ B. 10 cm
 - ☐ C. 40 cm
 - ☒ D. 30 cm

Q.39 A pump can fill a tank in 3 hours. Due to a leak in the tank, it takes 4.5 hours to fill the tank. In how much time can the leak empty the full tank if no other entry or exit routes are open?

- Ans**
- ☐ A. 7 hours
 - ☒ B. 9 hours
 - ☐ C. 8 hours
 - ☐ D. 6 hours

Q.40 Srinu starts from his home and drives 2 km towards the south, then takes a right turn and drives 5 km. He then takes a right turn and drives 6 km before taking a right turn again and driving 4 km further. Srinu finally takes a right turn and drives 4 km before stopping at his office. In which direction should Srinu drive to reach his home again? (All turns are 90-degree turns only unless specified.)

- Ans**
- ☐ A. South
 - ☒ B. East
 - ☐ C. North
 - ☐ D. West

Q.41 SANZ is related to YUTT in a certain way based on the English alphabetical order. In the same way, MTHM is related to SNNG. To which of the following is LJRE related to following the same logic?

- Ans**
- ☐ A. REXZ
 - ☒ B. RDX Y
 - ☐ C. QDYY
 - ☐ D. QEYZ

Q.42 What should come in place of the question mark (?) in the given series?

1 2 7 20 61 ?

- Ans**
- ☒ A. 182
 - ☐ B. 185
 - ☐ C. 181
 - ☐ D. 183

Q.43 A laboratory thermometer has a range from -10 degrees Celsius to 110 degrees Celsius and 120 equal divisions. What is the smallest value that this thermometer can read?

- Ans**
- ☐ A. 10 degrees Celsius
 - ☐ B. 2 degrees Celsius
 - ☐ C. 0.5 degrees Celsius
 - ☒ D. 1 degree Celsius

Q.44 A cyclist travels 120 km in 3 hours, rests for 1 hour, and then travels another 80 km in 2 hours. To determine the cyclist's average speed for the entire journey, which of the following quantities should be used?

- Ans**
- ☐ A. Distance travelled in a particular direction divided by time
 - ☐ B. Change in velocity divided by total time taken
 - ☐ C. Total displacement divided by total time taken
 - ☒ D. Total distance travelled divided by the total time taken

Q.45 The cost of a diamond varies directly with the square of its weight. A diamond broke into four pieces with weights in the ratio 2:4:1:3. If it had been broken into four equal pieces, the loss would have been ₹60,000. What was the original cost of the diamond?

- Ans**
- ☐ A. ₹78,000
 - ☐ B. ₹75,000
 - ☒ C. ₹80,000
 - ☐ D. ₹82,000

Q.46 Which statement best describes the front view in an engineering drawing?

- Ans**
- ☐ A. It shows the object's depth and height as seen from the side
 - ☐ B. It shows only the object's bottom or right side
 - ☐ C. It shows only one dimension of the object
 - ☒ D. It shows the object's height and width as seen from the front

Q.47 When a cutting plane line passes through a hole and a rib, which feature should be sectioned in the resulting view according to standard conventions?

- Ans**
- ☐ A. Both the hole and the rib are shown unsectioned
 - ☒ B. The hole is sectioned but the rib is shown unsectioned
 - ☐ C. Both the hole and the rib are shown sectioned
 - ☐ D. The rib is sectioned but the hole is left unsectioned

Q.48 If $x + \frac{1}{x} = 5$, then $\frac{x^3 - 5x^2 + 5x}{x^2 + 1}$ is equal to:

- Ans**
- ☐ A. $\frac{3}{5}$
 - ☐ B. $\frac{2}{5}$
 - ☒ C. $\frac{4}{5}$
 - ☐ D. $\frac{1}{5}$

Q.49 G is the mother of Y. Y is the sister of V. S is the father of L. L is the son of V. How is G related to L?

- Ans**
- ☐ A. Mother's sister
 - ☐ B. Sister
 - ☒ C. Mother's mother
 - ☐ D. Mother

Q.50 The average of five numbers is 30. If four of the numbers are 25, 35, 28 and 32, then what is the fifth number?

- Ans**
- ☒ A. 30
 - ☐ B. 32
 - ☐ C. 28
 - ☐ D. 35

Q.51 Find the compound interest on ₹5,70,000 for 1.5 years at 10% per annum compounded half-yearly.

- Ans**
- ☒ A. ₹89,846.25
 - ☐ B. ₹89,946.25
 - ☐ C. ₹92,846.25
 - ☐ D. ₹88,846.25

- Q.52** If $3x - 2y + 3z = 8$, $4x - 3y + 2z = 4$ and $2x + y - z = 1$, then find x, y and z, respectively.
- Ans** ☒ A. 2, 1 and 3
- ☒ B. 1, 2 and 3
- ☒ C. 3, 1 and 2
- ☒ D. 2, 3 and 1

- Q.53** A cyclist rides 60 meters north, then 80 meters south, and finally 70 meters north. What is the total distance the cyclist has traveled?
- Ans** ☒ A. 150 meters
- ☒ B. 60 meters
- ☒ C. 210 meters
- ☒ D. 10 meters

- Q.54** Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)
- Ans** ☒ A. DG – EH
- ☒ B. SJ – TK
- ☒ C. KE – LF
- ☒ D. IT – KV

- Q.55** Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

Some rugs are fans.

No fan is a car.

Conclusion (I) : Some rugs are cars.

Conclusion (II) : Some fans are rugs.

- Ans** ☒ A. Both conclusions (I) and (II) follow
- ☒ B. Only conclusion (II) follows
- ☒ C. Only conclusion (I) follows
- ☒ D. Neither conclusion (I) nor (II) follows

- Q.56** A crane lifts a 200 kg load to a height of 15 meters in 10 seconds. Assuming acceleration due to gravity is 10 m/s^2 and energy loss is negligible, what is the power output of the crane during this operation?
- Ans** ☒ A. 1500 W
- ☒ B. 1000 W
- ☒ C. 3000 W
- ☒ D. 2000 W

- Q.57** An engineering firm is tasked with creating a set of technical drawings for a large-scale project. The client specifies that all components must fit on a single sheet without reducing the drawing scale, and the total drawing area required is approximately 1 square meter. Based on standard drawing sheet sizes, which sheet should the firm select to best meet these requirements?
- Ans** ☒ A. A0 size sheet
- ☒ B. A1 size sheet
- ☒ C. A2 size sheet
- ☒ D. A3 size sheet

Q.58 A boy uses a wheelbarrow to carry sand. The wheel acts as the pivot, the sand is placed in the tray, and the boy lifts the handles. In this arrangement, the sand represents _____.

- Ans**
- ☒ A. Arm
 - ☒ B. Load
 - ☒ C. Fulcrum
 - ☒ D. Effort

Q.59 Two trains are moving in opposite directions. The first train is 120 m long and runs at 54 km/h. The second train is 180 m long and runs at 72 km/h. How much time will they take to cross each other completely?
(Rounded up to two decimal places)

- Ans**
- ☒ A. 8.43 seconds
 - ☒ B. 8.57 seconds
 - ☒ C. 7.57 seconds
 - ☒ D. 9.25 seconds

Q.60 Which of the following pairs of numbers is co-prime?

- Ans**
- ☒ A. (14, 28)
 - ☒ B. (17, 54)
 - ☒ C. (21, 33)
 - ☒ D. (28, 49)

Q.61 A ladder is leaning against a wall and makes an angle of 60° with the ground. If the length of the ladder is 24 m, find the distance of the foot of the ladder from the wall.

- Ans**
- ☒ A. 9 m
 - ☒ B. 12 m
 - ☒ C. 18 m
 - ☒ D. 15 m

Q.62 When drawing repeated 67° angles on an engineering sheet, which practice best helps minimize cumulative alignment errors?

- Ans**
- ☒ A. Drawing all angles continuously without intermediate verification
 - ☒ B. Marking all angles lightly with a pencil before finalizing
 - ☒ C. Relying solely on the initial protractor alignment for all angles
 - ☒ D. Using the same reference line for all repeated angles

Q.63 What should come in place of '?' in the given series?
11, 22, 44, 88, 176, ?

- Ans**
- ☒ A. 342
 - ☒ B. 358
 - ☒ C. 356
 - ☒ D. 352

Q.64 A cyclist travels from the kilometer stone marked 52 to the stone marked 79. How far has the cyclist traveled?

- Ans**
- ☒ A. 27 kilometers
 - ☒ B. 31 kilometers
 - ☒ C. 131 kilometers
 - ☒ D. 52 kilometers

Q.65 What does CPU stand for in computing?

- Ans**
- ☐ A. Computer Processing Unit
 - ☐ B. Core Processing Unit
 - ☒ C. Central Processing Unit
 - ☐ D. Control Processing Unit

Q.66 A technician needs to select a fuse wire for a room heater. Which property should be considered most important for safety based on the heating effect of electric current?

- Ans**
- ☒ A. The fuse wire must have a low melting point to break the circuit during excess current.
 - ☐ B. The fuse wire must have a high melting point for durability.
 - ☐ C. The fuse wire must have high resistance and be thick to prevent melting.
 - ☐ D. The fuse wire must have a shiny surface for efficient cooling.

Q.67 A ramp is used to lift a box to a platform 2 m high. To reduce the effort required, the ramp length is increased from 4 m to 8 m. Assuming negligible friction, what remains unchanged?

- Ans**
- ☐ A. The distance moved along the ramp
 - ☒ B. The work done in raising the box
 - ☐ C. The force required
 - ☐ D. The mechanical advantage

Q.68 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All chocolates are paneers.
No paneer is a milk.

Conclusions:

(I) No chocolate is a milk.
(II) Some milks are paneers.

- Ans**
- ☐ A. Neither conclusion (I) nor (II) follows.
 - ☐ B. Only conclusion (II) follows.
 - ☒ C. Only conclusion (I) follows.
 - ☐ D. Both conclusions (I) and (II) follow.

Q.69 Which color is universally associated with emergency exit signs in industrial workplaces under international standards?

- Ans**
- ☐ A. Yellow background with black text or symbols
 - ☒ B. Green background with white text or symbols
 - ☐ C. Blue background with white text or symbols
 - ☐ D. Red background with white text or symbols

Q.70 What is a key feature of single stroke lettering in technical drawings?

- Ans**
- ☐ A. Each character is outlined and then filled.
 - ☒ B. Each character is made with one continuous stroke.
 - ☐ C. Each character is made with several parallel lines.
 - ☐ D. Each character is shaded after drawing.

Q.71 If a rectangular field is measured to be 120 meters long and 75 meters wide, what is its area in SI units?

- Ans**
- ☒ A. 9000 square meters
 - ☐ B. 1800 square meters
 - ☐ C. 15000 square meters
 - ☐ D. 19500 square meters

Q.72 A, B, C, D and E have different heights. E is taller than C but shorter than A. Only one person is taller than A. D is shorter than C. Who amongst them is the third tallest?

- Ans**
- ☐ A. A
 - ☒ B. E
 - ☐ C. C
 - ☐ D. B

Q.73 Which of the following is the best example of municipal solid waste?

- Ans**
- ☐ A. Mining tailings
 - ☐ B. Hospital biomedical waste
 - ☒ C. Household kitchen garbage
 - ☐ D. Industrial process waste

Q.74 Five students, N, O, R, S and T, have different heights. T is taller than N. R is taller than S but shorter than O. S is taller than N. More than two people are taller than T. How many people are shorter than R?

- Ans**
- ☒ A. Three
 - ☐ B. One
 - ☐ C. Two
 - ☐ D. None

Q.75 A car travels from point A to point B in a zigzag path, covering a total distance of 200 meters. If the shortest straight-line distance between A and B is 120 meters, which statement best describes the car's distance and displacement?

- Ans**
- ☐ A. The distance is 200 meters; the displacement is 200 meters
 - ☐ B. The distance is 120 meters; the displacement is 120 meters
 - ☐ C. The distance is 120 meters; the displacement is 200 meters
 - ☒ D. The distance is 200 meters; the displacement is 120 meters

Q.76 An article is bought for ₹300 and its price is increased by 5.5%. The resulting price is then reduced by 8%. Find the final selling price.

- Ans**
- ☐ A. ₹288.24
 - ☐ B. ₹284.45
 - ☐ C. ₹296.46
 - ☒ D. ₹291.18

Q.77 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Among 5 sticks, B, U, N, M and D, each having a different height, which stick is the shortest?

(I) D is shorter than U. M is shorter than B.

(II) M is taller than D.

- Ans**
- ☐ A. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ B. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☒ C. Both statements I and II together are NOT sufficient to answer the question
 - ☐ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.78 Which statement best describes the side view in engineering drawing?

- Ans**
- ☒ A. It shows the object as seen from above or below
 - ☒ B. It shows the object as seen from left or right side
 - ☒ C. It shows a combination of all views of the object
 - ☒ D. It shows the object as seen clearly from the front

Q.79 What is the primary color used in warning signs to alert workers of potential hazards?

- Ans**
- ☒ A. Yellow with black symbol or text
 - ☒ B. Blue with white symbol or text
 - ☒ C. Green with white symbol or text
 - ☒ D. Red with white symbol or text

Q.80 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and select the most appropriate answer.

Question:

Among five trees N, O, R, S, and T, each having a different height, which tree is the tallest?

Statements:

- (I) T is taller than R. N is taller than T.
(II) R is shorter than O but taller than S.

- Ans**
- ☒ A. Both statements I and II together are NOT sufficient to answer the question
 - ☒ B. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☒ C. Data in Statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ D. Data in Statement I alone is sufficient to answer the question while data in statement II is not

Q.81 Sohan covers a total distance of 760 km to reach his home, traveling partly by train and partly by car. He takes 8 hours when he travels 160 km by train and the rest by car. If he travels 240 km by train and the remaining distance by car, his journey takes 12 minutes longer. Find the difference between the speeds of the train and the car.

- Ans**
- ☒ A. 20 km/h
 - ☒ B. 23 km/h
 - ☒ C. 27 km/h
 - ☒ D. 21 km/h

Q.82 A 42-litre solution has sugar and water in the ratio 2 : 5. If, due to evaporation, the volume is reduced by 35%, and only water evaporates, what is the new ratio of sugar to water?

- Ans**
- ☒ A. 31 : 50
 - ☒ B. 40 : 41
 - ☒ C. 51 : 42
 - ☒ D. 40 : 51

Q.83 Which symbol best represents a battery in an electric circuit diagram according to standard conventions?

- Ans**
- ☒ A. A single long line only
 - ☒ B. Two short lines placed together
 - ☒ C. A pair of long and short parallel lines placed alternately
 - ☒ D. Two circles connected in series

Q.84 A sum of money invested at simple interest amounts to ₹21,500 in 5 years and ₹26,000 in 8 years. Find the principal amount (in ₹).

- Ans**
- ☒ A. 7,500
 - ☒ B. 14,000
 - ☒ C. 15,500
 - ☒ D. 12,000

Q.85 Which of the following statements best describes a cuboid as used in engineering drawing?

- Ans**
- ☒ A. A cuboid has all sides and angles equal, making it similar to a cube.
 - ☒ B. A cuboid is a solid with six rectangular faces, and opposite faces are equal.
 - ☒ C. A cuboid is a solid where all faces are parallelograms but not necessarily rectangles.
 - ☒ D. A cuboid has all faces as squares of equal size.

Q.86 Which scenario best demonstrates proactive workplace safety behavior?

- Ans**
- ☒ A. Waiting for a supervisor to notice hazards
 - ☒ B. Reporting hazards after incidents happen
 - ☒ C. Identifying and correcting hazards before accidents occur
 - ☒ D. Discussing only past safety problems in meetings

Q.87 Which combination best describes the main environmental challenges associated with plastic waste management?

- Ans**
- ☒ A. Neutralization and easy recycling
 - ☒ B. Thermal pollution and effective composting
 - ☒ C. Persistence in the environment and microplastic formation
 - ☒ D. Rapid biodegradation and chemical leaching

Q.88 What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $5 \div 3 + 15 \times 5 - 3 = ?$

- Ans**
- ☒ A. 18
 - ☒ B. 9
 - ☒ C. 15
 - ☒ D. 12

Q.89 A group of numbers/symbols is coded using letter codes as per the codes given below and the conditions that follow. The correct combination of codes following the conditions is your answer.

Note: If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	3	@	8	4	\$	&	2	%	#	1	+	9	7	5
Code	U	G	B	K	M	F	X	R	E	Q	S	C	V	T

Conditions –

- (i) If the first element is a symbol and the last element an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and the last elements are to be coded as ©
- (iii) If both second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?
& 8 \$ 9 5

- Ans**
- ☒ A. TCMBF
 - ☒ B. FBMCT
 - ☒ C. TBMCF
 - ☒ D. FCBMT

Q.90 A dealer buys a table for ₹2,750. He first marks it up by 28%, then allows a 12% discount to a customer. If the customer also pays 5% GST on the selling price, find the profit percentage (excluding GST) made by the dealer.

- Ans**
- ☒ A. 13.81%
 - ☒ B. 12.64%
 - ☒ C. 15.12%
 - ☒ D. 10.36%

Q.91 Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

6 – 16 – 23 – 32; 7 – 19 – 26 – 35

- Ans**
- ☒ A. 12 – 34 – 41 – 50
 - ☒ B. 11 – 31 – 38 – 29
 - ☒ C. 4 – 14 – 21 – 30
 - ☒ D. 8 – 22 – 15 – 24

Q.92 What will come in place of the question mark (?) in the following equation if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $42 \times 6 \div 7 - 35 + 19 = ?$

- Ans**
- ☒ A. 65
 - ☒ B. 69
 - ☒ C. 67
 - ☒ D. 63

Q.93 A hiker lifts a backpack from the ground to a ledge 2 meters above the ground. Which situation would result in the greatest increase in the backpack's gravitational potential energy?

- Ans**
- ☒ A. Lifting a heavier backpack to the same 2-meter ledge
 - ☒ B. Lifting a lighter backpack to the same 2-meter ledge
 - ☒ C. Lifting the same backpack to a 1-meter ledge
 - ☒ D. Carrying the same backpack horizontally for 2 meters

Q.94 Why are electric wires in household appliances usually covered with plastic or rubber coating?

- Ans**
- ☒ A. To make the wires heavier
 - ☒ B. To prevent electric shocks by insulation
 - ☒ C. To produce more heat
 - ☒ D. To increase the flow of current

Q.95 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. There are exactly two boxes between T and P. Only Q is kept above U. No box is kept below P. S is kept somewhere below W but above V. Based on the given information, which box is kept third above V?

- Ans**
- ☒ A. W
 - ☒ B. S
 - ☒ C. P
 - ☒ D. T

Q.96 Seven boxes S, T, U, V, W, X, and Y are kept one over the other but not necessarily in the same order. U is kept exactly third from the top. Only one box is kept between U and T. W is kept immediately above T. Only three boxes are kept between X and S. V is kept on one of the positions below Y. Only two boxes are kept between U and S. Which box is kept second from the top?

- Ans**
- ☐ A. U
 - ☐ B. V
 - ☐ C. T
 - ☒ D. X

Q.97 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GXM 5, JVN 11, MTO 24, PRP 51, ?

- Ans**
- ☐ A. TPQ 107
 - ☐ B. TPQ 106
 - ☒ C. SPQ 106
 - ☐ D. SPQ 107

Q.98 What is the primary purpose of a Local Area Network (LAN)?

- Ans**
- ☐ A. To link wireless devices only
 - ☐ B. To connect social media accounts
 - ☒ C. To connect computers within a small geographical area
 - ☐ D. To connect global networks

Q.99 The price of sugar is increased by 20%. Manoj can increase his expenditure on sugar by only 15% from his income. In order to balance his expenditure, by what percentage should he reduce the quantity of sugar consumed?

- Ans**
- ☐ A. 5%
 - ☐ B. $5\frac{1}{3}\%$
 - ☒ C. $4\frac{1}{6}\%$
 - ☐ D. 6.5%

Q.100 Why does biomedical waste require special handling compared to general municipal waste?

- Ans**
- ☐ A. It is more likely to be recycled than other types of waste.
 - ☐ B. It has higher chemical content and is always toxic.
 - ☒ C. It may contain infectious agents that pose health risks.
 - ☐ D. It is always radioactive and requires heavy shielding.

Section : PART-B

Q.1 A resistor is marked with the bands Yellow, Violet, Orange, and Silver. Which statement is correct regarding the resistance value of the resistor?

- Ans**
- ☐ A. Its value is 47 Ω with $\pm 10\%$ tolerance
 - ☐ B. Its value is 4.7 k Ω with $\pm 5\%$ tolerance
 - ☒ C. Its value is 47 k Ω with $\pm 10\%$ tolerance
 - ☐ D. Its value is 470 k Ω with $\pm 20\%$ tolerance

Q.2 What is the main purpose of a limiter circuit in a Frequency Modulation receiver?

- Ans**
- ☐ A. To filter out all noise components
 - ☐ B. To demodulate the signal
 - ☒ C. To remove amplitude variations
 - ☐ D. To change the carrier frequency

Q.3 What is the working principle of an LVDT?

- Ans**
- ☐ A. It relies on the Hall effect for sensing
 - ☒ B. It operates on the principle of mutual induction
 - ☐ C. It uses the piezoelectric effect for measurement
 - ☐ D. It works by changing resistance with position

Q.4 According to engineering drawing, how is a plane surface defined?

- Ans**
- ☐ A. A surface kept parallel to one principal reference plane
 - ☒ B. A surface in which the line joining any two points lies entirely within it
 - ☐ C. A surface formed by rotating a straight line about a fixed axis
 - ☐ D. A surface having the shortest path between any two points

Q.5 While servicing an inverter-based stabilizer, you notice the relay contacts are heavily pitted. What is the best preventive measure when replacing the relay?

- Ans**
- ☐ A. Lower the relay switching voltage
 - ☐ B. Use a relay with smaller contacts
 - ☒ C. Choose a relay rated for higher contact current
 - ☐ D. Select a relay with lower coil resistance

Q.6 In a full adder circuit, under which input condition will the sum output be LOW (0)?

- Ans**
- ☐ A. When only one input is HIGH
 - ☐ B. When all inputs are HIGH
 - ☒ C. When an even number of inputs is HIGH
 - ☐ D. When an odd number of inputs is HIGH

Q.7 In a lab test, three resistors of 2 Ω , 3 Ω , and 6 Ω are connected in series across a 22V DC source. What is the current through the 3 Ω resistor in the circuit?

- Ans**
- ☐ A. 11 A
 - ☐ B. 3 A
 - ☐ C. 1 A
 - ☒ D. 2 A

Q.8 For a circuit to function as an oscillator and produce sustained sinusoidal output, the feedback applied must be:

- Ans**
- ☐ A. Zero feedback to avoid distortion
 - ☐ B. Random feedback depending on input signal
 - ☐ C. Negative feedback to stabilize gain
 - ☒ D. Positive feedback with proper phase

Q.9 An ITI workshop implements 5S but notices recurring safety hazards because tools are often left in different locations and workers cannot find them quickly. Which 5S step should be strengthened most effectively?

- Ans**
- ☐ A. Sustain
 - ☒ B. Set in Order
 - ☐ C. Shine
 - ☐ D. Sort

Q.10 To convert an op-amp integrator into a practical integrator (avoiding low-frequency saturation), which component is typically added in parallel with the feedback capacitor?

- Ans**
- ☒ A. A resistor
 - ☐ B. An inductor
 - ☐ C. A diode
 - ☐ D. A second capacitor

Q.11 When using a PMMC multimeter to measure current, how should the instrument be connected in the circuit?

- Ans**
- ☐ A. Across the resistor only
 - ☒ B. In series with the circuit
 - ☐ C. In parallel with the load
 - ☐ D. Across the voltage source

Q.12 What is the function of the heat sink on the motherboard in a computer system?

- Ans**
- ☐ A. Store BIOS settings in ROM
 - ☒ B. Absorb heat from the processor
 - ☐ C. Run the BIOS during booting process
 - ☐ D. Provide power to RAM

Q.13 Which of the following best describes the Internet of Things?

- Ans**
- ☐ A. A type of programming language
 - ☒ B. A network of connected devices sharing data
 - ☐ C. A single device connected to the internet
 - ☐ D. Only computers communicating online

Q.14 What is the purpose of the I/O shield supplied with a motherboard?

- Ans**
- ☐ A. Maintain the cooling of the cabinet
 - ☐ B. Improve processor speed
 - ☒ C. Align and protect rear motherboard ports
 - ☐ D. Cover and protect unused RAM slots

Q.15 Which illustrates the application of a voltage amplifier?

- Ans**
- ☐ A. Converting digital signals into analog
 - ☐ B. Measuring resistance directly
 - ☒ C. Enhancing the voltage of a sensor output before sending it to a microcontroller
 - ☐ D. Filtering unwanted frequencies

Q.16 What is the primary purpose of using the Pulse Amplitude Modulation (PAM) technique in communication systems?

- Ans**
- ☒ A. To represent analog information by varying the amplitude of high frequency discrete pulses
 - ☐ B. To reduce the bandwidth requirements of signals
 - ☐ C. To increase the frequency of pulses for transmission
 - ☐ D. To encode information using phase shifts in pulses

Q.17 An electrician is required to test a live electrical panel. Which PPE should be worn to protect the hands from electrical hazards?

- Ans**
- ☐ A. Safety helmet
 - ☐ B. Safety goggles
 - ☒ C. Insulated gloves
 - ☐ D. Ear plugs

Q.18 A technician opens a computer cabinet and notices a round coin-shaped battery on the motherboard. What is its purpose?

- Ans**
- ☒ A. Store BIOS/CMOS settings
 - ☐ B. Power the monitor
 - ☐ C. Control USB ports
 - ☐ D. Increase RAM speed

Q.19 Which sequence best ensures both picture quality and device safety while setting up a new LED or LCD TV with a set-top box?

- Ans**
- ☐ A. Connect the set-top box to the TV with AV cables, plug in while both devices are switched on.
 - ☐ B. Connect the set-top box to the TV with AV cables, power on both devices, then switch inputs.
 - ☒ C. Connect the set-top box to the TV with HDMI, power off both devices before plugging, then switch on after connections are secure.
 - ☐ D. Connect the set-top box to the TV with HDMI after turning on the TV first, then the set-top box.

Q.20 In a Pulse Position Modulation (PPM) signal, which of the following pulse parameters remain constant?

- Ans**
- ☐ A. Pulse width only
 - ☒ B. Pulse width and amplitude both
 - ☐ C. Pulse position
 - ☐ D. Pulse amplitude only

Q.21 While fixing a circuit board, which method is best for removing a surface-mount component without ripping or damaging the metal copper tracks?

- Ans**
- ☐ A. Using chemical solvent to dissolve solder and remove the component
 - ☒ B. Using a temperature-controlled soldering station with proper desoldering tools
 - ☐ C. Applying high heat quickly with a basic soldering iron and prying tool
 - ☐ D. Applying force with a heated tweezer to pull off the component

Q.22 Which memory technology is used in USB pen drives?

- Ans**
- ☐ A. Cache Memory
 - ☐ B. DRAM
 - ☒ C. Flash Memory
 - ☐ D. SRAM

Q.23 Which pin on the IC-555 Timer is used to discharge the timing capacitor when it is operated as an astable multivibrator?

- Ans**
- ☐ A. Pin 4
 - ☐ B. Pin 6
 - ☐ C. Pin 2
 - ☒ D. Pin 7

Q.24 An industrial environment with significant power line interference is causing issues in analog communication. Why would phase modulation be selected over amplitude modulation for the analog signaling in such an environment?

- Ans**
- ☐ A. Phase modulation requires less complex receivers than amplitude modulation
 - ☐ B. Phase modulation uses less power than amplitude modulation in all cases
 - ☐ C. Phase modulation guarantees maximum error in noisy environments
 - ☒ D. Phase modulation is less affected by amplitude variations caused by noise

Q.25 Which of the following materials has the lowest electrical conductivity and should be avoided for connecting sensitive measurement instruments?

- Ans
- ☐ A. Copper
 - ☐ B. Silver
 - ☐ C. Aluminum
 - ☒ D. Iron

Q.26 A black rectangular SMD component near an LED driver circuit's input has a white stripe on one edge, and the board is marked with a D. What is this component and its polarity?

- Ans
- ☐ A. Diode; stripe is the Anode (+)
 - ☒ B. Diode; stripe is the Cathode (-)
 - ☐ C. Capacitor; stripe is ground
 - ☐ D. Inductor; stripe is positive input

Q.27 During the troubleshooting workflow of an LED TV that has a No Video, But Has Audio fault condition, which of the following diagnostic steps should a technician perform immediately after confirming the power supply voltages are normal?

- Ans
- ☐ A. Replace the primary microprocessing main board assembly.
 - ☒ B. Perform a flashlight test on the screen to check for a faint image.
 - ☐ C. Replace the liquid crystal display panel assembly immediately.
 - ☐ D. Increase the main AC input voltage using a variable autotransformer.

Q.28 What is the function of RAM in a desktop computer?

- Ans
- ☒ A. Temporary data storage for running applications
 - ☐ B. Permanent storage of files and folders
 - ☐ C. Storing system backup
 - ☐ D. Processing data and performing calculations

Q.29 Which technology is used by a CD-ROM drive to read data in computer systems?

- Ans
- ☒ A. Laser technology
 - ☐ B. Ultraviolet light technology
 - ☐ C. Electrical contacts
 - ☐ D. Magnetic head

Q.30 What is the main benefit of increasing (extending) RAM in a desktop computer?

- Ans
- ☐ A. Faster processor speed
 - ☒ B. Improved multitasking performance
 - ☐ C. Higher disk permanent storage
 - ☐ D. Better display resolution

Q.31 Which type of charge carriers mainly control current in a Field Effect Transistor (FET)?

- Ans
- ☐ A. Electrons and holes together
 - ☐ B. Minority carriers only
 - ☐ C. Both minority and majority carriers
 - ☒ D. Majority carriers only

Q.32 In the procedure of measuring resistance with a shunt type ohmmeter, what will the pointer indicate if the test terminals remain open during testing?

- Ans
- ☐ A. Mid-scale reading
 - ☐ B. Zero resistance
 - ☒ C. Infinite resistance
 - ☐ D. Negative reading

Q.33 What is the function of a half wave rectifier?

- Ans**
- ☒ A. It converts AC to DC
 - ☐ B. It converts DC to AC
 - ☐ C. It amplifies signals
 - ☐ D. It stores electrical energy

Q.34 What does the term booting mean in a computer system?

- Ans**
- ☐ A. Defragmenting a hard disk to fix bad sectors
 - ☐ B. Installing open source software tools
 - ☐ C. Scanning for virus and deleting the infected files
 - ☒ D. Starting a computer and loading the operating system

Q.35 A silicon sample is doped with boron in a lab. Identify the semiconductor type.

- Ans**
- ☒ A. P-type semiconductor
 - ☐ B. Insulator
 - ☐ C. Intrinsic semiconductor
 - ☐ D. N-type semiconductor

Q.36 During an 8051 microcontroller experiment, switches are connected to Port 1. Before reading the switch status, the program writes logic '1' to the port pins. What is the purpose of this operation?

- Ans**
- ☐ A. To clear the data stored in the port register
 - ☐ B. To configure the port pins as output
 - ☒ C. To configure the port pins as input
 - ☐ D. To enable serial communication

Q.37 Why is a Double-Pole (DP) Miniature Circuit Breaker (MCB) generally preferred over a Single-Pole (SP) MCB in a single-phase distribution system?

- Ans**
- ☐ A. It increases the fault current carrying capacity of the circuit.
 - ☐ B. It eliminates the requirement for earthing in the installation.
 - ☐ C. It reduces the power consumption of the connected load.
 - ☒ D. It simultaneously disconnects both the phase and neutral conductors during switching or fault conditions.

Q.38 What is the purpose of the base region in an NPN transistor?

- Ans**
- ☐ A. To generate electrons for the collector
 - ☐ B. To act as the main current path
 - ☒ C. To control the number of electrons passing from emitter to collector
 - ☐ D. To dissipate heat

Q.39 Why are transistors preferred over mechanical switches for rapid switching operations?

- Ans**
- ☐ A. Transistors require manual operation
 - ☒ B. Transistors switch faster and have long life span
 - ☐ C. Transistors are larger in size
 - ☐ D. Transistors consume more power

Q.40 Which type of amplifier is used at the final stage to drive a loudspeaker?

- Ans**
- ☐ A. Pre-amplifier
 - ☐ B. Voltage amplifier
 - ☐ C. Buffer amplifier
 - ☒ D. Power amplifier

Q.41 An Earth Leakage Circuit Breaker (ELCB) is designed to disconnect the electrical supply under which of the following conditions?

- Ans**
- ☒ A. When the earth leakage current exceeds the preset sensitivity (trip) value
 - ☐ B. When the supply frequency deviates from its rated value
 - ☐ C. When the earth leakage current falls below the rated value
 - ☐ D. When the load current exceeds the rated current of the circuit

Q.42 Which of the following inputs is applied to a base terminal in a transistor amplifier during lab testing?

- Ans**
- ☐ A. Random noise signal
 - ☒ B. Small AC signal input
 - ☐ C. High DC voltage input
 - ☐ D. Zero signal input

Q.43 Two wires are made of the same material and have the same length. Wire A has a cross-sectional area of 2 mm^2 , and Wire B has a cross-sectional area of 5 mm^2 . Which wire has the greater resistance?

- Ans**
- ☒ A. Wire A, because smaller area gives higher resistance
 - ☐ B. Both have equal resistance because length is the same
 - ☐ C. Resistance cannot be compared without knowing voltage
 - ☐ D. Wire B, because larger area gives higher resistance

Q.44 What could happen if the desoldering pump is not used promptly after the solder melts during switch removal from a PCB?

- Ans**
- ☒ A. The solder may solidify before being removed
 - ☐ B. The switch will detach automatically
 - ☐ C. The PCB will break instantly
 - ☐ D. The desoldering pump may overheat

Q.45 When building a basic 6 by 4 LED matrix display, what is the total number of individual LEDs required to complete the grid?

- Ans**
- ☐ A. 10 LEDs
 - ☐ B. 2 LEDs
 - ☐ C. 64 LEDs
 - ☒ D. 24 LEDs

Q.46 In the output characteristics of a common-emitter configuration, a family of curves is obtained by varying V_{CE} while keeping which quantity fixed? (Symbols have their usual meaning.)

- Ans**
- ☐ A. I_C
 - ☐ B. V_{CE}
 - ☐ C. V_{CC}
 - ☒ D. I_B

Q.47 In an FM system, if the modulating signal frequency is doubled and the peak frequency deviation is kept constant, the modulation index will:

- Ans**
- ☐ A. Become zero
 - ☐ B. Double
 - ☐ C. Remain the same
 - ☒ D. Halve

Q.48 In quantization process for a Pulse code modulation system, a sampled version of a continuous analog signal are mapped to what type of values?

- Ans**
- ✓ A. A finite set of discrete Binary levels
 - ✗ B. An infinite set of discrete Binary levels
 - ✗ C. Random values
 - ✗ D. Analog values only

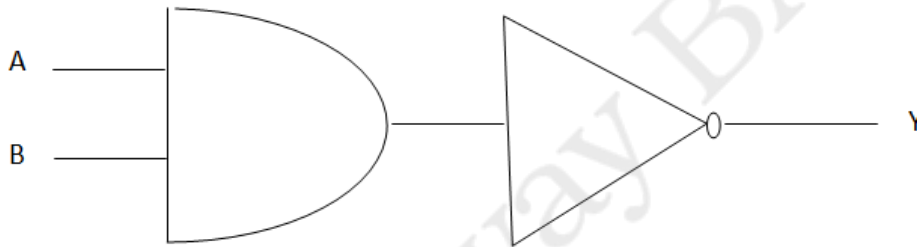
Q.49 When selecting a sensor for an industrial application that requires detecting very small temperature changes, which sensor characteristic should be prioritized to ensure the sensor can detect the smallest variation in temperature?

- Ans**
- ✗ A. Accuracy
 - ✗ B. Range
 - ✓ C. Resolution
 - ✗ D. Sensitivity

Q.50 If an intrinsic semiconductor has equal electrons and holes, and 20 electrons are added, what is the majority carrier?

- Ans**
- ✗ A. None present
 - ✗ B. Both electrons and holes are majority carriers
 - ✗ C. Holes only
 - ✓ D. Electrons only

Q.51 Consider the logic circuit shown in the given diagram. Which pair of the inputs A and B will produce output $Y = 0$?



- Ans**
- ✗ A. A=0, B=0
 - ✓ B. A=1, B=1
 - ✗ C. A=1, B=0
 - ✗ D. A=0, B=1

Q.52 A machinist is required to mark the axis of a drilled hole on an engineering drawing. Which line type according to BIS SP 46-2003 should be used for the axis?

- Ans**
- ✗ A. Thick zig-zag line
 - ✗ B. Continuous thick line
 - ✓ C. Chain thin line
 - ✗ D. Dashed thin line

Q.53 In an N-type semiconductor, what is the role of donor atoms?

- Ans**
- ✗ A. They absorb thermal energy
 - ✗ B. They create holes for conduction
 - ✗ C. They increase the energy gap
 - ✓ D. They provide extra electrons for conduction

Q.54 When analyzing a closed-loop circuit containing an **ideal operational amplifier**, what assumption must be applied regarding the currents entering the inverting and non-inverting input pins?

- Ans**
- ☒ A. No current flows into either input terminal
 - ☐ B. A small bias current flows into each terminal
 - ☐ C. Current flows only into the non-inverting terminal
 - ☐ D. Equal and opposite currents flow into both terminals

Q.55 In a moderately doped p-type semiconductor at $T = 300\text{ K}$, where is the Fermi level E_F located relative to the intrinsic Fermi level E_i ?

- Ans**
- ☐ A. Near conduction band and above the intrinsic Fermi Level
 - ☐ B. At the center of band gap
 - ☐ C. Outside band gap
 - ☒ D. Near valence band and below the intrinsic Fermi level

Q.56 Which scenario best demonstrates the use of IGBT in a real-world application?

- Ans**
- ☐ A. Amplifying small signals in a radio circuit
 - ☒ B. Controlling the speed of an industrial motor
 - ☐ C. Protecting a circuit from voltage surges
 - ☐ D. Providing voltage regulation in a small device

Q.57 The SI unit of magnetic flux density is:

- Ans**
- ☐ A. Ampere-turn
 - ☒ B. Tesla
 - ☐ C. Weber
 - ☐ D. Henry

Q.58 Which port is typically used to connect a monitor to the motherboard in computer system?

- Ans**
- ☒ A. VGA port
 - ☐ B. SATA port
 - ☐ C. Ethernet port
 - ☐ D. PATA port

Q.59 An apprentice needs to make a rectangular opening in a metal plate with accurate edges and sharp corners. Which combination of fitting tools is most suitable?

- Ans**
- ☒ A. Hacksaw and flat file for cutting and edge finishing
 - ☐ B. Round file and center punch for corner shaping work
 - ☐ C. Surface plate and scriber for cutting and finishing edges
 - ☐ D. Try square and flat file for layout and edge shaping

Q.60 As per BIS SP 46:2003 engineering drawing conventions, which arrowhead type is used for dimension lines?

- Ans**
- ☐ A. Dot arrowhead
 - ☐ B. Slashed arrowhead
 - ☒ C. Closed filled arrowhead
 - ☐ D. Open arrowhead

Q.61 A lamp circuit carries a charge of 24 coulombs in 8 seconds. What is the current in the circuit?

- Ans**
- ☒ A. 3 A
 - ☐ B. 1/3 A
 - ☐ C. 8 A
 - ☐ D. 2 A

Q.62 A magnetic path carries a flux density of 0.8 Tesla (T) through an area of 15 cm². What is the magnetic flux (in weber)?

- Ans**
- ☒ A. 0.0012 Wb
 - ☐ B. 1.2 Wb
 - ☐ C. 0.12 Wb
 - ☐ D. 0.012 Wb

Q.63 Which terminal is unique to an IGBT but not found in a BJT?

- Ans**
- ☐ A. Collector
 - ☐ B. Emitter
 - ☐ C. Base
 - ☒ D. Gate

Q.64 Which type of resistance is best measured using a Series type Ohm meter?

- Ans**
- ☐ A. Low resistance in less than 1 Ohm range
 - ☐ B. Capacitance value of a circuit
 - ☐ C. Very high resistance Greater than 100 Mega-ohm range
 - ☒ D. Medium resistance ranging from few ohms to kilo-ohms

Q.65 The surface-mount soldering defect where unequal surface tension causes a chip component to lift vertically off one pad is known as _____, which can be mitigated during manual rework by using _____.

- Ans**
- ☐ A. de-wetting; a higher-wattage chisel tip
 - ☐ B. cold joint; a lower melting-point solder paste
 - ☒ C. tombstoning; split-tip soldering iron
 - ☐ D. bridging; an unfluxed copper braid

Q.66 What happens to the gain of a non-inverting amplifier using OP-AMP if the feedback resistor value is increased by 5 % while keeping the input resistor constant? (Assuming the OP-AMP remains in linear range for operation.)

- Ans**
- ☐ A. The gain remains constant
 - ☐ B. The gain changes unpredictably
 - ☐ C. The gain decreases
 - ☒ D. The gain increases

Q.67 Why is rubber suitable for making seals and gaskets?

- Ans**
- ☐ A. It readily absorbs water
 - ☐ B. It reacts with most chemicals
 - ☒ C. It can form tight, flexible closures
 - ☐ D. It easily conducts electricity

Q.68 During hardware interfacing using the 8051 microcontroller, why are I/O ports essential?

- Ans**
- ☐ A. To perform calculations
 - ☐ B. To store information for processing
 - ☐ C. To increase the clock frequency of the microcontroller
 - ☒ D. To interface with external devices

Q.69 During lab practice, if you connect the input of a NOT gate to a logic low (0), what practical output should you observe?

- Ans**
- ☐ A. Logic low (0)
 - ☐ B. No change
 - ☐ C. Undefined
 - ☒ D. Logic high (1)

Q.70 Two oscillators use the same inductor (L) and the same capacitor (C) values. One is Colpitts with $C_1 = C_2$ and the other is Hartley with $L_1 = L_2$ with negligible mutual inductance (M). Which of the following is true about their resonant frequencies?

- Ans**
- ☐ A. Both have the same frequency
 - ☐ B. Hartley frequency is higher
 - ☐ C. Frequency depends on transistor beta
 - ☒ D. Colpitts frequency is higher

Q.71 In premium solid-state architectures requiring high color rendering indices, what unique structural method is used to construct a standard commercial white LED light bulb?

- Ans**
- ☐ A. Wiring three separate red, green, and blue monochromatic diodes in an absolute series loop fed by an unrectified AC power supply
 - ☐ B. Packing an isolated high-pressure low-temperature mercury vapor gas cell directly inside a silicon diode block
 - ☒ C. Depositing a yellow cerium-doped yttrium aluminum garnet phosphor coating directly over a blue indium gallium nitride semiconductor die
 - ☐ D. Forcing a direct current stream backward through an ultra-thin tungsten filament mounted between a pair of direct bandgap substrates

Q.72 On which principle does a Resistance Temperature Detector (RTD) work?

- Ans**
- ☒ A. Resistance increases with increase in temperature
 - ☐ B. Resistance remains constant with temperature
 - ☐ C. Resistance decreases with increase in temperature
 - ☐ D. Voltage decreases with increase in temperature

Q.73 The common-emitter (CE) configuration of a transistor is most widely used as a/an:

- Ans**
- ☐ A. Impedance matcher
 - ☐ B. Passive Filter
 - ☐ C. Rectifier
 - ☒ D. Voltage Amplifier

Q.74 Which single logic gate can be used to implement the Boolean equation $Y = A + B$ in a digital circuit?

- Ans**
- ☒ A. OR gate
 - ☐ B. AND gate
 - ☐ C. NAND gate
 - ☐ D. NOT gate

Q.75 Why is an online UPS preferred for critical computer equipment over other types of UPS?

- Ans**
- ☐ A. It is less expensive than all other UPS types
 - ☐ B. It is physically smaller than offline UPS systems
 - ☐ C. It uses fewer electronic components
 - ☒ D. It eliminates transfer time, preventing even brief power interruptions

Railway BABA



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	2:30 PM - 5:00 PM
Subject	ALP Stage 2 Fitter

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 Why is a room thermometer generally mounted vertically on a wall?

- Ans ☒ A. It ensures accurate reading by keeping the bulb exposed to room air.
- ☒ B. It prevents the liquid from freezing inside the thermometer.
- ☒ C. It helps the thermometer measure body temperature faster.
- ☒ D. It protects the thermometer from breaking easily.

Q.2 Why does biomedical waste require special handling compared to general municipal waste?

- Ans ☒ A. It has higher chemical content and is always toxic.
- ☒ B. It is more likely to be recycled than other types of waste.
- ☒ C. It is always radioactive and requires heavy shielding.
- ☒ D. It may contain infectious agents that pose health risks.

Q.3 Pipes A and B can fill an entire tank in 8 hours and 12 hours, respectively. The water tank is one-fourth full. If both the pipes are opened together, then how long will it take to fill the remaining part of the tank?

- Ans ☒ A. 3 hours 26 minutes
- ☒ B. 3 hours 36 minutes
- ☒ C. 3 hours 6 minutes
- ☒ D. 3 hours 16 minutes

Q.4 A pump can fill a tank in 3 hours. Due to a leak in the tank, it takes 4.5 hours to fill the tank. In how much time can the leak empty the full tank if no other entry or exit routes are open?

- Ans ☒ A. 6 hours
- ☒ B. 8 hours
- ☒ C. 9 hours
- ☒ D. 7 hours

Q.5 In a certain code language, 'SOIL' is coded as '1547' and 'COIL' is coded as '7124'. What is the code for 'C' in the given code language?

- Ans ☒ A. 1
- ☒ B. 4
- ☒ C. 2
- ☒ D. 7

Q.6 If the mean of the following data is 45, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	23	30	31	45	X

- Ans
- ☐ A. 162
 - ☐ B. 188
 - ☐ C. 180
 - ☒ D. 160

Q.7 Why does restricting certain chemical refrigerants effectively reduce damage to the ozone layer?

- Ans
- ☒ A. Refrigerants release substances that catalyze ozone breakdown.
 - ☐ B. Refrigerants contain particles that absorb harmful UV light.
 - ☐ C. Refrigerants increase oxygen production, supporting ozone recovery.
 - ☐ D. Refrigerants emit greenhouse gases that warm the stratosphere.

Q.8 Refer to the following letter series and answer the question that follows. (Counting to be done from left to right only.)

(Left) Q K Q N X K G G V M L A W T W K N G V (Right)

How many such consonants are there each of which is immediately preceded by a vowel and also immediately followed by a consonant?

- Ans
- ☒ A. One
 - ☐ B. Three
 - ☐ C. None
 - ☐ D. Two

Q.9 Which symbol best represents a battery in an electric circuit diagram according to standard conventions?

- Ans
- ☒ A. A pair of long and short parallel lines placed alternately
 - ☐ B. Two circles connected in series
 - ☐ C. A single long line only
 - ☐ D. Two short lines placed together

Q.10 Which statement best describes the front view in an engineering drawing?

- Ans
- ☒ A. It shows the object's height and width as seen from the front
 - ☐ B. It shows the object's depth and height as seen from the side
 - ☐ C. It shows only one dimension of the object
 - ☐ D. It shows only the object's bottom or right side

Q.11 A car travels from point A to point B in a zigzag path, covering a total distance of 200 meters. If the shortest straight-line distance between A and B is 120 meters, which statement best describes the car's distance and displacement?

- Ans
- ☐ A. The distance is 120 meters; the displacement is 120 meters
 - ☒ B. The distance is 200 meters; the displacement is 120 meters
 - ☐ C. The distance is 120 meters; the displacement is 200 meters
 - ☐ D. The distance is 200 meters; the displacement is 200 meters

Q.12 If $3x - 2y + 3z = 8$, $4x - 3y + 2z = 4$ and $2x + y - z = 1$, then find x, y and z, respectively.

- Ans
- ☐ A. 2, 1 and 3
 - ☐ B. 2, 3 and 1
 - ☐ C. 3, 1 and 2
 - ☒ D. 1, 2 and 3

Q.13 Five students, N, O, R, S and T, have different heights. T is taller than N. R is taller than S but shorter than O. S is taller than N. More than two people are taller than T. How many people are shorter than R?

- Ans**
- ☐ A. Two
 - ☐ B. None
 - ☒ C. Three
 - ☐ D. One

Q.14 When drawing repeated 67° angles on an engineering sheet, which practice best helps minimize cumulative alignment errors?

- Ans**
- ☐ A. Relying solely on the initial protractor alignment for all angles
 - ☐ B. Drawing all angles continuously without intermediate verification
 - ☒ C. Using the same reference line for all repeated angles
 - ☐ D. Marking all angles lightly with a pencil before finalizing

Q.15 Which type of personal protective equipment is most suitable for tasks involving airborne chemical particles in confined spaces?

- Ans**
- ☐ A. Head protection with industrial-grade hard hats
 - ☒ B. Respiratory protection devices such as half-face masks
 - ☐ C. Hand protection using chemical-resistant gloves
 - ☐ D. Body protection with flame-retardant suits

Q.16 Which color is universally associated with emergency exit signs in industrial workplaces under international standards?

- Ans**
- ☒ A. Green background with white text or symbols
 - ☐ B. Blue background with white text or symbols
 - ☐ C. Red background with white text or symbols
 - ☐ D. Yellow background with black text or symbols

Q.17 An engineering firm is tasked with creating a set of technical drawings for a large-scale project. The client specifies that all components must fit on a single sheet without reducing the drawing scale, and the total drawing area required is approximately 1 square meter. Based on standard drawing sheet sizes, which sheet should the firm select to best meet these requirements?

- Ans**
- ☐ A. A1 size sheet
 - ☒ B. A0 size sheet
 - ☐ C. A3 size sheet
 - ☐ D. A2 size sheet

Q.18 The price of sugar is increased by 20%. Manoj can increase his expenditure on sugar by only 15% from his income. In order to balance his expenditure, by what percentage should he reduce the quantity of sugar consumed?

- Ans**
- ☐ A. 5%
 - ☐ B. $5\frac{1}{3}\%$
 - ☐ C. 6.5%
 - ☒ D. $4\frac{1}{6}\%$

Q.19 A hiker lifts a backpack from the ground to a ledge 2 meters above the ground. Which situation would result in the greatest increase in the backpack's gravitational potential energy?

- Ans**
- ☐ A. Lifting a lighter backpack to the same 2-meter ledge
 - ☐ B. Carrying the same backpack horizontally for 2 meters
 - ☐ C. Lifting the same backpack to a 1-meter ledge
 - ☒ D. Lifting a heavier backpack to the same 2-meter ledge

Q.20 The salary of a person is increased by 10%, 20% and 25% successively in three consecutive years. Find the overall percentage increase in the salary at the end of the third year.

- Ans**
- ☒ A. 65%
 - ☐ B. 30%
 - ☐ C. 50%
 - ☐ D. 60%

Q.21 What should come in place of the question mark (?) in the given series?

1 2 7 20 61 ?

- Ans**
- ☒ A. 182
 - ☐ B. 181
 - ☐ C. 185
 - ☐ D. 183

Q.22 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

Some rugs are fans.

No fan is a car.

Conclusion (I) : Some rugs are cars.

Conclusion (II) : Some fans are rugs.

- Ans**
- ☐ A. Both conclusions (I) and (II) follow
 - ☐ B. Neither conclusion (I) nor (II) follows
 - ☒ C. Only conclusion (II) follows
 - ☐ D. Only conclusion (I) follows

Q.23 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Satish related to Mayank if 'Satish + Deep × Piyush - Hitesh % Mayank'?

- Ans**
- ☐ A. Mother's brother's wife's sister
 - ☐ B. Mother's brother's wife's mother
 - ☒ C. Father's brother's wife's mother
 - ☐ D. Father's brother's wife's sister

Q.24 A, B, C, D and E have different heights. E is taller than C but shorter than A. Only one person is taller than A. D is shorter than C. Who amongst them is the third tallest?

- Ans**
- ☒ A. E
 - ☐ B. B
 - ☐ C. C
 - ☐ D. A

Q.25 What information does a kilometer stone provide to travelers on a road?

- Ans**
- ☒ A. Distance from a reference point
 - ☐ B. Speed of the vehicle
 - ☐ C. Time taken to reach destination
 - ☐ D. Direction of travel

Q.26 Which of the following correctly states the full form of CD and the technology used to store data on it?

- Ans**
- ☐ A. Compact Disc, Magnetic Storage
 - ☐ B. Compact Drive, Optical Storage
 - ☐ C. Compact Drive, Magnetic Storage
 - ☒ D. Compact Disc, Optical Storage

Q.27 A cyclist travels 120 km in 3 hours, rests for 1 hour, and then travels another 80 km in 2 hours. To determine the cyclist's average speed for the entire journey, which of the following quantities should be used?

- Ans**
- ☐ A. Change in velocity divided by total time taken
 - ☐ B. Distance travelled in a particular direction divided by time
 - ☒ C. Total distance travelled divided by the total time taken
 - ☐ D. Total displacement divided by total time taken

Q.28 A sum of money invested at simple interest amounts to ₹21,500 in 5 years and ₹26,000 in 8 years. Find the principal amount (in ₹).

- Ans**
- ☐ A. 7,500
 - ☐ B. 15,500
 - ☒ C. 14,000
 - ☐ D. 12,000

Q.29 A crane lifts a 200 kg load to a height of 15 meters in 10 seconds. Assuming acceleration due to gravity is 10 m/s^2 and energy loss is negligible, what is the power output of the crane during this operation?

- Ans**
- ☐ A. 1000 W
 - ☐ B. 2000 W
 - ☐ C. 1500 W
 - ☒ D. 3000 W

Q.30 Which statement best describes how the mass and speed of an object affect its kinetic energy?

- Ans**
- ☐ A. An object with greater mass but lower speed will have more kinetic energy.
 - ☐ B. An object with same mass but higher speed will have less kinetic energy.
 - ☒ C. An object with greater mass and higher speed will have more kinetic energy.
 - ☐ D. An object with less mass and lower speed will have more kinetic energy.

Q.31 Refer to the given letter series and answer the question that follows.

(Left) A X T N K R Q K C P S I D F J U D O R G Z M B E L (Right)

How many letters are there in the English alphabetical series between the letter that is fourth from the right end and the letter that is third from the left end of the series?

- Ans**
- ☐ A. 3
 - ☐ B. 5
 - ☐ C. 4
 - ☒ D. 6

Q.32 Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

6 – 16 – 23 – 32; 7 – 19 – 26 – 35

- Ans
- ☐ A. 11 – 31 – 38 – 29
 - ☐ B. 8 – 22 – 15 – 24
 - ☐ C. 4 – 14 – 21 – 30
 - ☒ D. 12 – 34 – 41 – 50

Q.33 A cyclist travels from the kilometer stone marked 52 to the stone marked 79. How far has the cyclist traveled?

- Ans
- ☐ A. 31 kilometers
 - ☐ B. 52 kilometers
 - ☒ C. 27 kilometers
 - ☐ D. 131 kilometers

Q.34 Which tool safety measure best prevents injuries when cleaning a workshop lathe after use?

- Ans
- ☐ A. Wiping metal chips using bare hands directly
 - ☐ B. Blowing chips away with compressed air around the lathe
 - ☒ C. Using a brush to remove metal chips from the lathe
 - ☐ D. Using a rag to remove metal dust from the lathe

Q.35 A ramp is used to lift a box to a platform 2 m high. To reduce the effort required, the ramp length is increased from 4 m to 8 m. Assuming negligible friction, what remains unchanged?

- Ans
- ☐ A. The distance moved along the ramp
 - ☐ B. The force required
 - ☒ C. The work done in raising the box
 - ☐ D. The mechanical advantage

Q.36 If a rectangular field is measured to be 120 meters long and 75 meters wide, what is its area in SI units?

- Ans
- ☒ A. 9000 square meters
 - ☐ B. 15000 square meters
 - ☐ C. 1800 square meters
 - ☐ D. 19500 square meters

Q.37 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Among 5 sticks, B, U, N, M and D, each having a different height, which stick is the shortest?

(I) D is shorter than U. M is shorter than B.

(II) M is taller than D.

- Ans
- ☐ A. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ B. Both statements I and II together are NOT sufficient to answer the question
 - ☐ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ D. Data in statement I alone is sufficient to answer the question while data in statement II is not

Q.38 A group of numbers/symbols is coded using letter codes as per the codes given below and the conditions that follow. The correct combination of codes following the conditions is your answer.

Note: If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	3	@	8	4	\$	&	2	%	#	1	+	9	7	5
Code	U	G	B	K	M	F	X	R	E	Q	S	C	V	T

Conditions –

- (i) If the first element is a symbol and the last element an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and the last elements are to be coded as ©
- (iii) If both second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?
& 8 \$ 9 5

- Ans**
- ☒ A. TCMBF
 - ☒ B. FCBMT
 - ☒ C. FBMCT
 - ☒ D. TBMCF

Q.39 A dealer buys a table for ₹2,750. He first marks it up by 28%, then allows a 12% discount to a customer. If the customer also pays 5% GST on the selling price, find the profit percentage (excluding GST) made by the dealer.

- Ans**
- ☒ A. 10.36%
 - ☒ B. 12.64%
 - ☒ C. 15.12%
 - ☒ D. 13.81%

Q.40 Simplify the following expression.

$$11 \text{ of } 7 + 125 \div 5 + 99 \div 11 \times 7 - 17 \text{ of } 7 + 7 \times 6 - (91 \div 7 + 7 \times 5)$$

- Ans**
- ☒ A. 44
 - ☒ B. 48
 - ☒ C. 36
 - ☒ D. 40

Q.41 An article is bought for ₹300 and its price is increased by 5.5%. The resulting price is then reduced by 8%. Find the final selling price.

- Ans**
- ☒ A. ₹284.45
 - ☒ B. ₹288.24
 - ☒ C. ₹291.18
 - ☒ D. ₹296.46

Q.42 What is the primary role of the Central Processing Unit (CPU) in a computer system?

- Ans**
- ☒ A. To store long-term data
 - ☒ B. To display output on the screen
 - ☒ C. To manage network connections
 - ☒ D. To execute program instructions

Q.43 A laboratory thermometer has a range from -10 degrees Celsius to 110 degrees Celsius and 120 equal divisions. What is the smallest value that this thermometer can read?

- Ans**
- ☒ A. 10 degrees Celsius
 - ☒ B. 0.5 degrees Celsius
 - ☒ C. 1 degree Celsius
 - ☒ D. 2 degrees Celsius

Q.44 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans
- ☐ A. PJ-QK
 - ☐ B. HB-IC
 - ☐ C. FZ-GA
 - ☒ D. RL-SN

Q.45 Sohan covers a total distance of 760 km to reach his home, traveling partly by train and partly by car. He takes 8 hours when he travels 160 km by train and the rest by car. If he travels 240 km by train and the remaining distance by car, his journey takes 12 minutes longer. Find the difference between the speeds of the train and the car.

- Ans
- ☐ A. 27 km/h
 - ☐ B. 23 km/h
 - ☒ C. 20 km/h
 - ☐ D. 21 km/h

Q.46 Two trains are moving in opposite directions. The first train is 120 m long and runs at 54 km/h. The second train is 180 m long and runs at 72 km/h. How much time will they take to cross each other completely?
(Rounded up to two decimal places)

- Ans
- ☐ A. 9.25 seconds
 - ☐ B. 7.57 seconds
 - ☒ C. 8.57 seconds
 - ☐ D. 8.43 seconds

Q.47 12 is related to 1730 following a certain logic. Following the same logic, 13 is related to 2199. To which of the given options is 11 related, following the same logic?
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans
- ☐ A. 1443
 - ☐ B. 1543
 - ☒ C. 1333
 - ☐ D. 1433

Q.48 Find the compound interest on ₹5,70,000 for 1.5 years at 10% per annum compounded half-yearly.

- Ans
- ☐ A. ₹88,846.25
 - ☐ B. ₹89,946.25
 - ☒ C. ₹89,846.25
 - ☐ D. ₹92,846.25

Q.49 Which factor increases the amount of heat produced in a wire when an electric current flows through it for a fixed time?

- Ans
- ☒ A. Increasing the resistance of the wire
 - ☐ B. Reducing the current in the wire
 - ☐ C. Decreasing the length of the wire
 - ☐ D. Making the wire thicker

Q.50 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☒ A. IT – KV
 - ☐ B. SJ – TK
 - ☐ C. DG – EH
 - ☐ D. KE – LF

Q.51 An astronaut weighs 600 N on Earth. During a moon mission, she performs an experiment to measure her weight on the moon. Which value is closest to her expected weight on the moon, and why?

- Ans**
- ☐ A. 600 N, because a person's weight remains unchanged on the Moon.
 - ☐ B. 300 N, because the Moon's gravity is about one-half of Earth's.
 - ☒ C. 100 N, because the Moon's gravity is about one-sixth of Earth's.
 - ☐ D. 200 N, because the Moon's gravity is about one-third of Earth's.

Q.52 Seven boxes S, T, U, V, W, X, and Y are kept one over the other but not necessarily in the same order. U is kept exactly third from the top. Only one box is kept between U and T. W is kept immediately above T. Only three boxes are kept between X and S. V is kept on one of the positions below Y. Only two boxes are kept between U and S. Which box is kept second from the top?

- Ans**
- ☐ A. V
 - ☐ B. T
 - ☐ C. U
 - ☒ D. X

Q.53 A cyclist rides 60 meters north, then 80 meters south, and finally 70 meters north. What is the total distance the cyclist has traveled?

- Ans**
- ☒ A. 210 meters
 - ☐ B. 60 meters
 - ☐ C. 150 meters
 - ☐ D. 10 meters

Q.54 A 42-litre solution has sugar and water in the ratio 2 : 5. If, due to evaporation, the volume is reduced by 35%, and only water evaporates, what is the new ratio of sugar to water?

- Ans**
- ☐ A. 51 : 42
 - ☒ B. 40 : 51
 - ☐ C. 31 : 50
 - ☐ D. 40 : 41

Q.55 G is the mother of Y. Y is the sister of V. S is the father of L. L is the son of V. How is G related to L?

- Ans**
- ☐ A. Mother
 - ☒ B. Mother's mother
 - ☐ C. Mother's sister
 - ☐ D. Sister

Q.56 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

MDB PHE SLH VPK ?

- Ans**
- ☐ A. ZUO
 - ☐ B. ZTM
 - ☒ C. YTN
 - ☐ D. XSM

Q.57 An engineer is updating a schematic for a control panel and needs to indicate a normally closed push button. Which approach best ensures the symbol is universally understood among engineers referring to standard engineering drawings?

- Ans**
- ☒ A. Use the standardized symbol for a normally closed push button as per conventions
 - ☐ B. Draw a hand made representation of the push button with a note explaining function
 - ☐ C. Describe the normally closed push button in words within the schematic diagram clearly
 - ☐ D. Substitute the normally closed push button symbol with a general switch symbol

Q.58 Which intervention most effectively reduces ground-level pollutant concentrations during a winter temperature inversion?

- Ans**
- ☐ A. Elevating emission sources above inversion layers
 - ☐ B. Increasing surface temperatures near emission sources
 - ☐ C. Reducing local wind speed to minimize horizontal dispersion
 - ☒ D. Enhancing vertical air mixing through artificial turbulence

Q.59 Refer to the given letter series and answer the question that follows. Counting to be done from left to right only.

(Left) H S A N D D I A D F P A J O S K I O Z O T X (Right)

How many such consonants are there, each of which is immediately preceded by a consonant and also immediately followed by a vowel?

- Ans**
- ☒ A. Four
 - ☐ B. Three
 - ☐ C. Five
 - ☐ D. Six

Q.60 What is the primary color used in warning signs to alert workers of potential hazards?

- Ans**
- ☐ A. Blue with white symbol or text
 - ☐ B. Red with white symbol or text
 - ☒ C. Yellow with black symbol or text
 - ☐ D. Green with white symbol or text

Q.61 Which combination best describes the main environmental challenges associated with plastic waste management?

- Ans**
- ☐ A. Thermal pollution and effective composting
 - ☐ B. Neutralization and easy recycling
 - ☒ C. Persistence in the environment and microplastic formation
 - ☐ D. Rapid biodegradation and chemical leaching

Q.62 The first shopkeeper allows two successive discounts of 3% and 7%, while a second shopkeeper allows two successive discounts of 2% and 8%. A third shopkeeper allows 10% discount on the same item. From which shopkeeper should a customer buy if the marked price is the same at the three shops?

- Ans**
- ☐ A. Buy from the first or the second shopkeeper as both are the same.
 - ☐ B. Buy from the first shopkeeper
 - ☒ C. Buy from the third shopkeeper
 - ☐ D. Buy from the second shopkeeper

Q.63 Which scenario best demonstrates proactive workplace safety behavior?

- Ans**
- ☐ A. Discussing only past safety problems in meetings
 - ☐ B. Waiting for a supervisor to notice hazards
 - ☒ C. Identifying and correcting hazards before accidents occur
 - ☐ D. Reporting hazards after incidents happen

Q.64 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table.
Only two people sit between Y and C when counted from the left of C. D sits third to the left of B. A sits to the immediate right of B. A sits second to the left of Y. Z is not an immediate neighbor of D.
Who sits third to the right of X?

- Ans**
- ☒ A. A
 - ☐ B. D
 - ☐ C. Y
 - ☐ D. C

Q.65 What does the term 'HAZOP' stand for in occupational safety?

- Ans**
- ☐ A. Handling and Organizing Safety
 - ☐ B. Hazardous Operations Safety
 - ☐ C. Hazardous Operation Standard
 - ☒ D. Hazard and Operability Study

Q.66 Let C be a circle, and AB and DE be two chords on C such that AB = BE. In the quadrilateral ABED, let AE and BD intersect at F, $\angle DBE = 55^\circ$ and $\angle BAE = 40^\circ$. Find $\angle FED$.

- Ans**
- ☐ A. 110°
 - ☐ B. 60°
 - ☐ C. 55°
 - ☒ D. 45°

Q.67 Which of the following statements best describes a triangle as used in engineering drawing?

- Ans**
- ☐ A. A triangle is a polygon having three curved sides.
 - ☒ B. A triangle is a polygon with three straight sides and three angles.
 - ☐ C. A triangle is a polygon with four straight sides and four angles.
 - ☐ D. A triangle must always have all sides of equal length.

Q.68 What will come in place of the question mark (?) in the following equation if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $42 \times 6 \div 7 - 35 + 19 = ?$

- Ans**
- ☒ A. 65
 - ☐ B. 63
 - ☐ C. 69
 - ☐ D. 67

- Q.69** Which one of the following statements correctly describes a characteristic of WANs?
- Ans** ☒ A. WANs are always public networks managed solely by Internet Service Providers (ISPs).
☒ B. WANs typically use only wireless media to connect distant LANs.
☒ C. WANs can be built by connecting multiple LANs via wired or wireless links.
☒ D. WANs are limited to connecting devices within a radius of 1 to 2 km.

- Q.70** A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and select the most appropriate answer.

Question:

Among five trees N, O, R, S, and T, each having a different height, which tree is the tallest?

Statements:

(I) T is taller than R. N is taller than T.

(II) R is shorter than O but taller than S.

- Ans** ☒ A. Both statements I and II together are NOT sufficient to answer the question
☒ B. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
☒ C. Data in Statement II alone is sufficient to answer the question while data in statement I is not
☒ D. Data in Statement I alone is sufficient to answer the question while data in statement II is not

- Q.71** Why are electric wires in household appliances usually covered with plastic or rubber coating?

- Ans** ☒ A. To make the wires heavier
☒ B. To prevent electric shocks by insulation
☒ C. To increase the flow of current
☒ D. To produce more heat

- Q.72** Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

ZOT - TLP

NIL - HFH

- Ans** ☒ A. ABD - VZZ
☒ B. BOC - VZT
☒ C. VZZ - BCD
☒ D. BCD - VZZ

- Q.73** What is a key feature of single stroke lettering in technical drawings?

- Ans** ☒ A. Each character is outlined and then filled.
☒ B. Each character is made with one continuous stroke.
☒ C. Each character is made with several parallel lines.
☒ D. Each character is shaded after drawing.

- Q.74** A boy uses a wheelbarrow to carry sand. The wheel acts as the pivot, the sand is placed in the tray, and the boy lifts the handles. In this arrangement, the sand represents

- Ans** ☒ A. Arm
☒ B. Load
☒ C. Fulcrum
☒ D. Effort

Q.75 P, Q and R are three batsmen. The ratios of runs scored by them in a certain match were as follows:

P : Q = 5 : 7 and Q : R = 2 : 3.

If they scored a total of 765 runs, then find the number of runs scored by R.

- Ans**
- ☐ A. 350
 - ☐ B. 378
 - ☒ C. 357
 - ☐ D. 336

Q.76 A technician needs to select a fuse wire for a room heater. Which property should be considered most important for safety based on the heating effect of electric current?

- Ans**
- ☐ A. The fuse wire must have a high melting point for durability.
 - ☐ B. The fuse wire must have high resistance and be thick to prevent melting.
 - ☐ C. The fuse wire must have a shiny surface for efficient cooling.
 - ☒ D. The fuse wire must have a low melting point to break the circuit during excess current.

Q.77 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. There are exactly two boxes between T and P. Only Q is kept above U. No box is kept below P. S is kept somewhere below W but above V. Based on the given information, which box is kept third above V?

- Ans**
- ☐ A. T
 - ☐ B. P
 - ☒ C. W
 - ☐ D. S

Q.78 What does CPU stand for in computing?

- Ans**
- ☒ A. Central Processing Unit
 - ☐ B. Computer Processing Unit
 - ☐ C. Core Processing Unit
 - ☐ D. Control Processing Unit

Q.79 Srinu starts from his home and drives 2 km towards the south, then takes a right turn and drives 5 km. He then takes a right turn and drives 6 km before taking a right turn again and driving 4 km further. Srinu finally takes a right turn and drives 4 km before stopping at his office. In which direction should Srinu drive to reach his home again? (All turns are 90-degree turns only unless specified.)

- Ans**
- ☐ A. North
 - ☐ B. South
 - ☒ C. East
 - ☐ D. West

Q.80 When a cutting plane line passes through a hole and a rib, which feature should be sectioned in the resulting view according to standard conventions?

- Ans**
- ☒ A. The hole is sectioned but the rib is shown unsectioned
 - ☐ B. Both the hole and the rib are shown sectioned
 - ☐ C. Both the hole and the rib are shown unsectioned
 - ☐ D. The rib is sectioned but the hole is left unsectioned

Q.81 If 2 is subtracted from each odd digit and 2 is added to each even digit in the number 235234796423, what will be the sum of the digits that are third from the left and third from the right?

- Ans**
- ☒ A. 9
 - ☐ B. 6
 - ☐ C. 8
 - ☐ D. 7

Q.82 Which of the following is the best example of municipal solid waste?

- Ans**
- ☐ A. Mining tailings
 - ☐ B. Industrial process waste
 - ☒ C. Household kitchen garbage
 - ☐ D. Hospital biomedical waste

Q.83 A solid right circular cone is 7 cm high, and the radius of its base is 22.2 cm. It is melted and recast into a right circular cone with radius of its base 3.7 cm. Then the height (in cm) of the cone is _____.

- Ans**
- ☐ A. 159
 - ☒ B. 252
 - ☐ C. 267
 - ☐ D. 185

Q.84 What should come in place of '?' in the given series?
11, 22, 44, 88, 176, ?

- Ans**
- ☐ A. 358
 - ☐ B. 342
 - ☒ C. 352
 - ☐ D. 356

Q.85 The cost of a diamond varies directly with the square of its weight. A diamond broke into four pieces with weights in the ratio 2:4:1:3. If it had been broken into four equal pieces, the loss would have been ₹60,000. What was the original cost of the diamond?

- Ans**
- ☐ A. ₹75,000
 - ☐ B. ₹78,000
 - ☐ C. ₹82,000
 - ☒ D. ₹80,000

Q.86 The average of five numbers is 30. If four of the numbers are 25, 35, 28 and 32, then what is the fifth number?

- Ans**
- ☒ A. 30
 - ☐ B. 35
 - ☐ C. 32
 - ☐ D. 28

Q.87 A plane parallel to the base divides a cone of height 40 cm into two parts. If the volume of the upper smaller cone formed is $\frac{1}{64}$ of the volume of the original cone, calculate the height of the plane from the base of the cone.

- Ans**
- ☒ A. 30 cm
 - ☐ B. 40 cm
 - ☐ C. 20 cm
 - ☐ D. 10 cm

Q.88 Which of the following statements best describes a cuboid as used in engineering drawing?

- Ans**
- ☒ A. A cuboid is a solid with six rectangular faces, and opposite faces are equal.
 - ☐ B. A cuboid has all sides and angles equal, making it similar to a cube.
 - ☐ C. A cuboid is a solid where all faces are parallelograms but not necessarily rectangles.
 - ☐ D. A cuboid has all faces as squares of equal size.

Q.89 What is the primary purpose of a Local Area Network (LAN)?

- Ans**
- ☒ A. To connect computers within a small geographical area
 - ☐ B. To link wireless devices only
 - ☐ C. To connect global networks
 - ☐ D. To connect social media accounts

Q.90 If the height of an object is doubled while its mass remains constant, its gravitational potential energy will be:

- Ans**
- ☐ A. halved
 - ☐ B. decreased to one-fourth
 - ☒ C. doubled
 - ☐ D. unchanged

Q.91 A ladder is leaning against a wall and makes an angle of 60° with the ground. If the length of the ladder is 24 m, find the distance of the foot of the ladder from the wall.

- Ans**
- ☐ A. 18 m
 - ☒ B. 12 m
 - ☐ C. 9 m
 - ☐ D. 15 m

Q.92 Which of the following pairs of numbers is co-prime?

- Ans**
- ☒ A. (17, 54)
 - ☐ B. (21, 33)
 - ☐ C. (14, 28)
 - ☐ D. (28, 49)

Q.93 SANZ is related to YUTT in a certain way based on the English alphabetical order. In the same way, MTHM is related to SNNG. To which of the following is LJRE related to following the same logic?

- Ans**
- ☐ A. QDYY
 - ☒ B. RDXV
 - ☐ C. QEYZ
 - ☐ D. REXZ

Q.94 The mean of 11 numbers is 10.9. If the mean of the first 6 numbers is 10.5 and the mean of the last 6 numbers is 11.4, then find the 6th number.

- Ans**
- ☒ A. 11.5
 - ☐ B. 11
 - ☐ C. 10.5
 - ☐ D. 10

Q.95 What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $5 \div 3 + 15 \times 5 - 3 = ?$

- Ans**
- ☐ A. 18
 - ☐ B. 12
 - ☐ C. 9
 - ☒ D. 15

Q.96 Which statement best describes the side view in engineering drawing?

- Ans**
- ☒ A. It shows the object as seen from left or right side
 - ☐ B. It shows the object as seen from above or below
 - ☐ C. It shows the object as seen clearly from the front
 - ☐ D. It shows a combination of all views of the object

Q.97 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All chocolates are paneers.
No paneer is a milk.

Conclusions:

- (I) No chocolate is a milk.
(II) Some milks are paneers.

- Ans**
- ☒ A. Only conclusion (I) follows.
 - ☐ B. Both conclusions (I) and (II) follow.
 - ☐ C. Neither conclusion (I) nor (II) follows.
 - ☐ D. Only conclusion (II) follows.

Q.98 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GXM 5, JVN 11, MTO 24, PRP 51, ?

- Ans**
- ☒ A. SPQ 106
 - ☐ B. TPQ 106
 - ☐ C. TPQ 107
 - ☐ D. SPQ 107

Q.99 If $x + \frac{1}{x} = 5$, then $\frac{x^3 - 5x^2 + 5x}{x^2 + 1}$ is equal to:

- Ans**
- ☐ A. $\frac{3}{5}$
 - ☒ B. $\frac{4}{5}$
 - ☐ C. $\frac{2}{5}$
 - ☐ D. $\frac{1}{5}$

Q.100 Which of the following best describes the function of a speedometer in a vehicle?

- Ans**
- ☐ A. It calculates the average speed over a journey.
 - ☐ B. It measures the total distance the vehicle has traveled.
 - ☒ C. It displays the current speed at which the vehicle is moving.
 - ☐ D. It shows the rate at which the vehicle's speed changes.

Q.1 Which characteristic best describes a Barrette file used in fitting work?

- Ans**
- ☐ A. It has round surfaces with teeth on all sides for enlarging holes
 - ☐ B. It has curved edges with double cut teeth for rapid metal removal
 - ☐ C. It has square faces with rough teeth for cutting keyways
 - ☒ D. It has a flat triangular face with teeth only on the wide surface

Q.2 A workshop needs to transfer power across two parallel shafts using an open belt drive. If the center distance between the pulleys is increased while keeping pulley sizes unchanged, what is the most likely result regarding the required belt length?

- Ans**
- ☒ A. The required belt length increases to maintain proper tension
 - ☐ B. The required belt thickness increases to maintain proper grip
 - ☐ C. The required belt length remains unchanged for correct operation
 - ☐ D. The required belt length decreases to maintain proper tension

Q.3 Which of the following statements correctly describes the use of Allen keys in fitting accessories?

- Ans**
- ☐ A. Allen keys are used to tighten nuts with square holes.
 - ☐ B. Allen keys are used to adjust screws with slotted heads.
 - ☒ C. Allen keys are used for tightening or loosening hex socket screws.
 - ☐ D. Allen keys are used to turn screws with round heads only.

Q.4 What is the main reason silver is used in high-quality electrical contacts?

- Ans**
- ☐ A. Superior corrosion resistance
 - ☐ B. High thermal conductivity
 - ☐ C. Mechanical strength
 - ☒ D. Excellent electrical conductivity

Q.5 In a gang drilling machine, how are the spindles typically arranged?

- Ans**
- ☒ A. In a straight line on a common table
 - ☐ B. In a circular pattern around the table
 - ☐ C. Vertically stacked above each other
 - ☐ D. Randomly positioned on the base

Q.6 A heavy-duty belt drive requires reliable torque transmission without relative motion between the pulley and shaft. Which additional element is recommended for a split pulley?

- Ans**
- ☐ A. Crowning
 - ☐ B. Bush bearing
 - ☒ C. Sunk key
 - ☐ D. Set screw

Q.7 Which property makes tin suitable for coating steel sheets used in food containers?

- Ans**
- ☐ A. High hardness
 - ☐ B. High magnetic permeability
 - ☒ C. High corrosion resistance
 - ☐ D. High tensile strength

Q.8 Which of the following is the most important reason for providing continuous ventilation while working in a confined space?

- Ans**
- ☐ A. To control dust generated during work
 - ☐ B. To reduce noise levels for workers
 - ☐ C. To keep the confined space cool
 - ☒ D. To prevent the build-up of hazardous gases

Q.9 Which tool is best suited for shifting heavy machinery during erection by applying leverage, given constraints on space and need for controlled movement?

- Ans**
- ☐ A. Hammer is used to move heavy objects with leverage in restricted areas
 - ☐ B. Pipe wrench is used to move heavy objects with leverage in restricted areas
 - ☒ C. Crowbar is used to move heavy objects with leverage in restricted areas
 - ☐ D. Spanner is used to move heavy objects with leverage in restricted areas

Q.10 Which part of the Vernier height gauge is used to mark lines on the workpiece surface?

- Ans**
- ☐ A. Clamp screw
 - ☐ B. Vernier scale
 - ☐ C. Fine adjustment screw
 - ☒ D. Scriber

Q.11 A workshop supervisor needs to mix two types of oils in a ratio so that the resulting mixture maintains the same performance as the original oils used separately. If the first oil costs 60 rupees per liter and the second oil costs 80 rupees per liter, in what ratio should these be mixed to get a mixture worth 70 rupees per liter?

- Ans**
- ☐ A. 2:1
 - ☐ B. 1:2
 - ☒ C. 1:1
 - ☐ D. 3:2

Q.12 During maintenance, an employee notices that a hydraulic press is unable to lift the usual load even though the input force remains the same. Based on Pascal's Law, which scenario could be responsible for this failure?

- Ans**
- ☐ A. Using more hydraulic fluid while keeping pressure the same improves lifting
 - ☐ B. Increasing the input force beyond the usual value causes lifting failure
 - ☐ C. Replacing the fluid with a heavier type increases lifting capacity
 - ☒ D. A leak in the hydraulic line reduces pressure transmission to the lifting piston

Q.13 In a workshop, you need to fill a cylindrical tank with a liquid. The tank has a diameter of 1 meter and a height of 2 meters. Which method will give you the most accurate measurement of the tank's volume before filling it?

- Ans**
- ☐ A. Use the formula for the volume of a cube with the tank's height as a side
 - ☒ B. Calculate using the formula for the volume of a cylinder based on precise measurements
 - ☐ C. Measure the circumference and assume the tank is a sphere to calculate volume
 - ☐ D. Estimate by visual inspection and compare with other tanks

Q.14 In a basic hydraulic circuit, what is the function of the reservoir in relation to the other system components?

- Ans**
- ☐ A. Hydraulic filter removes contaminants from the hydraulic fluid during operation
 - ☒ B. Hydraulic reservoir stores and supplies fluid to the system continuously
 - ☐ C. Hydraulic pump is used to generate pressure for fluid movement
 - ☐ D. Pressure relief valve is used to control the maximum system pressure

Q.15 Which of the following best describes the method of operating HP (High Pressure) welding equipment in metal joining processes?

- Ans**
- ☐ A. The regulator can be ignored during normal operation
 - ☐ B. Only turning on the gas supply is necessary for operation
 - ☒ C. The torch and regulator must be adjusted to control the gas flow accurately
 - ☐ D. The equipment should be operated at maximum pressure for better results

Q.16 What is a butt joint in welding as per BIS SP 46-1988?

- Ans**
- ☐ A. A joint where two metal pieces are overlapped and welded
 - ☐ B. A joint where two metal pieces are placed at right angles and welded
 - ☐ C. A joint where two metal pieces are joined at an edge not in the same plane
 - ☒ D. A joint where two metal pieces are placed end to end and welded together

Q.17 The grade of a grinding wheel indicates:

- Ans**
- ☐ A. Cutting depth
 - ☒ B. Bond strength
 - ☐ C. Wheel speed
 - ☐ D. Grain size

Q.18 Which parameter must be lowered to decrease tool wear while machining a tough alloy material?

- Ans**
- ☐ A. Depth of cut
 - ☐ B. Feed rate
 - ☐ C. Rake angle
 - ☒ D. Cutting speed

Q.19 Which arrow head type is not recommended for dimension lines when preparing engineering drawings for fabrication tasks?

- Ans**
- ☐ A. Slashed arrow head
 - ☐ B. Open arrow head
 - ☐ C. Closed and filled arrow head
 - ☒ D. Dotted arrow head

Q.20 Why does the vernier scale contain slightly different spacing than the main scale?

- Ans**
- ☒ A. To create a measurable difference between scales
 - ☐ B. To obtain fractional readings smaller than one main scale division
 - ☐ C. To help align the vernier zero with the main scale zero
 - ☐ D. To allow comparison between main scale and vernier scale divisions

Q.21 A workshop assembly requires joining two metal plates to withstand vibrations without loosening over time. Which mechanical jointing method is most suitable for this requirement?

- Ans**
- ☐ A. Using permanent spot welding process
 - ☒ B. Using lock nuts and spring washers
 - ☐ C. Using standard threaded fasteners only
 - ☐ D. Using solid rivets for fixed assembly

Q.22 In which situation would wrought iron be a better choice than cast iron?

- Ans**
- ☐ A. Where maximum compressive strength is needed
 - ☐ B. Where high wear resistance is essential
 - ☐ C. Where vibration damping is a priority
 - ☒ D. Where ductility and shock resistance are required

Q.23 During a welding operation in a workshop, a 10-meter extension cable rated for 5 amperes is used to power a portable grinder that draws 8 amperes. To prevent electrical accidents, which corrective action should be taken before starting work?

- Ans**
- ☐ A. Leave the existing extension cable unchanged and work quickly
 - ☐ B. Reduce the grinder running time to minimize overload risk
 - ☒ C. Replace the extension cable with one rated for at least 8 amperes
 - ☐ D. Use a longer cable rated for 3 amperes to increase distance from the source

Q.24 Bolted joints are preferred because they are:

- Ans**
- ☒ A. Easy to assemble
 - ☐ B. Difficult to remove
 - ☐ C. Permanent only
 - ☐ D. Heavy in weight

Q.25 How does a hole gauge achieve higher accuracy in measurement?

- Ans**
- ☐ A. Using magnetic alignment measurement method
 - ☐ B. Using multi-point laser scanning system
 - ☒ C. Using two-point contact with split ball ends
 - ☐ D. Using fluid-based expansion mechanism

Q.26 A drawing shows two steel plates joined with a continuous fillet weld along one edge, and the drawing specifies a welding symbol with the fillet shape filled in and a reference line beneath. Based on this drawing, which interpretation is correct about the weld placement and its representation?

- Ans**
- ☐ A. The weld should be placed on the arrow side but as an intermittent fillet
 - ☒ B. The weld is to be placed on the arrow side with a continuous fillet along the joint
 - ☐ C. The weld is to be placed on the other side with an intermittent fillet
 - ☐ D. The weld should be a groove type applied on both sides of the plates

Q.27 Which situation requires the use of a reamer?

- Ans**
- ☐ A. When removing large amounts of material quickly
 - ☐ B. When rough shaping a workpiece
 - ☐ C. When making holes in wood
 - ☒ D. When a highly accurate hole diameter is needed

Q.28 Which cutting tool is primarily used to produce a smooth, flat face perpendicular to the workpiece axis?

- Ans**
- ☐ A. Boring tool
 - ☐ B. Turning tool
 - ☐ C. Knurling tool
 - ☒ D. Facing tool

Q.29 A material that fractures with very little or no plastic deformation is said to exhibit:

- Ans**
- ☐ A. Toughness
 - ☒ B. Brittleness
 - ☐ C. Elasticity
 - ☐ D. Ductility

Q.30 Vibration during hacksawing can be minimized by:

- Ans**
- ☐ A. Steady strokes and proper grip
 - ☐ B. Increasing cutting speed within recommended limits
 - ☒ C. Maintaining proper blade tension
 - ☐ D. Using correct blade pitch (TPI)

Q.31 Which of the following is a key purpose of implementing preventive maintenance in workshop equipment?

- Ans**
- ☐ A. To schedule downtime for the longest possible periods of production.
 - ☐ B. To use maintenance only for minor workshop tools and accessories.
 - ☒ C. To reduce unexpected breakdowns and improve equipment reliability.
 - ☐ D. To focus only on repair activities after equipment failure occurs.

Q.32 Using anti-stick compounds on gaskets may cause:

- Ans**
- ☐ A. Longer service life
 - ☐ B. Increased strength
 - ☒ C. Premature failure
 - ☐ D. Improved sealing

Q.33 Which tap in a standard set is best suited for starting a thread in a new hole?

- Ans**
- ☐ A. Flat bottomed tap
 - ☐ B. Bottoming tap
 - ☒ C. Taper tap
 - ☐ D. Thread chaser

Q.34 Which application is suited for a 5 by 2 valve in pneumatic systems?

- Ans**
- ☐ A. It is suited for pressure release and exhaust control
 - ☐ B. It is best for adding lubrication to compressed air
 - ☒ C. It is used for double acting cylinder direction control
 - ☐ D. It is used for single acting cylinder simple movement

Q.35 Which material will deform plastically first when temperature rises during a lathe operation?

- Ans**
- ☒ A. Carbon tool steel
 - ☐ B. High-speed steel (HSS)
 - ☐ C. Cast alloy steel
 - ☐ D. Ceramic tool material

Q.36 Pig iron is produced in a blast furnace using iron ore, coke, and limestone. In this process, coke acts as:

- Ans**
- ☐ A. Flux
 - ☒ B. Fuel
 - ☐ C. Coolant
 - ☐ D. Impurity

Q.37 Which factor affects the velocity ratio in a simple gear train during workshop assembly tasks?

- Ans**
- ☒ A. The number of teeth on the driver and driven gears
 - ☐ B. The shaft length between the two connected gears
 - ☐ C. The material used for making the gear wheels
 - ☐ D. The module size selected for the gear teeth

Q.38 When preparing an orthographic projection of a rectangular block resting with its largest face on the horizontal plane, which view will accurately represent the true shape and size of that face?

- Ans**
- ☐ A. The side view drawn at 45 degrees to the projection plane
 - ☐ B. The front view drawn perpendicular to the reference line
 - ☐ C. The auxiliary view drawn from an inclined axis
 - ☒ D. The top view drawn parallel to the horizontal reference line

Q.39 Why is the beam of a vernier caliper made long and rigid during construction?

- Ans**
- ☐ A. To provide a straight guide for smooth sliding jaw movement
 - ☐ B. To provide a stable reference surface for accurate measurement
 - ☐ C. To reduce the least count of the instrument
 - ☒ D. To support long measurement range without bending

Q.40 If the tolerance zone is completely above the basic size line, how is it indicated as per BIS?

- Ans**
- ☐ A. By using only negative deviation values
 - ☐ B. By using zero deviation values
 - ☐ C. By combining positive and negative deviations
 - ☒ D. By using only positive deviation values

Q.41 In a quick cut die stock, the two die halves are held securely by:

- Ans**
- ☒ A. A threaded guide plate
 - ☐ B. A tapered retaining ring
 - ☐ C. A spring-loaded clamp
 - ☐ D. A locking pin and washer

Q.42 When integrating a solenoid valve into a sequence control circuit for a machining process, what is a potential effect if the return spring inside the valve is damaged or missing?

- Ans**
- ☐ A. The electrical consumption of the valve decreases significantly
 - ☒ B. The valve may fail to return to its original position after de-energization
 - ☐ C. Continuous air supply to the actuator is ensured for all cycles
 - ☐ D. The valve cycles faster, improving process speed in the workshop

Q.43 Due to low thermal conductivity, laminated phenolic bearings require:

- Ans**
- ☒ A. Cooling system
 - ☐ B. Hard coating
 - ☐ C. Metal lining
 - ☐ D. Surface hardening

Q.44 What happens when the feed rate is too high during turning?

- Ans**
- ☐ A. Surface finish improves significantly
 - ☒ B. Cutting force and roughness increase
 - ☐ C. Tool wear decreases completely
 - ☐ D. Spindle speed reduces automatically

Q.45 Which type of bearing is specifically designed to support axial loads in machinery?

- Ans**
- ☒ A. Thrust bearing
 - ☐ B. Ball bearing
 - ☐ C. Plain bearing
 - ☐ D. Roller bearing

Q.46 Which of the following best describes the proper use and maintenance of a chipping hammer during welding operations?

- Ans**
- ☐ A. Use the chipping hammer before welding to clean oil from the surface and safely store it with welding rods.
 - ☐ B. Use the chipping hammer to shape the welded joint before welding and occasionally sharpen its pointed tip properly with a flat file.
 - ☒ C. Use the chipping hammer to remove slag after welding and keep the hammer clean to ensure effective slag removal.
 - ☐ D. Use the chipping hammer during welding to cool the joint and wipe its handle carefully with oil after every use.

Q.47 How is a small-diameter straight shank drill usually held in the tailstock?

- Ans**
- ☐ A. With a dog carrier
 - ☒ B. With a drill chuck
 - ☐ C. With a Morse taper
 - ☐ D. With a sleeve adapter

Q.48 A workshop supervisor needs a tool for scribing and layout work in a confined space. Which feature of the Hermaphrodite Caliper makes it different from other calipers?

- Ans**
- ☒ A. One leg ends in a pointed tip while the other has a caliper jaw
 - ☐ B. Both legs have sharp pointed tips for accurate marking work
 - ☐ C. One leg is straight while the other leg carries a flat measuring edge
 - ☐ D. Both legs are straight and parallel to each other

Q.49 A belt drive operating at a speed of 8 m/s is used to transmit a small amount of power in an agricultural machine. How is this drive classified?

- Ans**
- ☒ A. Light drive
 - ☐ B. Heavy drive
 - ☐ C. Compound drive
 - ☐ D. Medium drive

Q.50 Which problem is most likely to occur if a lathe tool's cutting angles are not ground properly?

- Ans**
- ☐ A. Excessive tool length
 - ☒ B. Poor surface finish
 - ☐ C. Problems with storing the tool
 - ☐ D. Issues with tool magnetism

Q.51 A machine drawing specifies an M12 screw for assembly. What does 'M12' indicate about the screw?

- Ans**
- ☐ A. The pitch length of the screw is 12 mm
 - ☐ B. The screw length is 12 mm
 - ☐ C. The screw head diameter is 12 mm
 - ☒ D. The major diameter of the screw is 12 mm

Q.52 During the fabrication of a machine base, an engineering drawing is provided with detailed dimensioning. What is the main purpose of these dimensioned drawings in the workshop setting?

- Ans**
- ☐ A. To indicate the type of material to be used for the part
 - ☐ B. To show the required surface finish for each feature
 - ☒ C. To provide exact sizes and locations for manufacturing parts accurately
 - ☐ D. To mark guidelines for the workshop before cutting begins

Q.53 In wet lapping, the abrasive compound is mixed with a liquid medium before application. Which substance is specifically mentioned for mixing with the abrasive powder?

- Ans**
- ☐ A. Alcohol as cleaning medium
 - ☐ B. Water as cooling medium
 - ☐ C. Glycerine as bonding medium
 - ☒ D. Kerosene as liquid medium

Q.54 Which measurement tool is most appropriate for checking the major diameter of a screw thread?

- Ans**
- ☐ A. Feeler gauge
 - ☐ B. Thread pitch gauge
 - ☐ C. Depth gauge
 - ☒ D. External micrometer

Q.55 When selecting an electrode for ARC welding mild steel structures exposed to variable weather conditions, which factor is most critical to ensure weld durability and integrity?

- Ans**
- ☐ A. Selecting an electrode with high current carrying capacity to increase speed
 - ☐ B. Using an electrode with higher tensile strength to match the base metal
 - ☐ C. Picking an electrode with fast deposition rate for quicker completion
 - ☒ D. Choosing an electrode with low hydrogen content to minimize cracking risk

Q.56 Which statement best explains the primary use of red lead in marking media for ITI Fitter Trade work?

- Ans**
- ☐ A. Red lead is applied as a lubricant for smooth movement of measuring instruments.
 - ☐ B. Red lead is used for cleaning measuring instruments before use.
 - ☒ C. Red lead is applied to surfaces to make scribed lines more visible during layout work.
 - ☐ D. Red lead is used for protecting measuring tools from rust during storage.

Q.57 In a cast iron pulley, the rim is connected to the central boss through structural members whose cross-section is generally elliptical. What are these members called?

- Ans**
- ☐ A. Bushes
 - ☐ B. Flanges
 - ☐ C. Keys
 - ☒ D. Arms/Spokes

Q.58 What is the orientation of the peen relative to the handle in a straight peen hammer?

- Ans**
- ☐ A. Perpendicular to the axis of the hammer handle
 - ☐ B. At sixty degrees to the hammer handle
 - ☒ C. Parallel to the axis of the hammer handle
 - ☐ D. At forty five degrees to the hammer handle

Q.59 In an assembly process, which sealing method is most appropriate to prevent oil leakage between two precisely machined flanges when disassembly may be required for maintenance?

- Ans**
- ☐ A. Sealing with adhesive compounds
 - ☐ B. Filling the joint with welding material
 - ☒ C. Using a preformed gasket between the flanges
 - ☐ D. Applying a thread sealant to the surfaces

Q.60 What is the standard material used for hacksaw blades in adjustable frames?

- Ans**
- ☐ A. Alloy tool steel
 - ☒ B. High carbon steel
 - ☐ C. Tungsten carbide
 - ☐ D. Mild steel

Q.61 Which component in a pneumatic system stores compressed air before it is distributed to the workshop machines?

- Ans**
- ☒ A. The air receiver tank stores compressed air for later use
 - ☐ B. A regulator controls the pressure supplied to equipment
 - ☐ C. A filter removes moisture and dust from the air
 - ☐ D. An air compressor generates compressed air for distribution

Q.62 What is the primary advantage of using a hydraulic bending machine for G.I. and M.S. pipes?

- Ans**
- ☐ A. It cleans pipe surfaces without using chemical solutions.
 - ☐ B. It cuts pipes accurately without producing metal shavings.
 - ☒ C. It bends pipes without requiring sand filling inside the pipe.
 - ☐ D. It joins pipes permanently without requiring threaded fittings.

Q.63 What is the main function of a pipe bending machine in pipe fitting work?

- Ans**
- ☐ A. To join two pipes together permanently using welding methods
 - ☒ B. To change the direction of a pipe without cutting it
 - ☐ C. To cut a pipe accurately to the required length
 - ☐ D. To create threads on the ends of a pipe for connections

Q.64 Which item is essential to wear for personal safety in a mechanical workshop?

- Ans**
- ☐ A. Earplugs
 - ☐ B. Regular shoes
 - ☒ C. Safety goggles
 - ☐ D. Wrist watch

Q.65 Which actuator type converts compressed air energy into linear motion for clamping during a machining operation?

- Ans**
- ☐ A. Rotary actuator is used to convert air into rotary motion for cutting
 - ☐ B. Diaphragm actuator is used for precise control in regulating pressure
 - ☒ C. Single-acting cylinder actuator is used to generate linear motion for clamping tasks
 - ☐ D. Double-acting cylinder actuator is used for tasks requiring motion in both directions

Q.66 In a gear set, which circle is used as the reference to determine the point where two gears effectively make contact and transfer motion?

- Ans**
- ☒ A. Pitch circle is the contact reference for motion transfer
 - ☐ B. Dedendum circle is the contact reference for motion transfer
 - ☐ C. Root circle is the contact reference for motion transfer
 - ☐ D. Addendum circle is the contact reference for motion transfer

Q.67 Which of the following is the main reason a pipe cut using a wheel pipe cutter must be deburred or reamed after cutting?

- Ans**
- ☐ A. The pipe cutter produces rough external threads on the pipe surface
 - ☐ B. The cutter removes excess metal chips inside the pipe during cutting
 - ☒ C. The cutting process leaves a ridge inside the pipe that may obstruct flow
 - ☐ D. The cutter wheel increases the internal diameter of the pipe after cutting

Q.68 Which change will decrease the electrical resistance of a metal wire in a workshop circuit?

- Ans**
- ☐ A. Lowering the voltage applied to the wire
 - ☐ B. Raising the temperature of the wire
 - ☐ C. Using a less conductive material for the wire
 - ☒ D. Increasing the thickness of the wire

Q.69 Cast iron is mainly used in bearings for:

- Ans**
- ☒ A. Light loads
 - ☐ B. Heavy loads
 - ☐ C. Shock loads
 - ☐ D. Impact loads

Q.70 Which of the following situations best demonstrates when a needle bearing is preferred over other types of bearings in an industrial setting?

- Ans**
- ☐ A. When vibration isolation is critical and misalignment may occur
 - ☒ B. When limited radial space is available and high load capacity is needed
 - ☐ C. When high-speed axial loads are present and minimal heat generation is needed
 - ☐ D. When large axial loads and self-alignment are required

Q.71 Which solder composition is most suitable for joining delicate electronic components requiring a low melting point and reliable electrical connections?

- Ans**
- ☐ A. Copper-based solder with 95% copper, 5% tin
 - ☒ B. Tin-lead solder with 60% tin and 40% lead
 - ☐ C. Lead solder with 70% lead and 30% tin
 - ☐ D. Silver solder with 2% silver, 97% tin, 1% copper

Q.72 What determines the final diameter of a hole after reaming?

- Ans**
- ☐ A. The hardness of the workpiece
 - ☐ B. The rotational speed of the lathe
 - ☒ C. The size of the reamer used
 - ☐ D. The type of the lubricant applied

Q.73 Which process is essential to ensure moisture is removed from compressed air before it enters pneumatic tools in a workshop environment?

- Ans**
- ☐ A. Passing air through a filter to trap solid contaminants
 - ☒ B. Using an air dryer to eliminate water vapor from compressed air
 - ☐ C. Allowing air to rest in a storage tank for moisture to settle
 - ☐ D. Cooling air in a closed chamber to reduce temperature

Q.74 What does the term 'centre of gravity' refer to in workshop calculations and science?

- Ans**
- ☐ A. It is the lowest point of the object
 - ☒ B. It is the point where the entire weight of an object acts
 - ☐ C. It is the point where the mass is maximum
 - ☐ D. It is the point where the object is fixed

Q.75 What does 'interchangeability' refer to in mechanical engineering?

- Ans**
- ☐ A. Ability to use any material for parts
 - ☐ B. Ability to change machine dimensions freely
 - ☒ C. Ability to replace parts without modification
 - ☐ D. Ability to assemble parts in any sequence



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	2:30 PM - 5:00 PM
Subject	ALP Stage 2 Heat Engine

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 Why is a room thermometer generally mounted vertically on a wall?

- Ans ☒ A. It protects the thermometer from breaking easily.
- ☒ B. It ensures accurate reading by keeping the bulb exposed to room air.
- ☒ C. It prevents the liquid from freezing inside the thermometer.
- ☒ D. It helps the thermometer measure body temperature faster.

Q.2 Which type of personal protective equipment is most suitable for tasks involving airborne chemical particles in confined spaces?

- Ans ☒ A. Hand protection using chemical-resistant gloves
- ☒ B. Body protection with flame-retardant suits
- ☒ C. Head protection with industrial-grade hard hats
- ☒ D. Respiratory protection devices such as half-face masks

Q.3 A sum of money invested at simple interest amounts to ₹21,500 in 5 years and ₹26,000 in 8 years. Find the principal amount (in ₹).

- Ans ☒ A. 14,000
- ☒ B. 12,000
- ☒ C. 7,500
- ☒ D. 15,500

Q.4 Which of the following pairs of numbers is co-prime?

- Ans ☒ A. (17, 54)
- ☒ B. (28, 49)
- ☒ C. (14, 28)
- ☒ D. (21, 33)

Q.5 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans ☒ A. HB-IC
- ☒ B. FZ-GA
- ☒ C. RL-SN
- ☒ D. PJ-QK

Q.6 Which tool safety measure best prevents injuries when cleaning a workshop lathe after use?

- Ans**
- ☐ A. Wiping metal chips using bare hands directly
 - ☐ B. Using a rag to remove metal dust from the lathe
 - ☐ C. Blowing chips away with compressed air around the lathe
 - ☒ D. Using a brush to remove metal chips from the lathe

Q.7 The mean of 11 numbers is 10.9. If the mean of the first 6 numbers is 10.5 and the mean of the last 6 numbers is 11.4, then find the 6th number.

- Ans**
- ☐ A. 10
 - ☐ B. 11
 - ☐ C. 10.5
 - ☒ D. 11.5

Q.8 Let C be a circle, and AB and DE be two chords on C such that AB = BE. In the quadrilateral ABED, let AE and BD intersect at F, $\angle DBE = 55^\circ$ and $\angle BAE = 40^\circ$. Find $\angle FED$.

- Ans**
- ☐ A. 60°
 - ☐ B. 55°
 - ☒ C. 45°
 - ☐ D. 110°

Q.9 What information does a kilometer stone provide to travelers on a road?

- Ans**
- ☒ A. Distance from a reference point
 - ☐ B. Speed of the vehicle
 - ☐ C. Time taken to reach destination
 - ☐ D. Direction of travel

Q.10 Pipes A and B can fill an entire tank in 8 hours and 12 hours, respectively. The water tank is one-fourth full. If both the pipes are opened together, then how long will it take to fill the remaining part of the tank?

- Ans**
- ☐ A. 3 hours 6 minutes
 - ☐ B. 3 hours 16 minutes
 - ☐ C. 3 hours 26 minutes
 - ☒ D. 3 hours 36 minutes

Q.11 A cyclist travels from the kilometer stone marked 52 to the stone marked 79. How far has the cyclist traveled?

- Ans**
- ☐ A. 31 kilometers
 - ☐ B. 131 kilometers
 - ☐ C. 52 kilometers
 - ☒ D. 27 kilometers

Q.12 A cyclist rides 60 meters north, then 80 meters south, and finally 70 meters north. What is the total distance the cyclist has traveled?

- Ans**
- ☒ A. 210 meters
 - ☐ B. 10 meters
 - ☐ C. 60 meters
 - ☐ D. 150 meters

Q.13 If $3x - 2y + 3z = 8$, $4x - 3y + 2z = 4$ and $2x + y - z = 1$, then find x, y and z, respectively.

Ans ☒ A. 1, 2 and 3

☐ B. 3, 1 and 2

☐ C. 2, 3 and 1

☐ D. 2, 1 and 3

Q.14 Why are electric wires in household appliances usually covered with plastic or rubber coating?

Ans ☐ A. To make the wires heavier

☐ B. To increase the flow of current

☒ C. To prevent electric shocks by insulation

☐ D. To produce more heat

Q.15 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Satish related to Mayank if 'Satish + Deep × Piyush - Hitesh % Mayank'?

Ans ☐ A. Mother's brother's wife's mother

☐ B. Father's brother's wife's sister

☐ C. Mother's brother's wife's sister

☒ D. Father's brother's wife's mother

Q.16 A hiker lifts a backpack from the ground to a ledge 2 meters above the ground. Which situation would result in the greatest increase in the backpack's gravitational potential energy?

Ans ☐ A. Lifting the same backpack to a 1-meter ledge

☐ B. Carrying the same backpack horizontally for 2 meters

☐ C. Lifting a lighter backpack to the same 2-meter ledge

☒ D. Lifting a heavier backpack to the same 2-meter ledge

Q.17 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and select the most appropriate answer.

Question:

Among five trees N, O, R, S, and T, each having a different height, which tree is the tallest?

Statements:

(I) T is taller than R. N is taller than T.

(II) R is shorter than O but taller than S.

Ans ☐ A. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question

☒ B. Both statements I and II together are NOT sufficient to answer the question

☐ C. Data in Statement II alone is sufficient to answer the question while data in statement I is not

☐ D. Data in Statement I alone is sufficient to answer the question while data in statement II is not

Q.18 In a certain code language, 'SOIL' is coded as '1547' and 'COIL' is coded as '7124'. What is the code for 'C' in the given code language?

Ans ☐ A. 7

☐ B. 4

☒ C. 2

☐ D. 1

Q.19 Srinu starts from his home and drives 2 km towards the south, then takes a right turn and drives 5 km. He then takes a right turn and drives 6 km before taking a right turn again and driving 4 km further. Srinu finally takes a right turn and drives 4 km before stopping at his office. In which direction should Srinu drive to reach his home again? (All turns are 90-degree turns only unless specified.)

- Ans** ☒ A. East
☐ B. West
☐ C. South
☐ D. North

Q.20 A ladder is leaning against a wall and makes an angle of 60° with the ground. If the length of the ladder is 24 m, find the distance of the foot of the ladder from the wall.

- Ans** ☐ A. 9 m
☐ B. 15 m
☒ C. 12 m
☐ D. 18 m

Q.21 The salary of a person is increased by 10%, 20% and 25% successively in three consecutive years. Find the overall percentage increase in the salary at the end of the third year.

- Ans** ☐ A. 50%
☐ B. 30%
☒ C. 65%
☐ D. 60%

Q.22 If a rectangular field is measured to be 120 meters long and 75 meters wide, what is its area in SI units?

- Ans** ☐ A. 19500 square meters
☒ B. 9000 square meters
☐ C. 1800 square meters
☐ D. 15000 square meters

Q.23 A cyclist travels 120 km in 3 hours, rests for 1 hour, and then travels another 80 km in 2 hours. To determine the cyclist's average speed for the entire journey, which of the following quantities should be used?

- Ans** ☐ A. Change in velocity divided by total time taken
☒ B. Total distance travelled divided by the total time taken
☐ C. Distance travelled in a particular direction divided by time
☐ D. Total displacement divided by total time taken

Q.24 A pump can fill a tank in 3 hours. Due to a leak in the tank, it takes 4.5 hours to fill the tank. In how much time can the leak empty the full tank if no other entry or exit routes are open?

- Ans** ☐ A. 6 hours
☒ B. 9 hours
☐ C. 7 hours
☐ D. 8 hours

Q.25 Which one of the following statements correctly describes a characteristic of WANs?

- Ans** ☐ A. WANs are limited to connecting devices within a radius of 1 to 2 km.
☐ B. WANs are always public networks managed solely by Internet Service Providers (ISPs).
☐ C. WANs typically use only wireless media to connect distant LANs.
☒ D. WANs can be built by connecting multiple LANs via wired or wireless links.

Q.26 An engineer is updating a schematic for a control panel and needs to indicate a normally closed push button. Which approach best ensures the symbol is universally understood among engineers referring to standard engineering drawings?

Ans ☐ A. Describe the normally closed push button in words within the schematic diagram clearly

☒ B. Use the standardized symbol for a normally closed push button as per conventions

☐ C. Substitute the normally closed push button symbol with a general switch symbol

☐ D. Draw a hand made representation of the push button with a note explaining function

Q.27 A technician needs to select a fuse wire for a room heater. Which property should be considered most important for safety based on the heating effect of electric current?

Ans ☐ A. The fuse wire must have high resistance and be thick to prevent melting.

☒ B. The fuse wire must have a low melting point to break the circuit during excess current.

☐ C. The fuse wire must have a high melting point for durability.

☐ D. The fuse wire must have a shiny surface for efficient cooling.

Q.28 What is the primary purpose of a Local Area Network (LAN)?

Ans ☐ A. To link wireless devices only

☒ B. To connect computers within a small geographical area

☐ C. To connect global networks

☐ D. To connect social media accounts

Q.29 A plane parallel to the base divides a cone of height 40 cm into two parts. If the volume of the upper smaller cone formed is $\frac{1}{64}$ of the volume of the original cone, calculate the height of the plane from the base of the cone.

Ans ☐ A. 20 cm

☒ B. 30 cm

☐ C. 40 cm

☐ D. 10 cm

Q.30 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

Ans ☐ A. DG – EH

☐ B. KE – LF

☒ C. IT – KV

☐ D. SJ – TK

Q.31 Seven boxes S, T, U, V, W, X, and Y are kept one over the other but not necessarily in the same order. U is kept exactly third from the top. Only one box is kept between U and T. W is kept immediately above T. Only three boxes are kept between X and S. V is kept on one of the positions below Y. Only two boxes are kept between U and S. Which box is kept second from the top?

Ans ☐ A. T

☒ B. X

☐ C. U

☐ D. V

Q.32 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

Some rugs are fans.

No fan is a car.

Conclusion (I) : Some rugs are cars.

Conclusion (II) : Some fans are rugs.

- Ans**
- ☐ A. Only conclusion (I) follows
 - ☐ B. Both conclusions (I) and (II) follow
 - ☐ C. Neither conclusion (I) nor (II) follows
 - ☒ D. Only conclusion (II) follows

Q.33 An article is bought for ₹300 and its price is increased by 5.5%. The resulting price is then reduced by 8%. Find the final selling price.

- Ans**
- ☐ A. ₹296.46
 - ☒ B. ₹291.18
 - ☐ C. ₹288.24
 - ☐ D. ₹284.45

Q.34 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

MDB PHE SLH VPK ?

- Ans**
- ☒ A. YTN
 - ☐ B. ZTM
 - ☐ C. ZUO
 - ☐ D. XSM

Q.35 A boy uses a wheelbarrow to carry sand. The wheel acts as the pivot, the sand is placed in the tray, and the boy lifts the handles. In this arrangement, the sand represents

- Ans**
- ☐ A. Fulcrum
 - ☒ B. Load
 - ☐ C. Arm
 - ☐ D. Effort

Q.36 Which statement best describes the front view in an engineering drawing?

- Ans**
- ☐ A. It shows only the object's bottom or right side
 - ☐ B. It shows the object's depth and height as seen from the side
 - ☐ C. It shows only one dimension of the object
 - ☒ D. It shows the object's height and width as seen from the front

Q.37 What is the primary role of the Central Processing Unit (CPU) in a computer system?

- Ans**
- ☒ A. To execute program instructions
 - ☐ B. To display output on the screen
 - ☐ C. To manage network connections
 - ☐ D. To store long-term data

Q.38 A ramp is used to lift a box to a platform 2 m high. To reduce the effort required, the ramp length is increased from 4 m to 8 m. Assuming negligible friction, what remains unchanged?

- Ans**
- ☒ A. The work done in raising the box
 - ☐ B. The mechanical advantage
 - ☐ C. The force required
 - ☐ D. The distance moved along the ramp

Q.39 The first shopkeeper allows two successive discounts of 3% and 7%, while a second shopkeeper allows two successive discounts of 2% and 8%. A third shopkeeper allows 10% discount on the same item. From which shopkeeper should a customer buy if the marked price is the same at the three shops?

- Ans**
- ☒ A. Buy from the third shopkeeper
 - ☐ B. Buy from the first shopkeeper
 - ☐ C. Buy from the first or the second shopkeeper as both are the same.
 - ☐ D. Buy from the second shopkeeper

Q.40 Simplify the following expression.

$$11 \text{ of } 7 + 125 \div 5 + 99 \div 11 \times 7 - 17 \text{ of } 7 + 7 \times 6 - (91 \div 7 + 7 \times 5)$$

- Ans**
- ☐ A. 44
 - ☐ B. 36
 - ☐ C. 48
 - ☒ D. 40

Q.41 Which statement best describes how the mass and speed of an object affect its kinetic energy?

- Ans**
- ☐ A. An object with same mass but higher speed will have less kinetic energy.
 - ☐ B. An object with greater mass but lower speed will have more kinetic energy.
 - ☒ C. An object with greater mass and higher speed will have more kinetic energy.
 - ☐ D. An object with less mass and lower speed will have more kinetic energy.

Q.42 Sohan covers a total distance of 760 km to reach his home, traveling partly by train and partly by car. He takes 8 hours when he travels 160 km by train and the rest by car. If he travels 240 km by train and the remaining distance by car, his journey takes 12 minutes longer. Find the difference between the speeds of the train and the car.

- Ans**
- ☐ A. 23 km/h
 - ☐ B. 27 km/h
 - ☐ C. 21 km/h
 - ☒ D. 20 km/h

Q.43 SANZ is related to YUTT in a certain way based on the English alphabetical order. In the same way, MTHM is related to SNNG. To which of the following is LJRE related to following the same logic?

- Ans**
- ☐ A. QEYZ
 - ☐ B. QDYY
 - ☒ C. RDX Y
 - ☐ D. REXZ

Q.44 Which of the following is the best example of municipal solid waste?

- Ans**
- ☐ A. Hospital biomedical waste
 - ☐ B. Mining tailings
 - ☒ C. Household kitchen garbage
 - ☐ D. Industrial process waste

Q.45 What should come in place of '?' in the given series?
11, 22, 44, 88, 176, ?

- Ans**
- ☐ A. 358
 - ☒ B. 352
 - ☐ C. 342
 - ☐ D. 356

Q.46 Which factor increases the amount of heat produced in a wire when an electric current flows through it for a fixed time?

- Ans**
- ☐ A. Making the wire thicker
 - ☒ B. Increasing the resistance of the wire
 - ☐ C. Reducing the current in the wire
 - ☐ D. Decreasing the length of the wire

Q.47 What should come in place of the question mark (?) in the given series?

1 2 7 20 61 ?

- Ans**
- ☐ A. 185
 - ☒ B. 182
 - ☐ C. 183
 - ☐ D. 181

Q.48 P, Q and R are three batsmen. The ratios of runs scored by them in a certain match were as follows:

$P : Q = 5 : 7$ and $Q : R = 2 : 3$.

If they scored a total of 765 runs, then find the number of runs scored by R.

- Ans**
- ☐ A. 350
 - ☐ B. 336
 - ☒ C. 357
 - ☐ D. 378

Q.49 Why does restricting certain chemical refrigerants effectively reduce damage to the ozone layer?

- Ans**
- ☐ A. Refrigerants contain particles that absorb harmful UV light.
 - ☐ B. Refrigerants increase oxygen production, supporting ozone recovery.
 - ☐ C. Refrigerants emit greenhouse gases that warm the stratosphere.
 - ☒ D. Refrigerants release substances that catalyze ozone breakdown.

Q.50 Find the compound interest on ₹5,70,000 for 1.5 years at 10% per annum compounded half-yearly.

- Ans**
- ☐ A. ₹88,846.25
 - ☒ B. ₹89,846.25
 - ☐ C. ₹92,846.25
 - ☐ D. ₹89,946.25

Q.51 The average of five numbers is 30. If four of the numbers are 25, 35, 28 and 32, then what is the fifth number?

- Ans**
- ☒ A. 30
 - ☐ B. 32
 - ☐ C. 28
 - ☐ D. 35

Q.52 Refer to the following letter series and answer the question that follows. (Counting to be done from left to right only.)

(Left) Q K Q N X K K G G V M L A W T W K N G V (Right)

How many such consonants are there each of which is immediately preceded by a vowel and also immediately followed by a consonant?

- Ans**
- ☐ A. Two
 - ☐ B. Three
 - ☒ C. One
 - ☐ D. None

Q.53 Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

6 – 16 – 23 – 32; 7 – 19 – 26 – 35

- Ans**
- ☒ A. 12 – 34 – 41 – 50
 - ☐ B. 11 – 31 – 38 – 29
 - ☐ C. 8 – 22 – 15 – 24
 - ☐ D. 4 – 14 – 21 – 30

Q.54 What is the primary color used in warning signs to alert workers of potential hazards?

- Ans**
- ☐ A. Green with white symbol or text
 - ☐ B. Blue with white symbol or text
 - ☐ C. Red with white symbol or text
 - ☒ D. Yellow with black symbol or text

Q.55 Refer to the given letter series and answer the question that follows. Counting to be done from left to right only.

(Left) H S A N D D I A D F P A J O S K I O Z O T X (Right)

How many such consonants are there, each of which is immediately preceded by a consonant and also immediately followed by a vowel?

- Ans**
- ☐ A. Three
 - ☐ B. Five
 - ☐ C. Six
 - ☒ D. Four

Q.56 A group of numbers/symbols is coded using letter codes as per the codes given below and the conditions that follow. The correct combination of codes following the conditions is your answer.

Note: If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	3	@	8	4	\$	&	2	%	#	1	+	9	7	5
Code	U	G	B	K	M	F	X	R	E	Q	S	C	V	T

Conditions –

(i) If the first element is a symbol and the last element an odd number, the codes for these two (the first and the last elements) are to be interchanged.

(ii) If the first element is an odd number and the last an even number, the first and the last elements are to be coded as ©

(iii) If both second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?

& 8 \$ 9 5

- Ans**
- ☒ A. TCMBF
 - ☒ B. FCBMT
 - ☒ C. TBMCF
 - ☒ D. FBMCT

Q.57 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All chocolates are paneers.

No paneer is a milk.

Conclusions:

(I) No chocolate is a milk.

(II) Some milks are paneers.

- Ans**
- ☒ A. Neither conclusion (I) nor (II) follows.
 - ☒ B. Both conclusions (I) and (II) follow.
 - ☒ C. Only conclusion (I) follows.
 - ☒ D. Only conclusion (II) follows.

Q.58 A 42-litre solution has sugar and water in the ratio 2 : 5. If, due to evaporation, the volume is reduced by 35%, and only water evaporates, what is the new ratio of sugar to water?

- Ans**
- ☒ A. 51 : 42
 - ☒ B. 40 : 51
 - ☒ C. 40 : 41
 - ☒ D. 31 : 50

Q.59 An astronaut weighs 600 N on Earth. During a moon mission, she performs an experiment to measure her weight on the moon. Which value is closest to her expected weight on the moon, and why?

- Ans**
- ☒ A. 600 N, because a person's weight remains unchanged on the Moon.
 - ☒ B. 300 N, because the Moon's gravity is about one-half of Earth's.
 - ☒ C. 200 N, because the Moon's gravity is about one-third of Earth's.
 - ☒ D. 100 N, because the Moon's gravity is about one-sixth of Earth's.

Q.60 G is the mother of Y. Y is the sister of V. S is the father of L. L is the son of V. How is G related to L?

- Ans**
- ☐ A. Mother
 - ☐ B. Mother's sister
 - ☒ C. Mother's mother
 - ☐ D. Sister

Q.61 Which combination best describes the main environmental challenges associated with plastic waste management?

- Ans**
- ☐ A. Neutralization and easy recycling
 - ☐ B. Rapid biodegradation and chemical leaching
 - ☐ C. Thermal pollution and effective composting
 - ☒ D. Persistence in the environment and microplastic formation

Q.62 Why does biomedical waste require special handling compared to general municipal waste?

- Ans**
- ☐ A. It is more likely to be recycled than other types of waste.
 - ☒ B. It may contain infectious agents that pose health risks.
 - ☐ C. It has higher chemical content and is always toxic.
 - ☐ D. It is always radioactive and requires heavy shielding.

Q.63 When a cutting plane line passes through a hole and a rib, which feature should be sectioned in the resulting view according to standard conventions?

- Ans**
- ☐ A. Both the hole and the rib are shown sectioned
 - ☐ B. Both the hole and the rib are shown unsectioned
 - ☒ C. The hole is sectioned but the rib is shown unsectioned
 - ☐ D. The rib is sectioned but the hole is left unsectioned

Q.64 If 2 is subtracted from each odd digit and 2 is added to each even digit in the number 235234796423, what will be the sum of the digits that are third from the left and third from the right?

- Ans**
- ☒ A. 9
 - ☐ B. 8
 - ☐ C. 7
 - ☐ D. 6

Q.65 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table.
Only two people sit between Y and C when counted from the left of C. D sits third to the left of B. A sits to the immediate right of B. A sits second to the left of Y. Z is not an immediate neighbor of D.
Who sits third to the right of X?

- Ans**
- ☒ A. A
 - ☐ B. D
 - ☐ C. Y
 - ☐ D. C

Q.66 A car travels from point A to point B in a zigzag path, covering a total distance of 200 meters. If the shortest straight-line distance between A and B is 120 meters, which statement best describes the car's distance and displacement?

- Ans**
- ☐ A. The distance is 200 meters; the displacement is 200 meters
 - ☒ B. The distance is 200 meters; the displacement is 120 meters
 - ☐ C. The distance is 120 meters; the displacement is 200 meters
 - ☐ D. The distance is 120 meters; the displacement is 120 meters

Q.67 Which of the following statements best describes a triangle as used in engineering drawing?

- Ans**
- ☐ A. A triangle is a polygon having three curved sides.
 - ☐ B. A triangle must always have all sides of equal length.
 - ☐ C. A triangle is a polygon with four straight sides and four angles.
 - ☒ D. A triangle is a polygon with three straight sides and three angles.

Q.68 The cost of a diamond varies directly with the square of its weight. A diamond broke into four pieces with weights in the ratio 2:4:1:3. If it had been broken into four equal pieces, the loss would have been ₹60,000. What was the original cost of the diamond?

- Ans**
- ☐ A. ₹78,000
 - ☒ B. ₹80,000
 - ☐ C. ₹75,000
 - ☐ D. ₹82,000

Q.69 What is a key feature of single stroke lettering in technical drawings?

- Ans**
- ☒ A. Each character is made with one continuous stroke.
 - ☐ B. Each character is outlined and then filled.
 - ☐ C. Each character is shaded after drawing.
 - ☐ D. Each character is made with several parallel lines.

Q.70 If the height of an object is doubled while its mass remains constant, its gravitational potential energy will be:

- Ans**
- ☐ A. halved
 - ☒ B. doubled
 - ☐ C. unchanged
 - ☐ D. decreased to one-fourth

Q.71 Which of the following correctly states the full form of CD and the technology used to store data on it?

- Ans**
- ☐ A. Compact Disc, Magnetic Storage
 - ☒ B. Compact Disc, Optical Storage
 - ☐ C. Compact Drive, Optical Storage
 - ☐ D. Compact Drive, Magnetic Storage

Q.72 What does the term 'HAZOP' stand for in occupational safety?

- Ans**
- ☐ A. Handling and Organizing Safety
 - ☐ B. Hazardous Operation Standard
 - ☒ C. Hazard and Operability Study
 - ☐ D. Hazardous Operations Safety

Q.73 A crane lifts a 200 kg load to a height of 15 meters in 10 seconds. Assuming acceleration due to gravity is 10 m/s^2 and energy loss is negligible, what is the power output of the crane during this operation?

- Ans**
- ☒ A. 3000 W
 - ☐ B. 1000 W
 - ☐ C. 2000 W
 - ☐ D. 1500 W

Q.74 Refer to the given letter series and answer the question that follows.

(Left) A X T N K R Q K C P S I D F J U D O R G Z M B E L (Right)

How many letters are there in the English alphabetical series between the letter that is fourth from the right end and the letter that is third from the left end of the series?

- Ans
- ☒ A. 4
 - ☒ B. 3
 - ☒ C. 6
 - ☒ D. 5

Q.75 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GXM 5, JVN 11, MTO 24, PRP 51, ?

- Ans
- ☒ A. TPQ 107
 - ☒ B. SPQ 107
 - ☒ C. SPQ 106
 - ☒ D. TPQ 106

Q.76 If the mean of the following data is 45, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	23	30	31	45	X

- Ans
- ☒ A. 160
 - ☒ B. 180
 - ☒ C. 188
 - ☒ D. 162

Q.77 When drawing repeated 67° angles on an engineering sheet, which practice best helps minimize cumulative alignment errors?

- Ans
- ☒ A. Using the same reference line for all repeated angles
 - ☒ B. Relying solely on the initial protractor alignment for all angles
 - ☒ C. Drawing all angles continuously without intermediate verification
 - ☒ D. Marking all angles lightly with a pencil before finalizing

Q.78 A dealer buys a table for ₹2,750. He first marks it up by 28%, then allows a 12% discount to a customer. If the customer also pays 5% GST on the selling price, find the profit percentage (excluding GST) made by the dealer.

- Ans
- ☒ A. 13.81%
 - ☒ B. 10.36%
 - ☒ C. 15.12%
 - ☒ D. 12.64%

Q.79 Which of the following statements best describes a cuboid as used in engineering drawing?

- Ans
- ☒ A. A cuboid has all faces as squares of equal size.
 - ☒ B. A cuboid is a solid with six rectangular faces, and opposite faces are equal.
 - ☒ C. A cuboid is a solid where all faces are parallelograms but not necessarily rectangles.
 - ☒ D. A cuboid has all sides and angles equal, making it similar to a cube.

Q.80 Which color is universally associated with emergency exit signs in industrial workplaces under international standards?

- Ans**
- ☐ A. Blue background with white text or symbols
 - ☐ B. Red background with white text or symbols
 - ☐ C. Yellow background with black text or symbols
 - ☒ D. Green background with white text or symbols

Q.81 12 is related to 1730 following a certain logic. Following the same logic, 13 is related to 2199. To which of the given options is 11 related, following the same logic?
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☐ A. 1543
 - ☒ B. 1333
 - ☐ C. 1433
 - ☐ D. 1443

Q.82 If $x + \frac{1}{x} = 5$, then $\frac{x^3 - 5x^2 + 5x}{x^2 + 1}$ is equal to:

- Ans**
- ☒ A. $\frac{4}{5}$
 - ☐ B. $\frac{1}{5}$
 - ☐ C. $\frac{3}{5}$
 - ☐ D. $\frac{2}{5}$

Q.83 A laboratory thermometer has a range from -10 degrees Celsius to 110 degrees Celsius and 120 equal divisions. What is the smallest value that this thermometer can read?

- Ans**
- ☐ A. 0.5 degrees Celsius
 - ☐ B. 10 degrees Celsius
 - ☐ C. 2 degrees Celsius
 - ☒ D. 1 degree Celsius

Q.84 Five students, N, O, R, S and T, have different heights. T is taller than N. R is taller than S but shorter than O. S is taller than N. More than two people are taller than T. How many people are shorter than R?

- Ans**
- ☐ A. Two
 - ☒ B. Three
 - ☐ C. One
 - ☐ D. None

Q.85 What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $5 \div 3 + 15 \times 5 - 3 = ?$

- Ans**
- ☒ A. 15
 - ☐ B. 18
 - ☐ C. 12
 - ☐ D. 9

Q.86 Which of the following best describes the function of a speedometer in a vehicle?

- Ans**
- ☒ A. It calculates the average speed over a journey.
 - ☒ B. It displays the current speed at which the vehicle is moving.
 - ☒ C. It shows the rate at which the vehicle's speed changes.
 - ☒ D. It measures the total distance the vehicle has traveled.

Q.87 The price of sugar is increased by 20%. Manoj can increase his expenditure on sugar by only 15% from his income. In order to balance his expenditure, by what percentage should he reduce the quantity of sugar consumed?

- Ans**
- ☒ A. 6.5%
 - ☒ B. $4\frac{1}{6}\%$
 - ☒ C. $5\frac{1}{3}\%$
 - ☒ D. 5%

Q.88 Which symbol best represents a battery in an electric circuit diagram according to standard conventions?

- Ans**
- ☒ A. A pair of long and short parallel lines placed alternately
 - ☒ B. Two circles connected in series
 - ☒ C. A single long line only
 - ☒ D. Two short lines placed together

Q.89 Which intervention most effectively reduces ground-level pollutant concentrations during a winter temperature inversion?

- Ans**
- ☒ A. Elevating emission sources above inversion layers
 - ☒ B. Enhancing vertical air mixing through artificial turbulence
 - ☒ C. Reducing local wind speed to minimize horizontal dispersion
 - ☒ D. Increasing surface temperatures near emission sources

Q.90 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

ZOT - TLP
NIL - HFH

- Ans**
- ☒ A. BCD - VZZ
 - ☒ B. VZZ - BCD
 - ☒ C. ABD - VZZ
 - ☒ D. BOC - VZT

Q.91 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. There are exactly two boxes between T and P. Only Q is kept above U. No box is kept below P. S is kept somewhere below W but above V. Based on the given information, which box is kept third above V?

- Ans**
- ☒ A. T
 - ☒ B. S
 - ☒ C. P
 - ☒ D. W

Q.92 What does CPU stand for in computing?

- Ans**
- ☒ A. Control Processing Unit
 - ☒ B. Computer Processing Unit
 - ☒ C. Core Processing Unit
 - ☒ D. Central Processing Unit

Q.93 Which scenario best demonstrates proactive workplace safety behavior?

- Ans**
- ☐ A. Waiting for a supervisor to notice hazards
 - ☒ B. Identifying and correcting hazards before accidents occur
 - ☐ C. Reporting hazards after incidents happen
 - ☐ D. Discussing only past safety problems in meetings

Q.94 A solid right circular cone is 7 cm high, and the radius of its base is 22.2 cm. It is melted and recast into a right circular cone with radius of its base 3.7 cm. Then the height (in cm) of the cone is _____.

- Ans**
- ☒ A. 252
 - ☐ B. 185
 - ☐ C. 267
 - ☐ D. 159

Q.95 A, B, C, D and E have different heights. E is taller than C but shorter than A. Only one person is taller than A. D is shorter than C. Who amongst them is the third tallest?

- Ans**
- ☒ A. E
 - ☐ B. B
 - ☐ C. A
 - ☐ D. C

Q.96 An engineering firm is tasked with creating a set of technical drawings for a large-scale project. The client specifies that all components must fit on a single sheet without reducing the drawing scale, and the total drawing area required is approximately 1 square meter. Based on standard drawing sheet sizes, which sheet should the firm select to best meet these requirements?

- Ans**
- ☐ A. A1 size sheet
 - ☐ B. A2 size sheet
 - ☐ C. A3 size sheet
 - ☒ D. A0 size sheet

Q.97 Two trains are moving in opposite directions. The first train is 120 m long and runs at 54 km/h. The second train is 180 m long and runs at 72 km/h. How much time will they take to cross each other completely? (Rounded up to two decimal places)

- Ans**
- ☐ A. 7.57 seconds
 - ☐ B. 9.25 seconds
 - ☒ C. 8.57 seconds
 - ☐ D. 8.43 seconds

Q.98 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Among 5 sticks, B, U, N, M and D, each having a different height, which stick is the shortest?

(I) D is shorter than U. M is shorter than B.

(II) M is taller than D.

- Ans**
- ☐ A. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ B. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☒ C. Both statements I and II together are NOT sufficient to answer the question
 - ☐ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.99 Which statement best describes the side view in engineering drawing?

- Ans**
- ☐ A. It shows the object as seen from above or below
 - ☐ B. It shows a combination of all views of the object
 - ☒ C. It shows the object as seen from left or right side
 - ☐ D. It shows the object as seen clearly from the front

Q.100 What will come in place of the question mark (?) in the following equation if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $42 \times 6 \div 7 - 35 + 19 = ?$

- Ans**
- ☒ A. 65
 - ☐ B. 63
 - ☐ C. 67
 - ☐ D. 69

Section : **PART-B**

Q.1 What component is responsible for pressurizing the brake fluid when the brake pedal is applied?

- Ans**
- ☐ A. Brake drum
 - ☒ B. Master cylinder
 - ☐ C. Wheel cylinder
 - ☐ D. Pedal return spring

Q.2 Which material is most commonly used to manufacture a solid frame hacksaw?

- Ans**
- ☐ A. Brass
 - ☐ B. Stainless steel
 - ☒ C. High carbon steel
 - ☐ D. Aluminum

Q.3 Why is Polyvinyl Chloride (PVC) commonly used as a covering material on household electrical wires?

- Ans**
- ☒ A. Because it acts as insulator to protect from electric shock
 - ☐ B. Because it is a good conductor of electricity
 - ☐ C. Because it increases the current in the wire
 - ☐ D. Because it reduces the supply voltage to a safe value

Q.4 Which of the following is a direct result of poor cylinder head design in diesel engines?

- Ans**
- ☐ A. Increased vibration due higher unbalance force
 - ☒ B. Frequent cylinder head gasket failures and leaks
 - ☐ C. Lower emissions and improved environment
 - ☐ D. Difficulties in gear shifting and transmission operation

Q.5 Magnetic permeability is a measure of a material's ability to _____.

- Ans**
- ☐ A. conduct electric current.
 - ☐ B. produce heat.
 - ☐ C. store electric charge.
 - ☒ D. carry magnetic flux.

Q.6 If a welded joint lacks sufficient strength and fails under design load, which process requirement was most likely overlooked?

- Ans**
- ☐ A. Post-weld grinding for smooth surface finish
 - ☐ B. Marking the weld center line with a scribe
 - ☒ C. Correct edge preparation before welding
 - ☐ D. Using the maximum available nozzle size

Q.7 While inspecting a finished part for flatness, which property of the surface plate makes it suitable for this task?

- Ans**
- ☐ A. Its weight compared to the workpiece
 - ☒ B. Its high degree of flatness and stability
 - ☐ C. Its light color for visibility
 - ☐ D. Its polished and shiny surface

Q.8 Which material is commonly used for manufacturing gears in automotive transmission systems due to its strength and durability?

- Ans**
- ☒ A. Alloy steel
 - ☐ B. Brass
 - ☐ C. Cast iron
 - ☐ D. Plastic

Q.9 Which sensor provides input to the Automated Manual Transmission (AMT) electronic control unit for deciding gear shifts?

- Ans**
- ☐ A. Clutch position sensor
 - ☒ B. Vehicle speed sensor
 - ☐ C. Oxygen sensor
 - ☐ D. Fuel injector

Q.10 A technician sets a digital multimeter to the 10 A current range and inserts the red probe into the 10 A terminal. He then accidentally connects the probes directly across a 24 V battery. What is the best evaluation of this action?

- Ans**
- ☐ A. It produces a stable reading without affecting the circuit
 - ☒ B. It creates a short circuit and may damage the multimeter
 - ☐ C. It correctly measures the current drawn by the battery
 - ☐ D. It increases the measured voltage due to range selection

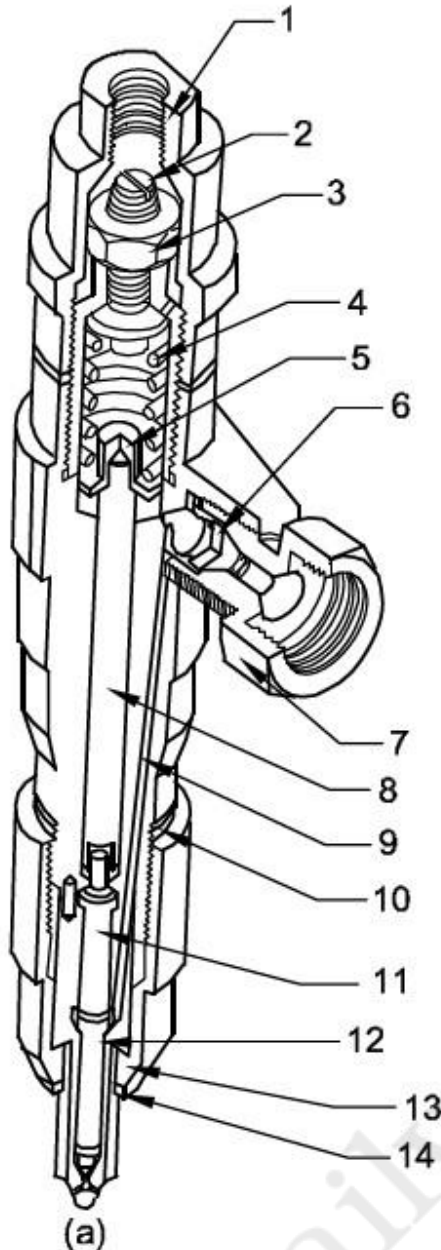
Q.11 How does the vertical down welding position influence weld speed and penetration compared to vertical up welding?

- Ans**
- ☐ A. Gives the same speed and penetration
 - ☒ B. Increases speed but reduces penetration
 - ☐ C. Increases penetration but reduces speed
 - ☐ D. Reduces speed but increases penetration

Q.12 A magnetic path has a reluctance of 5000 ampere-turns per weber. If the coil produces a magnetomotive force of 250 ampere-turns, what is the magnetic flux in the core?

- Ans**
- ☐ A. 1250000 Wb
 - ☐ B. 0.005 Wb
 - ☒ C. 0.05 Wb
 - ☐ D. 20 Wb

Q.13 In the given fuel injector figure of a three-wheeled diesel engine, what is the name of the part marked as number 8?



- Ans
- ✓ A. Spindle
 - ✗ B. Fuel passage
 - ✗ C. Needle valve
 - ✗ D. Nozzle body

Q.14 Why does the electrical conductivity of an intrinsic (pure) semiconductor increase with an increase in temperature?

- Ans
- ✗ A. Because higher temperature converts the semiconductor directly into a superconductor
 - ✓ B. Because higher temperature creates more free charge carriers by breaking some covalent bonds
 - ✗ C. Because higher temperature reduces the atomic size of the crystal
 - ✗ D. Because higher temperature permanently increases the number of valence electrons in each atom

Q.15 What is a key difference between 2-stroke and 4-stroke diesel engines?

- Ans
- ✗ A. A cooling system is absent in a 2-stroke engine
 - ✗ B. Higher-viscosity lubrication is required in a 4-stroke engine
 - ✓ C. Power stroke occurs in every revolution of a 2-stroke engine
 - ✗ D. Different fuels are used in 2-stroke and 4-stroke engines

Q.16 A brake pedal that sinks too low or travels excessively before applying the brakes often indicates that the gap between brake lining and brake drum is _____.

- Ans**
- ☒ A. properly adjusted
 - ☒ B. excessive
 - ☒ C. too small
 - ☒ D. zero

Q.17 Which combination of parts is directly involved in the conversion of reciprocating motion to rotary motion in a diesel engine?

- Ans**
- ☒ A. Piston, connecting rod, crankshaft
 - ☒ B. Cylinder liner, rocker arm, injector
 - ☒ C. Valve, cylinder head, camshaft
 - ☒ D. Fuel injector, camshaft, flywheel

Q.18 During a real-life pipeline repair, what sequence ensures both safety and weld integrity?

- Ans**
- ☒ A. Tack welding, cleaning joint, aligning, isolating pipeline, final welding
 - ☒ B. Cleaning joint, aligning, tack welding, final welding, isolating pipeline
 - ☒ C. Isolating pipeline, cleaning joint, aligning, tack welding, final welding
 - ☒ D. Final welding, aligning, cleaning joint, isolating pipeline, tack welding

Q.19 Which liner material is commonly used in petrol engines because of its good wear resistance and heat dissipation properties?

- Ans**
- ☒ A. Cast iron
 - ☒ B. Copper
 - ☒ C. Brass
 - ☒ D. Pure aluminum

Q.20 Which combination of factors makes edge joints less suitable for high-load applications?

- Ans**
- ☒ A. Large weld area and high overall strength
 - ☒ B. Wide accessibility and significant reinforcement
 - ☒ C. High ductility and flexibility in the joint
 - ☒ D. Limited weld area and reduced joint strength

Q.21 Why is the piston head designed with a slightly concave or domed shape in petrol engines?

- Ans**
- ☒ A. To cool the cylinder walls and spark plug
 - ☒ B. To increase the overall piston weight
 - ☒ C. To strengthen the crankshaft and connecting rod
 - ☒ D. To improve combustion and reduce knocking

Q.22 How does a single cut file differ from a double cut file?

- Ans**
- ☒ A. Single cut has one set of parallel teeth while double cut has two
 - ☒ B. Single cut files have no teeth while double cut do
 - ☒ C. Single cut is used only for wood while double cut is used for metals
 - ☒ D. Single cut files are always round while double cut are always flat

Q.23 Which of the following can cause a gear to slip during operation in a manual transmission system?

- Ans**
- ☒ A. New locking pin
 - ☒ B. Proper gear lever adjustment
 - ☒ C. Excessive end float of gear
 - ☒ D. Tight selector rod

Q.24 Which sheet is most commonly used for roofing because it is both lightweight and corrosion-resistant?

- Ans**
- ☒ A. Aluminum sheet
 - ☐ B. Copper sheet
 - ☐ C. Tinplate
 - ☐ D. Stainless steel sheet

Q.25 If a file's length is measured from tip to heel, what does this exclude?

- Ans**
- ☐ A. The width
 - ☐ B. The Edge
 - ☐ C. The teeth
 - ☒ D. The tang

Q.26 Which feature of a depth gauge allows it to measure from a reference surface?

- Ans**
- ☐ A. Circular dial
 - ☐ B. Handle grip
 - ☒ C. Flat base
 - ☐ D. Sharp cutting edge

Q.27 Which part of a ball peen hammer head is located between the striking face and the peen?

- Ans**
- ☒ A. Cheek portion forming the main body of hammer head
 - ☐ B. Wedge inserted to secure handle tightly
 - ☐ C. Grip section provided at the handle end
 - ☐ D. Eye hole connecting hammer head to handle

Q.28 Which component is directly responsible for opening and closing the engine valves?

- Ans**
- ☒ A. Camshaft
 - ☐ B. Crankshaft
 - ☐ C. Connecting rod
 - ☐ D. Piston

Q.29 Which of the following best describes the main purpose of occupational health in a workshop?

- Ans**
- ☐ A. To increase production output efficiently
 - ☒ B. To protect workers from health hazards at the workplace
 - ☐ C. To monitor workers' attendance records
 - ☐ D. To reduce the cost of machinery maintenance

Q.30 Which pair of components is directly connected in a parallelogram steering linkage system?

- Ans**
- ☐ A. Steering knuckle and pitman arm
 - ☐ B. Pitman arm and idler arm
 - ☒ C. Tie rod and center (relay) link
 - ☐ D. Steering column and center link

Q.31 Which statement correctly defines the temperature of a body?

- Ans**
- ☐ A. Quantity of temperature in a body
 - ☐ B. Ability to conduct heat
 - ☒ C. Degree of hotness or coldness of a body
 - ☐ D. Amount of heat in a body

Q.32 Which situation in engineering drawing typically requires the use of a dashed line?

- Ans**
- ☐ A. To indicate center lines for symmetry
 - ☒ B. To indicate hidden edges that are not directly visible
 - ☐ C. To indicate visible outlines of an object
 - ☐ D. To indicate dimension lines for measurements

Q.33 Which condition leads to disengagement of the overrunning clutch connection in an automatic transmission?

- Ans**
- ☐ A. Outer ring rotates in a clockwise direction
 - ☒ B. Outer ring rotates in an anticlockwise direction
 - ☐ C. Vehicle comes to a complete stop
 - ☐ D. Brakes are applied forcefully

Q.34 When evaluating timing synchronization, which symptom most directly suggests cam-crank misalignment in a diesel engine?

- Ans**
- ☐ A. Poor battery charge and slow cranking
 - ☐ B. Slipping fan belt and reduced alternator output
 - ☐ C. Low coolant level and high engine temperature
 - ☒ D. Difficulty in starting and abnormal engine noise

Q.35 Which type of material is commonly used for a drive plate to withstand engine torque?

- Ans**
- ☒ A. High-strength steel
 - ☐ B. Lightweight plastic
 - ☐ C. Copper alloy
 - ☐ D. Aluminum alloy

Q.36 A worker is required to weld steel frames for 7 hours a day. Which PPE combination ensures both respiratory and visual safety during this task?

- Ans**
- ☐ A. Welding helmet and safety shoes
 - ☐ B. Apron and dust mask
 - ☒ C. Welding helmet and respirator
 - ☐ D. Respirator and apron

Q.37 What kind of movement does the dial indicator detect in a dial bore gauge?

- Ans**
- ☐ A. Thermal contraction
 - ☐ B. Rotational movement
 - ☐ C. Thermal expansion
 - ☒ D. Linear movement

Q.38 What is the main purpose of valve seats in a diesel engine?

- Ans**
- ☐ A. To hold the piston rings securely in place
 - ☐ B. To support the camshaft in its position
 - ☒ C. To provide a sealing surface for the valves
 - ☐ D. To guide the movement of the rocker arm

Q.39 A technician is designing a safety checklist for petrol engine shutdown. Which combination of tasks ensures optimal safety and engine protection?

- Ans**
- ☒ A. Idle engine before shutdown, turn off ignition, inspect for leaks, secure battery terminals
 - ☐ B. Open radiator cap immediately, disconnect battery, check tyre pressure, adjust seat
 - ☐ C. Clean air filter, check seat belt, polish dashboard, refill coolant
 - ☐ D. Increase engine speed, turn off ignition, wash engine, inspect seat covers

Q.40 What is the least count of a standard metric micrometer depth gauge?

- Ans**
- ☒ A. 0.01 mm
 - ☐ B. 0.1 mm
 - ☐ C. 1 mm
 - ☐ D. 0.001 mm

Q.41 During lab practice, why does increasing the number of turns on a coil generally increase the magnetic field strength for the same current and magnetic path length?

- Ans**
- ☐ A. Because the iron core changes into an insulator
 - ☐ B. Because increasing turns always removes magnetic flux from the core
 - ☐ C. Because more turns reduce the supply voltage to zero
 - ☒ D. Because magnetomotive force increases as the product of turns and current

Q.42 Which tool is commonly used to check the backlash between old gears during inspection?

- Ans**
- ☒ A. Feeler gauge
 - ☐ B. Torque wrench
 - ☐ C. File
 - ☐ D. Hammer

Q.43 Which projection method is recommended by BIS (Bureau of Indian Standards) in India?

- Ans**
- ☒ A. First angle projection
 - ☐ B. Perspective projection
 - ☐ C. Third angle projection
 - ☐ D. Oblique projection

Q.44 A vehicle shows irregular engine output at the wheels despite a healthy combustion process. Which component's malfunction in the power transfer chain is most likely responsible?

- Ans**
- ☐ A. Radiator
 - ☐ B. Exhaust valve
 - ☐ C. Spark plug
 - ☒ D. Flywheel

Q.45 Which component interacts directly with the 2-3 shift valve to enable a gear change from second to third gear?

- Ans**
- ☐ A. Catalytic converter
 - ☐ B. Clutch pedal
 - ☒ C. Governor valve
 - ☐ D. Torque converter

Q.46 If chips are building up and not breaking during tapping, what should be done?

- Ans**
- ☐ A. Apply more torque to the tap
 - ☐ B. Reduce the amount of cutting fluid
 - ☐ C. Increase the tapping speed
 - ☒ D. Back off the tap to break and clear chips

Q.47 A mechanic observes poor wetting of solder on a cleaned iron component. Which corrective action is most effective?

- Ans**
- ☐ A. Cool the iron component before soldering
 - ☐ B. Increase the soldering iron wattage
 - ☐ C. Reduce the thickness of the solder
 - ☒ D. Apply an appropriate flux before soldering

Q.48 Which part of a gas regulator directly responds to changes in outlet pressure?

- Ans**
- ☐ A. The inlet connection of the regulator
 - ☐ B. The pressure gauge attached to the regulator
 - ☒ C. The diaphragm inside the regulator
 - ☐ D. The regulator body

Q.49 A sine bar with a 200 mm center distance is used with a 50 mm slip gauge height. Which principle is used to determine the angle?

- Ans**
- ☐ A. It is based on the ratio of center distance of sine bar to slip gauge height.
 - ☐ B. It is based on the product of slip gauge height and sine bar length.
 - ☒ C. It is based on the ratio of slip gauge height to the center distance of sine bar.
 - ☐ D. It is based on the sum of slip gauge height and sine bar length.

Q.50 Which practice is essential for producing accurate external threads using a die?

- Ans**
- ☐ A. Tilting the die slightly away from the workpiece axis
 - ☒ B. Ensuring the die is aligned squarely with the workpiece axis
 - ☐ C. Applying uneven pressure while rotating the die during cutting
 - ☐ D. Skipping lubrication during the external threading operation

Q.51 In an underground cable, why is a metallic sheath provided over the insulation?

- Ans**
- ☐ A. To increase the electrical conductivity of the phase conductor
 - ☐ B. To provide mechanical protection against heavy soil pressure
 - ☒ C. To protect the cable from moisture and damaging liquids in the soil
 - ☐ D. To reduce the initial cost of the underground cable system

Q.52 A silicon diode in a circuit has a forward voltage drop of 0.7 V. It is connected in series with a 1 ohm resistor to a 5 V supply. What is the current flowing through the resistor when the diode is forward biased?

- Ans**
- ☐ A. 3.5 A
 - ☐ B. 5.7 A
 - ☒ C. 4.3 A
 - ☐ D. 0.7 A

Q.53 What is the typical maximum temperature of an oxy-acetylene flame in gas welding?

- Ans**
- ☐ A. 2000 degree Celsius
 - ☒ B. 3100 degree Celsius
 - ☐ C. 2900 degree Celsius
 - ☐ D. 2400 degree Celsius

Q.54 A diesel engine provides excellent fuel economy and high thermal efficiency, but combustion noise is relatively high. Which combustion chamber design is most likely used?

- Ans**
- ☐ A. Air cell chamber with compressed air stored in a separate chamber
 - ☐ B. Pre-combustion chamber with initial combustion outside the cylinder
 - ☐ C. Swirl chamber with tangential air entry into an auxiliary chamber
 - ☒ D. Direct injection chamber with fuel injected into the main chamber

Q.55 Which pair of metals exhibits the highest electrical and thermal conductivities for engineering applications?

- Ans**
- ☐ A. Cast iron and wrought iron
 - ☒ B. Copper and aluminium
 - ☐ C. Mild steel and stainless steel
 - ☐ D. Lead and bronze

Q.56 A truck manufacturer must choose an engine suitable for heavy-duty transport applications. Based on a comparative study, which engine type is generally preferred?

- Ans**
- ☐ A. Two-stroke spark-ignition engine
 - ☒ B. Four-stroke compression-ignition engine
 - ☐ C. Four-stroke spark-ignition engine
 - ☐ D. Wankel rotary engine

Q.57 The geometrical figure of a triangle can be constructed using:

- Ans**
- ☐ A. Four sides
 - ☒ B. Two angles and one side
 - ☐ C. One angle only
 - ☐ D. One side and one angle only

Q.58 Which statement correctly expresses Ohm's law for an electrical conductor under constant physical conditions?

- Ans**
- ☒ A. Voltage is equal to current multiplied by resistance
 - ☐ B. Resistance is equal to voltage multiplied by current
 - ☐ C. Current is equal to power divided by voltage
 - ☐ D. Power is directly proportional to resistance

Q.59 What does reluctance represent in a magnetic circuit?

- Ans**
- ☐ A. The rate of change of magnetic field with time
 - ☐ B. The ability of a material to store magnetic flux
 - ☐ C. The power loss in the magnetic core
 - ☒ D. The opposition offered to the establishment of magnetic flux

Q.60 Which part of a vernier bevel protractor is used as the reference surface while measuring an angle?

- Ans**
- ☐ A. Blade
 - ☒ B. Stock
 - ☐ C. Vernier scale
 - ☐ D. Dial

Q.61 Which of the following auxiliary systems maintains engine temperature by circulating coolant and dissipating excess heat through the radiator?

- Ans**
- ☒ A. Cooling system
 - ☐ B. Lubrication system
 - ☐ C. Exhaust system
 - ☐ D. Fuel supply system

Q.62 Air entering the hydraulic brake system makes the brake pedal spongy because air is compressible and prevents proper transmission of force to the brakes. The corrective maintenance action is:

- Ans**
- ☒ A. System bleeding
 - ☐ B. Fluid topping
 - ☐ C. Cable tightening
 - ☐ D. Pad replacement

Q.63 Which use of calipers involves transferring a dimension from a workpiece to a scale?

- Ans**
- ☐ A. Setting out parallel lines
 - ☐ B. Comparing internal and external sizes
 - ☐ C. Direct measurement reading
 - ☒ D. Indirect measurement transfer

Q.64 When adjusting the brake valve spindle in the released position of the brake pedal, what is the correct procedure according to maintenance guidelines?

- Ans**
- ☐ A. Shorten the spindle by half its length and replace the gasket
 - ☒ B. Set the spindle length so the valve is fully pressed and secure the lock nut
 - ☐ C. Adjust the spindle until the pedal is flush with the floor and apply thread sealant
 - ☐ D. Extend the spindle until it contacts the pedal stop and loosen the jam nut

Q.65 For which application is a 32 Teeth Per Inch hacksaw blade ideal?

- Ans**
- ☐ A. Thin plastics bar
 - ☐ B. Thick steel bars
 - ☐ C. Thick plastics bar
 - ☒ D. Thin sheets

Q.66 How often should the die be backed off during external thread cutting?

- Ans**
- ☐ A. Only once at the beginning of the threading operation before cutting starts
 - ☐ B. Only at the end of the threading pass after reaching the required length
 - ☒ C. Periodically during cutting to break chips, depending on material conditions
 - ☐ D. After forming each complete thread along the workpiece to break chips

Q.67 Which characteristic of the crankshaft material plays a vital role in its performance?

- Ans**
- ☒ A. High fatigue strength
 - ☐ B. High electrical conductivity
 - ☐ C. High thermal expansion
 - ☐ D. High optical clarity

Q.68 Which component shares a similar operational principle with the wheel cylinder but operates in reverse?

- Ans**
- ☐ A. Brake booster
 - ☐ B. Brake drum
 - ☐ C. Proportioning valve
 - ☒ D. Master cylinder

Q.69 The distance of the effort from the fulcrum is called the _____.

- Ans**
- ☐ A. Mechanical arm
 - ☐ B. Lever length
 - ☒ C. Effort arm
 - ☐ D. Load arm

Q.70 Which of the following best describes the working principle of a 2-stroke diesel engine?

Ans ☒ A. Exhaust gases are expelled only during a separate exhaust stroke in the cycle

☒ B. The engine completes one power cycle in two strokes with one crankshaft revolution

☒ C. Air and fuel are mixed in the carburetor before entering the cylinder for combustion process

☒ D. The engine completes one power cycle in four strokes with two crankshaft revolutions

Q.71 How do the compression ratios of conventional petrol engines generally compare with diesel engines?

Ans ☒ A. Conventional petrol engines have lower compression ratios than diesel engines.

☒ B. Conventional petrol engines have higher compression ratios than diesel engines.

☒ C. Conventional petrol engines have higher compression ratios at idling speeds only.

☒ D. Conventional petrol engines have the same compression ratios as diesel engines.

Q.72 When soldering ferrous metals, which factor can cause a weak joint if not controlled?

Ans ☒ A. High melting solder

☒ B. Insufficient surface preparation

☒ C. Excessive solder application

☒ D. Low flux boiling point

Q.73 What is the main function of belt and chain tensioners in a diesel engine timing system?

Ans ☒ A. To increase engine compression ratio by providing high tension

☒ B. To eliminate the need for timing components completely

☒ C. To keep the timing belt or chain rotating

☒ D. To maintain proper tension in the drive

Q.74 Which scenario best demonstrates the benefit of electronic fuel injection in real-world driving conditions?

Ans ☒ A. Consistent engine performance at varying altitudes

☒ B. Manual adjustment of fuel jets on highways

☒ C. Frequent engine stalling in city traffic

☒ D. Delayed ignition timing during acceleration

Q.75 Which of these is NOT a purpose of the drive plate in an automatic transmission system?

Ans ☒ A. Transmitting torque to the transmission

☒ B. Storing rotational energy

☒ C. Connecting torque converter to crankshaft

☒ D. Handling flexing during rotation



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	2:30 PM - 5:00 PM
Subject	ALP Stage 2 Machinist

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 Why does biomedical waste require special handling compared to general municipal waste?

- Ans**
- ☒ A. It has higher chemical content and is always toxic.
 - ☒ B. It is more likely to be recycled than other types of waste.
 - ☒ C. It may contain infectious agents that pose health risks.
 - ☒ D. It is always radioactive and requires heavy shielding.

Q.2 What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $5 \div 3 + 15 \times 5 - 3 = ?$

- Ans**
- ☒ A. 9
 - ☒ B. 18
 - ☒ C. 15
 - ☒ D. 12

Q.3 If 2 is subtracted from each odd digit and 2 is added to each even digit in the number 235234796423, what will be the sum of the digits that are third from the left and third from the right?

- Ans**
- ☒ A. 7
 - ☒ B. 6
 - ☒ C. 9
 - ☒ D. 8

Q.4 Which of the following pairs of numbers is co-prime?

- Ans**
- ☒ A. (28, 49)
 - ☒ B. (17, 54)
 - ☒ C. (14, 28)
 - ☒ D. (21, 33)

Q.5 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

Some rugs are fans.

No fan is a car.

Conclusion (I) : Some rugs are cars.

Conclusion (II) : Some fans are rugs.

- Ans**
- ☐ A. Neither conclusion (I) nor (II) follows
 - ☐ B. Both conclusions (I) and (II) follow
 - ☐ C. Only conclusion (I) follows
 - ☒ D. Only conclusion (II) follows

Q.6 A boy uses a wheelbarrow to carry sand. The wheel acts as the pivot, the sand is placed in the tray, and the boy lifts the handles. In this arrangement, the sand represents

- Ans**
- ☒ A. Load
 - ☐ B. Effort
 - ☐ C. Arm
 - ☐ D. Fulcrum

Q.7 The salary of a person is increased by 10%, 20% and 25% successively in three consecutive years. Find the overall percentage increase in the salary at the end of the third year.

- Ans**
- ☐ A. 30%
 - ☐ B. 50%
 - ☐ C. 60%
 - ☒ D. 65%

Q.8 Which statement best describes the side view in engineering drawing?

- Ans**
- ☐ A. It shows the object as seen clearly from the front
 - ☒ B. It shows the object as seen from left or right side
 - ☐ C. It shows the object as seen from above or below
 - ☐ D. It shows a combination of all views of the object

Q.9 Which type of personal protective equipment is most suitable for tasks involving airborne chemical particles in confined spaces?

- Ans**
- ☐ A. Body protection with flame-retardant suits
 - ☐ B. Hand protection using chemical-resistant gloves
 - ☐ C. Head protection with industrial-grade hard hats
 - ☒ D. Respiratory protection devices such as half-face masks

Q.10 What is a key feature of single stroke lettering in technical drawings?

- Ans**
- ☒ A. Each character is made with one continuous stroke.
 - ☐ B. Each character is outlined and then filled.
 - ☐ C. Each character is made with several parallel lines.
 - ☐ D. Each character is shaded after drawing.

Q.11 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All chocolates are paneers.
No paneer is a milk.

Conclusions:

- (I) No chocolate is a milk.
(II) Some milks are paneers.

Ans ☒ A. Both conclusions (I) and (II) follow.
☒ B. Only conclusion (II) follows.
☒ C. Neither conclusion (I) nor (II) follows.
☒ D. Only conclusion (I) follows.

Q.12 Which of the following correctly states the full form of CD and the technology used to store data on it?

Ans ☒ A. Compact Disc, Magnetic Storage
☒ B. Compact Drive, Magnetic Storage
☒ C. Compact Drive, Optical Storage
☒ D. Compact Disc, Optical Storage

Q.13 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

Ans ☒ A. FZ-GA
☒ B. HB-IC
☒ C. RL-SN
☒ D. PJ-QK

Q.14 G is the mother of Y. Y is the sister of V. S is the father of L. L is the son of V. How is G related to L?

Ans ☒ A. Mother
☒ B. Mother's sister
☒ C. Sister
☒ D. Mother's mother

Q.15 The price of sugar is increased by 20%. Manoj can increase his expenditure on sugar by only 15% from his income. In order to balance his expenditure, by what percentage should he reduce the quantity of sugar consumed?

Ans ☒ A. 6.5%
☒ B. $5\frac{1}{3}\%$
☒ C. $4\frac{1}{6}\%$
☒ D. 5%

Q.16 A solid right circular cone is 7 cm high, and the radius of its base is 22.2 cm. It is melted and recast into a right circular cone with radius of its base 3.7 cm. Then the height (in cm) of the cone is _____.

Ans ☒ A. 159
☒ B. 185
☒ C. 267
☒ D. 252

- Q.17** An engineer is updating a schematic for a control panel and needs to indicate a normally closed push button. Which approach best ensures the symbol is universally understood among engineers referring to standard engineering drawings?
- Ans** ☒ A. Substitute the normally closed push button symbol with a general switch symbol
- ☒ B. Draw a hand made representation of the push button with a note explaining function
- ☒ C. Use the standardized symbol for a normally closed push button as per conventions
- ☒ D. Describe the normally closed push button in words within the schematic diagram clearly

- Q.18** Let C be a circle, and AB and DE be two chords on C such that $AB = BE$. In the quadrilateral ABED, let AE and BD intersect at F, $\angle DBE = 55^\circ$ and $\angle BAE = 40^\circ$. Find $\angle FED$.
- Ans** ☒ A. 110°
- ☒ B. 45°
- ☒ C. 55°
- ☒ D. 60°

- Q.19** SANZ is related to YUTT in a certain way based on the English alphabetical order. In the same way, MTHM is related to SNNG. To which of the following is LJRE related to following the same logic?
- Ans** ☒ A. REXZ
- ☒ B. RDX Y
- ☒ C. QDYY
- ☒ D. QEYZ

- Q.20** Which color is universally associated with emergency exit signs in industrial workplaces under international standards?
- Ans** ☒ A. Green background with white text or symbols
- ☒ B. Blue background with white text or symbols
- ☒ C. Red background with white text or symbols
- ☒ D. Yellow background with black text or symbols

- Q.21** Which factor increases the amount of heat produced in a wire when an electric current flows through it for a fixed time?
- Ans** ☒ A. Increasing the resistance of the wire
- ☒ B. Decreasing the length of the wire
- ☒ C. Reducing the current in the wire
- ☒ D. Making the wire thicker

- Q.22** A cyclist travels from the kilometer stone marked 52 to the stone marked 79. How far has the cyclist traveled?
- Ans** ☒ A. 52 kilometers
- ☒ B. 31 kilometers
- ☒ C. 131 kilometers
- ☒ D. 27 kilometers

- Q.23** In a certain code language, 'SOIL' is coded as '1547' and 'COIL' is coded as '7124'. What is the code for 'C' in the given code language?
- Ans** ☒ A. 4
- ☒ B. 2
- ☒ C. 7
- ☒ D. 1

Q.24 What is the primary color used in warning signs to alert workers of potential hazards?

- Ans**
- ☒ A. Yellow with black symbol or text
 - ☐ B. Blue with white symbol or text
 - ☐ C. Red with white symbol or text
 - ☐ D. Green with white symbol or text

Q.25 Which scenario best demonstrates proactive workplace safety behavior?

- Ans**
- ☒ A. Identifying and correcting hazards before accidents occur
 - ☐ B. Waiting for a supervisor to notice hazards
 - ☐ C. Discussing only past safety problems in meetings
 - ☐ D. Reporting hazards after incidents happen

Q.26 What is the primary role of the Central Processing Unit (CPU) in a computer system?

- Ans**
- ☐ A. To manage network connections
 - ☐ B. To store long-term data
 - ☐ C. To display output on the screen
 - ☒ D. To execute program instructions

Q.27 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GXM 5, JVN 11, MTO 24, PRP 51, ?

- Ans**
- ☐ A. TPQ 106
 - ☒ B. SPQ 106
 - ☐ C. TPQ 107
 - ☐ D. SPQ 107

Q.28 Which combination best describes the main environmental challenges associated with plastic waste management?

- Ans**
- ☐ A. Rapid biodegradation and chemical leaching
 - ☐ B. Thermal pollution and effective composting
 - ☐ C. Neutralization and easy recycling
 - ☒ D. Persistence in the environment and microplastic formation

Q.29 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Among 5 sticks, B, U, N, M and D, each having a different height, which stick is the shortest?

(I) D is shorter than U. M is shorter than B.

(II) M is taller than D.

- Ans**
- ☐ A. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☐ B. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ C. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ D. Both statements I and II together are NOT sufficient to answer the question

Q.30 Simplify the following expression.

11 of $7 + 125 \div 5 + 99 \div 11 \times 7 - 17$ of $7 + 7 \times 6 - (91 \div 7 + 7 \times 5)$

- Ans**
- ☐ A. 44
 - ☒ B. 40
 - ☐ C. 48
 - ☐ D. 36

Q.31 Which statement best describes how the mass and speed of an object affect its kinetic energy?

- Ans**
- ☒ A. An object with greater mass and higher speed will have more kinetic energy.
 - ☐ B. An object with greater mass but lower speed will have more kinetic energy.
 - ☐ C. An object with less mass and lower speed will have more kinetic energy.
 - ☐ D. An object with same mass but higher speed will have less kinetic energy.

Q.32 A plane parallel to the base divides a cone of height 40 cm into two parts. If the volume of the upper smaller cone formed is $\frac{1}{64}$ of the volume of the original cone, calculate the height of the plane from the base of the cone.

- Ans**
- ☐ A. 10 cm
 - ☐ B. 40 cm
 - ☐ C. 20 cm
 - ☒ D. 30 cm

Q.33 If $x + \frac{1}{x} = 5$, then $\frac{x^3 - 5x^2 + 5x}{x^2 + 1}$ is equal to:

- Ans**
- ☐ A. $\frac{1}{5}$
 - ☐ B. $\frac{3}{5}$
 - ☐ C. $\frac{2}{5}$
 - ☒ D. $\frac{4}{5}$

Q.34 A ladder is leaning against a wall and makes an angle of 60° with the ground. If the length of the ladder is 24 m, find the distance of the foot of the ladder from the wall.

- Ans**
- ☐ A. 9 m
 - ☐ B. 15 m
 - ☐ C. 18 m
 - ☒ D. 12 m

Q.35 Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

6 – 16 – 23 – 32; 7 – 19 – 26 – 35

- Ans**
- ☒ A. 12 – 34 – 41 – 50
 - ☐ B. 11 – 31 – 38 – 29
 - ☐ C. 8 – 22 – 15 – 24
 - ☐ D. 4 – 14 – 21 – 30

Q.36 A car travels from point A to point B in a zigzag path, covering a total distance of 200 meters. If the shortest straight-line distance between A and B is 120 meters, which statement best describes the car's distance and displacement?

- Ans**
- ☒ A. The distance is 200 meters; the displacement is 120 meters
 - ☐ B. The distance is 120 meters; the displacement is 120 meters
 - ☐ C. The distance is 120 meters; the displacement is 200 meters
 - ☐ D. The distance is 200 meters; the displacement is 200 meters

Q.37 A laboratory thermometer has a range from -10 degrees Celsius to 110 degrees Celsius and 120 equal divisions. What is the smallest value that this thermometer can read?

- Ans**
- ☐ A. 2 degrees Celsius
 - ☐ B. 0.5 degrees Celsius
 - ☐ C. 10 degrees Celsius
 - ☒ D. 1 degree Celsius

Q.38 What will come in place of the question mark (?) in the following equation if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $42 \times 6 \div 7 - 35 + 19 = ?$

- Ans**
- ☐ A. 67
 - ☐ B. 63
 - ☐ C. 69
 - ☒ D. 65

Q.39 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and select the most appropriate answer.

Question:

Among five trees N, O, R, S, and T, each having a different height, which tree is the tallest?

Statements:

(I) T is taller than R. N is taller than T.

(II) R is shorter than O but taller than S.

- Ans**
- ☒ A. Both statements I and II together are NOT sufficient to answer the question
 - ☐ B. Data in Statement I alone is sufficient to answer the question while data in statement II is not
 - ☐ C. Data in Statement II alone is sufficient to answer the question while data in statement I is not
 - ☐ D. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question

Q.40 If a rectangular field is measured to be 120 meters long and 75 meters wide, what is its area in SI units?

- Ans**
- ☒ A. 9000 square meters
 - ☐ B. 19500 square meters
 - ☐ C. 1800 square meters
 - ☐ D. 15000 square meters

Q.41 Sohan covers a total distance of 760 km to reach his home, traveling partly by train and partly by car. He takes 8 hours when he travels 160 km by train and the rest by car. If he travels 240 km by train and the remaining distance by car, his journey takes 12 minutes longer. Find the difference between the speeds of the train and the car.

- Ans**
- ☐ A. 23 km/h
 - ☐ B. 21 km/h
 - ☒ C. 20 km/h
 - ☐ D. 27 km/h

Q.42 Which of the following is the best example of municipal solid waste?

- Ans**
- ☐ A. Industrial process waste
 - ☐ B. Mining tailings
 - ☒ C. Household kitchen garbage
 - ☐ D. Hospital biomedical waste

Q.43 Which statement best describes the front view in an engineering drawing?

- Ans**
- ☐ A. It shows only one dimension of the object
 - ☒ B. It shows the object's height and width as seen from the front
 - ☐ C. It shows only the object's bottom or right side
 - ☐ D. It shows the object's depth and height as seen from the side

Q.44 A sum of money invested at simple interest amounts to ₹21,500 in 5 years and ₹26,000 in 8 years. Find the principal amount (in ₹).

- Ans**
- ☐ A. 12,000
 - ☒ B. 14,000
 - ☐ C. 15,500
 - ☐ D. 7,500

Q.45 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

ZOT - TLP
NIL - HFH

- Ans**
- ☐ A. VZZ - BCD
 - ☐ B. ABD - VZZ
 - ☐ C. BOC - VZT
 - ☒ D. BCD - VZZ

Q.46 Refer to the given letter series and answer the question that follows.

(Left) A X T N K R Q K C P S I D F J U D O R G Z M B E L (Right)

How many letters are there in the English alphabetical series between the letter that is fourth from the right end and the letter that is third from the left end of the series?

- Ans**
- ☐ A. 5
 - ☐ B. 4
 - ☒ C. 6
 - ☐ D. 3

Q.47 Why does restricting certain chemical refrigerants effectively reduce damage to the ozone layer?

- Ans**
- ☐ A. Refrigerants contain particles that absorb harmful UV light.
 - ☐ B. Refrigerants emit greenhouse gases that warm the stratosphere.
 - ☒ C. Refrigerants release substances that catalyze ozone breakdown.
 - ☐ D. Refrigerants increase oxygen production, supporting ozone recovery.

Q.48 Which of the following statements best describes a triangle as used in engineering drawing?

- Ans**
- ☒ A. A triangle is a polygon with three straight sides and three angles.
 - ☐ B. A triangle is a polygon with four straight sides and four angles.
 - ☐ C. A triangle is a polygon having three curved sides.
 - ☐ D. A triangle must always have all sides of equal length.

Q.49 If the mean of the following data is 45, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	23	30	31	45	X

- Ans ☒ A. 160
☒ B. 162
☒ C. 188
☒ D. 180

Q.50 What information does a kilometer stone provide to travelers on a road?

- Ans ☒ A. Direction of travel
☒ B. Time taken to reach destination
☒ C. Distance from a reference point
☒ D. Speed of the vehicle

Q.51 A, B, C, D and E have different heights. E is taller than C but shorter than A. Only one person is taller than A. D is shorter than C. Who amongst them is the third tallest?

- Ans ☒ A. E
☒ B. C
☒ C. B
☒ D. A

Q.52 Pipes A and B can fill an entire tank in 8 hours and 12 hours, respectively. The water tank is one-fourth full. If both the pipes are opened together, then how long will it take to fill the remaining part of the tank?

- Ans ☒ A. 3 hours 16 minutes
☒ B. 3 hours 26 minutes
☒ C. 3 hours 36 minutes
☒ D. 3 hours 6 minutes

Q.53 A ramp is used to lift a box to a platform 2 m high. To reduce the effort required, the ramp length is increased from 4 m to 8 m. Assuming negligible friction, what remains unchanged?

- Ans ☒ A. The force required
☒ B. The mechanical advantage
☒ C. The work done in raising the box
☒ D. The distance moved along the ramp

Q.54 Refer to the given letter series and answer the question that follows. Counting to be done from left to right only.

(Left) H S A N D D I A D F P A J O S K I O Z O T X (Right)

How many such consonants are there, each of which is immediately preceded by a consonant and also immediately followed by a vowel?

- Ans ☒ A. Four
☒ B. Three
☒ C. Five
☒ D. Six

Q.55 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. There are exactly two boxes between T and P. Only Q is kept above U. No box is kept below P. S is kept somewhere below W but above V. Based on the given information, which box is kept third above V?

- Ans**
- ☒ A. S
 - ☒ B. W
 - ☒ C. T
 - ☒ D. P

Q.56 An engineering firm is tasked with creating a set of technical drawings for a large-scale project. The client specifies that all components must fit on a single sheet without reducing the drawing scale, and the total drawing area required is approximately 1 square meter. Based on standard drawing sheet sizes, which sheet should the firm select to best meet these requirements?

- Ans**
- ☒ A. A3 size sheet
 - ☒ B. A1 size sheet
 - ☒ C. A0 size sheet
 - ☒ D. A2 size sheet

Q.57 Five students, N, O, R, S and T, have different heights. T is taller than N. R is taller than S but shorter than O. S is taller than N. More than two people are taller than T. How many people are shorter than R?

- Ans**
- ☒ A. Two
 - ☒ B. None
 - ☒ C. One
 - ☒ D. Three

Q.58 A technician needs to select a fuse wire for a room heater. Which property should be considered most important for safety based on the heating effect of electric current?

- Ans**
- ☒ A. The fuse wire must have a low melting point to break the circuit during excess current.
 - ☒ B. The fuse wire must have a high melting point for durability.
 - ☒ C. The fuse wire must have high resistance and be thick to prevent melting.
 - ☒ D. The fuse wire must have a shiny surface for efficient cooling.

Q.59 A crane lifts a 200 kg load to a height of 15 meters in 10 seconds. Assuming acceleration due to gravity is 10 m/s^2 and energy loss is negligible, what is the power output of the crane during this operation?

- Ans**
- ☒ A. 1500 W
 - ☒ B. 3000 W
 - ☒ C. 1000 W
 - ☒ D. 2000 W

Q.60 If $3x - 2y + 3z = 8$, $4x - 3y + 2z = 4$ and $2x + y - z = 1$, then find x, y and z, respectively.

- Ans**
- ☒ A. 2, 3 and 1
 - ☒ B. 2, 1 and 3
 - ☒ C. 3, 1 and 2
 - ☒ D. 1, 2 and 3

Q.61 What should come in place of the question mark (?) in the given series?

1 2 7 20 61 ?

- Ans**
- ☒ A. 181
 - ☒ B. 185
 - ☒ C. 182
 - ☒ D. 183

Q.62 A dealer buys a table for ₹2,750. He first marks it up by 28%, then allows a 12% discount to a customer. If the customer also pays 5% GST on the selling price, find the profit percentage (excluding GST) made by the dealer.

- Ans**
- ☒ A. 13.81%
 - ☒ B. 10.36%
 - ☒ C. 15.12%
 - ☒ D. 12.64%

Q.63 Which one of the following statements correctly describes a characteristic of WANs?

- Ans**
- ☒ A. WANs typically use only wireless media to connect distant LANs.
 - ☒ B. WANs can be built by connecting multiple LANs via wired or wireless links.
 - ☒ C. WANs are limited to connecting devices within a radius of 1 to 2 km.
 - ☒ D. WANs are always public networks managed solely by Internet Service Providers (ISPs).

Q.64 The cost of a diamond varies directly with the square of its weight. A diamond broke into four pieces with weights in the ratio 2:4:1:3. If it had been broken into four equal pieces, the loss would have been ₹60,000. What was the original cost of the diamond?

- Ans**
- ☒ A. ₹80,000
 - ☒ B. ₹82,000
 - ☒ C. ₹78,000
 - ☒ D. ₹75,000

Q.65 A group of numbers/symbols is coded using letter codes as per the codes given below and the conditions that follow. The correct combination of codes following the conditions is your answer.

Note: If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	3	@	8	4	\$	&	2	%	#	1	+	9	7	5
Code	U	G	B	K	M	F	X	R	E	Q	S	C	V	T

Conditions –

- (i) If the first element is a symbol and the last element an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and the last elements are to be coded as ©
- (iii) If both second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?
& 8 \$ 9 5

- Ans**
- ☒ A. FCBMT
 - ☒ B. TCMBF
 - ☒ C. FBMCT
 - ☒ D. TBMCF

Q.66 Find the compound interest on ₹5,70,000 for 1.5 years at 10% per annum compounded half-yearly.

- Ans**
- ☒ A. ₹92,846.25
 - ☒ B. ₹89,946.25
 - ☒ C. ₹88,846.25
 - ☒ D. ₹89,846.25

Q.67 What is the primary purpose of a Local Area Network (LAN)?

- Ans**
- ☒ A. To connect global networks
 - ☒ B. To link wireless devices only
 - ☒ C. To connect social media accounts
 - ☒ D. To connect computers within a small geographical area

Q.68 12 is related to 1730 following a certain logic. Following the same logic, 13 is related to 2199. To which of the given options is 11 related, following the same logic?
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans** ☒ A. 1443
☒ B. 1333
☒ C. 1433
☒ D. 1543

Q.69 Seven boxes S, T, U, V, W, X, and Y are kept one over the other but not necessarily in the same order. U is kept exactly third from the top. Only one box is kept between U and T. W is kept immediately above T. Only three boxes are kept between X and S. V is kept on one of the positions below Y. Only two boxes are kept between U and S. Which box is kept second from the top?

- Ans** ☒ A. U
☒ B. T
☒ C. V
☒ D. X

Q.70 What does the term 'HAZOP' stand for in occupational safety?

- Ans** ☒ A. Hazard and Operability Study
☒ B. Handling and Organizing Safety
☒ C. Hazardous Operation Standard
☒ D. Hazardous Operations Safety

Q.71 In a certain code language,
A + B means 'A is the mother of B',
A – B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Satish related to Mayank if 'Satish + Deep × Piyush – Hitesh % Mayank'?

- Ans** ☒ A. Father's brother's wife's sister
☒ B. Father's brother's wife's mother
☒ C. Mother's brother's wife's sister
☒ D. Mother's brother's wife's mother

Q.72 A 42-litre solution has sugar and water in the ratio 2 : 5. If, due to evaporation, the volume is reduced by 35%, and only water evaporates, what is the new ratio of sugar to water?

- Ans** ☒ A. 40 : 41
☒ B. 31 : 50
☒ C. 40 : 51
☒ D. 51 : 42

Q.73 A pump can fill a tank in 3 hours. Due to a leak in the tank, it takes 4.5 hours to fill the tank. In how much time can the leak empty the full tank if no other entry or exit routes are open?

- Ans** ☒ A. 8 hours
☒ B. 9 hours
☒ C. 7 hours
☒ D. 6 hours

Q.74 An astronaut weighs 600 N on Earth. During a moon mission, she performs an experiment to measure her weight on the moon. Which value is closest to her expected weight on the moon, and why?

- Ans**
- ☐ A. 300 N, because the Moon's gravity is about one-half of Earth's.
 - ☒ B. 100 N, because the Moon's gravity is about one-sixth of Earth's.
 - ☐ C. 600 N, because a person's weight remains unchanged on the Moon.
 - ☐ D. 200 N, because the Moon's gravity is about one-third of Earth's.

Q.75 A hiker lifts a backpack from the ground to a ledge 2 meters above the ground. Which situation would result in the greatest increase in the backpack's gravitational potential energy?

- Ans**
- ☐ A. Carrying the same backpack horizontally for 2 meters
 - ☒ B. Lifting a heavier backpack to the same 2-meter ledge
 - ☐ C. Lifting a lighter backpack to the same 2-meter ledge
 - ☐ D. Lifting the same backpack to a 1-meter ledge

Q.76 Which intervention most effectively reduces ground-level pollutant concentrations during a winter temperature inversion?

- Ans**
- ☐ A. Increasing surface temperatures near emission sources
 - ☐ B. Reducing local wind speed to minimize horizontal dispersion
 - ☐ C. Elevating emission sources above inversion layers
 - ☒ D. Enhancing vertical air mixing through artificial turbulence

Q.77 Srinu starts from his home and drives 2 km towards the south, then takes a right turn and drives 5 km. He then takes a right turn and drives 6 km before taking a right turn again and driving 4 km further. Srinu finally takes a right turn and drives 4 km before stopping at his office. In which direction should Srinu drive to reach his home again? (All turns are 90-degree turns only unless specified.)

- Ans**
- ☐ A. West
 - ☐ B. South
 - ☐ C. North
 - ☒ D. East

Q.78 When drawing repeated 67° angles on an engineering sheet, which practice best helps minimize cumulative alignment errors?

- Ans**
- ☐ A. Relying solely on the initial protractor alignment for all angles
 - ☒ B. Using the same reference line for all repeated angles
 - ☐ C. Marking all angles lightly with a pencil before finalizing
 - ☐ D. Drawing all angles continuously without intermediate verification

Q.79 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

MDB PHE SLH VPK ?

- Ans**
- ☐ A. ZUO
 - ☐ B. ZTM
 - ☒ C. YTN
 - ☐ D. XSM

Q.80 What does CPU stand for in computing?

- Ans**
- ☐ A. Core Processing Unit
 - ☐ B. Computer Processing Unit
 - ☐ C. Control Processing Unit
 - ☒ D. Central Processing Unit

Q.81 Two trains are moving in opposite directions. The first train is 120 m long and runs at 54 km/h. The second train is 180 m long and runs at 72 km/h. How much time will they take to cross each other completely?
(Rounded up to two decimal places)

- Ans**
- ☒ A. 8.57 seconds
 - ☐ B. 8.43 seconds
 - ☐ C. 9.25 seconds
 - ☐ D. 7.57 seconds

Q.82 The average of five numbers is 30. If four of the numbers are 25, 35, 28 and 32, then what is the fifth number?

- Ans**
- ☐ A. 28
 - ☒ B. 30
 - ☐ C. 35
 - ☐ D. 32

Q.83 When a cutting plane line passes through a hole and a rib, which feature should be sectioned in the resulting view according to standard conventions?

- Ans**
- ☒ A. The hole is sectioned but the rib is shown unsectioned
 - ☐ B. The rib is sectioned but the hole is left unsectioned
 - ☐ C. Both the hole and the rib are shown unsectioned
 - ☐ D. Both the hole and the rib are shown sectioned

Q.84 What should come in place of '?' in the given series?
11, 22, 44, 88, 176, ?

- Ans**
- ☐ A. 358
 - ☐ B. 342
 - ☐ C. 356
 - ☒ D. 352

Q.85 Which symbol best represents a battery in an electric circuit diagram according to standard conventions?

- Ans**
- ☐ A. A single long line only
 - ☐ B. Two short lines placed together
 - ☐ C. Two circles connected in series
 - ☒ D. A pair of long and short parallel lines placed alternately

Q.86 Why is a room thermometer generally mounted vertically on a wall?

- Ans**
- ☐ A. It protects the thermometer from breaking easily.
 - ☐ B. It prevents the liquid from freezing inside the thermometer.
 - ☐ C. It helps the thermometer measure body temperature faster.
 - ☒ D. It ensures accurate reading by keeping the bulb exposed to room air.

Q.87 Refer to the following letter series and answer the question that follows. (Counting to be done from left to right only.)

(Left) Q K Q N X K G G V M L A W T W K N G V (Right)

How many such consonants are there each of which is immediately preceded by a vowel and also immediately followed by a consonant?

- Ans**
- ☐ A. None
 - ☒ B. One
 - ☐ C. Two
 - ☐ D. Three

Q.88 The first shopkeeper allows two successive discounts of 3% and 7%, while a second shopkeeper allows two successive discounts of 2% and 8%. A third shopkeeper allows 10% discount on the same item. From which shopkeeper should a customer buy if the marked price is the same at the three shops?

- Ans**
- ☐ A. Buy from the first or the second shopkeeper as both are the same.
 - ☒ B. Buy from the third shopkeeper
 - ☐ C. Buy from the second shopkeeper
 - ☐ D. Buy from the first shopkeeper

Q.89 Why are electric wires in household appliances usually covered with plastic or rubber coating?

- Ans**
- ☐ A. To produce more heat
 - ☐ B. To make the wires heavier
 - ☒ C. To prevent electric shocks by insulation
 - ☐ D. To increase the flow of current

Q.90 A cyclist rides 60 meters north, then 80 meters south, and finally 70 meters north. What is the total distance the cyclist has traveled?

- Ans**
- ☒ A. 210 meters
 - ☐ B. 150 meters
 - ☐ C. 10 meters
 - ☐ D. 60 meters

Q.91 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between Y and C when counted from the left of C. D sits third to the left of B. A sits to the immediate right of B. A sits second to the left of Y. Z is not an immediate neighbor of D. Who sits third to the right of X?

- Ans**
- ☐ A. C
 - ☐ B. D
 - ☒ C. A
 - ☐ D. Y

Q.92 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☐ A. DG – EH
 - ☐ B. SJ – TK
 - ☐ C. KE – LF
 - ☒ D. IT – KV

Q.93 The mean of 11 numbers is 10.9. If the mean of the first 6 numbers is 10.5 and the mean of the last 6 numbers is 11.4, then find the 6th number.

- Ans**
- ☐ A. 11
 - ☐ B. 10.5
 - ☒ C. 11.5
 - ☐ D. 10

Q.94 Which of the following best describes the function of a speedometer in a vehicle?

- Ans**
- ☐ A. It calculates the average speed over a journey.
 - ☒ B. It displays the current speed at which the vehicle is moving.
 - ☐ C. It shows the rate at which the vehicle's speed changes.
 - ☐ D. It measures the total distance the vehicle has traveled.

Q.95 A cyclist travels 120 km in 3 hours, rests for 1 hour, and then travels another 80 km in 2 hours. To determine the cyclist's average speed for the entire journey, which of the following quantities should be used?

- Ans**
- ☐ A. Total displacement divided by total time taken
 - ☐ B. Change in velocity divided by total time taken
 - ☐ C. Distance travelled in a particular direction divided by time
 - ☒ D. Total distance travelled divided by the total time taken

Q.96 Which of the following statements best describes a cuboid as used in engineering drawing?

- Ans**
- ☐ A. A cuboid has all faces as squares of equal size.
 - ☒ B. A cuboid is a solid with six rectangular faces, and opposite faces are equal.
 - ☐ C. A cuboid has all sides and angles equal, making it similar to a cube.
 - ☐ D. A cuboid is a solid where all faces are parallelograms but not necessarily rectangles.

Q.97 Which tool safety measure best prevents injuries when cleaning a workshop lathe after use?

- Ans**
- ☐ A. Using a rag to remove metal dust from the lathe
 - ☐ B. Blowing chips away with compressed air around the lathe
 - ☐ C. Wiping metal chips using bare hands directly
 - ☒ D. Using a brush to remove metal chips from the lathe

Q.98 An article is bought for ₹300 and its price is increased by 5.5%. The resulting price is then reduced by 8%. Find the final selling price.

- Ans**
- ☐ A. ₹288.24
 - ☐ B. ₹296.46
 - ☒ C. ₹291.18
 - ☐ D. ₹284.45

Q.99 If the height of an object is doubled while its mass remains constant, its gravitational potential energy will be:

- Ans**
- ☒ A. doubled
 - ☐ B. halved
 - ☐ C. unchanged
 - ☐ D. decreased to one-fourth

Q.100 P, Q and R are three batsmen. The ratios of runs scored by them in a certain match were as follows:

$P : Q = 5 : 7$ and $Q : R = 2 : 3$.

If they scored a total of 765 runs, then find the number of runs scored by R.

- Ans**
- ☐ A. 336
 - ☒ B. 357
 - ☐ C. 378
 - ☐ D. 350

Q.1 A 1:40 taper is to be turned using the compound rest. If the workpiece is 200 mm long, what is the approximate compound rest angle required?

- Ans**
- ☐ A. 1.15 degrees
 - ☐ B. 0.36 degrees
 - ☒ C. 0.72 degrees
 - ☐ D. 1.43 degrees

Q.2 After resolving an axis over-travel on a CNC lathe, which action should be performed before resuming the program?

- Ans**
- ☐ A. Change the workpiece and start a new setup
 - ☐ B. Ignore the zero return process and continue machining
 - ☐ C. Restart the program immediately from where it stopped
 - ☒ D. Verify axis position and reference zero return if needed

Q.3 In a puncher type slotter, what is the primary movement of the cutting tool?

- Ans**
- ☐ A. Rotating horizontally
 - ☐ B. Moving diagonally
 - ☐ C. Oscillating in circles
 - ☒ D. Reciprocating vertically

Q.4 A trainee accidentally activates the automatic tool changer while a hand is near the turret. What is the safest immediate action using panel controls?

- Ans**
- ☐ A. Press the cycle pause button to hold program execution
 - ☒ B. Activate the emergency stop to instantly cut machine movement
 - ☐ C. Decrease the axis movement speed using the override dial
 - ☐ D. Switch to manual mode on the panel controls

Q.5 Which method of cylindrical grinding is used when the workpiece is supported between centers and rotated?

- Ans**
- ☐ A. Infeed center-less method
 - ☐ B. End feed grinding method
 - ☐ C. Through feed grinding method
 - ☒ D. Traverse grinding method

Q.6 When a taper turning attachment is used instead of swiveling the compound rest, what machining capability is significantly enhanced?

- Ans**
- ☐ A. It reduces the hardness of the workpiece material
 - ☐ B. It allows for cutting threads on the workpiece
 - ☒ C. It enables the production of long tapers accurately
 - ☐ D. It makes the tool holder lighter for easier handling

Q.7 Which grade of pencil is recommended for single-stroke lettering in engineering drawings?

- Ans**
- ☐ A. B grade
 - ☐ B. F grade
 - ☒ C. HB grade
 - ☐ D. 2H grade

Q.8 Which material is least likely to be affected by rapid temperature changes during cutting?

- Ans**
- ☐ A. Ceramic tool material
 - ☒ B. High-speed steel (HSS)
 - ☐ C. Cast alloy steel
 - ☐ D. Carbon tool steel

Q.9 The main factor influencing a lathe's firmness under load is:

- Ans**
- ☒ A. Bed width and design
 - ☐ B. Spindle bore diameter
 - ☐ C. Swing over bed
 - ☐ D. Spindle speed range

Q.10 What is the main function of the spindle in a bench vice?

- Ans**
- ☐ A. To increase friction on the workpiece
 - ☐ B. To support the base
 - ☐ C. To protect the jaws
 - ☒ D. To convert rotary motion into linear motion

Q.11 When setting up for a heavy milling operation, why is it important to ensure that the overarm and ram are securely locked in position?

- Ans**
- ☐ A. Extends table travel distance
 - ☐ B. Increases spindle rotation speed
 - ☐ C. Improves coolant flow rate
 - ☒ D. Prevents unwanted movement during cutting

Q.12 Which type of drilling machines is specifically designed to accommodate multiple spindles so that different drilling operations can be performed at the same time?

- Ans**
- ☐ A. Bench drilling machine
 - ☒ B. Gang drilling machine
 - ☐ C. Upright drilling machine
 - ☐ D. Radial drilling machine

Q.13 A production line experiences repeated delays due to waiting for maintenance staff to fix machines. As a machinist, what process change would best minimize down time in this scenario?

- Ans**
- ☐ A. Extending machine warranty agreements for repairs
 - ☐ B. Rescheduling shifts to match maintenance staff availability
 - ☐ C. Increasing the number of maintenance staff on call
 - ☒ D. Training operators to perform routine maintenance tasks

Q.14 In a milling operation, the actual cycle time is consistently higher than the estimated cycle time. Which factor is most likely causing this discrepancy if all other parameters remain constant?

- Ans**
- ☐ A. Machine speed is always constant
 - ☒ B. Frequent tool changes are causing delays
 - ☐ C. Operator skill is unchanged
 - ☐ D. Material properties remain the same during operation

Q.15 What does the term 'machine hour rate' refer to in costing?

- Ans**
- ☐ A. The total machine-related cost allocated for one year
 - ☐ B. The total operating profit earned per machine day
 - ☒ C. The factory overhead cost incurred per machine hour
 - ☐ D. The total machine-generated revenue earned per shift

Q.16 In a scenario where a CNC vertical machining center is required to maintain extremely tight tolerances over an extended production run, which closed-loop control component is directly responsible for identifying and reporting deviations from the programmed tool path?

- Ans**
- ☐ A. Spindle motor drive
 - ☐ B. Power supply module
 - ☒ C. Position feedback transducer
 - ☐ D. Coolant distribution unit

Q.17 A machinist is required to finish a hole in a hard alloy component. Which reamer material should be selected?

- Ans**
- ☐ A. Copper
 - ☐ B. Mild Steel
 - ☐ C. Brass
 - ☒ D. Carbide

Q.18 Which property of the coolant fluid is most critical to ensure both effective cooling and lubrication during vertical milling operations?

- Ans**
- ☐ A. The coolant must have high electrical conductivity for machine safety.
 - ☐ B. The coolant must be brightly colored for easy visibility while machining.
 - ☐ C. The coolant must be able to produce foam to protect the workpiece from chips.
 - ☒ D. The coolant must have suitable viscosity and thermal conductivity for machining.

Q.19 When changing from a shorter to a longer tool on a CNC lathe, which adjustment must be made to maintain machining accuracy?

- Ans**
- ☐ A. Adjust the spindle feed rate
 - ☒ B. Update the tool length offset value
 - ☐ C. Update the work table offset value
 - ☐ D. Select a different part program

Q.20 When does a parallelogram become a rectangle?

- Ans**
- ☒ A. When all four internal angles become right angles.
 - ☐ B. When all four boundary sides become unequal in length.
 - ☐ C. When the two adjacent sides become equal in length.
 - ☐ D. When the two diagonal lines become perpendicular.

Q.21 Which part of the lathe is mounted on the left end of the bed?

- Ans**
- ☐ A. Tool post
 - ☐ B. Tailstock
 - ☒ C. Headstock
 - ☐ D. Carriage

Q.22 Why is a feedback device such as an encoder important in the closed-loop control of CNC VMC machines?

- Ans**
- ☒ A. It operates independently without any feedback from the machine to adjust its speed.
 - ☒ B. It sets the initial speed of the spindle but does not monitor its position.
 - ☒ C. It allows the controller to correct errors in tool movement during machining.
 - ☒ D. It displays the position information on the screen for the operator for information.

Q.23 A machinist is experiencing periodic marks on the surface of a workpiece during cylindrical grinding. After checking for machine looseness and wheel balance, which adjustment should be prioritized to eliminate chatter if the marks persist?

- Ans**
- ☒ A. Increase the rigidity of the workpiece support
 - ☒ B. Decrease the feed rate of the grinding wheel
 - ☒ C. Switch to a softer grade grinding wheel
 - ☒ D. Increase the grinding wheel speed

Q.24 Which operation would most benefit from using a half round file over a square file?

- Ans**
- ☒ A. Shaping a hexagonal hole
 - ☒ B. Leveling a flat surface
 - ☒ C. Blending a curved groove
 - ☒ D. Making a sharp corner

Q.25 When producing a plate cam, why is it necessary to use a template or pattern during manufacturing?

- Ans**
- ☒ A. It increases the hardness of the material used in cam manufacturing
 - ☒ B. It ensures the cam profile is accurately reproduced to the required profile
 - ☒ C. It ensures that the heat treatment process does not lead to warping
 - ☒ D. It speeds up the process and ensures the correct setup for milling

Q.26 During preventive maintenance, unusual wear is observed on the gripping arms of the ATC in a CNC VMC. Which operational issue is most likely to occur if this wear is not addressed promptly?

- Ans**
- ☒ A. Incorrect spindle speed may be selected during tool change
 - ☒ B. Coolant may not be delivered during tool changes
 - ☒ C. Tools may be dropped or not securely loaded into the spindle
 - ☒ D. ATC may not recognize the correct tool number

Q.27 During CNC VMC milling, an operator must program the machine to activate coolant flow before starting the spindle for a heat-sensitive operation. Which ISO M code should be programmed before spindle start to ensure coolant is delivered to the cutting zone?

- Ans**
- ☒ A. M08
 - ☒ B. M05
 - ☒ C. M03
 - ☒ D. M09

Q.28 A machinist wants to divide a workpiece into 8 equal parts using direct indexing. How many holes should be moved between each division on a 24-hole plate?

- Ans**
- ☒ A. Move 6 holes each time
 - ☒ B. Move 4 holes each time
 - ☒ C. Move 2 holes each time
 - ☒ D. Move 3 holes each time

Q.29 How does natural deterioration of component affect production?

- Ans**
- ☐ A. It improves production speed and operating efficiency
 - ☐ B. It eliminates maintenance requirements for equipment
 - ☒ C. It leads to more production interruptions and stoppages
 - ☐ D. It reduces equipment downtime during production activities

Q.30 Which lighting is commonly used in workshops for safe movement during a power failure?

- Ans**
- ☐ A. Task lighting
 - ☐ B. Decorative lighting
 - ☐ C. Ambient lighting
 - ☒ D. Emergency lighting

Q.31 If the volume of a cube is 3375 cm³, what is the length of one side?

- Ans**
- ☐ A. 18 cm
 - ☐ B. 20 cm
 - ☐ C. 12 cm
 - ☒ D. 15 cm

Q.32 If a bench vice shows uneven clamping pressure, which maintenance step should be performed first?

- Ans**
- ☐ A. Increase the lubrication amount
 - ☐ B. Reduce the handle length
 - ☐ C. Replace the entire vice
 - ☒ D. Check jaw alignment and tighten mounting bolts

Q.33 A machine with a power rating of 2 kW operates continuously for 5 hours. What is the total electrical energy consumed by the machine during this period?

- Ans**
- ☐ A. 7 kWh
 - ☐ B. 2.5 kWh
 - ☐ C. 0.4 kWh
 - ☒ D. 10 kWh

Q.34 In a CNC turning center, the operator finds that sharp corners in the programmed part are automatically blended with a small radius. Which tool compensation setting should be checked to restore sharp corners?

- Ans**
- ☐ A. Coolant pressure adjustment during cutting
 - ☒ B. Tool radius offset value for the current tool
 - ☐ C. Spindle power setting during finishing
 - ☐ D. Tool change position in the turret

Q.35 A student claims that a V-block can be used for holding flat jobs as effectively as round jobs. Why is this statement incorrect?

- Ans**
- ☐ A. Flat jobs are too heavy
 - ☒ B. Flat jobs lack surface contact in the V-block
 - ☐ C. V-blocks are only made for large jobs
 - ☐ D. V-blocks damage flat jobs

Q.36 A machinist observes that the spindle motor of a CNC lathe is overheating after prolonged use. Which aspect of the spindle drive system should be primarily checked to address this issue?

- Ans**
- ☐ A. Lubrication system condition
 - ☐ B. Electrical wiring insulation
 - ☐ C. Drive belt alignment
 - ☒ D. Cooling mechanism efficiency

Q.37 If a machinist must grind a non-ferrous metal, which grinding wheel would be most appropriate to use?

- Ans**
- ☐ A. Diamond wheel is used for non-ferrous metals
 - ☐ B. Cubic boron nitride wheel is best for non-ferrous metals
 - ☒ C. Silicon carbide wheel is suitable for non-ferrous metals
 - ☐ D. Aluminum oxide wheel is ideal for non-ferrous metals

Q.38 Which part(s) of the milling cutter is/are primarily used for cutting in face milling operations?

- Ans**
- ☐ A. Machine spindle body
 - ☒ B. Cutter face edges
 - ☐ C. Cutter side edges
 - ☐ D. Arbor shaft face

Q.39 During a milling operation, what aspect of the spindle ensures accurate machining and surface finish on the workpiece?

- Ans**
- ☐ A. Increasing spindle speed beyond recommended levels
 - ☐ B. Using a heavy-duty spindle for large cutters
 - ☒ C. Proper alignment and minimal runout of the spindle
 - ☐ D. Only using lubricated spindle bearings

Q.40 Which PPE is appropriate for protecting against electrical hazards in a workshop?

- Ans**
- ☐ A. Cotton gloves
 - ☐ B. Leather gloves
 - ☐ C. Latex gloves
 - ☒ D. Insulated gloves

Q.41 Which type of encoders is most commonly used in CNC VMC machines for precise position measurement?

- Ans**
- ☐ A. Linear encoder
 - ☒ B. Rotary encoder
 - ☐ C. Limit switch
 - ☐ D. Optical sensor

Q.42 A mechanic observes rust spots on a file despite storage. What maintenance step was likely skipped?

- Ans**
- ☒ A. Application of light oil before storage
 - ☐ B. Sharpening the file teeth
 - ☐ C. Polishing with emery cloth
 - ☐ D. Use of a plastic handle

Q.43 In the tailstock offset method for taper turning, what is the primary function of the tailstock?

- Ans**
- ☐ A. To support threading operations
 - ☐ B. To adjust spindle speed during operation
 - ☐ C. To set tool feed direction
 - ☒ D. To set the alignment for creating a taper

Q.44 Where must the title block be located on an engineering drawing sheet according to the prescribed standard?

- Ans**
- ☒ A. Bottom right-hand corner
 - ☐ B. Top left-hand corner
 - ☐ C. Top right-hand corner
 - ☐ D. Bottom left-hand corner

Q.45 Which of the following is NOT usually a cause of machine downtime?

- Ans**
- ☐ A. Scheduled maintenance
 - ☒ B. Continuous production run
 - ☐ C. Power supply interruption
 - ☐ D. Equipment failure

Q.46 Which part of a cylindrical grinder holds and rotates the workpiece during the grinding operation?

- Ans**
- ☐ A. Tailstock
 - ☒ B. Headstock
 - ☐ C. Carriage
 - ☐ D. Grinding wheel

Q.47 Which unsafe practice can lead to electrical accidents in a workshop?

- Ans**
- ☐ A. Checking voltage before equipment use
 - ☒ B. Bypassing safety interlocks on machines
 - ☐ C. Using dry hands when operating switches
 - ☐ D. Wearing safety shoes during work

Q.48 When using the reciprocating table method, what is the primary movement of the surface grinder table relative to the grinding wheel?

- Ans**
- ☒ A. Back-and-forth linear motion
 - ☐ B. Side-to-side linear motion
 - ☐ C. Up-and-down vertical motion
 - ☐ D. Rotary circular motion

Q.49 Which application is best suited for carbide drills?

- Ans**
- ☒ A. High-speed machining of tough materials
 - ☐ B. Drilling wood objects only
 - ☐ C. Manual metal bending
 - ☐ D. Finishing internal surfaces of plastic materials

Q.50 Which scenario requires the use of multiple auxiliary views in orthographic projection?

- Ans**
- ☐ A. A rectangular block with entirely flat and straight faces.
 - ☒ B. A part with several surfaces inclined at different angles.
 - ☐ C. An object with all surfaces parallel to principal planes.
 - ☐ D. A cylinder with its axis perpendicular to all planes.

Q.51 Which statement correctly explains the purpose of setting a work offset in CNC VMC programming?

- Ans**
- ☐ A. A work offset modifies the tool length during program setup in CNC VMC for accurate machining.
 - ☐ B. A work offset changes the home position of the CNC machine for each tool used for accurate machining.
 - ☒ C. A work offset establishes the relationship between the machine zero and the part zero for accurate machining.
 - ☐ D. A work offset is used exclusively during tool change operations in CNC VMC for accurate machining.

Q.52 Which tool is most commonly used for cutting keyways on a slotting machine?

- Ans**
- ☐ A. Formed tool type
 - ☒ B. Single point tool
 - ☐ C. Round nose tool
 - ☐ D. Diamond point tool

Q.53 During a cylindrical grinding operation, an operator observes closely spaced, repetitive marks on the surface of the workpiece. Which of the following is most likely responsible for the formation of these chatter marks?

- Ans**
- ☐ A. Excessive coolant flow on the wheel
 - ☒ B. Loose spindle bearings causing vibration
 - ☐ C. Wheel loading resulting in glazing
 - ☐ D. Incorrect work speed causing burns

Q.54 While operating a CNC lathe, an unexpected tool movement causes the tool to contact the chuck. What type of machine damage is most likely to occur from this collision?

- Ans**
- ☐ A. Coolant leakage
 - ☐ B. Bed misalignment
 - ☐ C. Spindle bearing failure
 - ☒ D. Chuck jaw deformation

Q.55 How much is 1 calorie in joules?

- Ans**
- ☐ A. 2.500 joules
 - ☐ B. 1.000 joules
 - ☐ C. 10.000 joules
 - ☒ D. 4.186 joules

Q.56 If a flash fire occurs during hot work, what should be the worker's IMMEDIATE response?

- Ans**
- ☐ A. Trying to hide the incident temporarily to avoid interrupting ongoing workshop operations
 - ☒ B. Activating the nearest fire alarm and evacuating the area according to emergency procedures
 - ☐ C. Completing the current hot work activity before taking action against the fire emergency
 - ☐ D. Attempting to extinguish the flash fire alone before informing nearby workers or supervisors

Q.57 A steel plate has a mass of 8.516 kg. If its volume is 1089 cm³, what is the density in gm/cm³?

- Ans**
- ☐ A. 8.50
 - ☐ B. 8.00
 - ☒ C. 7.82
 - ☐ D. 7.25

Q.58 If the contact surfaces of a V-block become worn, the most appropriate action is to:

- Ans**
- ☐ A. Ignore the wear
 - ☐ B. Increase clamping force
 - ☐ C. Paint the surface
 - ☒ D. Replace or recondition the V-block

Q.59 Which of the following is a multipoint cutting tool?

- Ans**
- ☒ A. Parting tool
 - ☒ B. Milling cutter
 - ☒ C. Boring bar
 - ☒ D. Lathe tool

Q.60 Why should regular inspections be performed on equipment?

- Ans**
- ☒ A. To reduce maintenance records and documentation efforts
 - ☒ B. To identify potential problems before major failures occur
 - ☒ C. To increase machine output and production efficiency
 - ☒ D. To complete routine inspection checklists within schedule

Q.61 Tools are required to resist wear and function reliably during repetitive operations. Which property is most commonly enhanced through heat treatment to fulfill this requirement?

- Ans**
- ☒ A. Toughness
 - ☒ B. Machinability
 - ☒ C. Wear resistance
 - ☒ D. Elasticity

Q.62 When interpreting a job drawing, how can you distinguish a split pin from a solid pin based on conventional representation?

- Ans**
- ☒ A. A split pin shows two legs with a visible gap
 - ☒ B. A split pin appears as a circle with center dot
 - ☒ C. A split pin uses zigzag lines for representation
 - ☒ D. A split pin uses crossing lines in the drawing

Q.63 Which fluid is typically used to improve aluminum machining on a lathe machine?

- Ans**
- ☒ A. Soluble oil-based coolant
 - ☒ B. Kerosene without additives
 - ☒ C. Synthetic cutting fluid
 - ☒ D. Pure water as a coolant

Q.64 How does the pitch (number of teeth per inch) of a hacksaw blade affect its cutting ability?

- Ans**
- ☒ A. Finer pitch produces smoother cuts
 - ☒ B. Pitch only affects heat generation during cutting
 - ☒ C. Pitch material only affects blade lifespan
 - ☒ D. Coarser pitch is better for all materials

Q.65 Why does BIS tolerance notation specify hole designation before shaft designation in fits?

- Ans**
- ☒ A. To specify the tolerance magnitude of shaft before hole
 - ☒ B. To identify the inspection sequence during measurement
 - ☒ C. To represent the actual size obtained after machining
 - ☒ D. To indicate the hole basis or shaft basis relationship used for the fit

Q.66 In an open-loop CNC control system, what happens if there is a load disturbance during machining?

- Ans**
- ☒ A. The system slows down to adjust the error
 - ☒ B. The system automatically compensates the disturbance
 - ☒ C. The system cannot detect or correct the error
 - ☒ D. The system sends an alarm to the operator to stop

Q.67 A machinist wants to create a gear with 20 teeth using simple indexing. Which setting should be used on a standard 40:1 dividing head?

- Ans**
- ☐ A. Ten full rotations
 - ☐ B. Five full rotations
 - ☒ C. Two full rotations
 - ☐ D. Four full rotations

Q.68 While operating a CNC lathe, an unexpected tool movement causes the tool to contact the chuck. Which type of machine damage is most likely to occur from this collision?

- Ans**
- ☐ A. CNC controller software errors
 - ☒ B. Turret misalignment or damage
 - ☐ C. Unstable spindle speed during cycles
 - ☐ D. Tool magazine jamming during tool change

Q.69 Given a 10 mm twist drill and a recommended feed of 0.15 mm/rev, what is the total feed after 20 revolutions?

- Ans**
- ☐ A. 0.75 millimeters
 - ☒ B. 3.00 millimeters
 - ☐ C. 2.00 millimeters
 - ☐ D. 1.50 millimeters

Q.70 Which term refers to the number of teeth per inch on a file?

- Ans**
- ☐ A. Shape
 - ☐ B. Length
 - ☒ C. Cut
 - ☐ D. Pitch

Q.71 A heat treatment process is required to maximize the shock resistance of a tool used for impact operations. Which process should be applied to achieve the required property enhancement?

- Ans**
- ☒ A. Tempering after quenching
 - ☐ B. Quenching without tempering
 - ☐ C. Normalizing to refine grain structure
 - ☐ D. Full annealing at high temperature

Q.72 A machinist selects tempering as the next step after hardening a steel component. Which property is most likely to improve as a result of tempering in this heat treatment process?

- Ans**
- ☐ A. Hardness increases with reduced ductility
 - ☐ B. Grain size increases with no change in ductility
 - ☒ C. Toughness increases while brittleness decreases
 - ☐ D. Strength decreases with finer grain structure

Q.73 During a straddle milling operation, chatter marks are observed on both parallel surfaces after machining. Which adjustment would most likely reduce this defect?

- Ans**
- ☐ A. Increasing the table feed significantly
 - ☐ B. Using a coarser feed rate
 - ☐ C. Raising the spindle speed substantially
 - ☒ D. Reducing the cutter overhang on the arbor

Q.74 Why should a reamer never be rotated backwards during removal from a hole?

- Ans**
- ☐ A. It prevents chip removal
 - ☐ B. It reduces tool temperature
 - ☐ C. It will improve the surface finish
 - ☒ D. It damages the cutting edges and accuracy

Q.75 Which feature distinguishes a helix from a simple spiral?

- Ans**
- ☐ A. A helix and a spiral both lie in a single plane but differ in size.
 - ☐ B. A helix forms a closed loop, while a spiral always remains open-ended.
 - ☒ C. A helix extends in three dimensions around an axis, while a spiral lies flat in one plane.
 - ☐ D. A helix always starts at a single point, while a spiral does not.

Railway BABA



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	2:30 PM - 5:00 PM
Subject	ALP Stage 2 Mechanic Diesel

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 Let C be a circle, and AB and DE be two chords on C such that $AB = BE$. In the quadrilateral ABED, let AE and BD intersect at F, $\angle DBE = 55^\circ$ and $\angle BAE = 40^\circ$. Find $\angle FED$.

- Ans**
- ☒ A. 55°
 - ☒ B. 60°
 - ☒ C. 45°
 - ☒ D. 110°

Q.2 Which statement best describes how the mass and speed of an object affect its kinetic energy?

- Ans**
- ☒ A. An object with same mass but higher speed will have less kinetic energy.
 - ☒ B. An object with greater mass and higher speed will have more kinetic energy.
 - ☒ C. An object with less mass and lower speed will have more kinetic energy.
 - ☒ D. An object with greater mass but lower speed will have more kinetic energy.

Q.3 Which of the following statements best describes a triangle as used in engineering drawing?

- Ans**
- ☒ A. A triangle is a polygon with three straight sides and three angles.
 - ☒ B. A triangle must always have all sides of equal length.
 - ☒ C. A triangle is a polygon with four straight sides and four angles.
 - ☒ D. A triangle is a polygon having three curved sides.

Q.4 Which of the following correctly states the full form of CD and the technology used to store data on it?

- Ans**
- ☒ A. Compact Disc, Optical Storage
 - ☒ B. Compact Disc, Magnetic Storage
 - ☒ C. Compact Drive, Optical Storage
 - ☒ D. Compact Drive, Magnetic Storage

Q.5 The average of five numbers is 30. If four of the numbers are 25, 35, 28 and 32, then what is the fifth number?

- Ans**
- ☒ A. 35
 - ☒ B. 32
 - ☒ C. 28
 - ☒ D. 30

Q.6 The first shopkeeper allows two successive discounts of 3% and 7%, while a second shopkeeper allows two successive discounts of 2% and 8%. A third shopkeeper allows 10% discount on the same item. From which shopkeeper should a customer buy if the marked price is the same at the three shops?

- Ans**
- ☐ A. Buy from the first shopkeeper
 - ☐ B. Buy from the second shopkeeper
 - ☒ C. Buy from the third shopkeeper
 - ☐ D. Buy from the first or the second shopkeeper as both are the same.

Q.7 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☐ A. HB-IC
 - ☐ B. PJ-QK
 - ☒ C. RL-SN
 - ☐ D. FZ-GA

Q.8 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

Some rugs are fans.

No fan is a car.

Conclusion (I) : Some rugs are cars.

Conclusion (II) : Some fans are rugs.

- Ans**
- ☐ A. Only conclusion (I) follows
 - ☐ B. Both conclusions (I) and (II) follow
 - ☒ C. Only conclusion (II) follows
 - ☐ D. Neither conclusion (I) nor (II) follows

Q.9 If $3x - 2y + 3z = 8$, $4x - 3y + 2z = 4$ and $2x + y - z = 1$, then find x, y and z, respectively.

- Ans**
- ☐ A. 2, 3 and 1
 - ☐ B. 3, 1 and 2
 - ☒ C. 1, 2 and 3
 - ☐ D. 2, 1 and 3

Q.10 A ladder is leaning against a wall and makes an angle of 60° with the ground. If the length of the ladder is 24 m, find the distance of the foot of the ladder from the wall.

- Ans**
- ☐ A. 9 m
 - ☐ B. 15 m
 - ☒ C. 12 m
 - ☐ D. 18 m

Q.11 Refer to the given letter series and answer the question that follows. Counting to be done from left to right only.

(Left) H S A N D D I A D F P A J O S K I O Z O T X (Right)

How many such consonants are there, each of which is immediately preceded by a consonant and also immediately followed by a vowel?

- Ans**
- ☒ A. Four
 - ☐ B. Three
 - ☐ C. Six
 - ☐ D. Five

Q.12 If 2 is subtracted from each odd digit and 2 is added to each even digit in the number 235234796423, what will be the sum of the digits that are third from the left and third from the right?

- Ans**
- ☐ A. 7
 - ☐ B. 6
 - ☒ C. 9
 - ☐ D. 8

Q.13 Why is a room thermometer generally mounted vertically on a wall?

- Ans**
- ☐ A. It helps the thermometer measure body temperature faster.
 - ☒ B. It ensures accurate reading by keeping the bulb exposed to room air.
 - ☐ C. It prevents the liquid from freezing inside the thermometer.
 - ☐ D. It protects the thermometer from breaking easily.

Q.14 Which of the following best describes the function of a speedometer in a vehicle?

- Ans**
- ☐ A. It calculates the average speed over a journey.
 - ☐ B. It shows the rate at which the vehicle's speed changes.
 - ☐ C. It measures the total distance the vehicle has traveled.
 - ☒ D. It displays the current speed at which the vehicle is moving.

Q.15 Refer to the following letter series and answer the question that follows. (Counting to be done from left to right only.)

(Left) Q K Q N X K G G V M L A W T W K N G V (Right)

How many such consonants are there each of which is immediately preceded by a vowel and also immediately followed by a consonant?

- Ans**
- ☐ A. None
 - ☐ B. Two
 - ☒ C. One
 - ☐ D. Three

Q.16 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and select the most appropriate answer.

Question:

Among five trees N, O, R, S, and T, each having a different height, which tree is the tallest?

Statements:

(I) T is taller than R. N is taller than T.

(II) R is shorter than O but taller than S.

- Ans**
- ☐ A. Data in Statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ B. Both statements I and II together are NOT sufficient to answer the question
 - ☐ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ D. Data in Statement I alone is sufficient to answer the question while data in statement II is not

Q.17 A ramp is used to lift a box to a platform 2 m high. To reduce the effort required, the ramp length is increased from 4 m to 8 m. Assuming negligible friction, what remains unchanged?

- Ans**
- ☐ A. The mechanical advantage
 - ☒ B. The work done in raising the box
 - ☐ C. The distance moved along the ramp
 - ☐ D. The force required

Q.18 Which tool safety measure best prevents injuries when cleaning a workshop lathe after use?

- Ans**
- ☒ A. Using a brush to remove metal chips from the lathe
 - ☐ B. Blowing chips away with compressed air around the lathe
 - ☐ C. Wiping metal chips using bare hands directly
 - ☐ D. Using a rag to remove metal dust from the lathe

Q.19 Which scenario best demonstrates proactive workplace safety behavior?

- Ans**
- ☐ A. Reporting hazards after incidents happen
 - ☐ B. Waiting for a supervisor to notice hazards
 - ☐ C. Discussing only past safety problems in meetings
 - ☒ D. Identifying and correcting hazards before accidents occur

Q.20 A laboratory thermometer has a range from -10 degrees Celsius to 110 degrees Celsius and 120 equal divisions. What is the smallest value that this thermometer can read?

- Ans**
- ☒ A. 1 degree Celsius
 - ☐ B. 10 degrees Celsius
 - ☐ C. 2 degrees Celsius
 - ☐ D. 0.5 degrees Celsius

Q.21 An astronaut weighs 600 N on Earth. During a moon mission, she performs an experiment to measure her weight on the moon. Which value is closest to her expected weight on the moon, and why?

- Ans**
- ☐ A. 600 N, because a person's weight remains unchanged on the Moon.
 - ☐ B. 200 N, because the Moon's gravity is about one-third of Earth's.
 - ☒ C. 100 N, because the Moon's gravity is about one-sixth of Earth's.
 - ☐ D. 300 N, because the Moon's gravity is about one-half of Earth's.

Q.22 A cyclist rides 60 meters north, then 80 meters south, and finally 70 meters north. What is the total distance the cyclist has traveled?

- Ans**
- ☒ A. 210 meters
 - ☐ B. 150 meters
 - ☐ C. 60 meters
 - ☐ D. 10 meters

Q.23 What information does a kilometer stone provide to travelers on a road?

- Ans**
- ☐ A. Speed of the vehicle
 - ☐ B. Time taken to reach destination
 - ☐ C. Direction of travel
 - ☒ D. Distance from a reference point

Q.24 A plane parallel to the base divides a cone of height 40 cm into two parts. If the volume of the upper smaller cone formed is $\frac{1}{64}$ of the volume of the original cone, calculate the height of the plane from the base of the cone.

- Ans**
- ☐ A. 10 cm
 - ☐ B. 40 cm
 - ☐ C. 20 cm
 - ☒ D. 30 cm

Q.25 12 is related to 1730 following a certain logic. Following the same logic, 13 is related to 2199. To which of the given options is 11 related, following the same logic?
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☒ A. 1333
 - ☐ B. 1443
 - ☐ C. 1543
 - ☐ D. 1433

Q.26 When drawing repeated 67° angles on an engineering sheet, which practice best helps minimize cumulative alignment errors?

- Ans**
- ☐ A. Drawing all angles continuously without intermediate verification
 - ☐ B. Relying solely on the initial protractor alignment for all angles
 - ☐ C. Marking all angles lightly with a pencil before finalizing
 - ☒ D. Using the same reference line for all repeated angles

Q.27 A pump can fill a tank in 3 hours. Due to a leak in the tank, it takes 4.5 hours to fill the tank. In how much time can the leak empty the full tank if no other entry or exit routes are open?

- Ans**
- ☐ A. 7 hours
 - ☒ B. 9 hours
 - ☐ C. 6 hours
 - ☐ D. 8 hours

Q.28 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

ZOT - TLP
NIL - HFH

- Ans**
- ☐ A. BOC - VZT
 - ☐ B. VZZ - BCD
 - ☐ C. ABD - VZZ
 - ☒ D. BCD - VZZ

Q.29 Which factor increases the amount of heat produced in a wire when an electric current flows through it for a fixed time?

- Ans**
- ☐ A. Making the wire thicker
 - ☒ B. Increasing the resistance of the wire
 - ☐ C. Reducing the current in the wire
 - ☐ D. Decreasing the length of the wire

Q.30 Which type of personal protective equipment is most suitable for tasks involving airborne chemical particles in confined spaces?

- Ans**
- ☐ A. Hand protection using chemical-resistant gloves
 - ☐ B. Head protection with industrial-grade hard hats
 - ☐ C. Body protection with flame-retardant suits
 - ☒ D. Respiratory protection devices such as half-face masks

Q.31 Sohan covers a total distance of 760 km to reach his home, traveling partly by train and partly by car. He takes 8 hours when he travels 160 km by train and the rest by car. If he travels 240 km by train and the remaining distance by car, his journey takes 12 minutes longer. Find the difference between the speeds of the train and the car.

- Ans**
- ☒ A. 20 km/h
 - ☐ B. 27 km/h
 - ☐ C. 23 km/h
 - ☐ D. 21 km/h

Q.32 Find the compound interest on ₹5,70,000 for 1.5 years at 10% per annum compounded half-yearly.

- Ans**
- ☐ A. ₹89,946.25
 - ☐ B. ₹92,846.25
 - ☐ C. ₹88,846.25
 - ☒ D. ₹89,846.25

Q.33 Which combination best describes the main environmental challenges associated with plastic waste management?

- Ans**
- ☐ A. Thermal pollution and effective composting
 - ☐ B. Rapid biodegradation and chemical leaching
 - ☐ C. Neutralization and easy recycling
 - ☒ D. Persistence in the environment and microplastic formation

Q.34 When a cutting plane line passes through a hole and a rib, which feature should be sectioned in the resulting view according to standard conventions?

- Ans**
- ☐ A. Both the hole and the rib are shown unsectioned
 - ☐ B. The rib is sectioned but the hole is left unsectioned
 - ☒ C. The hole is sectioned but the rib is shown unsectioned
 - ☐ D. Both the hole and the rib are shown sectioned

Q.35 Five students, N, O, R, S and T, have different heights. T is taller than N. R is taller than S but shorter than O. S is taller than N. More than two people are taller than T. How many people are shorter than R?

- Ans**
- ☐ A. Two
 - ☒ B. Three
 - ☐ C. None
 - ☐ D. One

Q.36 If the height of an object is doubled while its mass remains constant, its gravitational potential energy will be:

- Ans**
- ☐ A. halved
 - ☒ B. doubled
 - ☐ C. unchanged
 - ☐ D. decreased to one-fourth

Q.37 Why does biomedical waste require special handling compared to general municipal waste?

- Ans**
- ☒ A. It may contain infectious agents that pose health risks.
 - ☐ B. It is always radioactive and requires heavy shielding.
 - ☐ C. It has higher chemical content and is always toxic.
 - ☐ D. It is more likely to be recycled than other types of waste.

Q.38 A crane lifts a 200 kg load to a height of 15 meters in 10 seconds. Assuming acceleration due to gravity is 10 m/s² and energy loss is negligible, what is the power output of the crane during this operation?

- Ans**
- ☐ A. 2000 W
 - ☒ B. 3000 W
 - ☐ C. 1000 W
 - ☐ D. 1500 W

Q.39 What is the primary purpose of a Local Area Network (LAN)?

- Ans**
- ☐ A. To connect global networks
 - ☐ B. To link wireless devices only
 - ☐ C. To connect social media accounts
 - ☒ D. To connect computers within a small geographical area

Q.40 What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $5 \div 3 + 15 \times 5 - 3 = ?$

- Ans**
- ☐ A. 18
 - ☒ B. 15
 - ☐ C. 12
 - ☐ D. 9

Q.41 A 42-litre solution has sugar and water in the ratio 2 : 5. If, due to evaporation, the volume is reduced by 35%, and only water evaporates, what is the new ratio of sugar to water?

- Ans**
- ☒ A. 40 : 51
 - ☐ B. 31 : 50
 - ☐ C. 40 : 41
 - ☐ D. 51 : 42

Q.42 Pipes A and B can fill an entire tank in 8 hours and 12 hours, respectively. The water tank is one-fourth full. If both the pipes are opened together, then how long will it take to fill the remaining part of the tank?

- Ans**
- ☐ A. 3 hours 16 minutes
 - ☐ B. 3 hours 6 minutes
 - ☐ C. 3 hours 26 minutes
 - ☒ D. 3 hours 36 minutes

Q.43 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☐ A. DG – EH
 - ☐ B. KE – LF
 - ☒ C. IT – KV
 - ☐ D. SJ – TK

Q.44 An article is bought for ₹300 and its price is increased by 5.5%. The resulting price is then reduced by 8%. Find the final selling price.

- Ans**
- ☒ A. ₹291.18
 - ☐ B. ₹284.45
 - ☐ C. ₹296.46
 - ☐ D. ₹288.24

Q.45 If a rectangular field is measured to be 120 meters long and 75 meters wide, what is its area in SI units?

- Ans**
- ☐ A. 1800 square meters
 - ☒ B. 9000 square meters
 - ☐ C. 15000 square meters
 - ☐ D. 19500 square meters

Q.46 Which one of the following statements correctly describes a characteristic of WANs?

- Ans**
- ☐ A. WANs typically use only wireless media to connect distant LANs.
 - ☐ B. WANs are limited to connecting devices within a radius of 1 to 2 km.
 - ☐ C. WANs are always public networks managed solely by Internet Service Providers (ISPs).
 - ☒ D. WANs can be built by connecting multiple LANs via wired or wireless links.

Q.47 Srinu starts from his home and drives 2 km towards the south, then takes a right turn and drives 5 km. He then takes a right turn and drives 6 km before taking a right turn again and driving 4 km further. Srinu finally takes a right turn and drives 4 km before stopping at his office. In which direction should Srinu drive to reach his home again? (All turns are 90-degree turns only unless specified.)

- Ans**
- ☐ A. North
 - ☒ B. East
 - ☐ C. West
 - ☐ D. South

Q.48 The price of sugar is increased by 20%. Manoj can increase his expenditure on sugar by only 15% from his income. In order to balance his expenditure, by what percentage should he reduce the quantity of sugar consumed?

- Ans**
- ☐ A. 5%
 - ☐ B. $5\frac{1}{3}\%$
 - ☐ C. 6.5%
 - ☒ D. $4\frac{1}{6}\%$

Q.49 The mean of 11 numbers is 10.9. If the mean of the first 6 numbers is 10.5 and the mean of the last 6 numbers is 11.4, then find the 6th number.

- Ans**
- ☐ A. 10
 - ☐ B. 10.5
 - ☒ C. 11.5
 - ☐ D. 11

Q.50 In a certain code language, 'SOIL' is coded as '1547' and 'COIL' is coded as '7124'. What is the code for 'C' in the given code language?

- Ans**
- ☐ A. 1
 - ☐ B. 4
 - ☐ C. 7
 - ☒ D. 2

Q.51 Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

6 – 16 – 23 – 32; 7 – 19 – 26 – 35

- Ans
- ☐ A. 4 – 14 – 21 – 30
 - ☐ B. 8 – 22 – 15 – 24
 - ☒ C. 12 – 34 – 41 – 50
 - ☐ D. 11 – 31 – 38 – 29

Q.52 A solid right circular cone is 7 cm high, and the radius of its base is 22.2 cm. It is melted and recast into a right circular cone with radius of its base 3.7 cm. Then the height (in cm) of the cone is _____.

- Ans
- ☐ A. 159
 - ☐ B. 267
 - ☒ C. 252
 - ☐ D. 185

Q.53 What is the primary role of the Central Processing Unit (CPU) in a computer system?

- Ans
- ☐ A. To display output on the screen
 - ☐ B. To manage network connections
 - ☒ C. To execute program instructions
 - ☐ D. To store long-term data

Q.54 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

MDB PHE SLH VPK ?

- Ans
- ☐ A. ZUO
 - ☒ B. YTN
 - ☐ C. XSM
 - ☐ D. ZTM

Q.55 Which symbol best represents a battery in an electric circuit diagram according to standard conventions?

- Ans
- ☐ A. Two circles connected in series
 - ☐ B. A single long line only
 - ☐ C. Two short lines placed together
 - ☒ D. A pair of long and short parallel lines placed alternately

Q.56 A technician needs to select a fuse wire for a room heater. Which property should be considered most important for safety based on the heating effect of electric current?

- Ans
- ☐ A. The fuse wire must have a shiny surface for efficient cooling.
 - ☒ B. The fuse wire must have a low melting point to break the circuit during excess current.
 - ☐ C. The fuse wire must have a high melting point for durability.
 - ☐ D. The fuse wire must have high resistance and be thick to prevent melting.

Q.57 A group of numbers/symbols is coded using letter codes as per the codes given below and the conditions that follow. The correct combination of codes following the conditions is your answer.

Note: If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	3	@	8	4	\$	&	2	%	#	1	+	9	7	5
Code	U	G	B	K	M	F	X	R	E	Q	S	C	V	T

Conditions –

(i) If the first element is a symbol and the last element an odd number, the codes for these two (the first and the last elements) are to be interchanged.

(ii) If the first element is an odd number and the last an even number, the first and the last elements are to be coded as ©

(iii) If both second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?

& 8 \$ 9 5

- Ans**
- ☒ A. FCBMT
 - ☒ B. TCMBF
 - ☒ C. FBMCT
 - ☒ D. TBMCF

Q.58 Which color is universally associated with emergency exit signs in industrial workplaces under international standards?

- Ans**
- ☒ A. Yellow background with black text or symbols
 - ☒ B. Red background with white text or symbols
 - ☒ C. Blue background with white text or symbols
 - ☒ D. Green background with white text or symbols

Q.59 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Among 5 sticks, B, U, N, M and D, each having a different height, which stick is the shortest?

(I) D is shorter than U. M is shorter than B.

(II) M is taller than D.

- Ans**
- ☒ A. Both statements I and II together are NOT sufficient to answer the question
 - ☒ B. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☒ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☒ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.60 Why are electric wires in household appliances usually covered with plastic or rubber coating?

- Ans**
- ☒ A. To produce more heat
 - ☒ B. To make the wires heavier
 - ☒ C. To prevent electric shocks by insulation
 - ☒ D. To increase the flow of current

Q.61 A cyclist travels 120 km in 3 hours, rests for 1 hour, and then travels another 80 km in 2 hours. To determine the cyclist's average speed for the entire journey, which of the following quantities should be used?

- Ans**
- ☒ A. Total displacement divided by total time taken
 - ☒ B. Distance travelled in a particular direction divided by time
 - ☒ C. Change in velocity divided by total time taken
 - ☒ D. Total distance travelled divided by the total time taken

Q.62 Which intervention most effectively reduces ground-level pollutant concentrations during a winter temperature inversion?

- Ans**
- ☐ A. Reducing local wind speed to minimize horizontal dispersion
 - ☐ B. Increasing surface temperatures near emission sources
 - ☐ C. Elevating emission sources above inversion layers
 - ☒ D. Enhancing vertical air mixing through artificial turbulence

Q.63 Simplify the following expression.

$$11 \text{ of } 7 + 125 \div 5 + 99 \div 11 \times 7 - 17 \text{ of } 7 + 7 \times 6 - (91 \div 7 + 7 \times 5)$$

- Ans**
- ☐ A. 48
 - ☐ B. 44
 - ☒ C. 40
 - ☐ D. 36

Q.64 Which of the following pairs of numbers is co-prime?

- Ans**
- ☒ A. (17, 54)
 - ☐ B. (28, 49)
 - ☐ C. (14, 28)
 - ☐ D. (21, 33)

Q.65 What will come in place of the question mark (?) in the following equation if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $42 \times 6 \div 7 - 35 + 19 = ?$

- Ans**
- ☐ A. 69
 - ☐ B. 63
 - ☒ C. 65
 - ☐ D. 67

Q.66 A, B, C, D and E have different heights. E is taller than C but shorter than A. Only one person is taller than A. D is shorter than C. Who amongst them is the third tallest?

- Ans**
- ☒ A. E
 - ☐ B. C
 - ☐ C. B
 - ☐ D. A

Q.67 The cost of a diamond varies directly with the square of its weight. A diamond broke into four pieces with weights in the ratio 2:4:1:3. If it had been broken into four equal pieces, the loss would have been ₹60,000. What was the original cost of the diamond?

- Ans**
- ☒ A. ₹80,000
 - ☐ B. ₹82,000
 - ☐ C. ₹75,000
 - ☐ D. ₹78,000

Q.68 A boy uses a wheelbarrow to carry sand. The wheel acts as the pivot, the sand is placed in the tray, and the boy lifts the handles. In this arrangement, the sand represents _____.

- Ans**
- ☐ A. Effort
 - ☐ B. Fulcrum
 - ☒ C. Load
 - ☐ D. Arm

Q.69 A cyclist travels from the kilometer stone marked 52 to the stone marked 79. How far has the cyclist traveled?

- Ans
- ☒ A. 52 kilometers
 - ☒ B. 27 kilometers
 - ☒ C. 31 kilometers
 - ☒ D. 131 kilometers

Q.70 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All chocolates are paneers.
No paneer is a milk.

Conclusions:

- (I) No chocolate is a milk.
(II) Some milks are paneers.

- Ans
- ☒ A. Only conclusion (I) follows.
 - ☒ B. Both conclusions (I) and (II) follow.
 - ☒ C. Neither conclusion (I) nor (II) follows.
 - ☒ D. Only conclusion (II) follows.

Q.71 What is a key feature of single stroke lettering in technical drawings?

- Ans
- ☒ A. Each character is outlined and then filled.
 - ☒ B. Each character is shaded after drawing.
 - ☒ C. Each character is made with several parallel lines.
 - ☒ D. Each character is made with one continuous stroke.

Q.72 If $x + \frac{1}{x} = 5$, then $\frac{x^3 - 5x^2 + 5x}{x^2 + 1}$ is equal to:

- Ans
- ☒ A. $\frac{1}{5}$
 - ☒ B. $\frac{3}{5}$
 - ☒ C. $\frac{4}{5}$
 - ☒ D. $\frac{2}{5}$

Q.73 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. There are exactly two boxes between T and P. Only Q is kept above U. No box is kept below P. S is kept somewhere below W but above V. Based on the given information, which box is kept third above V?

- Ans
- ☒ A. W
 - ☒ B. T
 - ☒ C. P
 - ☒ D. S

Q.74 P, Q and R are three batsmen. The ratios of runs scored by them in a certain match were as follows:

$P : Q = 5 : 7$ and $Q : R = 2 : 3$.

If they scored a total of 765 runs, then find the number of runs scored by R.

- Ans
- ☐ A. 350
 - ☒ B. 357
 - ☐ C. 336
 - ☐ D. 378

Q.75 What should come in place of '?' in the given series?
11, 22, 44, 88, 176, ?

- Ans
- ☐ A. 358
 - ☐ B. 342
 - ☒ C. 352
 - ☐ D. 356

Q.76 The salary of a person is increased by 10%, 20% and 25% successively in three consecutive years. Find the overall percentage increase in the salary at the end of the third year.

- Ans
- ☒ A. 65%
 - ☐ B. 30%
 - ☐ C. 50%
 - ☐ D. 60%

Q.77 Why does restricting certain chemical refrigerants effectively reduce damage to the ozone layer?

- Ans
- ☒ A. Refrigerants release substances that catalyze ozone breakdown.
 - ☐ B. Refrigerants increase oxygen production, supporting ozone recovery.
 - ☐ C. Refrigerants emit greenhouse gases that warm the stratosphere.
 - ☐ D. Refrigerants contain particles that absorb harmful UV light.

Q.78 An engineer is updating a schematic for a control panel and needs to indicate a normally closed push button. Which approach best ensures the symbol is universally understood among engineers referring to standard engineering drawings?

- Ans
- ☐ A. Describe the normally closed push button in words within the schematic diagram clearly
 - ☒ B. Use the standardized symbol for a normally closed push button as per conventions
 - ☐ C. Substitute the normally closed push button symbol with a general switch symbol
 - ☐ D. Draw a hand made representation of the push button with a note explaining function

Q.79 Which of the following statements best describes a cuboid as used in engineering drawing?

- Ans
- ☐ A. A cuboid is a solid where all faces are parallelograms but not necessarily rectangles.
 - ☒ B. A cuboid is a solid with six rectangular faces, and opposite faces are equal.
 - ☐ C. A cuboid has all faces as squares of equal size.
 - ☐ D. A cuboid has all sides and angles equal, making it similar to a cube.

Q.80 A dealer buys a table for ₹2,750. He first marks it up by 28%, then allows a 12% discount to a customer. If the customer also pays 5% GST on the selling price, find the profit percentage (excluding GST) made by the dealer.

- Ans
- ☐ A. 13.81%
 - ☐ B. 10.36%
 - ☒ C. 12.64%
 - ☐ D. 15.12%

Q.81 In a certain code language,
A + B means 'A is the mother of B',
A – B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Satish related to Mayank if 'Satish + Deep × Piyush – Hitesh % Mayank'?

- Ans**
- ☐ A. Mother's brother's wife's sister
 - ☐ B. Mother's brother's wife's mother
 - ☐ C. Father's brother's wife's sister
 - ☒ D. Father's brother's wife's mother

Q.82 SANZ is related to YUTT in a certain way based on the English alphabetical order. In the same way, MTHM is related to SNNG. To which of the following is LJRE related to following the same logic?

- Ans**
- ☐ A. REXZ
 - ☒ B. RDXY
 - ☐ C. QEYZ
 - ☐ D. QDYY

Q.83 Which statement best describes the front view in an engineering drawing?

- Ans**
- ☒ A. It shows the object's height and width as seen from the front
 - ☐ B. It shows the object's depth and height as seen from the side
 - ☐ C. It shows only one dimension of the object
 - ☐ D. It shows only the object's bottom or right side

Q.84 A sum of money invested at simple interest amounts to ₹21,500 in 5 years and ₹26,000 in 8 years. Find the principal amount (in ₹).

- Ans**
- ☒ A. 14,000
 - ☐ B. 7,500
 - ☐ C. 12,000
 - ☐ D. 15,500

Q.85 G is the mother of Y. Y is the sister of V. S is the father of L. L is the son of V. How is G related to L?

- Ans**
- ☐ A. Mother
 - ☐ B. Mother's sister
 - ☒ C. Mother's mother
 - ☐ D. Sister

Q.86 A hiker lifts a backpack from the ground to a ledge 2 meters above the ground. Which situation would result in the greatest increase in the backpack's gravitational potential energy?

- Ans**
- ☒ A. Lifting a heavier backpack to the same 2-meter ledge
 - ☐ B. Lifting the same backpack to a 1-meter ledge
 - ☐ C. Carrying the same backpack horizontally for 2 meters
 - ☐ D. Lifting a lighter backpack to the same 2-meter ledge

Q.87 Which statement best describes the side view in engineering drawing?

- Ans**
- ☐ A. It shows the object as seen clearly from the front
 - ☒ B. It shows the object as seen from left or right side
 - ☐ C. It shows a combination of all views of the object
 - ☐ D. It shows the object as seen from above or below

Q.88 An engineering firm is tasked with creating a set of technical drawings for a large-scale project. The client specifies that all components must fit on a single sheet without reducing the drawing scale, and the total drawing area required is approximately 1 square meter. Based on standard drawing sheet sizes, which sheet should the firm select to best meet these requirements?

- Ans**
- ☒ A. A0 size sheet
 - ☐ B. A3 size sheet
 - ☐ C. A1 size sheet
 - ☐ D. A2 size sheet

Q.89 Which of the following is the best example of municipal solid waste?

- Ans**
- ☐ A. Industrial process waste
 - ☒ B. Household kitchen garbage
 - ☐ C. Hospital biomedical waste
 - ☐ D. Mining tailings

Q.90 What does the term 'HAZOP' stand for in occupational safety?

- Ans**
- ☐ A. Handling and Organizing Safety
 - ☐ B. Hazardous Operations Safety
 - ☒ C. Hazard and Operability Study
 - ☐ D. Hazardous Operation Standard

Q.91 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GXM 5, JVN 11, MTO 24, PRP 51, ?

- Ans**
- ☒ A. SPQ 106
 - ☐ B. TPQ 106
 - ☐ C. TPQ 107
 - ☐ D. SPQ 107

Q.92 What is the primary color used in warning signs to alert workers of potential hazards?

- Ans**
- ☐ A. Red with white symbol or text
 - ☐ B. Green with white symbol or text
 - ☒ C. Yellow with black symbol or text
 - ☐ D. Blue with white symbol or text

Q.93 Refer to the given letter series and answer the question that follows.

(Left) A X T N K R Q K C P S I D F J U D O R G Z M B E L (Right)

How many letters are there in the English alphabetical series between the letter that is fourth from the right end and the letter that is third from the left end of the series?

- Ans**
- ☐ A. 3
 - ☒ B. 6
 - ☐ C. 5
 - ☐ D. 4

Q.94 What should come in place of the question mark (?) in the given series?

1 2 7 20 61 ?

- Ans**
- ☐ A. 183
 - ☐ B. 185
 - ☒ C. 182
 - ☐ D. 181

Q.95 If the mean of the following data is 45, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	23	30	31	45	X

- Ans
- ☐ A. 180
 - ☐ B. 188
 - ☒ C. 160
 - ☐ D. 162

Q.96 Two trains are moving in opposite directions. The first train is 120 m long and runs at 54 km/h. The second train is 180 m long and runs at 72 km/h. How much time will they take to cross each other completely?
(Rounded up to two decimal places)

- Ans
- ☐ A. 8.43 seconds
 - ☐ B. 9.25 seconds
 - ☒ C. 8.57 seconds
 - ☐ D. 7.57 seconds

Q.97 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table.
Only two people sit between Y and C when counted from the left of C. D sits third to the left of B. A sits to the immediate right of B. A sits second to the left of Y. Z is not an immediate neighbor of D.
Who sits third to the right of X?

- Ans
- ☐ A. D
 - ☐ B. C
 - ☐ C. Y
 - ☒ D. A

Q.98 What does CPU stand for in computing?

- Ans
- ☐ A. Control Processing Unit
 - ☒ B. Central Processing Unit
 - ☐ C. Core Processing Unit
 - ☐ D. Computer Processing Unit

Q.99 A car travels from point A to point B in a zigzag path, covering a total distance of 200 meters. If the shortest straight-line distance between A and B is 120 meters, which statement best describes the car's distance and displacement?

- Ans
- ☒ A. The distance is 200 meters; the displacement is 120 meters
 - ☐ B. The distance is 120 meters; the displacement is 200 meters
 - ☐ C. The distance is 120 meters; the displacement is 120 meters
 - ☐ D. The distance is 200 meters; the displacement is 200 meters

Q.100 Seven boxes S, T, U, V, W, X, and Y are kept one over the other but not necessarily in the same order. U is kept exactly third from the top. Only one box is kept between U and T. W is kept immediately above T. Only three boxes are kept between X and S. V is kept on one of the positions below Y. Only two boxes are kept between U and S. Which box is kept second from the top?

- Ans
- ☒ A. X
 - ☐ B. U
 - ☐ C. V
 - ☐ D. T

Q.1 Which repair action is directly associated with restoring smooth current transfer in a damaged commutator in the starter motor?

- Ans**
- ☐ A. Tightening
 - ☐ B. Lubricating
 - ☒ C. Regrounding
 - ☐ D. Rewinding

Q.2 In planning a new industrial site, engineers must select vehicles for internal goods movement. If safety and maneuverability are both priorities, which vehicle classification by wheels is most suitable?

- Ans**
- ☒ A. Four-wheel electric cart
 - ☐ B. Six-wheel articulated truck
 - ☐ C. Three-wheel scooter with mixed tires
 - ☐ D. Two-wheel hand trolley

Q.3 Which of the following is a common application of pneumatic systems in automobiles?

- Ans**
- ☐ A. Powering headlights in cars
 - ☒ B. Operating heavy vehicle brakes
 - ☐ C. Starting the engine in cars
 - ☐ D. Running the fuel pump in cars

Q.4 If the oil return passages are blocked and the piston rings are worn, what is the likely outcome in a diesel engine?

- Ans**
- ☐ A. Poor battery charging
 - ☐ B. Overheated starter motor
 - ☐ C. Reduced fuel pressure
 - ☒ D. Excessive oil consumption

Q.5 In an industrial engine, the cooling water temperature unexpectedly rises above normal, but oil pressure and oil flow remain consistent. How does this condition affect the oil cooler's ability to regulate engine oil temperature?

- Ans**
- ☐ A. The oil cooler cools oil faster due to greater heat exchange rate
 - ☐ B. The oil cooler compensates automatically, keeping oil temperature stable
 - ☐ C. The oil cooler maintains oil temperature by increasing water pressure
 - ☒ D. The oil cooler becomes less effective, resulting in higher oil temperature

Q.6 During routine workshop maintenance, 80 liters of used engine oil are collected. If each disposal drum has a marked capacity of 25 liters and regulations require drums to be filled to only 80 percent for safe transport, how many drums are required?

- Ans**
- ☐ A. 5 drums
 - ☒ B. 4 drums
 - ☐ C. 3 drums
 - ☐ D. 6 drums

Q.7 In a scenario where flatness and minimal material removal are both critical, which lapping abrasive trait should be prioritized when selecting a compound?

- Ans**
- ☒ A. Controlled abrasive friability
 - ☐ B. Chemical inertness
 - ☐ C. High thermal conductivity
 - ☐ D. High initial hardness

Q.8 What is a key diagnostic sign of low oil pressure in a Hydraulic Electronic Unit Injector (HEUI) system?

- Ans**
- ☐ A. Rapid fuel consumption rate
 - ☒ B. Engine misfires or rough running
 - ☐ C. High exhaust temperature
 - ☐ D. Timing chain rattle noise

Q.9 In an electrical machine, interaction between stator and rotor magnetic fields produces:

- Ans**
- ☐ A. Thermal insulation
 - ☐ B. Electrochemical action
 - ☐ C. Optical energy
 - ☒ D. Mechanical torque

Q.10 When using outside calipers to compare two shafts, what is the best approach?

- Ans**
- ☐ A. Use inside calipers for both shafts
 - ☐ B. Measure both shafts together at once
 - ☒ C. Set calipers to one shaft and check the other
 - ☐ D. Estimate by eye after using calipers

Q.11 In a hydraulic system, why is a non-return valve used when connecting a pump to a cylinder?

- Ans**
- ☒ A. To ensure one-way fluid flow & no backflow
 - ☐ B. To reduce leakage between connections
 - ☐ C. To increase the pressure in the cylinder only
 - ☐ D. To permit fluid flow in both directions

Q.12 Why does using oil with incorrect viscosity contribute to low engine oil pressure in a diesel engine?

- Ans**
- ☐ A. High viscosity oil restricts oil flow and increases pressure
 - ☒ B. Low viscosity oil flows too easily and reduces pressure
 - ☐ C. Overfilled oil sump increases oil pressure
 - ☐ D. Underfilled oil sump increases oil pressure

Q.13 Which piston pin locking system is NOT commonly preferred in high-speed engines because of vibration loosening?

- Ans**
- ☐ A. Wire lock locking
 - ☐ B. Circlip locking
 - ☒ C. Set screw locking
 - ☐ D. End pad locking

Q.14 Which type of wire is used for the pull-in winding in a solenoid switch?

- Ans**
- ☐ A. Thick Aluminium wire
 - ☐ B. Thin Copper wire
 - ☒ C. Thick Copper wire
 - ☐ D. Silver wire

Q.15 What property should a diesel engine bearing material have to withstand high loads?

- Ans**
- ☐ A. High porosity
 - ☒ B. High fatigue strength
 - ☐ C. Low thermal conductivity
 - ☐ D. Low melting point

Q.16 Which vehicle body classification has a fixed roof, moderate passenger capacity, and a separate luggage compartment, commonly used as a family car?

- Ans**
- ☒ A. Sedan
 - ☐ B. Van
 - ☐ C. Hatchback
 - ☐ D. Convertible

Q.17 In a series circuit, all components are connected in:

- Ans**
- ☒ A. A single current path
 - ☐ B. Parallel paths only
 - ☐ C. Separate branches
 - ☐ D. Independent voltage loops

Q.18 A technician must prevent vibration-induced loosening in a bolted assembly on a high-speed machine. Which type of washer is suitable for this situation?

- Ans**
- ☐ A. Flat washer
 - ☐ B. Plain washer
 - ☐ C. Taper washer
 - ☒ D. Spring lock washer

Q.19 Valve seat inserts are commonly made from which type of material?

- Ans**
- ☐ A. Lead-tin alloy
 - ☐ B. Aluminum alloy base
 - ☐ C. Copper and tin mixture
 - ☒ D. High-strength alloy steel

Q.20 Which process best describes the use of a cylindrical lap in achieving a high-quality surface finish on hardened steel shafts?

- Ans**
- ☐ A. Rubbing the lap manually without compound
 - ☐ B. Using the lap without abrasive compound applied
 - ☐ C. Applying compound but not rotating the lap
 - ☒ D. Rotating the lap with abrasive compound applied evenly

Q.21 What type of gears is most commonly used in a ship's reduction gearbox?

- Ans**
- ☐ A. Bevel gears
 - ☐ B. Spur gears
 - ☒ C. Double helical gears
 - ☐ D. Worm gears

Q.22 Which part of the crankshaft connects to the connecting rod in a diesel engine?

- Ans**
- ☐ A. Main journal
 - ☒ B. Crankpin
 - ☐ C. Flywheel
 - ☐ D. Flange

Q.23 A maintenance supervisor is designing a test to evaluate the effect of radiator cap pressure on engine cooling systems. He uses three identical engines but fits each with radiator caps rated at 0.7 bar, 1.0 bar, and 1.3 bar, respectively. Which system will allow the coolant to reach the highest temperature before boiling?

- Ans**
- ☐ A. All systems will boil at the same temperature
 - ☐ B. System with the 1.0 bar radiator cap installed
 - ☒ C. System with the 1.3 bar radiator cap installed
 - ☐ D. System with the 0.7 bar radiator cap installed

Q.24 While welding, an operator observes sparks flying towards a nearby electrical extension board. What should be done to minimize electrical hazards during this activity?

- Ans**
- ☒ A. Relocate the extension board outside the hazard zone
 - ☐ B. Place a damp cloth over the electrical extension board
 - ☐ C. Leave the electrical board in its current position
 - ☐ D. Shield the extension board using a metal cover

Q.25 When performing external checking of a forged component with outside callipers, which practice ensures reliable results?

- Ans**
- ☒ A. Zeroing calliper to a known standard before use
 - ☐ B. Reading values directly from the calliper scale
 - ☐ C. Recalibrating the tool after every measurement
 - ☐ D. Applying excessive force to ensure contact

Q.26 In which situation is a paper gasket used as a sealing element in automotive applications?

- Ans**
- ☐ A. Sealing joints exposed to heavy oils and chemicals
 - ☐ B. Sealing high-temperature exhaust manifolds
 - ☐ C. Sealing uneven, rough surfaces in high vibration areas
 - ☒ D. Sealing flat, smooth surfaces with low pressure

Q.27 The total surface area of a cylinder is given by _____.

- Ans**
- ☐ A. $\pi r^2 h$
 - ☐ B. $4\pi r^2$
 - ☐ C. $2\pi r h$
 - ☒ D. $2\pi r(h + r)$

Q.28 Which environmental problem is most closely linked to increased carbon dioxide emissions?

- Ans**
- ☐ A. Formation of acid rain on buildings
 - ☐ B. Thinning of ozone layer in upper sky
 - ☐ C. Soil erosion in agricultural fields
 - ☒ D. Rising global temperatures over long periods

Q.29 What is the main function of the evaporative emission control system?

- Ans**
- ☐ A. It increases the engine operating temperature
 - ☐ B. It increases the overall fuel consumption of the vehicle
 - ☒ C. It prevents fuel vapours entering the atmosphere
 - ☐ D. It improves the performance and grip of tyres

Q.30 What would happen if the intake valve in a diesel engine is too small?

- Ans**
- ☐ A. More fuel would flow into the engine
 - ☐ B. Exhaust gases would increase
 - ☐ C. The engine would cool faster
 - ☒ D. Less air would enter the cylinder

Q.31 Which of the following represents the total surface area of a sphere?

- Ans**
- ☐ A. $2\pi r^2$
 - ☒ B. $4\pi r^2$
 - ☐ C. πr^2
 - ☐ D. $3\pi r^2$

Q.32 A mechanic observes that the engine temperature indicator on the instrument panel has moved into the red zone during operation. What does this instrument primarily indicate in the context of the cooling system?

- Ans**
- ☐ A. It measures the oil pressure in the engine block.
 - ☐ B. It displays the engine RPM on the instrument panel.
 - ☐ C. It shows the fuel level in the fuel tank only.
 - ☒ D. It indicates the temperature of water in engine water jackets.

Q.33 How does the flywheel contribute to the operation of other engine accessories?

- Ans**
- ☒ A. By providing a mounting surface
 - ☐ B. By regulating valve operation
 - ☐ C. By cooling lubricant
 - ☐ D. By filtering fuel

Q.34 Apart from drawing circles, a large compass is also used for:

- Ans**
- ☐ A. Measuring temperature
 - ☐ B. Printing drawings
 - ☐ C. Cutting sheets
 - ☒ D. Taking large measurements

Q.35 A diesel mechanic is asked why carburetors are essential for petrol engines but not used in standard diesel engines. Based on the working principle, what is the best explanation?

- Ans**
- ☐ A. Carburetors increase fuel atomization in diesel engines
 - ☒ B. Carburetors create air-fuel mixtures required in petrol engines
 - ☐ C. Carburetors adjust exhaust emissions for diesel engines only
 - ☐ D. Carburetors control engine cooling in both engine types

Q.36 While manufacturing a cutting tool, which mechanical property is most important for the material to resist wear and scratching during operation?

- Ans**
- ☒ A. Hardness
 - ☐ B. Ductility
 - ☐ C. Toughness
 - ☐ D. Elasticity

Q.37 Increasing current through a conductor increases the heat produced because heat is proportional to:

- Ans**
- ☐ A. Voltage only
 - ☒ B. Square of current
 - ☐ C. Current
 - ☐ D. Resistance only

Q.38 Why are Bharat Stage standards updated periodically for diesel engine vehicles in India?

- Ans**
- ☐ A. They are updated to maintain older diesel engine designs and keep them functional
 - ☒ B. They are updated to reduce pollution and match global emission requirements
 - ☐ C. They are updated to improve fuel efficiency and decrease maintenance costs
 - ☐ D. They are updated to increase vehicle sales and purchasing capacity in India

Q.39 Why are fillets provided at the junctions of crank pins and webs?

- Ans**
- ☒ A. Reduce stress concentration
 - ☐ B. Enhance combustion efficiency
 - ☐ C. Improve fuel atomization
 - ☐ D. Decrease exhaust noise

Q.40 Which scenario best demonstrates the correct use of a wire brush in an ITI workshop?

- Ans**
- ☐ A. Cutting a metal pipe for measurement tasks
 - ☒ B. Cleaning a metal pipe before using a scribe
 - ☐ C. Measuring the pipe length accurately
 - ☐ D. Painting a metal pipe for finishing

Q.41 Which part interacts directly with the camshaft lobe to open an engine valve?

- Ans**
- ☐ A. The flywheel ring gear
 - ☒ B. The valve lifter or follower
 - ☐ C. The crankshaft main journal
 - ☐ D. The piston ring assembly

Q.42 In a scenario where multiple remedies are possible, how should a mechanic address persistent engine noise after all standard procedures have failed?

- Ans**
- ☐ A. Replacing air filter with high-quality type
 - ☐ B. Lubricating piston rings using correct oil
 - ☐ C. Adjusting valve clearance to manufacturer recommendations
 - ☒ D. Conducting a comprehensive engine teardown and inspection

Q.43 What is the main advantage of using superchargers in marine engines?

- Ans**
- ☐ A. Reduces air compression
 - ☒ B. Increases thermal efficiency
 - ☐ C. Increases engine size
 - ☐ D. Decreases engine efficiency

Q.44 Which combination of actions helps prevent engine overheating due to coolant flow issues?

- Ans**
- ☐ A. Adjust injector pressure and clean air intake
 - ☒ B. Flush cooling system and replace thermostat
 - ☐ C. Change fuel type for better combustion
 - ☐ D. Replace exhaust manifold gasket and inspect timing

Q.45 What issue can occur in the charging system due to a worn out or sticking brush in the alternator?

- Ans**
- ☐ A. Alternator noise
 - ☐ B. Over charging condition
 - ☒ C. No charging condition
 - ☐ D. Low output

Q.46 Which of the following is an important step to ensure personal safety in an auto workshop?

- Ans**
- ☐ A. Keeping tools scattered on the floor of the workshop
 - ☐ B. Ignoring warning signs in the workshop
 - ☒ C. Wearing protective gloves and goggles
 - ☐ D. Working with wet hands near electrical equipments

Q.47 Which maintenance task is critical for a Hydraulic Electronic Unit Injector (HEUI) system reliability?

- Ans**
- ☐ A. Routine air filter replacement
 - ☒ B. Regular engine oil changes
 - ☐ C. Regular injector nozzle cleaning
 - ☐ D. Frequent fuel filter cleaning

Q.48 The extension lines are used together with _____ in engineering drawing dimensioning.

- Ans**
- ☐ A. Border lines
 - ☒ B. Dimension lines
 - ☐ C. Cutting plane lines
 - ☐ D. Hidden lines

Q.49 An engine with a two-part mechanical fuel pump design is experiencing intermittent fuel supply issues. During inspection, the technician finds that all external connections are secure and the mounting bolts are tight. What should the technician examine next to identify the source of the problem?

- Ans**
- ☐ A. The technician should check the fuel quality in the tank.
 - ☐ B. The technician should examine electrical connections to the pump.
 - ☐ C. The technician should inspect the pump exterior for leaks.
 - ☒ D. The technician should inspect the internal rocker cam connection.

Q.50 A mechanic turns the ignition key in a vehicle fitted with an electrical fuel pump. What happens to the pump at that moment?

- Ans**
- ☐ A. The pump starts after engine warms up fully
 - ☒ B. The pump starts operating immediately upon ignition
 - ☐ C. The pump starts after fuel pressure drops
 - ☐ D. The pump starts when the vehicle begins moving

Q.51 In engineering drawing, what angle do two radii form within a quadrant?

- Ans**
- ☒ A. 90°
 - ☐ B. 360°
 - ☐ C. 45°
 - ☐ D. 180°

Q.52 A thermocouple generates thermoelectric voltage when its two junctions are at:

- Ans**
- ☐ A. Equal resistance
 - ☐ B. Equal temperatures
 - ☒ C. Different temperatures
 - ☐ D. Zero pressure

Q.53 Which engine is generally more compact for the same power output?

- Ans**
- ☐ A. Stirling engine
 - ☐ B. Steam engine
 - ☐ C. External combustion engine
 - ☒ D. Internal combustion engine

Q.54 If an engine is operated in a tilted position for extended periods, which lubrication system is most likely to ensure reliable oil supply to all parts?

- Ans**
- ☐ A. Wet sump lubrication system
 - ☐ B. Oil mist lubrication system
 - ☐ C. Splash lubrication system
 - ☒ D. Dry sump lubrication system

Q.55 While servicing a diesel engine, a technician notes that the extractor manifold helps maintain a specific gas velocity. What design feature of the extractor primarily supports this function?

- Ans**
- ☐ A. Changing the type of fuel supplied to engine
 - ☐ B. Modifying the timing of ignition sparks
 - ☐ C. Adjusting the size of engine pistons used
 - ☒ D. Choosing the correct tube diameter for flow

Q.56 Which factor most influences the completeness of combustion in a diesel engine?

- Ans**
- ☒ A. The mixing of air and fuel
 - ☐ B. The octane number of fuel
 - ☐ C. The frequency of high voltage
 - ☐ D. The engine's battery condition

Q.57 Which of the following best describes the use of a non-continuous/dashed lines in engineering drawing?

- Ans**
- ☒ A. To indicate hidden outlines and edges
 - ☐ B. To show dimension and extension lines
 - ☐ C. To represent visible outlines and edges
 - ☐ D. To indicate cutting planes

Q.58 When designing an automated cutting machine that requires precise blade positioning from both sides, why is a double-ended cylinder preferred over a single-ended one?

- Ans**
- ☐ A. It requires more manual adjustment for alignment
 - ☐ B. It makes synchronization with separate cylinders easier
 - ☐ C. It allows use of different cylinder sizes for each side
 - ☒ D. It balances force and movement bilaterally for accuracy

Q.59 Which feature distinguishes a taper reamer from a straight reamer?

- Ans**
- ☐ A. The handles are always longer on taper reamers
 - ☒ B. A taper reamer's edges match the required taper
 - ☐ C. The number of flutes is always greater on taper reamers
 - ☐ D. Taper reamers have serrated teeth for faster cutting

Q.60 Which part of the micrometer should be cleaned to remove debris after use?

- Ans**
- ☐ A. Lock nut
 - ☒ B. Measuring faces
 - ☐ C. Ratchet stop
 - ☐ D. Thimble

Q.61 What is the main purpose of a diesel engine cylinder head?

- Ans**
- ☐ A. To drive the crankshaft
 - ☐ B. To supply fuel
 - ☐ C. To lubricate pistons
 - ☒ D. To seal the combustion chamber

Q.62 A senior technician explains that the recovery system's design allows expelled coolant to return to the radiator instead of being lost. How does this benefit overall cooling system performance?

- Ans**
- ☐ A. It enhances coolant flow rate and improves engine performance
 - ☐ B. It improves fuel efficiency and reduces exhaust emissions
 - ☒ C. It maintains system volume and reduces risk of overheating or air entry
 - ☐ D. It lowers engine noise and reduces mechanical vibration

Q.63 Which engine type is more suitable for vehicles requiring frequent speed changes and quick acceleration?

- Ans**
- ☒ A. Internal combustion engine
 - ☐ B. Stirling engine
 - ☐ C. Steam engine
 - ☐ D. External combustion engine

Q.64 In Marine Engines, which sequence best describes the coolant flow in a heat exchange cooling system after leaving the expansion tank?

- Ans**
- ☐ A. Direct to engine, then to oil cooler, then to cores
 - ☐ B. To exhaust manifold, then to oil cooler, then to cores
 - ☐ C. To keeling coil, then to engine, then to expansion tank
 - ☒ D. Around cores, to oil cooler, to engine coolant pump inlet

Q.65 An engine exhibits erratic idling and excessive smoke after the induction manifold was reinstalled. What should be evaluated first regarding the diesel induction system's function?

- Ans**
- ☐ A. Clean the air cleaner to restore unrestricted intake flow
 - ☒ B. Check for manifold air leaks affecting air supply consistency
 - ☐ C. Inspect the intake valve for proper seating and movement
 - ☐ D. Adjust the timing to optimize combustion efficiency

Q.66 Which part of a Vernier caliper is used to measure the depth of a hole?

- Ans**
- ☐ A. The fixed jaw
 - ☐ B. The main scale
 - ☒ C. The depth measuring blade
 - ☐ D. The locking screw

Q.67 How does the crankshaft help maintain engine balance during operation?

- Ans**
- ☒ A. By using counterweights
 - ☐ B. By increasing fuel injection
 - ☐ C. By controlling valve timing
 - ☐ D. By reducing exhaust gases

Q.68 Which feature makes a scribe suitable for marking on metal surfaces?

- Ans**
- ☐ A. Graduated measuring scale
 - ☐ B. Flexible rubber grip
 - ☒ C. Hard pointed tip
 - ☐ D. Wide flat blade

Q.69 During troubleshooting, a mechanic finds premature bearing wear in a diesel engine with infrequent oil filter changes. What does this suggest about the filter's function?

- Ans**
- ☐ A. It is used for reducing operational noise in oil
 - ☐ B. It is necessary for changing oil flow direction only
 - ☐ C. It is important for raising the total oil volume always
 - ☒ D. It is critical for removing abrasive particles from oil

Q.70 Which combination of components allows a vernier calliper to measure both internal and external dimensions accurately?

- Ans**
- ☐ A. Fixed jaw and locking screw
 - ☐ B. Locking screw and main scale
 - ☐ C. Depth measuring blade and main scale
 - ☒ D. Fixed jaw, movable jaw & vernier scale

Q.71 If a supercharger is driven directly by the engine through gears and shafts, what will happen for engine operation at higher speeds?

- Ans**
- ☒ A. It increases compressed intake-charge delivery.
 - ☐ B. It keeps intake-charge delivery unchanged.
 - ☐ C. It decreases compressed intake-charge delivery.
 - ☐ D. It stops compressed intake-charge delivery.

Q.72 A mechanic observes that the gear shift indicator suggests an upshift during steady driving at moderate speed. Why is following the gear shift indicator's recommendation beneficial in this scenario?

- Ans**
- ☒ A. Following the gear shift indicator's recommendation reduces unnecessary engine load and improves fuel efficiency.
 - ☐ B. Following the gear shift indicator's recommendation enhances rapid acceleration and shortens journey times.
 - ☐ C. Following the gear shift indicator's recommendation increases transmission temperature and reduces driver comfort.
 - ☐ D. Following the gear shift indicator's recommendation maintains high engine speed and increases exhaust emissions.

Q.73 Which condition can lead to low engine oil pressure in a diesel engine?

- Ans**
- ☐ A. Oil pressure relief valve stuck closed
 - ☐ B. Oil pressure gauge showing excessive pressure
 - ☐ C. Oil of higher-than-recommended viscosity
 - ☒ D. Insufficient oil level in the sump

Q.74 A mechanic inspects a modern diesel vehicle and notices the seat belt warning light remains active even when the passenger seat is empty. Based on the dashboard instrument design, which action should the mechanic prioritize to ensure system reliability?

- Ans**
- ☐ A. Replace the dashboard instrument cluster immediately
 - ☐ B. Check for blown seat belt indicator bulbs only
 - ☐ C. Update the vehicle's onboard software system
 - ☒ D. Inspect the seat weight sensor wiring for faults

Q.75 Which of the following aspects is most important for controlling vehicle emissions in modern diesel vehicles?

- Ans**
- ☐ A. Using high-content carbon fossil fuels results in lower vehicle emissions
 - ☐ B. Ignoring engine maintenance and overhauling leads to reduced emissions
 - ☒ C. Using proper emission control systems reduces harmful exhaust gases
 - ☐ D. Increasing engine size helps reduce emission levels in diesel vehicles



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	2:30 PM - 5:00 PM
Subject	ALP Stage 2 Mechanic Motor Vehicle

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 Which statement best describes how the mass and speed of an object affect its kinetic energy?

- Ans**
- ☒ A. An object with greater mass and higher speed will have more kinetic energy.
 - ☐ B. An object with greater mass but lower speed will have more kinetic energy.
 - ☐ C. An object with same mass but higher speed will have less kinetic energy.
 - ☐ D. An object with less mass and lower speed will have more kinetic energy.

Q.2 Which of the following is the best example of municipal solid waste?

- Ans**
- ☐ A. Mining tailings
 - ☒ B. Household kitchen garbage
 - ☐ C. Industrial process waste
 - ☐ D. Hospital biomedical waste

Q.3 What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $5 \div 3 + 15 \times 5 - 3 = ?$

- Ans**
- ☐ A. 12
 - ☐ B. 9
 - ☒ C. 15
 - ☐ D. 18

Q.4 Which factor increases the amount of heat produced in a wire when an electric current flows through it for a fixed time?

- Ans**
- ☐ A. Decreasing the length of the wire
 - ☐ B. Reducing the current in the wire
 - ☒ C. Increasing the resistance of the wire
 - ☐ D. Making the wire thicker

Q.5 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Among 5 sticks, B, U, N, M and D, each having a different height, which stick is the shortest?

(I) D is shorter than U. M is shorter than B.

(II) M is taller than D.

- Ans**
- ☒ A. Both statements I and II together are NOT sufficient to answer the question
 - ☐ B. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☐ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.6 Why does biomedical waste require special handling compared to general municipal waste?

- Ans**
- ☒ A. It may contain infectious agents that pose health risks.
 - ☐ B. It is always radioactive and requires heavy shielding.
 - ☐ C. It has higher chemical content and is always toxic.
 - ☐ D. It is more likely to be recycled than other types of waste.

Q.7 Simplify the following expression.

11 of $7 + 125 \div 5 + 99 \div 11 \times 7 - 17$ of $7 + 7 \times 6 - (91 \div 7 + 7 \times 5)$

- Ans**
- ☐ A. 44
 - ☐ B. 36
 - ☐ C. 48
 - ☒ D. 40

Q.8 In a certain code language, 'SOIL' is coded as '1547' and 'COIL' is coded as '7124'. What is the code for 'C' in the given code language?

- Ans**
- ☐ A. 7
 - ☒ B. 2
 - ☐ C. 1
 - ☐ D. 4

Q.9 Which intervention most effectively reduces ground-level pollutant concentrations during a winter temperature inversion?

- Ans**
- ☐ A. Increasing surface temperatures near emission sources
 - ☐ B. Elevating emission sources above inversion layers
 - ☒ C. Enhancing vertical air mixing through artificial turbulence
 - ☐ D. Reducing local wind speed to minimize horizontal dispersion

Q.10 An engineering firm is tasked with creating a set of technical drawings for a large-scale project. The client specifies that all components must fit on a single sheet without reducing the drawing scale, and the total drawing area required is approximately 1 square meter. Based on standard drawing sheet sizes, which sheet should the firm select to best meet these requirements?

- Ans**
- ☐ A. A1 size sheet
 - ☐ B. A2 size sheet
 - ☐ C. A3 size sheet
 - ☒ D. A0 size sheet

Q.11 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table.
Only two people sit between Y and C when counted from the left of C. D sits third to the left of B. A sits to the immediate right of B. A sits second to the left of Y. Z is not an immediate neighbor of D.
Who sits third to the right of X?

Ans ☒ A. D
☒ B. A
☒ C. Y
☒ D. C

Q.12 What does the term 'HAZOP' stand for in occupational safety?

Ans ☒ A. Hazardous Operations Safety
☒ B. Handling and Organizing Safety
☒ C. Hazardous Operation Standard
☒ D. Hazard and Operability Study

Q.13 The average of five numbers is 30. If four of the numbers are 25, 35, 28 and 32, then what is the fifth number?

Ans ☒ A. 35
☒ B. 32
☒ C. 30
☒ D. 28

Q.14 If a rectangular field is measured to be 120 meters long and 75 meters wide, what is its area in SI units?

Ans ☒ A. 15000 square meters
☒ B. 9000 square meters
☒ C. 1800 square meters
☒ D. 19500 square meters

Q.15 If the mean of the following data is 45, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	23	30	31	45	X

Ans ☒ A. 160
☒ B. 180
☒ C. 188
☒ D. 162

Q.16 If the height of an object is doubled while its mass remains constant, its gravitational potential energy will be:

Ans ☒ A. unchanged
☒ B. doubled
☒ C. halved
☒ D. decreased to one-fourth

Q.17 In a certain code language,
A + B means 'A is the mother of B',
A – B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Satish related to Mayank if 'Satish + Deep × Piyush – Hitesh % Mayank'?

- Ans**
- ☒ A. Mother's brother's wife's sister
 - ☒ B. Father's brother's wife's mother
 - ☒ C. Mother's brother's wife's mother
 - ☒ D. Father's brother's wife's sister

Q.18 A hiker lifts a backpack from the ground to a ledge 2 meters above the ground. Which situation would result in the greatest increase in the backpack's gravitational potential energy?

- Ans**
- ☒ A. Lifting the same backpack to a 1-meter ledge
 - ☒ B. Carrying the same backpack horizontally for 2 meters
 - ☒ C. Lifting a heavier backpack to the same 2-meter ledge
 - ☒ D. Lifting a lighter backpack to the same 2-meter ledge

Q.19 What is a key feature of single stroke lettering in technical drawings?

- Ans**
- ☒ A. Each character is made with one continuous stroke.
 - ☒ B. Each character is outlined and then filled.
 - ☒ C. Each character is made with several parallel lines.
 - ☒ D. Each character is shaded after drawing.

Q.20 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☒ A. IT – KV
 - ☒ B. DG – EH
 - ☒ C. SJ – TK
 - ☒ D. KE – LF

Q.21 What does CPU stand for in computing?

- Ans**
- ☒ A. Computer Processing Unit
 - ☒ B. Control Processing Unit
 - ☒ C. Central Processing Unit
 - ☒ D. Core Processing Unit

Q.22 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☒ A. HB-IC
 - ☒ B. PJ-QK
 - ☒ C. FZ-GA
 - ☒ D. RL-SN

Q.23 A, B, C, D and E have different heights. E is taller than C but shorter than A. Only one person is taller than A. D is shorter than C. Who amongst them is the third tallest?

- Ans**
- ☒ A. A
 - ☒ B. E
 - ☒ C. B
 - ☒ D. C

Q.24 Which of the following correctly states the full form of CD and the technology used to store data on it?

- Ans**
- ☒ A. Compact Disc, Optical Storage
 - ☒ B. Compact Drive, Magnetic Storage
 - ☒ C. Compact Disc, Magnetic Storage
 - ☒ D. Compact Drive, Optical Storage

Q.25 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. There are exactly two boxes between T and P. Only Q is kept above U. No box is kept below P. S is kept somewhere below W but above V. Based on the given information, which box is kept third above V?

- Ans**
- ☒ A. P
 - ☒ B. W
 - ☒ C. T
 - ☒ D. S

Q.26 Which type of personal protective equipment is most suitable for tasks involving airborne chemical particles in confined spaces?

- Ans**
- ☒ A. Respiratory protection devices such as half-face masks
 - ☒ B. Body protection with flame-retardant suits
 - ☒ C. Hand protection using chemical-resistant gloves
 - ☒ D. Head protection with industrial-grade hard hats

Q.27 Which of the following statements best describes a triangle as used in engineering drawing?

- Ans**
- ☒ A. A triangle is a polygon with four straight sides and four angles.
 - ☒ B. A triangle must always have all sides of equal length.
 - ☒ C. A triangle is a polygon with three straight sides and three angles.
 - ☒ D. A triangle is a polygon having three curved sides.

Q.28 Refer to the given letter series and answer the question that follows.

(Left) A X T N K R Q K C P S I D F J U D O R G Z M B E L (Right)

How many letters are there in the English alphabetical series between the letter that is fourth from the right end and the letter that is third from the left end of the series?

- Ans**
- ☒ A. 6
 - ☒ B. 4
 - ☒ C. 3
 - ☒ D. 5

Q.29 A ramp is used to lift a box to a platform 2 m high. To reduce the effort required, the ramp length is increased from 4 m to 8 m. Assuming negligible friction, what remains unchanged?

- Ans**
- ☒ A. The work done in raising the box
 - ☒ B. The mechanical advantage
 - ☒ C. The force required
 - ☒ D. The distance moved along the ramp

Q.30 Which scenario best demonstrates proactive workplace safety behavior?

- Ans**
- ☐ A. Reporting hazards after incidents happen
 - ☒ B. Identifying and correcting hazards before accidents occur
 - ☐ C. Waiting for a supervisor to notice hazards
 - ☐ D. Discussing only past safety problems in meetings

Q.31 A ladder is leaning against a wall and makes an angle of 60° with the ground. If the length of the ladder is 24 m, find the distance of the foot of the ladder from the wall.

- Ans**
- ☐ A. 9 m
 - ☐ B. 15 m
 - ☒ C. 12 m
 - ☐ D. 18 m

Q.32 A cyclist travels from the kilometer stone marked 52 to the stone marked 79. How far has the cyclist traveled?

- Ans**
- ☐ A. 52 kilometers
 - ☐ B. 31 kilometers
 - ☐ C. 131 kilometers
 - ☒ D. 27 kilometers

Q.33 A dealer buys a table for ₹2,750. He first marks it up by 28%, then allows a 12% discount to a customer. If the customer also pays 5% GST on the selling price, find the profit percentage (excluding GST) made by the dealer.

- Ans**
- ☐ A. 15.12%
 - ☐ B. 10.36%
 - ☐ C. 13.81%
 - ☒ D. 12.64%

Q.34 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

ZOT - TLP
NIL - HFH

- Ans**
- ☒ A. BCD - VZZ
 - ☐ B. BOC - VZT
 - ☐ C. VZZ - BCD
 - ☐ D. ABD - VZZ

Q.35 A boy uses a wheelbarrow to carry sand. The wheel acts as the pivot, the sand is placed in the tray, and the boy lifts the handles. In this arrangement, the sand represents _____.

- Ans**
- ☒ A. Load
 - ☐ B. Arm
 - ☐ C. Fulcrum
 - ☐ D. Effort

Q.36 Srinu starts from his home and drives 2 km towards the south, then takes a right turn and drives 5 km. He then takes a right turn and drives 6 km before taking a right turn again and driving 4 km further. Srinu finally takes a right turn and drives 4 km before stopping at his office. In which direction should Srinu drive to reach his home again? (All turns are 90-degree turns only unless specified.)

- Ans**
- ☐ A. West
 - ☐ B. South
 - ☒ C. East
 - ☐ D. North

Q.37 What is the primary color used in warning signs to alert workers of potential hazards?

- Ans**
- ☒ A. Blue with white symbol or text
 - ☒ B. Yellow with black symbol or text
 - ☒ C. Red with white symbol or text
 - ☒ D. Green with white symbol or text

Q.38 An astronaut weighs 600 N on Earth. During a moon mission, she performs an experiment to measure her weight on the moon. Which value is closest to her expected weight on the moon, and why?

- Ans**
- ☒ A. 200 N, because the Moon's gravity is about one-third of Earth's.
 - ☒ B. 100 N, because the Moon's gravity is about one-sixth of Earth's.
 - ☒ C. 600 N, because a person's weight remains unchanged on the Moon.
 - ☒ D. 300 N, because the Moon's gravity is about one-half of Earth's.

Q.39 Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

6 – 16 – 23 – 32; 7 – 19 – 26 – 35

- Ans**
- ☒ A. 12 – 34 – 41 – 50
 - ☒ B. 4 – 14 – 21 – 30
 - ☒ C. 8 – 22 – 15 – 24
 - ☒ D. 11 – 31 – 38 – 29

Q.40 What should come in place of the question mark (?) in the given series?

1 2 7 20 61 ?

- Ans**
- ☒ A. 183
 - ☒ B. 185
 - ☒ C. 181
 - ☒ D. 182

Q.41 A laboratory thermometer has a range from -10 degrees Celsius to 110 degrees Celsius and 120 equal divisions. What is the smallest value that this thermometer can read?

- Ans**
- ☒ A. 2 degrees Celsius
 - ☒ B. 10 degrees Celsius
 - ☒ C. 0.5 degrees Celsius
 - ☒ D. 1 degree Celsius

Q.42 Why are electric wires in household appliances usually covered with plastic or rubber coating?

- Ans**
- ☒ A. To prevent electric shocks by insulation
 - ☒ B. To make the wires heavier
 - ☒ C. To increase the flow of current
 - ☒ D. To produce more heat

Q.43 Which of the following best describes the function of a speedometer in a vehicle?

- Ans**
- ☒ A. It displays the current speed at which the vehicle is moving.
 - ☒ B. It calculates the average speed over a journey.
 - ☒ C. It measures the total distance the vehicle has traveled.
 - ☒ D. It shows the rate at which the vehicle's speed changes.

Q.44 What should come in place of '?' in the given series?
11, 22, 44, 88, 176, ?

- Ans
- ☒ A. 352
 - ☐ B. 356
 - ☐ C. 342
 - ☐ D. 358

Q.45 A car travels from point A to point B in a zigzag path, covering a total distance of 200 meters. If the shortest straight-line distance between A and B is 120 meters, which statement best describes the car's distance and displacement?

- Ans
- ☐ A. The distance is 120 meters; the displacement is 120 meters
 - ☐ B. The distance is 120 meters; the displacement is 200 meters
 - ☒ C. The distance is 200 meters; the displacement is 120 meters
 - ☐ D. The distance is 200 meters; the displacement is 200 meters

Q.46 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

MDB PHE SLH VPK ?

- Ans
- ☐ A. ZUO
 - ☐ B. XSM
 - ☐ C. ZTM
 - ☒ D. YTN

Q.47 Two trains are moving in opposite directions. The first train is 120 m long and runs at 54 km/h. The second train is 180 m long and runs at 72 km/h. How much time will they take to cross each other completely?
(Rounded up to two decimal places)

- Ans
- ☐ A. 7.57 seconds
 - ☐ B. 8.43 seconds
 - ☐ C. 9.25 seconds
 - ☒ D. 8.57 seconds

Q.48 Let C be a circle, and AB and DE be two chords on C such that AB = BE. In the quadrilateral ABED, let AE and BD intersect at F, $\angle DBE = 55^\circ$ and $\angle BAE = 40^\circ$. Find $\angle FED$.

- Ans
- ☒ A. 45°
 - ☐ B. 55°
 - ☐ C. 60°
 - ☐ D. 110°

Q.49 What will come in place of the question mark (?) in the following equation if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $42 \times 6 \div 7 - 35 + 19 = ?$

- Ans
- ☒ A. 65
 - ☐ B. 67
 - ☐ C. 63
 - ☐ D. 69

Q.50 A cyclist rides 60 meters north, then 80 meters south, and finally 70 meters north. What is the total distance the cyclist has traveled?

- Ans
- ☐ A. 60 meters
 - ☐ B. 150 meters
 - ☒ C. 210 meters
 - ☐ D. 10 meters

Q.51 Which statement best describes the side view in engineering drawing?

- Ans**
- ☐ A. It shows a combination of all views of the object
 - ☐ B. It shows the object as seen clearly from the front
 - ☒ C. It shows the object as seen from left or right side
 - ☐ D. It shows the object as seen from above or below

Q.52 An article is bought for ₹300 and its price is increased by 5.5%. The resulting price is then reduced by 8%. Find the final selling price.

- Ans**
- ☐ A. ₹284.45
 - ☐ B. ₹296.46
 - ☒ C. ₹291.18
 - ☐ D. ₹288.24

Q.53 A solid right circular cone is 7 cm high, and the radius of its base is 22.2 cm. It is melted and recast into a right circular cone with radius of its base 3.7 cm. Then the height (in cm) of the cone is _____.

- Ans**
- ☐ A. 185
 - ☐ B. 267
 - ☒ C. 252
 - ☐ D. 159

Q.54 The price of sugar is increased by 20%. Manoj can increase his expenditure on sugar by only 15% from his income. In order to balance his expenditure, by what percentage should he reduce the quantity of sugar consumed?

- Ans**
- ☐ A. 6.5%
 - ☐ B. 5%
 - ☒ C. $4\frac{1}{6}\%$
 - ☐ D. $5\frac{1}{3}\%$

Q.55 12 is related to 1730 following a certain logic. Following the same logic, 13 is related to 2199. To which of the given options is 11 related, following the same logic?
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☐ A. 1443
 - ☒ B. 1333
 - ☐ C. 1433
 - ☐ D. 1543

Q.56 What is the primary role of the Central Processing Unit (CPU) in a computer system?

- Ans**
- ☐ A. To display output on the screen
 - ☐ B. To store long-term data
 - ☐ C. To manage network connections
 - ☒ D. To execute program instructions

Q.57 Which statement best describes the front view in an engineering drawing?

- Ans**
- ☐ A. It shows the object's depth and height as seen from the side
 - ☒ B. It shows the object's height and width as seen from the front
 - ☐ C. It shows only the object's bottom or right side
 - ☐ D. It shows only one dimension of the object

Q.58 If 2 is subtracted from each odd digit and 2 is added to each even digit in the number 235234796423, what will be the sum of the digits that are third from the left and third from the right?

- Ans**
- ☒ A. 7
 - ☒ B. 9
 - ☒ C. 6
 - ☒ D. 8

Q.59 The salary of a person is increased by 10%, 20% and 25% successively in three consecutive years. Find the overall percentage increase in the salary at the end of the third year.

- Ans**
- ☒ A. 50%
 - ☒ B. 30%
 - ☒ C. 65%
 - ☒ D. 60%

Q.60 Refer to the given letter series and answer the question that follows. Counting to be done from left to right only.

(Left) H S A N D D I A D F P A J O S K I O Z O T X (Right)

How many such consonants are there, each of which is immediately preceded by a consonant and also immediately followed by a vowel?

- Ans**
- ☒ A. Four
 - ☒ B. Three
 - ☒ C. Six
 - ☒ D. Five

Q.61 An engineer is updating a schematic for a control panel and needs to indicate a normally closed push button. Which approach best ensures the symbol is universally understood among engineers referring to standard engineering drawings?

- Ans**
- ☒ A. Substitute the normally closed push button symbol with a general switch symbol
 - ☒ B. Describe the normally closed push button in words within the schematic diagram clearly
 - ☒ C. Draw a hand made representation of the push button with a note explaining function
 - ☒ D. Use the standardized symbol for a normally closed push button as per conventions

Q.62 Seven boxes S, T, U, V, W, X, and Y are kept one over the other but not necessarily in the same order. U is kept exactly third from the top. Only one box is kept between U and T. W is kept immediately above T. Only three boxes are kept between X and S. V is kept on one of the positions below Y. Only two boxes are kept between U and S. Which box is kept second from the top?

- Ans**
- ☒ A. U
 - ☒ B. V
 - ☒ C. X
 - ☒ D. T

Q.63 Which symbol best represents a battery in an electric circuit diagram according to standard conventions?

- Ans**
- ☒ A. A pair of long and short parallel lines placed alternately
 - ☒ B. A single long line only
 - ☒ C. Two circles connected in series
 - ☒ D. Two short lines placed together

Q.64 A group of numbers/symbols is coded using letter codes as per the codes given below and the conditions that follow. The correct combination of codes following the conditions is your answer.

Note: If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	3	@	8	4	\$	&	2	%	#	1	+	9	7	5
Code	U	G	B	K	M	F	X	R	E	Q	S	C	V	T

Conditions –

- (i) If the first element is a symbol and the last element an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and the last elements are to be coded as ©
- (iii) If both second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?

& 8 \$ 9 5

- Ans**
- ☒ A. FCBMT
 - ☒ B. TBMCF
 - ☒ C. FBMCT
 - ☒ D. TCMBF

Q.65 Which of the following statements best describes a cuboid as used in engineering drawing?

- Ans**
- ☒ A. A cuboid has all sides and angles equal, making it similar to a cube.
 - ☒ B. A cuboid is a solid with six rectangular faces, and opposite faces are equal.
 - ☒ C. A cuboid has all faces as squares of equal size.
 - ☒ D. A cuboid is a solid where all faces are parallelograms but not necessarily rectangles.

Q.66 Pipes A and B can fill an entire tank in 8 hours and 12 hours, respectively. The water tank is one-fourth full. If both the pipes are opened together, then how long will it take to fill the remaining part of the tank?

- Ans**
- ☒ A. 3 hours 6 minutes
 - ☒ B. 3 hours 26 minutes
 - ☒ C. 3 hours 16 minutes
 - ☒ D. 3 hours 36 minutes

Q.67 A plane parallel to the base divides a cone of height 40 cm into two parts. If the volume of the upper smaller cone formed is $\frac{1}{64}$ of the volume of the original cone, calculate the height of the plane from the base of the cone.

- Ans**
- ☒ A. 20 cm
 - ☒ B. 40 cm
 - ☒ C. 10 cm
 - ☒ D. 30 cm

Q.68 A technician needs to select a fuse wire for a room heater. Which property should be considered most important for safety based on the heating effect of electric current?

- Ans**
- ☒ A. The fuse wire must have high resistance and be thick to prevent melting.
 - ☒ B. The fuse wire must have a high melting point for durability.
 - ☒ C. The fuse wire must have a low melting point to break the circuit during excess current.
 - ☒ D. The fuse wire must have a shiny surface for efficient cooling.

Q.69 A crane lifts a 200 kg load to a height of 15 meters in 10 seconds. Assuming acceleration due to gravity is 10 m/s^2 and energy loss is negligible, what is the power output of the crane during this operation?

- Ans**
- ☐ A. 2000 W
 - ☐ B. 1000 W
 - ☒ C. 3000 W
 - ☐ D. 1500 W

Q.70 Sohan covers a total distance of 760 km to reach his home, traveling partly by train and partly by car. He takes 8 hours when he travels 160 km by train and the rest by car. If he travels 240 km by train and the remaining distance by car, his journey takes 12 minutes longer. Find the difference between the speeds of the train and the car.

- Ans**
- ☒ A. 20 km/h
 - ☐ B. 23 km/h
 - ☐ C. 27 km/h
 - ☐ D. 21 km/h

Q.71 A pump can fill a tank in 3 hours. Due to a leak in the tank, it takes 4.5 hours to fill the tank. In how much time can the leak empty the full tank if no other entry or exit routes are open?

- Ans**
- ☐ A. 8 hours
 - ☐ B. 6 hours
 - ☐ C. 7 hours
 - ☒ D. 9 hours

Q.72 Which color is universally associated with emergency exit signs in industrial workplaces under international standards?

- Ans**
- ☐ A. Yellow background with black text or symbols
 - ☐ B. Blue background with white text or symbols
 - ☐ C. Red background with white text or symbols
 - ☒ D. Green background with white text or symbols

Q.73 Why does restricting certain chemical refrigerants effectively reduce damage to the ozone layer?

- Ans**
- ☐ A. Refrigerants contain particles that absorb harmful UV light.
 - ☐ B. Refrigerants increase oxygen production, supporting ozone recovery.
 - ☐ C. Refrigerants emit greenhouse gases that warm the stratosphere.
 - ☒ D. Refrigerants release substances that catalyze ozone breakdown.

Q.74 Which of the following pairs of numbers is co-prime?

- Ans**
- ☒ A. (17, 54)
 - ☐ B. (28, 49)
 - ☐ C. (14, 28)
 - ☐ D. (21, 33)

Q.75 When drawing repeated 67° angles on an engineering sheet, which practice best helps minimize cumulative alignment errors?

- Ans**
- ☐ A. Relying solely on the initial protractor alignment for all angles
 - ☒ B. Using the same reference line for all repeated angles
 - ☐ C. Drawing all angles continuously without intermediate verification
 - ☐ D. Marking all angles lightly with a pencil before finalizing

Q.76 Why is a room thermometer generally mounted vertically on a wall?

- Ans**
- ☐ A. It prevents the liquid from freezing inside the thermometer.
 - ☐ B. It helps the thermometer measure body temperature faster.
 - ☒ C. It ensures accurate reading by keeping the bulb exposed to room air.
 - ☐ D. It protects the thermometer from breaking easily.

Q.77 The first shopkeeper allows two successive discounts of 3% and 7%, while a second shopkeeper allows two successive discounts of 2% and 8%. A third shopkeeper allows 10% discount on the same item. From which shopkeeper should a customer buy if the marked price is the same at the three shops?

- Ans**
- ☒ A. Buy from the third shopkeeper
 - ☐ B. Buy from the second shopkeeper
 - ☐ C. Buy from the first or the second shopkeeper as both are the same.
 - ☐ D. Buy from the first shopkeeper

Q.78 Which combination best describes the main environmental challenges associated with plastic waste management?

- Ans**
- ☒ A. Persistence in the environment and microplastic formation
 - ☐ B. Neutralization and easy recycling
 - ☐ C. Thermal pollution and effective composting
 - ☐ D. Rapid biodegradation and chemical leaching

Q.79 What information does a kilometer stone provide to travelers on a road?

- Ans**
- ☐ A. Direction of travel
 - ☒ B. Distance from a reference point
 - ☐ C. Time taken to reach destination
 - ☐ D. Speed of the vehicle

Q.80 SANZ is related to YUTT in a certain way based on the English alphabetical order. In the same way, MTHM is related to SNNG. To which of the following is LJRE related to following the same logic?

- Ans**
- ☐ A. QDYY
 - ☐ B. REXZ
 - ☐ C. QEYZ
 - ☒ D. RDXY

Q.81 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GXM 5, JVN 11, MTO 24, PRP 51, ?

- Ans**
- ☐ A. TPQ 106
 - ☐ B. SPQ 107
 - ☐ C. TPQ 107
 - ☒ D. SPQ 106

Q.82 The mean of 11 numbers is 10.9. If the mean of the first 6 numbers is 10.5 and the mean of the last 6 numbers is 11.4, then find the 6th number.

- Ans**
- ☐ A. 11
 - ☒ B. 11.5
 - ☐ C. 10
 - ☐ D. 10.5

Q.83 Five students, N, O, R, S and T, have different heights. T is taller than N. R is taller than S but shorter than O. S is taller than N. More than two people are taller than T. How many people are shorter than R?

- Ans**
- ☐ A. One
 - ☐ B. None
 - ☐ C. Two
 - ☒ D. Three

Q.84 Which tool safety measure best prevents injuries when cleaning a workshop lathe after use?

- Ans**
- ☒ A. Using a brush to remove metal chips from the lathe
 - ☐ B. Blowing chips away with compressed air around the lathe
 - ☐ C. Using a rag to remove metal dust from the lathe
 - ☐ D. Wiping metal chips using bare hands directly

Q.85 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All chocolates are paneers.
No paneer is a milk.

Conclusions:

- (I) No chocolate is a milk.
(II) Some milks are paneers.

- Ans**
- ☐ A. Neither conclusion (I) nor (II) follows.
 - ☐ B. Only conclusion (II) follows.
 - ☐ C. Both conclusions (I) and (II) follow.
 - ☒ D. Only conclusion (I) follows.

Q.86 If $3x - 2y + 3z = 8$, $4x - 3y + 2z = 4$ and $2x + y - z = 1$, then find x, y and z, respectively.

- Ans**
- ☐ A. 2, 1 and 3
 - ☐ B. 3, 1 and 2
 - ☒ C. 1, 2 and 3
 - ☐ D. 2, 3 and 1

Q.87 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

Some rugs are fans.
No fan is a car.

Conclusion (I) : Some rugs are cars.
Conclusion (II) : Some fans are rugs.

- Ans**
- ☐ A. Both conclusions (I) and (II) follow
 - ☐ B. Only conclusion (I) follows
 - ☐ C. Neither conclusion (I) nor (II) follows
 - ☒ D. Only conclusion (II) follows

Q.88 The cost of a diamond varies directly with the square of its weight. A diamond broke into four pieces with weights in the ratio 2:4:1:3. If it had been broken into four equal pieces, the loss would have been ₹60,000. What was the original cost of the diamond?

- Ans**
- ☒ A. ₹80,000
 - ☐ B. ₹75,000
 - ☐ C. ₹82,000
 - ☐ D. ₹78,000

Q.89 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and select the most appropriate answer.

Question:

Among five trees N, O, R, S, and T, each having a different height, which tree is the tallest?

Statements:

(I) T is taller than R. N is taller than T.

(II) R is shorter than O but taller than S.

- Ans**
- ☐ A. Data in Statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ B. Both statements I and II together are NOT sufficient to answer the question
 - ☐ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☐ D. Data in Statement I alone is sufficient to answer the question while data in statement II is not

Q.90 P, Q and R are three batsmen. The ratios of runs scored by them in a certain match were as follows:

$P : Q = 5 : 7$ and $Q : R = 2 : 3$.

If they scored a total of 765 runs, then find the number of runs scored by R.

- Ans**
- ☐ A. 350
 - ☒ B. 357
 - ☐ C. 378
 - ☐ D. 336

Q.91 If $x + \frac{1}{x} = 5$, then $\frac{x^3 - 5x^2 + 5x}{x^2 + 1}$ is equal to:

- Ans**
- ☐ A. $\frac{1}{5}$
 - ☐ B. $\frac{2}{5}$
 - ☐ C. $\frac{3}{5}$
 - ☒ D. $\frac{4}{5}$

Q.92 Which one of the following statements correctly describes a characteristic of WANs?

- Ans**
- ☐ A. WANs are limited to connecting devices within a radius of 1 to 2 km.
 - ☐ B. WANs are always public networks managed solely by Internet Service Providers (ISPs).
 - ☒ C. WANs can be built by connecting multiple LANs via wired or wireless links.
 - ☐ D. WANs typically use only wireless media to connect distant LANs.

Q.93 A cyclist travels 120 km in 3 hours, rests for 1 hour, and then travels another 80 km in 2 hours. To determine the cyclist's average speed for the entire journey, which of the following quantities should be used?

- Ans**
- ☐ A. Distance travelled in a particular direction divided by time
 - ☒ B. Total distance travelled divided by the total time taken
 - ☐ C. Total displacement divided by total time taken
 - ☐ D. Change in velocity divided by total time taken

Q.94 What is the primary purpose of a Local Area Network (LAN)?

- Ans**
- ☐ A. To link wireless devices only
 - ☐ B. To connect social media accounts
 - ☒ C. To connect computers within a small geographical area
 - ☐ D. To connect global networks

Q.95 G is the mother of Y. Y is the sister of V. S is the father of L. L is the son of V. How is G related to L?

- Ans**
- ☐ A. Mother's sister
 - ☒ B. Mother's mother
 - ☐ C. Mother
 - ☐ D. Sister

Q.96 When a cutting plane line passes through a hole and a rib, which feature should be sectioned in the resulting view according to standard conventions?

- Ans**
- ☐ A. Both the hole and the rib are shown unsectioned
 - ☒ B. The hole is sectioned but the rib is shown unsectioned
 - ☐ C. Both the hole and the rib are shown sectioned
 - ☐ D. The rib is sectioned but the hole is left unsectioned

Q.97 Find the compound interest on ₹5,70,000 for 1.5 years at 10% per annum compounded half-yearly.

- Ans**
- ☐ A. ₹88,846.25
 - ☐ B. ₹89,946.25
 - ☐ C. ₹92,846.25
 - ☒ D. ₹89,846.25

Q.98 A 42-litre solution has sugar and water in the ratio 2 : 5. If, due to evaporation, the volume is reduced by 35%, and only water evaporates, what is the new ratio of sugar to water?

- Ans**
- ☒ A. 40 : 51
 - ☐ B. 51 : 42
 - ☐ C. 31 : 50
 - ☐ D. 40 : 41

Q.99 Refer to the following letter series and answer the question that follows. (Counting to be done from left to right only.)

(Left) Q K Q N X K G G V M L A W T W K N G V (Right)

How many such consonants are there each of which is immediately preceded by a vowel and also immediately followed by a consonant?

- Ans**
- ☐ A. None
 - ☐ B. Two
 - ☒ C. One
 - ☐ D. Three

Q.100 A sum of money invested at simple interest amounts to ₹21,500 in 5 years and ₹26,000 in 8 years. Find the principal amount (in ₹).

- Ans**
- ☒ A. 15,500
 - ☒ B. 14,000
 - ☒ C. 12,000
 - ☒ D. 7,500

Section : **PART-B**

Q.1 Why is a flywheel essential for starting a diesel engine equipped with a manual transmission?

- Ans**
- ☒ A. It provides inertia for easier engine rotation during cranking
 - ☒ B. It supplies electrical current to the glow plugs
 - ☒ C. It generates fuel pressure for the injectors
 - ☒ D. It cools the engine oil during initial cycles

Q.2 What happens to the boiling point of coolant when the pressure inside the cooling system increases?

- Ans**
- ☒ A. The boiling point of coolant fluctuates
 - ☒ B. The boiling point of coolant decreases
 - ☒ C. The boiling point of coolant remains unchanged
 - ☒ D. The boiling point of coolant increases

Q.3 How does the use of nylon or rayon cords contribute to the reduction of hysteresis in tyres?

- Ans**
- ☒ A. They make the tyre rigid and stiff
 - ☒ B. They provide flexibility and recover quickly
 - ☒ C. They reduce the tread's grip on wet roads
 - ☒ D. They increase the overall tyre weight

Q.4 Why is it important to use insulated tools when servicing hybrid electric vehicles?

- Ans**
- ☒ A. To prevent accidental electric shock
 - ☒ B. To reduce the weight of tools
 - ☒ C. To prevent oil spills in engine bay
 - ☒ D. To avoid scratching metal parts

Q.5 When connecting phase windings in a star configuration, what is formed at the common point?

- Ans**
- ☒ A. A positive terminal is formed at the common point
 - ☒ B. A disruptive ground loop shared at one connection
 - ☒ C. A negative terminal is formed at the common point
 - ☒ D. A neutral terminal is formed at the common point

Q.6 During which engine operating condition does the alternator supply maximum current to the battery?

- Ans**
- ☒ A. When the engine is off
 - ☒ B. At engine idle only
 - ☒ C. During engine starting
 - ☒ D. At higher engine speeds

Q.7 Which of these is the best footwear for personal safety in an automotive workshop?

- Ans**
- ☒ A. Steel-toed shoes
 - ☐ B. Sandals
 - ☐ C. Rubber slippers
 - ☐ D. Canvas shoes

Q.8 If the length of a conductor is doubled while keeping other factors constant, its resistance will:

- Ans**
- ☐ A. Become zero
 - ☐ B. Become half
 - ☐ C. Remain unchanged
 - ☒ D. Double

Q.9 What is the role of eddy currents in an electromagnetic retarder?

- Ans**
- ☐ A. To create magnetic drag through direct physical contact
 - ☐ B. To generate thermal energy to lock the vehicle brakes
 - ☐ C. To maintain a stationary magnetic field in the stator
 - ☒ D. To create magnetic drag without physical contact

Q.10 In an automobile alternator, if one rectifier diode becomes open-circuited, what is the most likely effect on battery charging?

- Ans**
- ☒ A. Battery charging current reduces and AC ripple increases.
 - ☐ B. Battery receives smooth DC charging with no change in output.
 - ☐ C. Alternator produces only AC output without any mechanical effect.
 - ☐ D. Ignition system voltage becomes fully stabilized automatically.

Q.11 What movement does the shackle perform when the vehicle passes over a bump or ditch?

- Ans**
- ☐ A. It moves vertically to support the axle
 - ☐ B. It moves forward to accommodate the spring's elongation
 - ☐ C. It stays fixed in one position to accommodate the spring's elongation
 - ☒ D. It moves backward to accommodate the spring's elongation

Q.12 Which of the following is a likely cause of low engine power output?

- Ans**
- ☐ A. Low oil level in the sump
 - ☐ B. Engine oil low viscosity
 - ☐ C. Engine oil high viscosity
 - ☒ D. Defective injector

Q.13 Why does an automatic transmission vehicle require a torque converter in stop-and-go driving situations?

- Ans**
- ☐ A. Directly locks the engine to the wheels
 - ☒ B. Smooth engine power transmission at low speed
 - ☐ C. Increases the braking force during stops
 - ☐ D. Eliminates the need for transmission fluid

Q.14 What should be checked before using a divider to ensure accuracy in workshop practice?

- Ans**
- ☐ A. The surface finish is shiny
 - ☒ B. Both legs are of equal length
 - ☐ C. The color of the divider
 - ☐ D. The divider is heavy

Q.15 Which component in the EFI wiring system is responsible for effective atomization characteristics during cold starting condition?

- Ans**
- ☒ A. Cold start valve
 - ☐ B. Air flow sensor
 - ☐ C. Fuel regulator
 - ☐ D. Spiral coil spring

Q.16 A lathe machine performs work at a constant rate. What does this indicate about its power output?

- Ans**
- ☒ A. The power output is constant
 - ☐ B. The power output is increasing
 - ☐ C. The power output is zero
 - ☐ D. The power output is decreasing

Q.17 How does the condenser assist the ignition coil after the contact breaker points separate?

- Ans**
- ☒ A. It enables the high voltage surge through the secondary winding
 - ☐ B. It triggers the spark plug to fire directly
 - ☐ C. It slows down the current in the primary circuit
 - ☐ D. It enables the high voltage surge through the primary winding

Q.18 A student hypothesizes that using ethanol-blended gasoline requires a different stoichiometric air–fuel ratio than pure gasoline. Which consideration supports this claim?

- Ans**
- ☒ A. Oxygen content in fuel blend
 - ☐ B. Octane rating of the fuel
 - ☐ C. Evaporation rate of fuel
 - ☐ D. Color of gasoline blend

Q.19 Why is the vernier scale constructed with divisions slightly different from those on the main scale in a vernier caliper?

- Ans**
- ☐ A. To make the vernier scale divisions identical to the main scale divisions.
 - ☐ B. To ensure the vernier scale is always smaller than the main scale.
 - ☒ C. To allow precise matching of a vernier division with a main scale division at specific points.
 - ☐ D. To make the vernier scale divisions twice as large as the main scale divisions.

Q.20 During a workshop repair, which sign would suggest a failed gasket in a manual transmission case?

- Ans**
- ☐ A. Unusual noise coming from inside the case
 - ☒ B. Visible fluid seeping from between the case and cover plate
 - ☐ C. Vibration felt during gear changes
 - ☐ D. Difficulty shifting between gears

Q.21 What could be a consequence of operating a diesel engine without a functioning vibration damper?

- Ans**
- ☐ A. Stable camshaft timing at all speeds
 - ☐ B. Improved fuel atomization in injectors
 - ☒ C. Crankshaft failure due to excessive stress
 - ☐ D. Increased combustion efficiency under load

Q.22 What does a simple zig-zag line typically symbolize in automobile engineering drawings?

- Ans**
- ☒ A. A resistor in a circuit
 - ☐ B. A fuse in a circuit
 - ☐ C. A horn in a circuit
 - ☐ D. A bulb in a circuit

Q.23 If a technician is asked to estimate the distance a vehicle can travel after a full recharge or refuel, what is the term used to describe this value?

- Ans**
- ☐ A. Fuel economy
 - ☐ B. Charge time
 - ☒ C. Driving range
 - ☐ D. Horsepower

Q.24 Which component in an electric vehicle stores electrical energy for propulsion?

- Ans**
- ☐ A. Alternator unit
 - ☒ B. Battery pack
 - ☐ C. Carburetor set
 - ☐ D. Fuel tank set

Q.25 Why are gear ratios arranged in a specific sequence in manual transmissions?

- Ans**
- ☐ A. To reduce the vehicle's fuel tank capacity
 - ☒ B. To provide smooth acceleration and efficient speed control
 - ☐ C. To confuse the driver while shifting gears
 - ☐ D. To maximize engine noise at all speeds

Q.26 What is the main function of the anvil in the construction of a micrometer?

- Ans**
- ☒ A. Provides a stationary measuring surface
 - ☐ B. Displays the main scale reading
 - ☐ C. Rotates the spindle
 - ☐ D. Adjusts the measuring pressure

Q.27 Why must the starter motor disengage from the flywheel after the engine starts?

- Ans**
- ☐ A. To increase battery life during operation
 - ☐ B. To improve fuel efficiency during driving
 - ☒ C. To prevent damage to the starter and flywheel
 - ☐ D. To adjust ignition timing automatically

Q.28 Which signal is used to indicate special movement instructions for emergency vehicles at an intersection?

- Ans**
- ☐ A. A flashing red signal is used for emergency vehicles
 - ☐ B. A flashing green signal is used for emergency vehicles
 - ☒ C. A flashing blue signal is used for emergency vehicles
 - ☐ D. A flashing yellow signal is used for emergency vehicles

Q.29 How does an electronic fuel injection (EFI) system protect an overspeeding engine using fuel?

- Ans**
- ☐ A. Lowers fuel pump voltage
 - ☐ B. Causes immediate acceleration
 - ☐ C. Accelerates combustion
 - ☒ D. Temporarily cuts fuel injection

Q.30 Internal combustion engines offer which advantage in terms of start-up?

- Ans**
- ☐ A. Internal combustion engines have slow start-up time
 - ☒ B. Internal combustion engines have quick start-up time
 - ☐ C. Internal combustion engines start without a compression process
 - ☐ D. Internal combustion engines start without cranking

Q.31 What is the primary purpose of gasoline's volatility in a motor vehicle fuel system?

- Ans**
- ☐ A. To increase the octane rating directly
 - ☒ B. To ensure rapid vaporization for ignition
 - ☐ C. To reduce exhaust emissions automatically
 - ☐ D. To prevent corrosion of metal parts

Q.32 What is a key reason for selecting carbon fiber reinforced carbon composite for racing car brake pads?

- Ans**
- ☐ A. It is more fuel efficient than other materials
 - ☐ B. It can handle extreme pressures without failing
 - ☐ C. It is more cost-effective than all metals
 - ☒ D. It can handle extreme temperatures without failing

Q.33 Which part works closely with actuators to ensure correct fuel injection?

- Ans**
- ☐ A. Air filter assembly
 - ☒ B. Electronic Control Unit (ECU)
 - ☐ C. Radiator fan blade
 - ☐ D. Gear lever handle

Q.34 Which tool is commonly used to tighten cylinder head bolts during diesel engine assembly?

- Ans**
- ☐ A. Combination spanner is used for cylinder head bolts
 - ☒ B. Torque wrench is used to tighten cylinder head bolts
 - ☐ C. Adjustable wrench is best for all types of bolt tightening
 - ☐ D. Soft mallet is ideal for tightening cylinder head bolts

Q.35 Which scenario best describes zero work being done?

- Ans**
- ☐ A. Pulling a rope to lift a load
 - ☐ B. Pushing a trolley across the floor
 - ☒ C. Holding a suspended weight without moving it
 - ☐ D. Lifting a box onto a table

Q.36 On an engineering drawing, what does a circle with two parallel lines inside typically indicate?

- Ans**
- ☐ A. A fuse
 - ☐ B. A junction box
 - ☐ C. A ground connection
 - ☒ D. A ball bearing

Q.37 Which of the following best describes the driver's experience in a four-wheel steering vehicle during a sharp turn?

- Ans**
- ☒ A. Less effort is needed to steer sharply
 - ☐ B. Movement becomes unstable during sharp turns
 - ☐ C. Response to steering input is delayed
 - ☐ D. More effort is required to initiate a turn

Q.38 Which is the lightest among the following commonly used workshop materials?

- Ans**
- ☐ A. Steel rod
 - ☐ B. Iron rod
 - ☐ C. Copper rod
 - ☒ D. Aluminum rod

Q.39 What is a practical effect of using helical gears in a vehicle's steering mechanism?

- Ans**
- ☐ A. Steering feels harder and has less vibration
 - ☐ B. Steering transmits less force to the wheels
 - ☐ C. Steering becomes harder to turn
 - ☒ D. Steering feels smoother and has less vibration

Q.40 What should be done if oil is mixed with water in oil sump and the engine does not start?

- Ans**
- ☐ A. Repair the pitted valve seat
 - ☐ B. Clean the exhaust ports
 - ☒ C. Replace ruptured cylinder head gasket
 - ☐ D. Replace cracked valve seat

Q.41 Which of the following component is most likely worn or failed if there is excessive lateral chassis movement in a rigid non drive rear suspension?

- Ans**
- ☐ A. Upper control arm
 - ☐ B. Shock absorber
 - ☐ C. Coil spring
 - ☒ D. Tracking bar

Q.42 What feature can be changed in a manual adjustable-rate shock absorber to control oil flow?

- Ans**
- ☐ A. The size of the spring inside
 - ☐ B. The shape of the piston head
 - ☒ C. The position of the valves in the piston
 - ☐ D. The amount of oil used

Q.43 Which part of the charging system detects changes in battery voltage and adjusts output accordingly?

- Ans**
- ☐ A. Fuse box
 - ☐ B. Starter motor
 - ☐ C. Ignition coil
 - ☒ D. Regulator unit

Q.44 A vehicle's thermostat is working erratically, leading to overheating. What should be done?

- Ans**
- ☐ A. Repair thermostat
 - ☒ B. Replace thermostat
 - ☐ C. Replace water pump
 - ☐ D. Open radiator shutter

Q.45 Which piston pin arrangement normally requires thrust washers least often?

- Ans**
- ☐ A. Semi-floating clamped rod type
 - ☐ B. Taper pin type
 - ☒ C. Fully floating with circlips
 - ☐ D. Fixed pin type

Q.46 What does a typical immobilizer system use to verify authorized access?

- Ans**
- ☐ A. Engine oil dipstick
 - ☐ B. Standard metal ignition key
 - ☐ C. Manual window crank handle
 - ☒ D. Coded electronic key or fob

Q.47 Which step is essential before using an inch tap to obtain the correct internal thread size?

- Ans**
- ☐ A. Mark the center with a prick punch
 - ☐ B. Apply lubricant to the tap before use
 - ☐ C. Use a die to test the tap size
 - ☒ D. Drill a hole of correct size for the tap

Q.48 During a precision tapping job, an operator notices the tap slipping within the wrench. Which corrective action should be taken to resolve this using an adjustable tap wrench?

- Ans**
- ☐ A. Apply greater force while turning the tap
 - ☒ B. Retighten the jaws to secure the tap firmly in the wrench
 - ☐ C. Switch to a fixed tap wrench for the operation
 - ☐ D. Replace the tap with a new one of the same size

Q.49 If the length of the insulator nose is long, what is the direct effect on the spark plug heat range?

- Ans**
- ☒ A. The plug will run hotter
 - ☐ B. The plug will foul easily
 - ☐ C. The plug will run cooler
 - ☐ D. The plug will transfer heat faster

Q.50 Which component of vehicle exhaust is most closely linked to hydrocarbon emissions?

- Ans**
- ☐ A. Carbon monoxide
 - ☒ B. Unburned fuel vapors
 - ☐ C. Nitrogen oxides
 - ☐ D. Excess water vapor

Q.51 Which feature distinguishes a heavy load vehicle from a light load vehicle?

- Ans**
- ☒ A. High payload capacity
 - ☐ B. Steering wheel
 - ☐ C. Aerodynamic shape
 - ☐ D. Headlights

Q.52 A hydraulic system is designed to lift heavy loads but requires fluid to flow in only one direction to prevent backflow. Which application most appropriately uses a non-return valve?

- Ans**
- ☐ A. Mounting a non return valve in a control valve line for flow regulation
 - ☐ B. Placing a non return valve in the system inlet line to enhance pressure
 - ☒ C. Inserting a non return valve in the pump discharge line to stop reverse fluid flow
 - ☐ D. Fitting a non return valve in the reservoir return line for fluid direction

Q.53 Which device in a clean diesel exhaust system is responsible for reducing NO_x pollutants chemically?

- Ans**
- ☐ A. Air filter device
 - ☐ B. Diesel oxidation catalyst
 - ☐ C. Turbocharger assembly
 - ☒ D. Urea injection system

Q.54 Which method of heat transfer is most responsible for removing excess engine heat in a water-cooled diesel engine's radiator system?

- Ans**
- ☒ A. Convection of coolant through radiator tubes
 - ☐ B. Conduction of heat through engine block
 - ☐ C. Air conduction through engine block
 - ☐ D. Radiation from engine surfaces

Q.55 How can a properly sealed gasket improve manual transmission longevity and care?

- Ans**
- ☐ A. Requires frequent replacement
 - ☒ B. Reduces maintenance by preventing leaks
 - ☐ C. Increases gear wear over time
 - ☐ D. Synchronizes gear shifting

Q.56 Which material property is most critical for the packing material in absorptive mufflers to maximize sound absorption efficiency?

- Ans**
- ☐ A. Low density and water resistance
 - ☐ B. Moderate surface hardness
 - ☒ C. High porosity and thermal stability
 - ☐ D. High electrical conductivity

Q.57 Which feature is designed on pistons to reduce friction with the cylinder wall?

- Ans**
- ☒ A. A skirt is designed on pistons to reduce friction
 - ☐ B. A pin bore is designed on pistons to reduce friction
 - ☐ C. A groove is designed on pistons to reduce friction
 - ☐ D. A dome is designed on pistons to reduce friction

Q.58 Which ECU-controlled feature adjusts the intake air path into the engine?

- Ans**
- ☐ A. Evaporative emission container
 - ☐ B. Idle speed control
 - ☐ C. Air: Fuel ratio
 - ☒ D. Variable intake manifold

Q.59 How does high humidity in the workshop air affect drying of paint on vehicle surfaces?

- Ans**
- ☐ A. Speeds up the drying process
 - ☐ B. Causes immediate rusting
 - ☐ C. Changes paint color instantly
 - ☒ D. Slows down the drying process

Q.60 During which stroke of the engine cycle are nitrogen oxides produced in the highest amount?

- Ans**
- ☐ A. Intake stroke
 - ☒ B. Power stroke
 - ☐ C. Compression stroke
 - ☐ D. Exhaust stroke

Q.61 What is the correct action after fuel is accidentally spilled on a workshop floor?

- Ans**
- ☐ A. Allow the fuel to dry naturally before cleaning
 - ☐ B. Cover the area and continue normal workshop activity
 - ☒ C. Absorb the fuel and wipe the area immediately
 - ☐ D. Flush the area thoroughly using running water

Q.62 A solenoid actuator converts electrical energy into:

- Ans**
- ☐ A. Optical energy
 - ☐ B. Thermal insulation
 - ☐ C. Chemical energy
 - ☒ D. Linear magnetic actuation

Q.63 What is the main function of an oil pressure relief valve in a diesel engine lubrication system?

- Ans**
- ☒ A. It limits maximum oil pressure in the system
 - ☐ B. It filters contaminants from the oil
 - ☐ C. It cools the engine oil during operation
 - ☐ D. It blocks oil flow completely if pressure is high

Q.64 Which component directly transmits movement to the front wheels in a recirculating ball and nut system?

- Ans**
- ☒ A. The drop arm transmits movement to the front wheels.
 - ☐ B. The worm transmits movement to the front wheels.
 - ☐ C. The ball nut transmits movement to the front wheels.
 - ☐ D. The sector transmits movement to the front wheels.

Q.65 What is the role of the adjustment spring in a thermostatic expansion valve?

- Ans**
- ☒ A. To set the superheat value
 - ☐ B. To filter the refrigerant
 - ☐ C. To sense refrigerant heat
 - ☐ D. To transmit pressure

Q.66 What action do the pistons perform once they are moved by the hydraulic fluid?

- Ans**
- ☐ A. They rotate the brake disc and slow down the vehicle.
 - ☐ B. They retract the brake pads to release the brakes.
 - ☒ C. They move against the brake pads, pressing them against the rotating brake disc.
 - ☐ D. They pump the hydraulic fluid back into the reservoir and slow down the vehicle.

Q.67 Which action should be taken first when fuel is accidentally spilled on a workshop floor?

- Ans**
- ☐ A. Moving nearby tools without removing the spill
 - ☐ B. Opening fuel containers to improve air circulation
 - ☒ C. Applying absorbent material and cleaning the area
 - ☐ D. Continuing work until the current task is finished

Q.68 A technician needs a quick approximate measurement of a machined slot in workshop practice. Which task best represents the use of a steel rule?

- Ans**
- ☐ A. Comparing internal bore sizes of cylindrical parts
 - ☐ B. Marking reference positions near slot edges
 - ☒ C. Checking slot width against a given dimension
 - ☐ D. Guiding straight layout lines on metal surfaces

Q.69 When used in hydraulic power packs, internal gear pumps are preferred because they:

- Ans**
- ☒ A. Circulate coolant efficiently through the pack
 - ☒ B. Provide consistent flow for actuator control
 - ☒ C. Separate air from oil in the reservoir
 - ☒ D. Filter out particles at extremely high pressure

Q.70 According to Ohm's law, current in a conductor is directly proportional to:

- Ans**
- ☒ A. Power
 - ☒ B. Resistance
 - ☒ C. Voltage
 - ☒ D. Resistivity

Q.71 In most vehicles, where is the headlight relay typically located?

- Ans**
- ☒ A. In the fuse box under the hood
 - ☒ B. Mounted on the headlight housing
 - ☒ C. Inside the glove compartment
 - ☒ D. Attached to the battery terminal

Q.72 Which SAE viscosity grade is most suitable for a heavy-duty diesel engine operating continuously under high-load conditions in hot summers and moderately cold winters?

- Ans**
- ☒ A. SAE 10W-30
 - ☒ B. SAE 40
 - ☒ C. SAE 15W-40
 - ☒ D. SAE 5W-20

Q.73 At what point inside the torque converter is the flow called the 'coupling point'?

- Ans**
- ☒ A. When the stator is locked on its shaft
 - ☒ B. When the impeller and turbine reach the same speed
 - ☒ C. When the vehicle is idling at low speed
 - ☒ D. When the impeller rotates faster than the turbine

Q.74 Which construction type is most commonly used in modern passenger vehicles for its durability and handling?

- Ans**
- ☒ A. Radial ply construction
 - ☒ B. Tubeless construction
 - ☒ C. Bias ply construction
 - ☒ D. Solid rubber construction

Q.75 Why is the body of a flat chisel slightly tapered towards the cutting edge?

- Ans**
- ☒ A. To increase striking force
 - ☒ B. To prevent sticking in work
 - ☒ C. To provide hand grip
 - ☒ D. To add striking surface



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	2:30 PM - 5:00 PM
Subject	ALP Stage 2 Mechanic Tractor

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 A, B, C, D and E have different heights. E is taller than C but shorter than A. Only one person is taller than A. D is shorter than C. Who amongst them is the third tallest?

Ans ☒ A. C
☒ B. A
☒ C. B
☒ D. E

Q.2 Which color is universally associated with emergency exit signs in industrial workplaces under international standards?

Ans ☒ A. Blue background with white text or symbols
☒ B. Yellow background with black text or symbols
☒ C. Red background with white text or symbols
☒ D. Green background with white text or symbols

Q.3 What does the term 'HAZOP' stand for in occupational safety?

Ans ☒ A. Handling and Organizing Safety
☒ B. Hazard and Operability Study
☒ C. Hazardous Operations Safety
☒ D. Hazardous Operation Standard

Q.4 Which factor increases the amount of heat produced in a wire when an electric current flows through it for a fixed time?

Ans ☒ A. Decreasing the length of the wire
☒ B. Increasing the resistance of the wire
☒ C. Making the wire thicker
☒ D. Reducing the current in the wire

Q.5 When a cutting plane line passes through a hole and a rib, which feature should be sectioned in the resulting view according to standard conventions?

Ans ☒ A. The hole is sectioned but the rib is shown unsectioned
☒ B. The rib is sectioned but the hole is left unsectioned
☒ C. Both the hole and the rib are shown sectioned
☒ D. Both the hole and the rib are shown unsectioned

Q.6 12 is related to 1730 following a certain logic. Following the same logic, 13 is related to 2199. To which of the given options is 11 related, following the same logic?
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☒ A. 1543
 - ☒ B. 1433
 - ☒ C. 1443
 - ☒ D. 1333

Q.7 Five students, N, O, R, S and T, have different heights. T is taller than N. R is taller than S but shorter than O. S is taller than N. More than two people are taller than T. How many people are shorter than R?

- Ans**
- ☒ A. One
 - ☒ B. Three
 - ☒ C. Two
 - ☒ D. None

Q.8 What is the primary color used in warning signs to alert workers of potential hazards?

- Ans**
- ☒ A. Green with white symbol or text
 - ☒ B. Yellow with black symbol or text
 - ☒ C. Red with white symbol or text
 - ☒ D. Blue with white symbol or text

Q.9 Let C be a circle, and AB and DE be two chords on C such that AB = BE. In the quadrilateral ABED, let AE and BD intersect at F, $\angle DBE = 55^\circ$ and $\angle BAE = 40^\circ$. Find $\angle FED$.

- Ans**
- ☒ A. 110°
 - ☒ B. 45°
 - ☒ C. 60°
 - ☒ D. 55°

Q.10 A cyclist travels from the kilometer stone marked 52 to the stone marked 79. How far has the cyclist traveled?

- Ans**
- ☒ A. 52 kilometers
 - ☒ B. 131 kilometers
 - ☒ C. 27 kilometers
 - ☒ D. 31 kilometers

Q.11 If 2 is subtracted from each odd digit and 2 is added to each even digit in the number 235234796423, what will be the sum of the digits that are third from the left and third from the right?

- Ans**
- ☒ A. 7
 - ☒ B. 8
 - ☒ C. 6
 - ☒ D. 9

Q.12 The cost of a diamond varies directly with the square of its weight. A diamond broke into four pieces with weights in the ratio 2:4:1:3. If it had been broken into four equal pieces, the loss would have been ₹60,000. What was the original cost of the diamond?

- Ans**
- ☒ A. ₹82,000
 - ☒ B. ₹78,000
 - ☒ C. ₹75,000
 - ☒ D. ₹80,000

Q.13 Which tool safety measure best prevents injuries when cleaning a workshop lathe after use?

- Ans**
- ☐ A. Wiping metal chips using bare hands directly
 - ☒ B. Using a brush to remove metal chips from the lathe
 - ☐ C. Blowing chips away with compressed air around the lathe
 - ☐ D. Using a rag to remove metal dust from the lathe

Q.14 A cyclist travels 120 km in 3 hours, rests for 1 hour, and then travels another 80 km in 2 hours. To determine the cyclist's average speed for the entire journey, which of the following quantities should be used?

- Ans**
- ☐ A. Distance travelled in a particular direction divided by time
 - ☐ B. Total displacement divided by total time taken
 - ☒ C. Total distance travelled divided by the total time taken
 - ☐ D. Change in velocity divided by total time taken

Q.15 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Satish related to Mayank if 'Satish + Deep × Piyush - Hitesh % Mayank'?

- Ans**
- ☐ A. Mother's brother's wife's sister
 - ☐ B. Father's brother's wife's sister
 - ☒ C. Father's brother's wife's mother
 - ☐ D. Mother's brother's wife's mother

Q.16 Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 - Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

6 - 16 - 23 - 32; 7 - 19 - 26 - 35

- Ans**
- ☐ A. 8 - 22 - 15 - 24
 - ☐ B. 11 - 31 - 38 - 29
 - ☒ C. 12 - 34 - 41 - 50
 - ☐ D. 4 - 14 - 21 - 30

Q.17 Which of the following pairs of numbers is co-prime?

- Ans**
- ☐ A. (21, 33)
 - ☐ B. (28, 49)
 - ☐ C. (14, 28)
 - ☒ D. (17, 54)

Q.18 Why does biomedical waste require special handling compared to general municipal waste?

- Ans**
- ☐ A. It is always radioactive and requires heavy shielding.
 - ☐ B. It is more likely to be recycled than other types of waste.
 - ☒ C. It may contain infectious agents that pose health risks.
 - ☐ D. It has higher chemical content and is always toxic.

Q.19 Which of the following best describes the function of a speedometer in a vehicle?

- Ans**
- ☐ A. It calculates the average speed over a journey.
 - ☐ B. It shows the rate at which the vehicle's speed changes.
 - ☒ C. It displays the current speed at which the vehicle is moving.
 - ☐ D. It measures the total distance the vehicle has traveled.

Q.20 A ramp is used to lift a box to a platform 2 m high. To reduce the effort required, the ramp length is increased from 4 m to 8 m. Assuming negligible friction, what remains unchanged?

- Ans**
- ☐ A. The force required
 - ☒ B. The work done in raising the box
 - ☐ C. The distance moved along the ramp
 - ☐ D. The mechanical advantage

Q.21 Srinu starts from his home and drives 2 km towards the south, then takes a right turn and drives 5 km. He then takes a right turn and drives 6 km before taking a right turn again and driving 4 km further. Srinu finally takes a right turn and drives 4 km before stopping at his office. In which direction should Srinu drive to reach his home again? (All turns are 90-degree turns only unless specified.)

- Ans**
- ☐ A. South
 - ☐ B. West
 - ☒ C. East
 - ☐ D. North

Q.22 Which statement best describes the front view in an engineering drawing?

- Ans**
- ☐ A. It shows the object's depth and height as seen from the side
 - ☐ B. It shows only one dimension of the object
 - ☐ C. It shows only the object's bottom or right side
 - ☒ D. It shows the object's height and width as seen from the front

Q.23 What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $5 \div 3 + 15 \times 5 - 3 = ?$

- Ans**
- ☐ A. 18
 - ☐ B. 9
 - ☐ C. 12
 - ☒ D. 15

Q.24 Simplify the following expression.

$$11 \text{ of } 7 + 125 \div 5 + 99 \div 11 \times 7 - 17 \text{ of } 7 + 7 \times 6 - (91 \div 7 + 7 \times 5)$$

- Ans**
- ☒ A. 40
 - ☐ B. 44
 - ☐ C. 48
 - ☐ D. 36

Q.25 Why are electric wires in household appliances usually covered with plastic or rubber coating?

- Ans**
- ☐ A. To increase the flow of current
 - ☒ B. To prevent electric shocks by insulation
 - ☐ C. To produce more heat
 - ☐ D. To make the wires heavier

Q.26 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ☐ A. DG – EH
 - ☐ B. KE – LF
 - ☐ C. SJ – TK
 - ☒ D. IT – KV

Q.27 What is the primary purpose of a Local Area Network (LAN)?

- Ans**
- ☐ A. To link wireless devices only
 - ☒ B. To connect computers within a small geographical area
 - ☐ C. To connect global networks
 - ☐ D. To connect social media accounts

Q.28 A technician needs to select a fuse wire for a room heater. Which property should be considered most important for safety based on the heating effect of electric current?

- Ans**
- ☐ A. The fuse wire must have a shiny surface for efficient cooling.
 - ☐ B. The fuse wire must have a high melting point for durability.
 - ☒ C. The fuse wire must have a low melting point to break the circuit during excess current.
 - ☐ D. The fuse wire must have high resistance and be thick to prevent melting.

Q.29 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table.
Only two people sit between Y and C when counted from the left of C. D sits third to the left of B. A sits to the immediate right of B. A sits second to the left of Y. Z is not an immediate neighbor of D.
Who sits third to the right of X?

- Ans**
- ☐ A. Y
 - ☐ B. C
 - ☐ C. D
 - ☒ D. A

Q.30 An engineer is updating a schematic for a control panel and needs to indicate a normally closed push button. Which approach best ensures the symbol is universally understood among engineers referring to standard engineering drawings?

- Ans**
- ☒ A. Use the standardized symbol for a normally closed push button as per conventions
 - ☐ B. Substitute the normally closed push button symbol with a general switch symbol
 - ☐ C. Draw a hand made representation of the push button with a note explaining function
 - ☐ D. Describe the normally closed push button in words within the schematic diagram clearly

Q.31 Which statement best describes the side view in engineering drawing?

- Ans**
- ☐ A. It shows the object as seen from above or below
 - ☒ B. It shows the object as seen from left or right side
 - ☐ C. It shows the object as seen clearly from the front
 - ☐ D. It shows a combination of all views of the object

Q.32 If $3x - 2y + 3z = 8$, $4x - 3y + 2z = 4$ and $2x + y - z = 1$, then find x, y and z, respectively.

- Ans**
- ☒ A. 1, 2 and 3
 - ☐ B. 2, 3 and 1
 - ☐ C. 2, 1 and 3
 - ☐ D. 3, 1 and 2

Q.33 SANZ is related to YUTT in a certain way based on the English alphabetical order. In the same way, MTHM is related to SNNG. To which of the following is LJRE related to following the same logic?

- Ans**
- ☐ A. REXZ
 - ☐ B. QDYY
 - ☒ C. RDXY
 - ☐ D. QEYZ

Q.34 If $x + \frac{1}{x} = 5$, then $\frac{x^3 - 5x^2 + 5x}{x^2 + 1}$ is equal to:

- Ans**
- ☐ A. $\frac{2}{5}$
 - ☐ B. $\frac{1}{5}$
 - ☐ C. $\frac{3}{5}$
 - ☒ D. $\frac{4}{5}$

Q.35 A 42-litre solution has sugar and water in the ratio 2 : 5. If, due to evaporation, the volume is reduced by 35%, and only water evaporates, what is the new ratio of sugar to water?

- Ans**
- ☒ A. 40 : 51
 - ☐ B. 31 : 50
 - ☐ C. 40 : 41
 - ☐ D. 51 : 42

Q.36 The first shopkeeper allows two successive discounts of 3% and 7%, while a second shopkeeper allows two successive discounts of 2% and 8%. A third shopkeeper allows 10% discount on the same item. From which shopkeeper should a customer buy if the marked price is the same at the three shops?

- Ans**
- ☒ A. Buy from the third shopkeeper
 - ☐ B. Buy from the second shopkeeper
 - ☐ C. Buy from the first or the second shopkeeper as both are the same.
 - ☐ D. Buy from the first shopkeeper

Q.37 Which of the following correctly states the full form of CD and the technology used to store data on it?

- Ans**
- ☒ A. Compact Disc, Optical Storage
 - ☐ B. Compact Disc, Magnetic Storage
 - ☐ C. Compact Drive, Optical Storage
 - ☐ D. Compact Drive, Magnetic Storage

Q.38 A hiker lifts a backpack from the ground to a ledge 2 meters above the ground. Which situation would result in the greatest increase in the backpack's gravitational potential energy?

- Ans**
- ☐ A. Carrying the same backpack horizontally for 2 meters
 - ☒ B. Lifting a heavier backpack to the same 2-meter ledge
 - ☐ C. Lifting the same backpack to a 1-meter ledge
 - ☐ D. Lifting a lighter backpack to the same 2-meter ledge

Q.39 Which intervention most effectively reduces ground-level pollutant concentrations during a winter temperature inversion?

- Ans**
- ☐ A. Elevating emission sources above inversion layers
 - ☐ B. Reducing local wind speed to minimize horizontal dispersion
 - ☐ C. Increasing surface temperatures near emission sources
 - ☒ D. Enhancing vertical air mixing through artificial turbulence

Q.40 A cyclist rides 60 meters north, then 80 meters south, and finally 70 meters north. What is the total distance the cyclist has traveled?

- Ans**
- ☐ A. 60 meters
 - ☒ B. 210 meters
 - ☐ C. 150 meters
 - ☐ D. 10 meters

Q.41 Which scenario best demonstrates proactive workplace safety behavior?

- Ans**
- ☐ A. Discussing only past safety problems in meetings
 - ☐ B. Reporting hazards after incidents happen
 - ☐ C. Waiting for a supervisor to notice hazards
 - ☒ D. Identifying and correcting hazards before accidents occur

Q.42 Which statement best describes how the mass and speed of an object affect its kinetic energy?

- Ans**
- ☐ A. An object with same mass but higher speed will have less kinetic energy.
 - ☐ B. An object with less mass and lower speed will have more kinetic energy.
 - ☐ C. An object with greater mass but lower speed will have more kinetic energy.
 - ☒ D. An object with greater mass and higher speed will have more kinetic energy.

Q.43 An astronaut weighs 600 N on Earth. During a moon mission, she performs an experiment to measure her weight on the moon. Which value is closest to her expected weight on the moon, and why?

- Ans**
- ☐ A. 600 N, because a person's weight remains unchanged on the Moon.
 - ☒ B. 100 N, because the Moon's gravity is about one-sixth of Earth's.
 - ☐ C. 200 N, because the Moon's gravity is about one-third of Earth's.
 - ☐ D. 300 N, because the Moon's gravity is about one-half of Earth's.

Q.44 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and select the most appropriate answer.

Question:

Among five trees N, O, R, S, and T, each having a different height, which tree is the tallest?

Statements:

- (I) T is taller than R. N is taller than T.
(II) R is shorter than O but taller than S.

- Ans**
- ☐ A. Data in Statement I alone is sufficient to answer the question while data in statement II is not
 - ☒ B. Both statements I and II together are NOT sufficient to answer the question
 - ☐ C. Data in Statement II alone is sufficient to answer the question while data in statement I is not
 - ☐ D. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question

Q.45 If the height of an object is doubled while its mass remains constant, its gravitational potential energy will be:

- Ans**
- ☒ A. unchanged
 - ☒ B. doubled
 - ☒ C. halved
 - ☒ D. decreased to one-fourth

Q.46 What is a key feature of single stroke lettering in technical drawings?

- Ans**
- ☒ A. Each character is outlined and then filled.
 - ☒ B. Each character is shaded after drawing.
 - ☒ C. Each character is made with one continuous stroke.
 - ☒ D. Each character is made with several parallel lines.

Q.47 What information does a kilometer stone provide to travelers on a road?

- Ans**
- ☒ A. Speed of the vehicle
 - ☒ B. Direction of travel
 - ☒ C. Distance from a reference point
 - ☒ D. Time taken to reach destination

Q.48 Why is a room thermometer generally mounted vertically on a wall?

- Ans**
- ☒ A. It ensures accurate reading by keeping the bulb exposed to room air.
 - ☒ B. It prevents the liquid from freezing inside the thermometer.
 - ☒ C. It helps the thermometer measure body temperature faster.
 - ☒ D. It protects the thermometer from breaking easily.

Q.49 A group of numbers/symbols is coded using letter codes as per the codes given below and the conditions that follow. The correct combination of codes following the conditions is your answer.

Note: If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	3	@	8	4	\$	&	2	%	#	1	+	9	7	5
Code	U	G	B	K	M	F	X	R	E	Q	S	C	V	T

Conditions –

- (i) If the first element is a symbol and the last element an odd number, the codes for these two (the first and the last elements) are to be interchanged.
- (ii) If the first element is an odd number and the last an even number, the first and the last elements are to be coded as ©
- (iii) If both second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?

& 8 \$ 9 5

- Ans**
- ☒ A. TBMCF
 - ☒ B. FCBMT
 - ☒ C. FBMCT
 - ☒ D. TCMBF

Q.50 Refer to the following letter series and answer the question that follows. (Counting to be done from left to right only.)

(Left) Q K Q N X K G G V M L A W T W K N G V (Right)

How many such consonants are there each of which is immediately preceded by a vowel and also immediately followed by a consonant?

- Ans** ☒ A. One
☐ B. Three
☐ C. None
☐ D. Two

Q.51 Seven boxes S, T, U, V, W, X, and Y are kept one over the other but not necessarily in the same order. U is kept exactly third from the top. Only one box is kept between U and T. W is kept immediately above T. Only three boxes are kept between X and S. V is kept on one of the positions below Y. Only two boxes are kept between U and S. Which box is kept second from the top?

- Ans** ☐ A. V
☒ B. X
☐ C. U
☐ D. T

Q.52 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GXM 5, JVN 11, MTO 24, PRP 51, ?

- Ans** ☒ A. SPQ 106
☐ B. TPQ 107
☐ C. SPQ 107
☐ D. TPQ 106

Q.53 An article is bought for ₹300 and its price is increased by 5.5%. The resulting price is then reduced by 8%. Find the final selling price.

- Ans** ☐ A. ₹296.46
☒ B. ₹291.18
☐ C. ₹288.24
☐ D. ₹284.45

Q.54 If a rectangular field is measured to be 120 meters long and 75 meters wide, what is its area in SI units?

- Ans** ☐ A. 19500 square meters
☐ B. 1800 square meters
☒ C. 9000 square meters
☐ D. 15000 square meters

Q.55 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans** ☐ A. FZ-GA
☐ B. HB-IC
☐ C. PJ-QK
☒ D. RL-SN

Q.56 What is the primary role of the Central Processing Unit (CPU) in a computer system?

- Ans**
- ☒ A. To display output on the screen
 - ☒ B. To execute program instructions
 - ☒ C. To manage network connections
 - ☒ D. To store long-term data

Q.57 Which symbol best represents a battery in an electric circuit diagram according to standard conventions?

- Ans**
- ☒ A. A single long line only
 - ☒ B. A pair of long and short parallel lines placed alternately
 - ☒ C. Two circles connected in series
 - ☒ D. Two short lines placed together

Q.58 A ladder is leaning against a wall and makes an angle of 60° with the ground. If the length of the ladder is 24 m, find the distance of the foot of the ladder from the wall.

- Ans**
- ☒ A. 12 m
 - ☒ B. 9 m
 - ☒ C. 18 m
 - ☒ D. 15 m

Q.59 P, Q and R are three batsmen. The ratios of runs scored by them in a certain match were as follows:

$P : Q = 5 : 7$ and $Q : R = 2 : 3$.

If they scored a total of 765 runs, then find the number of runs scored by R.

- Ans**
- ☒ A. 378
 - ☒ B. 357
 - ☒ C. 336
 - ☒ D. 350

Q.60 What should come in place of '?' in the given series?
11, 22, 44, 88, 176, ?

- Ans**
- ☒ A. 352
 - ☒ B. 356
 - ☒ C. 358
 - ☒ D. 342

Q.61 Which combination best describes the main environmental challenges associated with plastic waste management?

- Ans**
- ☒ A. Neutralization and easy recycling
 - ☒ B. Thermal pollution and effective composting
 - ☒ C. Persistence in the environment and microplastic formation
 - ☒ D. Rapid biodegradation and chemical leaching

Q.62 Pipes A and B can fill an entire tank in 8 hours and 12 hours, respectively. The water tank is one-fourth full. If both the pipes are opened together, then how long will it take to fill the remaining part of the tank?

- Ans**
- ☒ A. 3 hours 16 minutes
 - ☒ B. 3 hours 6 minutes
 - ☒ C. 3 hours 26 minutes
 - ☒ D. 3 hours 36 minutes

Q.63 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

Some rugs are fans.

No fan is a car.

Conclusion (I) : Some rugs are cars.

Conclusion (II) : Some fans are rugs.

- Ans**
- ☐ A. Only conclusion (I) follows
 - ☐ B. Neither conclusion (I) nor (II) follows
 - ☐ C. Both conclusions (I) and (II) follow
 - ☒ D. Only conclusion (II) follows

Q.64 If the mean of the following data is 45, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	23	30	31	45	X

- Ans**
- ☒ A. 160
 - ☐ B. 188
 - ☐ C. 162
 - ☐ D. 180

Q.65 A sum of money invested at simple interest amounts to ₹21,500 in 5 years and ₹26,000 in 8 years. Find the principal amount (in ₹).

- Ans**
- ☐ A. 12,000
 - ☐ B. 15,500
 - ☐ C. 7,500
 - ☒ D. 14,000

Q.66 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. There are exactly two boxes between T and P. Only Q is kept above U. No box is kept below P. S is kept somewhere below W but above V. Based on the given information, which box is kept third above V?

- Ans**
- ☐ A. T
 - ☐ B. P
 - ☒ C. W
 - ☐ D. S

Q.67 A pump can fill a tank in 3 hours. Due to a leak in the tank, it takes 4.5 hours to fill the tank. In how much time can the leak empty the full tank if no other entry or exit routes are open?

- Ans**
- ☐ A. 6 hours
 - ☐ B. 8 hours
 - ☒ C. 9 hours
 - ☐ D. 7 hours

Q.68 Which of the following is the best example of municipal solid waste?

- Ans**
- ☐ A. Industrial process waste
 - ☐ B. Hospital biomedical waste
 - ☒ C. Household kitchen garbage
 - ☐ D. Mining tailings

Q.69 An engineering firm is tasked with creating a set of technical drawings for a large-scale project. The client specifies that all components must fit on a single sheet without reducing the drawing scale, and the total drawing area required is approximately 1 square meter. Based on standard drawing sheet sizes, which sheet should the firm select to best meet these requirements?

- Ans**
- ☐ A. A2 size sheet
 - ☐ B. A3 size sheet
 - ☒ C. A0 size sheet
 - ☐ D. A1 size sheet

Q.70 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All chocolates are paneers.
No paneer is a milk.

Conclusions:

- (I) No chocolate is a milk.
(II) Some milks are paneers.

- Ans**
- ☒ A. Only conclusion (I) follows.
 - ☐ B. Only conclusion (II) follows.
 - ☐ C. Both conclusions (I) and (II) follow.
 - ☐ D. Neither conclusion (I) nor (II) follows.

Q.71 What should come in place of the question mark (?) in the given series?

1 2 7 20 61 ?

- Ans**
- ☒ A. 182
 - ☐ B. 185
 - ☐ C. 181
 - ☐ D. 183

Q.72 Sohan covers a total distance of 760 km to reach his home, traveling partly by train and partly by car. He takes 8 hours when he travels 160 km by train and the rest by car. If he travels 240 km by train and the remaining distance by car, his journey takes 12 minutes longer. Find the difference between the speeds of the train and the car.

- Ans**
- ☒ A. 20 km/h
 - ☐ B. 21 km/h
 - ☐ C. 27 km/h
 - ☐ D. 23 km/h

Q.73 A laboratory thermometer has a range from -10 degrees Celsius to 110 degrees Celsius and 120 equal divisions. What is the smallest value that this thermometer can read?

- Ans**
- ☒ A. 1 degree Celsius
 - ☐ B. 2 degrees Celsius
 - ☐ C. 10 degrees Celsius
 - ☐ D. 0.5 degrees Celsius

Q.74 In a certain code language, 'SOIL' is coded as '1547' and 'COIL' is coded as '7124'. What is the code for 'C' in the given code language?

- Ans**
- ☐ A. 7
 - ☒ B. 2
 - ☐ C. 1
 - ☐ D. 4

Q.75 A boy uses a wheelbarrow to carry sand. The wheel acts as the pivot, the sand is placed in the tray, and the boy lifts the handles. In this arrangement, the sand represents _____.

- Ans**
- ✓ A. Load
 - ✗ B. Fulcrum
 - ✗ C. Effort
 - ✗ D. Arm

Q.76 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Among 5 sticks, B, U, N, M and D, each having a different height, which stick is the shortest?

(I) D is shorter than U. M is shorter than B.

(II) M is taller than D.

- Ans**
- ✓ A. Both statements I and II together are NOT sufficient to answer the question
 - ✗ B. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ✗ C. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ✗ D. Data in statement I alone is sufficient to answer the question while data in statement II is not

Q.77 Which type of personal protective equipment is most suitable for tasks involving airborne chemical particles in confined spaces?

- Ans**
- ✗ A. Hand protection using chemical-resistant gloves
 - ✗ B. Body protection with flame-retardant suits
 - ✓ C. Respiratory protection devices such as half-face masks
 - ✗ D. Head protection with industrial-grade hard hats

Q.78 A plane parallel to the base divides a cone of height 40 cm into two parts. If the volume of the upper smaller cone formed is $\frac{1}{64}$ of the volume of the original cone, calculate the height of the plane from the base of the cone.

- Ans**
- ✗ A. 40 cm
 - ✗ B. 20 cm
 - ✓ C. 30 cm
 - ✗ D. 10 cm

Q.79 G is the mother of Y. Y is the sister of V. S is the father of L. L is the son of V. How is G related to L?

- Ans**
- ✗ A. Sister
 - ✓ B. Mother's mother
 - ✗ C. Mother
 - ✗ D. Mother's sister

Q.80 The mean of 11 numbers is 10.9. If the mean of the first 6 numbers is 10.5 and the mean of the last 6 numbers is 11.4, then find the 6th number.

- Ans**
- ✗ A. 10
 - ✗ B. 10.5
 - ✓ C. 11.5
 - ✗ D. 11

Q.81 Which one of the following statements correctly describes a characteristic of WANs?

- Ans**
- ✗ A. WANs are limited to connecting devices within a radius of 1 to 2 km.
 - ✗ B. WANs are always public networks managed solely by Internet Service Providers (ISPs).
 - ✓ C. WANs can be built by connecting multiple LANs via wired or wireless links.
 - ✗ D. WANs typically use only wireless media to connect distant LANs.

Q.82 The price of sugar is increased by 20%. Manoj can increase his expenditure on sugar by only 15% from his income. In order to balance his expenditure, by what percentage should he reduce the quantity of sugar consumed?

- Ans**
- ☒ A. $5\frac{1}{3}\%$
 - ☒ B. $4\frac{1}{6}\%$
 - ☒ C. 6.5%
 - ☒ D. 5%

Q.83 A dealer buys a table for ₹2,750. He first marks it up by 28%, then allows a 12% discount to a customer. If the customer also pays 5% GST on the selling price, find the profit percentage (excluding GST) made by the dealer.

- Ans**
- ☒ A. 10.36%
 - ☒ B. 15.12%
 - ☒ C. 13.81%
 - ☒ D. 12.64%

Q.84 Find the compound interest on ₹5,70,000 for 1.5 years at 10% per annum compounded half-yearly.

- Ans**
- ☒ A. ₹88,846.25
 - ☒ B. ₹92,846.25
 - ☒ C. ₹89,846.25
 - ☒ D. ₹89,946.25

Q.85 A solid right circular cone is 7 cm high, and the radius of its base is 22.2 cm. It is melted and recast into a right circular cone with radius of its base 3.7 cm. Then the height (in cm) of the cone is _____.

- Ans**
- ☒ A. 252
 - ☒ B. 185
 - ☒ C. 267
 - ☒ D. 159

Q.86 What does CPU stand for in computing?

- Ans**
- ☒ A. Computer Processing Unit
 - ☒ B. Central Processing Unit
 - ☒ C. Core Processing Unit
 - ☒ D. Control Processing Unit

Q.87 Refer to the given letter series and answer the question that follows.

(Left) A X T N K R Q K C P S I D F J U D O R G Z M B E L (Right)

How many letters are there in the English alphabetical series between the letter that is fourth from the right end and the letter that is third from the left end of the series?

- Ans**
- ☒ A. 3
 - ☒ B. 4
 - ☒ C. 5
 - ☒ D. 6

Q.88 Which of the following statements best describes a triangle as used in engineering drawing?

- Ans**
- ☒ A. A triangle is a polygon having three curved sides.
 - ☒ B. A triangle must always have all sides of equal length.
 - ☒ C. A triangle is a polygon with four straight sides and four angles.
 - ☒ D. A triangle is a polygon with three straight sides and three angles.

Q.89 A crane lifts a 200 kg load to a height of 15 meters in 10 seconds. Assuming acceleration due to gravity is 10 m/s^2 and energy loss is negligible, what is the power output of the crane during this operation?

- Ans**
- ☐ A. 1500 W
 - ☐ B. 2000 W
 - ☐ C. 1000 W
 - ☒ D. 3000 W

Q.90 When drawing repeated 67° angles on an engineering sheet, which practice best helps minimize cumulative alignment errors?

- Ans**
- ☒ A. Using the same reference line for all repeated angles
 - ☐ B. Drawing all angles continuously without intermediate verification
 - ☐ C. Relying solely on the initial protractor alignment for all angles
 - ☐ D. Marking all angles lightly with a pencil before finalizing

Q.91 Two trains are moving in opposite directions. The first train is 120 m long and runs at 54 km/h. The second train is 180 m long and runs at 72 km/h. How much time will they take to cross each other completely?
(Rounded up to two decimal places)

- Ans**
- ☒ A. 8.57 seconds
 - ☐ B. 8.43 seconds
 - ☐ C. 7.57 seconds
 - ☐ D. 9.25 seconds

Q.92 Which of the following statements best describes a cuboid as used in engineering drawing?

- Ans**
- ☒ A. A cuboid is a solid with six rectangular faces, and opposite faces are equal.
 - ☐ B. A cuboid has all faces as squares of equal size.
 - ☐ C. A cuboid has all sides and angles equal, making it similar to a cube.
 - ☐ D. A cuboid is a solid where all faces are parallelograms but not necessarily rectangles.

Q.93 A car travels from point A to point B in a zigzag path, covering a total distance of 200 meters. If the shortest straight-line distance between A and B is 120 meters, which statement best describes the car's distance and displacement?

- Ans**
- ☐ A. The distance is 120 meters; the displacement is 120 meters
 - ☒ B. The distance is 200 meters; the displacement is 120 meters
 - ☐ C. The distance is 200 meters; the displacement is 200 meters
 - ☐ D. The distance is 120 meters; the displacement is 200 meters

Q.94 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

MDB PHE SLH VPK ?

- Ans**
- ☐ A. ZTM
 - ☐ B. ZUO
 - ☒ C. YTN
 - ☐ D. XSM

Q.95 The salary of a person is increased by 10%, 20% and 25% successively in three consecutive years. Find the overall percentage increase in the salary at the end of the third year.

- Ans**
- ☒ A. 65%
 - ☐ B. 60%
 - ☐ C. 30%
 - ☐ D. 50%

Q.96 Refer to the given letter series and answer the question that follows. Counting to be done from left to right only.

(Left) H S A N D D I A D F P A J O S K I O Z O T X (Right)

How many such consonants are there, each of which is immediately preceded by a consonant and also immediately followed by a vowel?

- Ans**
- ☒ A. Three
 - ☒ B. Four
 - ☒ C. Six
 - ☒ D. Five

Q.97 Why does restricting certain chemical refrigerants effectively reduce damage to the ozone layer?

- Ans**
- ☒ A. Refrigerants release substances that catalyze ozone breakdown.
 - ☒ B. Refrigerants increase oxygen production, supporting ozone recovery.
 - ☒ C. Refrigerants contain particles that absorb harmful UV light.
 - ☒ D. Refrigerants emit greenhouse gases that warm the stratosphere.

Q.98 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

ZOT - TLP
NIL - HFH

- Ans**
- ☒ A. BCD - VZZ
 - ☒ B. VZZ - BCD
 - ☒ C. ABD - VZZ
 - ☒ D. BOC - VZT

Q.99 What will come in place of the question mark (?) in the following equation if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $42 \times 6 \div 7 - 35 + 19 = ?$

- Ans**
- ☒ A. 63
 - ☒ B. 65
 - ☒ C. 67
 - ☒ D. 69

Q.100 The average of five numbers is 30. If four of the numbers are 25, 35, 28 and 32, then what is the fifth number?

- Ans**
- ☒ A. 30
 - ☒ B. 28
 - ☒ C. 35
 - ☒ D. 32

Section : PART-B

Q.1 A maintenance engineer must select a gasket for a flange joint exposed to both vibration and oil. Which material should be considered?

- Ans**
- ☒ A. Compressed asbestos sheet
 - ☒ B. Rubber-reinforced cork sheet
 - ☒ C. Plain paper gasket sheet
 - ☒ D. Pure metal gasket sheet

Q.2 A file made from which material will provide the best performance for finishing hardened steel parts?

- Ans**
- ☒ A. Aluminium
 - ☒ B. Tool steel
 - ☒ C. Copper
 - ☒ D. Brass

Q.3 Hidden edges in two wheeler drawing are generally represented using:

- Ans**
- ☒ A. Dashed lines
 - ☒ B. Chain thick lines
 - ☒ C. Double curved lines
 - ☒ D. Continuous thick lines

Q.4 Which of the following is a safety step before adjusting the drawbar?

- Ans**
- ☒ A. Engage the parking brake
 - ☒ B. Open the fuel tank
 - ☒ C. Release the clutch lever
 - ☒ D. Rev up the engine

Q.5 Which company is known for introducing the first indigenous tractor in India?

- Ans**
- ☒ A. TAFE Tractors
 - ☒ B. Swaraj Tractors
 - ☒ C. Escorts Limited
 - ☒ D. Eicher Tractors

Q.6 How does the use of advanced electronic control units (ECUs) in clean diesel technology improve emission performance?

- Ans**
- ☒ A. Increases diesel tank size
 - ☒ B. Bypasses emission control sensors
 - ☒ C. Optimizes injection timing precisely
 - ☒ D. Runs injectors at maximum rate

Q.7 According to IEC 60445 wiring colour codes, the neutral conductor is identified by:

- Ans**
- ☒ A. Red
 - ☒ B. Brown
 - ☒ C. Blue
 - ☒ D. Green-yellow

Q.8 What is the main function of variable valve timing in a diesel engine?

- Ans**
- ☒ A. To provide the lubrication system for smooth operation
 - ☒ B. To change the timing of piston mechanism system
 - ☒ C. To reduce the overall size of the valve mechanism
 - ☒ D. To optimize valve opening and closing events

Q.9 What does the valve timing diagram illustrate in a diesel engine?

- Ans**
- ☒ A. The variation of fuel pressure during combustion
 - ☒ B. Fuel injection pressure variation
 - ☒ C. Mechanical designing of inlet and exhaust valves
 - ☒ D. Sequence of valve operations

Q.10 An operator wants to weld a thin sheet metal using gas welding. Which equipment adjustment is most critical for this task?

- Ans**
- ☐ A. Use large nozzle for wider flame spread
 - ☐ B. Change mixer setting to higher oxygen ratio
 - ☒ C. Set low gas pressure with correct nozzle size
 - ☐ D. Increase gas pressure for deeper penetration

Q.11 Why is speed called a scalar quantity?

- Ans**
- ☒ A. It has magnitude but no direction
 - ☐ B. It acts opposite to motion
 - ☐ C. It depends only on force
 - ☐ D. It changes with acceleration only

Q.12 Which component is primarily responsible for maintaining alignment between the left and right front wheels in a mechanical steering system?

- Ans**
- ☐ A. Pitman arm lever
 - ☐ B. Drag link mechanism
 - ☐ C. Steering gear box
 - ☒ D. Tie rod assembly

Q.13 In a dimensioning system, the ends of a dimension line usually touch:

- Ans**
- ☒ A. Extension lines
 - ☐ B. Hidden outlines
 - ☐ C. Centre lines
 - ☐ D. Hatching lines

Q.14 What is the basic working principle of a power tiller?

- Ans**
- ☐ A. It operates completely using battery-driven mechanisms
 - ☐ B. It uses compressed air systems for field operation
 - ☐ C. It works through only hydraulic systems for field movement
 - ☒ D. It transmits engine power to wheels and implements

Q.15 How does periodic testing improve overall safety in lifting operations?

- Ans**
- ☐ A. It focuses mainly on equipment appearance
 - ☐ B. It ensures new equipment is always safe
 - ☒ C. It helps identify hidden defects early
 - ☐ D. It depends on user experience and training

Q.16 What is the primary risk if the locking pin of a trailer hitch is not fully engaged during operation?

- Ans**
- ☒ A. The trailer can detach unexpectedly under load
 - ☐ B. The drawbar will bend and misalign
 - ☐ C. The tiller engine may overheat rapidly
 - ☐ D. The tires may lose air pressure quickly

Q.17 Why must both tie rod ends be adjusted equally on a tractor during alignment?

- Ans**
- ☐ A. To create additional toe-in for the wheels
 - ☐ B. To improve hydraulic fluid performance
 - ☐ C. To provide more toe-out for field turns
 - ☒ D. To ensure both wheels track straight ahead

Q.18 What is the effect on back pressure if the exhaust pipe diameter is too small?

- Ans**
- ☒ A. Only increases back pressure
 - ☐ B. Eliminates back pressure
 - ☐ C. Only decreases back pressure
 - ☐ D. Has no effect on back pressure

Q.19 During a practical assessment, a student sharpens a centre punch at 45 degrees instead of the recommended angle. What is a likely result of this error?

- Ans**
- ☒ A. The punch tip will wear out quickly
 - ☐ B. The marks will be deeper and clear
 - ☐ C. The punch will become stronger
 - ☐ D. The punch will lose its weight

Q.20 In a capacitor, the dielectric material is used to:

- Ans**
- ☒ A. Insulate the plates from each other
 - ☐ B. Reduce supply voltage
 - ☐ C. Join the plates together
 - ☐ D. Increase current flow

Q.21 What is the main function of the ignition warning lamp in a tractor electrical system?

- Ans**
- ☒ A. To indicate charging system faults
 - ☐ B. To increase battery voltage
 - ☐ C. To control wheel alignment
 - ☐ D. To reduce engine temperature

Q.22 A tractor tyre with a 'B' temperature rating is best suited for which type of usage?

- Ans**
- ☐ A. Light loads and low speeds
 - ☒ B. Moderate speeds and moderate loads
 - ☐ C. Strictly off-road use only
 - ☐ D. High speeds and heavy loads

Q.23 How does the chemical structure of synthetic oils affect their performance in diesel engines?

- Ans**
- ☐ A. It decreases the oil's ability to resist thermal breakdown
 - ☐ B. It increases the possibility of sludge formation
 - ☐ C. It encourages irregular molecular arrangement for inconsistent results
 - ☒ D. It enables superior molecular uniformity for consistent lubrication

Q.24 How does the Electronic Control Unit (ECU) contribute to emission control in diesel engines?

- Ans**
- ☐ A. Enhances radiator fan speed
 - ☐ B. Modifies gear lever position
 - ☒ C. Adjusts fuel delivery
 - ☐ D. Increases fuel tank capacity

Q.25 Among the following metals, which has the lowest boiling point?

- Ans**
- ☐ A. Cobalt
 - ☐ B. Calcium
 - ☐ C. Aluminium
 - ☒ D. Cadmium

Q.26 Why might extractors be chosen over a standard exhaust manifold in automotive design?

- Ans**
- ☐ A. They reduce the overall weight of the vehicle significantly
 - ☐ B. They decrease the temperature of exhaust gases
 - ☐ C. They lower the manufacturing cost of the exhaust system
 - ☒ D. They increase performance by optimizing exhaust flow timing

Q.27 Which factor is most improved by using synthetic oils in diesel engine lubrication systems?

- Ans**
- ☒ A. Resistance to breakdown at higher temperatures
 - ☐ B. Formation of abrasive particles
 - ☐ C. Speed of oil degradation
 - ☐ D. Ability to attract moisture into the system

Q.28 Which component regulates the timing of diesel injection?

- Ans**
- ☐ A. Glow plug
 - ☒ B. Injection pump
 - ☐ C. Fuel filter
 - ☐ D. Air intake

Q.29 A thyristor continues to conduct even after the gate pulse is removed. What is the main reason for this behavior?

- Ans**
- ☐ A. The thyristor acts like a fuse
 - ☒ B. The device latches ON after triggering
 - ☐ C. Gate current continuously increases
 - ☐ D. Collector-emitter junction remains reverse biased

Q.30 If a tractor starter emits grinding noises, what is the likely issue?

- Ans**
- ☐ A. Damaged fan blade
 - ☐ B. Faulty governor spring
 - ☒ C. Worn starter pinion
 - ☐ D. Clogged fuel line

Q.31 Why are diodes used in the alternator circuit?

- Ans**
- ☐ A. To increase the magnetic field strength
 - ☐ B. To store electrical charge
 - ☐ C. To reduce mechanical losses
 - ☒ D. To allow current flow in one direction only

Q.32 In a tractor, why is it important that brakes are applied equally to both rear wheels?

- Ans**
- ☐ A. To achieve faster stopping in all conditions
 - ☒ B. To maintain straight movement while stopping
 - ☐ C. To reduce wear on the engine components
 - ☐ D. To increase the fuel efficiency of the tractor

Q.33 An operator notices excessive soot in the flame during welding. What adjustment should be made?

- Ans**
- ☐ A. Reduce the oxygen supply to the flame
 - ☒ B. Increase the oxygen supply to the flame
 - ☐ C. Add more acetylene to the flame
 - ☐ D. Lower both gases at the same rate

Q.34 Which component is directly affected by changes in compression ratio within the engine cycle?

- Ans**
- ☒ A. Air filter
 - ☒ B. Combustion chamber
 - ☒ C. Timing belt
 - ☒ D. Alternator

Q.35 Which tool is primarily used to create straight layout lines on metal surfaces?

- Ans**
- ☒ A. Scribe with steel rule
 - ☒ B. Outside micrometer with try square
 - ☒ C. Centre punch with hammer
 - ☒ D. Vernier caliper with divider

Q.36 Which type of lamps is commonly used for the rear lights in a tractor?

- Ans**
- ☒ A. Flood lamp
 - ☒ B. Spot lamp
 - ☒ C. Headlamp
 - ☒ D. Tail lamp

Q.37 If only a half round file is available, what limitation might a worker face?

- Ans**
- ☒ A. Inability to work on curved surfaces
 - ☒ B. Excess removal of material
 - ☒ C. Difficulty accessing sharp internal corners
 - ☒ D. Inability to finish flat surfaces

Q.38 Which emissions are primarily reduced using variable valve timing in diesel engines?

- Ans**
- ☒ A. Reduction in hydrogen emissions
 - ☒ B. Reduction in nitrogen oxide emissions
 - ☒ C. Rise in particulate matter emissions
 - ☒ D. Reduction in the sulfur dioxide emissions

Q.39 What role does earthing play in electrical installations?

- Ans**
- ☒ A. Reduces voltage to devices
 - ☒ B. Directs fault current to ground
 - ☒ C. Increases device power
 - ☒ D. Stores excess electricity

Q.40 How does the use of a recovery system during maintenance support workplace safety?

- Ans**
- ☒ A. It lubricates moving parts inside the unit
 - ☒ B. It insulates electrical wires from short circuits
 - ☒ C. It automatically shuts off the system during faults
 - ☒ D. It prevents harmful refrigerant exposure to technicians

Q.41 If a machinist wants to drill a precise hole with minimal wandering, which twist drill feature is most critical?

- Ans**
- ☒ A. Point angle
 - ☒ B. Margin
 - ☒ C. Flute
 - ☒ D. Shank

Q.42 A student used a centre punch to mark points for drilling, but the drill bit still slipped. What is the most likely reason?

- Ans**
- ☐ A. Too much force was used
 - ☐ B. The wrong punch was selected
 - ☒ C. The indentation was too shallow
 - ☐ D. The punch was hardened excessively

Q.43 Aluminium is used in overhead transmission lines because it has:

- Ans**
- ☐ A. Zero electrical conductivity
 - ☐ B. High resistance and high weight
 - ☒ C. Good electrical conductivity and low weight
 - ☐ D. Infinite resistivity

Q.44 Which situation best demonstrates a limitation of paper gaskets in sealing applications?

- Ans**
- ☐ A. Temporary repair for a small oil leak
 - ☒ B. Sealing a coolant system with high pressure and heat
 - ☐ C. Covering a low-stress inspection panel
 - ☐ D. Sealing a non-pressurized valve cover

Q.45 Which sequence should be followed when adjusting the pinion in the final drive assembly?

- Ans**
- ☐ A. Adjust backlash, check depth, set contact pattern
 - ☒ B. Set the depth, adjust the backlash, check contact pattern
 - ☐ C. Check contact pattern, set backlash, adjust depth
 - ☐ D. Check pattern, adjust depth, set backlash

Q.46 Why is calibration necessary for a micrometer?

- Ans**
- ☐ A. To change the measuring range of the tool
 - ☐ B. To measure the reading up to the three decimal point
 - ☐ C. To increase the size of the instrument
 - ☒ D. To ensure accurate measurement readings

Q.47 Why are bearing shells made slightly thinner in the middle, than at the ends?

- Ans**
- ☐ A. To increase structural strength
 - ☒ B. To accommodate thermal expansion
 - ☐ C. To reduce overall engine weight
 - ☐ D. To improve noise reduction

Q.48 Which type of projection is commonly used in engineering drawing to represent the exact shape and size of an object?

- Ans**
- ☐ A. Oblique projection
 - ☒ B. Orthographic projection
 - ☐ C. Perspective projection
 - ☐ D. Isometric projection

Q.49 The introduction of which system has most reduced soil compaction in Indian tractor operations?

- Ans**
- ☐ A. Triangular caterpillar tracks
 - ☐ B. Solid rubber treads
 - ☒ C. Low-pressure radial tires
 - ☐ D. Cast iron wheels

Q.50 One horse power is equal to:

- Ans**
- ☒ A. 4500 kgf metre/min
 - ☐ B. 3000 kgf metre/min
 - ☐ C. 6000 kgf metre/min
 - ☐ D. 1500 kgf metre/min

Q.51 Which issue can arise from manufacturing a bearing shell with low-grade material?

- Ans**
- ☐ A. Reduced vibration
 - ☒ B. Premature bearing failure
 - ☐ C. Enhanced oil pressure
 - ☐ D. Improved engine speed

Q.52 What is the main advantage of split (dual) brake pedals in tractors according to the context?

- Ans**
- ☒ A. They allow independent braking for better turning ability
 - ☐ B. They increase the power of the braking system
 - ☐ C. They provide consistent braking on rough terrain
 - ☐ D. They reduce the need for regular maintenance

Q.53 Which characteristic is essential for the material used in exhaust manifolds?

- Ans**
- ☒ A. High thermal resistance
 - ☐ B. Low density for lightweight
 - ☐ C. High electrical conductivity
 - ☐ D. High magnetic permeability

Q.54 Which of the following is a type of brake booster commonly used in vehicles?

- Ans**
- ☐ A. Electromagnetic brake booster
 - ☐ B. Centrifugal brake booster
 - ☒ C. Vacuum brake booster
 - ☐ D. Mechanical brake booster

Q.55 Which property is most important for a cylinder sleeve material?

- Ans**
- ☐ A. High transparency
 - ☐ B. High electrical conductivity
 - ☒ C. High wear resistance
 - ☐ D. High friction

Q.56 What could happen if a tractor is operated in a high gear while pulling a heavy load?

- Ans**
- ☐ A. The engine switches to a lower gear automatically
 - ☒ B. The engine may stall due to insufficient torque
 - ☐ C. The engine runs more efficiently under load
 - ☐ D. The engine produces more power for the load

Q.57 What is a significant impact of Ministry of Road Transport and Highways (MoRTH's) regulatory initiatives on highway safety?

- Ans**
- ☐ A. Supervising driver training schools
 - ☐ B. Issuing pollution control certificates
 - ☐ C. Regulating taxi permit allocation
 - ☒ D. Implementing uniform signage across states

Q.58 What does the ply rating of a tractor tyre indicate?

- Ans**
- ☐ A. The type of tread pattern on the tyre
 - ☒ B. The strength and load-carrying capacity of the tyre
 - ☐ C. The size and width of the tyre
 - ☐ D. The air pressure required in the tyre

Q.59 Projection lines or extension lines are usually drawn using:

- Ans**
- ☐ A. Chain thick line
 - ☒ B. Continuous thin line
 - ☐ C. Continuous thick line
 - ☐ D. Dashed thin line

Q.60 When would a solid die be unsuitable for threading work?

- Ans**
- ☒ A. When slight size adjustments are needed
 - ☐ B. When threading steel rods
 - ☐ C. When using a die stock for support
 - ☐ D. When threading by hand operation

Q.61 What is the common cross-sectional shape of a connecting rod used in diesel engines?

- Ans**
- ☐ A. T-section
 - ☐ B. Square
 - ☐ C. Circular
 - ☒ D. I-section

Q.62 Which property is essential for materials used in piston rings of diesel engines?

- Ans**
- ☐ A. Low wear resistance
 - ☒ B. High wear resistance
 - ☐ C. Low corrosion resistance
 - ☐ D. High corrosion resistance

Q.63 Why is it necessary for tractors to have manual transmissions instead of fixed gear systems?

- Ans**
- ☐ A. They ensure tractors always run at a constant speed
 - ☐ B. They eliminate the need for regular brake usage
 - ☒ C. They allow tractors to adapt to varying work conditions
 - ☐ D. They are primarily used to reduce engine noise

Q.64 When would a four post hoist be less advantageous than a two post hoist?

- Ans**
- ☐ A. While draining engine coolant
 - ☒ B. When checking underbody rust
 - ☐ C. During oil filter replacement
 - ☐ D. When accessing side body panels

Q.65 A tractor safety interlock circuit allows engine starting only when both clutch and neutral switches are active. Which logic gate is most suitable for this operation? (Assume active switch means logic HIGH)

- Ans**
- ☐ A. NOT gate
 - ☐ B. OR gate
 - ☐ C. XOR gate
 - ☒ D. AND gate

Q.66 When reversing a tractor with a mounted cultivator, what effect can an incorrect top link adjustment have?

- Ans**
- ☒ A. It can cause the implement to lift unevenly
 - ☐ B. It can increase the gear ratio sharply
 - ☐ C. It can drop the hydraulic fluid level
 - ☐ D. It can change the injector sequence

Q.67 A cylindrical tank of diameter 2 m and height 3.5 m is filled with petrol. Using $\pi = 22/7$, the volume is:

- Ans**
- ☐ A. 9 m³
 - ☐ B. 12 m³
 - ☒ C. 11 m³
 - ☐ D. 15 m³

Q.68 A technician must drill holes at multiple heights on a construction site with limited access to power outlets. Which portable drilling solution is most suitable?

- Ans**
- ☒ A. Using a battery-operated cordless drill
 - ☐ B. Using a heavy stationary drill press
 - ☐ C. Using a corded electric bench drill
 - ☐ D. Using a pneumatic drilling machine

Q.69 In the event of a suspected electrical fire in the workshop, which action should be avoided to ensure safety?

- Ans**
- ☒ A. Using water to extinguish the electrical fire
 - ☐ B. Disconnecting power supply immediately
 - ☐ C. Evacuating the workshop if smoke increases
 - ☐ D. Using an electrical-rated fire extinguisher

Q.70 A driver notices steam coming from the radiator after a long drive. What does this most likely indicate about the radiator's function?

- Ans**
- ☐ A. The radiator is cleaning the fuel lines
 - ☒ B. The radiator is failing to remove heat effectively
 - ☐ C. The radiator is maintaining tire pressure
 - ☐ D. The radiator is overfilling with coolant

Q.71 Why is a 4-3 way valve preferred for controlling the direction of a double-acting actuator?

- Ans**
- ☒ A. It can reverse flow and provide a neutral position
 - ☐ B. It only allows one-way fluid movement
 - ☐ C. It is smaller than other valve types
 - ☐ D. It increases pressure automatically

Q.72 Which maintenance action is essential for a tractor clutch shaft to function properly?

- Ans**
- ☐ A. Tightening all nearby gearbox mounting bolts
 - ☐ B. Applying grease to all clutch components
 - ☐ C. Regular cleaning of the shaft with solvents
 - ☒ D. Ensuring correct alignment during assembly and repairs

Q.73 Why is it important to use a die stock rather than gripping the die directly with pliers when threading a rod?

- Ans**
- ☐ A. Die stock is lighter in weight
 - ☐ B. Die stock increases cutting speed only
 - ☐ C. Die stock creates more torque than pliers
 - ☒ D. Die stock provides stability and alignment

Q.74 Why is an outside micrometer not suitable for measuring deep internal grooves?

- Ans**
- ☐ A. It expands to fit into grooves automatically
 - ☐ B. It is designed for measuring large holes
 - ☒ C. The spindle cannot reach into grooves
 - ☐ D. It measures multiple grooves simultaneously

Q.75 Which phenomenon primarily causes knocking in spark-ignition (SI) engines and limits their compression ratio?

- Ans**
- ☐ A. Incomplete vaporization of fuel during injection
 - ☒ B. Auto-ignition of unburned mixture ahead of flame front
 - ☐ C. Too high amount of oxygen causing incomplete combustion
 - ☐ D. Excessive temperature of the engine lubrication oil



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	2:30 PM - 5:00 PM
Subject	ALP Stage 2 Millwright Mechanic Machine Tool Maintenance

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 ఈ క్రింది అక్షరాల శ్రేణిని పరిశీలించి, ప్రశ్నకు సమాధానం ఇవ్వండి. లెక్కింపు ఎడమవైపు నుండి కుడివైపుకు మాత్రమే చేయాలి.

(ఎడమ) H S A N D D I A D F P A J O S K I O Z O T X (కుడి)

ప్రతిదానికి తక్షణమే ముందు ఒక హల్లు మరియు తక్షణమే తర్వాత ఒక అచ్చు ఉండేటటువంటి హల్లులు ఎన్ని ఉన్నాయి?

- Ans
- ☒ A. ఆరు
 - ☒ B. ఐదు
 - ☒ C. నాలుగు
 - ☒ D. మూడు

Q.2 ఒక టెక్స్టిలియన్, ఒక రూమ్ హీటర్ కోసం పూజ్ తీగను ఎంపిక చేసుకోవాలి. అయితే, విద్యుత్ ప్రవాహం(ఎలక్ట్రిక్ కరెంట్) యొక్క తాపన ప్రభావం ఆధారంగా, భద్రత దృష్ట్యా అత్యంత ముఖ్యమైనదిగా పరిగణించాల్సిన 'ధర్మం' ఏమిటి?

- Ans
- ☒ A. అధిక విద్యుత్ ప్రవాహించినప్పుడు వలయాన్ని విచ్ఛిన్నం చేయడానికి పూజ్ తీగకు తక్కువ ద్రవీభవన స్థానం ఉండాలి.
 - ☒ B. సమర్థవంతమైన శీతలీకరణ కోసం పూజ్ తీగకు మెరిసే ఉపరితలం ఉండాలి.
 - ☒ C. మన్నిక కోసం పూజ్ తీగ అధిక ద్రవీభవన స్థానాన్ని కలిగి ఉండాలి.
 - ☒ D. కరిగిపోకుండా నిరోధించడానికి పూజ్ తీగకు అధిక నిరోధకత మరియు మందం ఉండాలి.

Q.3 What is a key feature of single stroke lettering in technical drawings?

- Ans
- ☒ A. Each character is shaded after drawing.
 - ☒ B. Each character is outlined and then filled.
 - ☒ C. Each character is made with several parallel lines.
 - ☒ D. Each character is made with one continuous stroke.

Q.4 '+' మరియు '-' లను పరస్పరం మార్చి, 'x' మరియు '÷' లను పరస్పరం మార్చబడినప్పుడు, ఈ క్రింది సమీకరణంలో ప్రశ్నార్థకం (?) స్థానంలో ఏమి వస్తుంది?

$$42 \times 6 \div 7 - 35 + 19 = ?$$

- Ans
- ☒ A. 69
 - ☒ B. 65
 - ☒ C. 67
 - ☒ D. 63

Q.5 క్రింద ఇవ్వబడిన రెండు జతలు అనుసరించే అదే నమూనాను అనుసరించే జతను ఎంచుకోండి. రెండు జతలూ ఒకే నమూనాని అనుసరిస్తాయి.

ZOT - TLP
NIL - HFH

- Ans ☒ A. ABD - VZZ
☒ B. BCD - VZZ
☒ C. VZZ - BCD
☒ D. BOC - VZT

Q.6 ఎదురెదురు దిశలలో ప్రయాణిస్తున్న రెండు రైళ్లలో మొదటి రైలు 120 m పొడవు ఉండి, 54 km/h వేగం మరియు రెండవ రైలు 180 m పొడవు ఉండి, గంటకు 72 km/h వేగంతో ప్రయాణించినట్లయితే, అవి ఒకదానిని మరొకటి పూర్తిగా దాటుకోవడానికి ఎంత సమయం పడుతుంది?
(రెండు దశాంశ స్థానాలకు సవరించండి)

- Ans ☒ A. 7.57 సెకండ్లు
☒ B. 8.43 సెకండ్లు
☒ C. 9.25 సెకండ్లు
☒ D. 8.57 సెకండ్లు

Q.7 C అనేది ఒక వృత్తం, మరియు C పై AB = BE అయ్యేలా, AB మరియు DE అనేవి రెండు జ్యాలు. చతుర్భుజం ABEDలో, AE మరియు BD లు F వద్ద ఖండించుకుంటాయి, $\angle DBE = 55^\circ$ మరియు $\angle BAE = 40^\circ$. $\angle FED$ ని కనుగొనండి.

- Ans ☒ A. 45°
☒ B. 60°
☒ C. 55°
☒ D. 110°

Q.8 ఒక సైకిల్ తొక్కే వ్యక్తి, ఉత్తరం వైపుకు 60 మీటర్లు, ఆపై దక్షిణం వైపుకు 80 మీటర్లు, చివరగా ఉత్తరం వైపుకు 70 మీటర్లు ప్రయాణించినట్లయితే, ఆ వ్యక్తి ప్రయాణించిన మొత్తం దూరం ఎంత?

- Ans ☒ A. 210 మీటర్లు
☒ B. 60 మీటర్లు
☒ C. 10 మీటర్లు
☒ D. 150 మీటర్లు

Q.9 ఒక వస్తువు 'ద్రవ్యరాశి' మరియు 'వడి', దాని గతిశక్తిని ఎలా ప్రభావితం చేస్తాయో ఉత్తమంగా వివరించే ప్రకటన ఏది?

- Ans ☒ A. ఎక్కువ ద్రవ్యరాశి మరియు తక్కువ వడి కలిగిన ఒక వస్తువుకు ఎక్కువ గతిశక్తి ఉంటుంది.
☒ B. ఒకే ద్రవ్యరాశి మరియు ఎక్కువ వడి కలిగిన ఒక వస్తువుకు తక్కువ గతిశక్తి ఉంటుంది.
☒ C. ఎక్కువ ద్రవ్యరాశి మరియు ఎక్కువ వడి కలిగిన ఒక వస్తువుకు ఎక్కువ గతిశక్తి ఉంటుంది.
☒ D. తక్కువ ద్రవ్యరాశి మరియు తక్కువ వడి కలిగిన ఒక వస్తువుకు ఎక్కువ గతిశక్తి ఉంటుంది.

Q.10 ఒక 42 లీటర్ల ద్రావణంలో చక్కెర మరియు నీరు 2 : 5 నిష్పత్తిలో ఉండి, బాష్పీభవనం కారణంగా ద్రావణం పరిమాణం 35% తగ్గి, నీరు మాత్రమే ఆవిరైనట్లయితే, చక్కెర మరియు నీరు యొక్క కొత్త నిష్పత్తి ఎంత?

- Ans ☒ A. 31 : 50
☒ B. 51 : 42
☒ C. 40 : 51
☒ D. 40 : 41

Q.11 క్రింద రెండు సంఖ్యా సమితులు ఇవ్వబడ్డాయి. ప్రతి సంఖ్యా సమితిలో, మొదటి సంఖ్యపై నిర్దిష్ట గణిత పరిక్రియ (లు) చేయడం ద్వారా రెండవ సంఖ్యను పొందుతాము. అదేవిధంగా, రెండవ సంఖ్యపై కొన్ని గణిత పరిక్రియ (లు) చేయడం ద్వారా మూడవ సంఖ్యను పొందుతాము మరియు ఈ ప్రక్రియ ఇలాగే కొనసాగుతుంది. ఇచ్చిన సంఖ్యా సమితులలో గల అదే పరిక్రియలను అనుసరించు ఐచ్ఛికం ఏది?

(గమనిక: సంఖ్యలను విడివిడి అంకెలుగా విడగొట్టకుండా, మొత్తం సంఖ్యలపై పరిక్రియలు చేయాలి. ఉదా. 13 కి కలపడం/13 నుంచి తీసివేయడం/13 తో గుణించడం వంటి పరిక్రియలను 13 పై చేయవచ్చు కానీ 13ని 1 మరియు 3గా విడగొట్టి, ఆపై 1 మరియు 3లపై గణిత పరిక్రియలు చేయడం అనుమతించబడదు.)

6 – 16 – 23 – 32; 7 – 19 – 26 – 35

- Ans ☒ A. 8 – 22 – 15 – 24
☒ B. 12 – 34 – 41 – 50
☒ C. 4 – 14 – 21 – 30
☒ D. 11 – 31 – 38 – 29

Q.12 ఒక పంపు ఒక ట్యాంకుని 3 గంటల్లో నింపగలదు. ట్యాంకులో లీకేజీ కారణంగా, ట్యాంకుని నింపడానికి 4.5 గంటలు పడుతుంది. ఇతర ప్రవేశ(ఎంట్రీ) లేదా నిష్క్రమణ(ఎగ్జిట్) మార్గాలు తెరవకపోతే, ఆ లీక్ ఎంత సమయంలో నిండియున్న ట్యాంకుని ఖాళీ చేయగలదు?

- Ans ☒ A. 6 గంటలు
☒ B. 9 గంటలు
☒ C. 7 గంటలు
☒ D. 8 గంటలు

Q.13 A, B, C, D మరియు E అనేవారు వేర్వేరు ఎత్తులను కలిగి ఉన్నారు. C కంటే E పొడవుగా ఉన్నాడు కానీ A కంటే పొట్టిగా ఉన్నాడు. A కంటే కేవలం ఒక్క వ్యక్తి మాత్రమే పొడవుగా ఉన్నాడు. C కంటే D పొట్టిగా ఉన్నాడు. అయిన వారిలో మూడవ అత్యంత పొడవైన వ్యక్తి ఎవరు?

- Ans ☒ A. E
☒ B. B
☒ C. A
☒ D. C

Q.14 Which scenario best demonstrates proactive workplace safety behavior?

- Ans ☒ A. Discussing only past safety problems in meetings
☒ B. Identifying and correcting hazards before accidents occur
☒ C. Reporting hazards after incidents happen
☒ D. Waiting for a supervisor to notice hazards

Q.15 40 cm ఎత్తు ఉన్న ఒక శంఖువును, దాని భూమికి సమాంతరంగా ఉండే ఒక సమతలం రెండు భాగాలుగా విభజిస్తుంది. ఒకవేళ ఏర్పడిన పై చిన్న శంఖువు ఘనపరిమాణం, అసలు శంఖువు ఘనపరిమాణంలో 1/64వ వంతు ఉన్నట్లయితే, శంఖువు భూమి నుండి సమతలం ఎత్తును లెక్కించండి?

- Ans ☒ A. 30 cm
☒ B. 40 cm
☒ C. 10 cm
☒ D. 20 cm

Q.16 ఇవ్వబడిన శ్రేణిలో '?' స్థానంలో ఏమి రావాలి?

11, 22, 44, 88, 176, ?

- Ans ☒ A. 358
☒ B. 352
☒ C. 356
☒ D. 342

Q.17 A cyclist travels 120 km in 3 hours, rests for 1 hour, and then travels another 80 km in 2 hours. To determine the cyclist's average speed for the entire journey, which of the following quantities should be used?

- Ans
- ☒ A. Total displacement divided by total time taken
 - ☒ B. Distance travelled in a particular direction divided by time
 - ☒ C. Total distance travelled divided by the total time taken
 - ☒ D. Change in velocity divided by total time taken

Q.18 P, Q, S, T, U, V మరియు W అనే ఏడు పెట్టెలు ఒకదానిపై ఒకటి ఉంచబడతాయి, కానీ అవి ఇచ్చిన ఇదే క్రమంలో ఉండవలసిన అవసరం లేదు. T మరియు Pల మధ్య సరిగ్గా రెండు పెట్టెలు ఉంచబడ్డాయి. Uకి పైన Q మాత్రమే ఉంచబడింది. Pకి కింద ఏ పెట్టె ఉంచబడదు. Wకి కింద ఏదో ఒక చోట, కానీ Vకి పైన ఏదో ఒక చోట S ఉంచబడింది. ఇవ్వబడిన సమాచారం ఆధారంగా, Vకి పైన మూడవ స్థానంలో ఏ పెట్టె ఉంచబడింది?

- Ans
- ☒ A. S
 - ☒ B. W
 - ☒ C. T
 - ☒ D. P

Q.19 ఒక హోల్ మరియు ఒక రిబ్ గుండా కట్టింగ్ ప్లేన్ లైన్ వెళుతున్నప్పుడు, స్టాండర్డ్ కన్వెన్షన్ల ప్రకారం రిజల్టింగ్ వ్యూలో ఏ ఫీచర్ని సెక్షన్ చేయాలి?

- Ans
- ☒ A. రిబ్ సెక్షన్ చేయబడింది కానీ హోల్ సెక్షన్ చేయబడలేదు
 - ☒ B. హోల్ మరియు రిబ్లు రెండూ సెక్షన్ చేయబడ్డాయి
 - ☒ C. హోల్ మరియు రిబ్లు రెండూ సెక్షన్ చేయబడకుండా చూపబడ్డాయి
 - ☒ D. హోల్ సెక్షన్ చేయబడింది, కానీ రిబ్ సెక్షన్ చేయబడకుండా చూపబడింది

Q.20 క్రింది వాటిలో "WANల క్వారెంటైన్డ్ (లక్షణాలు)"ను సరిగ్గా వివరించే ప్రకటన ఏది?

- Ans
- ☒ A. WANలు సాధారణంగా దూరంగా ఉన్న LANలను కనెక్ట్ చేయడానికి వైర్లెస్ మీడియాను మాత్రమే ఉపయోగిస్తాయి
 - ☒ B. WANలు ఎల్లప్పుడూ ఇంటర్నెట్ సర్వీస్ ప్రొవైడర్ (ISP)ల చేత మాత్రమే మేనేజ్ చేయబడే పబ్లిక్ నెట్వర్క్లు
 - ☒ C. WANలు 1 నుండి 2 kmల రేడియస్లో ఉండే డివైజ్ ను కనెక్ట్ చేయడానికి మాత్రమే పరిమితం చేయబడ్డాయి
 - ☒ D. WANలను వైర్డ్ లేదా వైర్లెస్ లింక్ల ద్వారా మల్టీపుల్ LANలను కనెక్ట్ చేయడం ద్వారా బిల్డ్ చేయవచ్చు

Q.21 A మరియు B అనే పైపులు ఒక ట్యాంకు మొత్తాన్ని వరుసగా 8 గంటలు మరియు 12 గంటల్లో నింపగలవు. నీటి ట్యాంకులో నాలుగింట ఒక వంతు నిండి ఉండగా, రెండు పైపులను ఏకకాలంలో తెరిస్తే, ట్యాంకులోని మిగిలిన భాగాన్ని నింపడానికి ఎంత సమయం పడుతుంది?

- Ans
- ☒ A. 3 గంటల 36 నిమిషాలు
 - ☒ B. 3 గంటల 16 నిమిషాలు
 - ☒ C. 3 గంటల 26 నిమిషాలు
 - ☒ D. 3 గంటల 6 నిమిషాలు

Q.22 సోహన్ తన ఇంటికి చేరుకోవడానికి, పాక్షికంగా రైలులో మరియు పాక్షికంగా కారులో, మొత్తం 760 km దూరాన్ని ప్రయాణించాడు. అతను 160 km రైలులో మరియు మిగిలినది కారులో ప్రయాణిస్తే 8 గంటలు పడుతుంది. అతను 240 km రైలులో మరియు మిగిలిన దూరం కారులో ప్రయాణిస్తే, అతని ప్రయాణం 12 నిమిషాలు ఎక్కువ అవుతుంది. రైలు మరియు కారు వేగాల మధ్య భేదాన్ని (వ్యత్యాసాన్ని) కనుగొనండి.

- Ans
- ☒ A. 27 km/h
 - ☒ B. 23 km/h
 - ☒ C. 21 km/h
 - ☒ D. 20 km/h

Q.23 చక్కెర ధర 20% పెరిగినప్పుడు, మనోజ్ తన ఆదాయం నుండి చక్కెరపై చేసే వ్యయాన్ని 15% మాత్రమే పెంచగలడు. అయితే, వ్యయాన్ని సమం(బ్యాలెన్స్) చేయడానికి, చక్కెర వినియోగ పరిమాణాన్ని ఎంత శాతం తగ్గించుకోవాలి?

- Ans
- ☒ A. 5%
 - ☒ B. $5\frac{1}{3}\%$
 - ☒ C. 6.5%
 - ☒ D. $4\frac{1}{6}\%$

Q.24 A ramp is used to lift a box to a platform 2 m high. To reduce the effort required, the ramp length is increased from 4 m to 8 m. Assuming negligible friction, what remains unchanged?

- Ans
- ☒ A. The work done in raising the box
 - ☒ B. The mechanical advantage
 - ☒ C. The distance moved along the ramp
 - ☒ D. The force required

Q.25 ప్రామాణిక సంప్రదాయాల ప్రకారం, ఒక విద్యుత్ వలయ రేఖాచిత్రంలో బ్యాటరీని ఉత్తమంగా సూచించే సంకేతం ఏది?

- Ans
- ☒ A. ఒకే పొడవైన రేఖ మాత్రమే
 - ☒ B. శ్రేణిలో అనుసంధానించబడిన రెండు వృత్తాలు
 - ☒ C. ఒకదాని తర్వాత ఒకటిగా ఉంచబడిన పొడవైన మరియు చిన్న సమాంతర రేఖల జత
 - ☒ D. కలిసి ఉంచబడిన రెండు చిన్న రేఖలు

Q.26 ఆంగ్ల అక్షర క్రమం ఆధారంగా, క్రింది నాలుగు అక్షర-సమూహ జతల్లో మూడు ఒక నిర్దిష్ట మార్గంలో ఒకేలా ఉండి, తద్వారా సమూహాన్ని ఏర్పరుస్తాయి. ఆ సమూహానికి చెందని అక్షర-సమూహ జత ఏది?
(గమనిక: భిన్నమైన అక్షర-సమూహ జత అనేది హల్లులు/అచ్చుల సంఖ్య లేదా అక్షర సమూహంలో వాటి స్థానాలపై ఆధారపడదు.)

- Ans
- ☒ A. KE – LF
 - ☒ B. IT – KV
 - ☒ C. SJ – TK
 - ☒ D. DG – EH

Q.27 '235234796423' అనే సంఖ్యలోని ప్రతి బేసి అంకె నుండి 2 తీసివేసి, ప్రతి సరి అంకెకు 2 కలిపితే, ఎడమ నుండి మూడవ మరియు కుడి నుండి మూడవ స్థానంలో ఉండే అంకెల మొత్తం ఎంత అవుతుంది?

- Ans
- ☒ A. 8
 - ☒ B. 9
 - ☒ C. 7
 - ☒ D. 6

Q.28 శ్రీను తన ఇంటి నుండి బయలుదేరి, దక్షిణం వైపు 2 km, ఆపై కుడి మలుపు తీసుకుని 5 km, తర్వాత మళ్ళీ కుడి మలుపు తీసుకుని 6 km, తిరిగి కుడి మలుపు తీసుకుని 4 km, చివరగా కుడి మలుపు తీసుకుని 4 km ప్రయాణించి తన కార్యాలయం వద్ద ఆగుతాడు. తిరిగి తన ఇంటికి చేరుకోవడానికి శ్రీను ఏ దిశలో ప్రయాణించాలి? (ప్రత్యేకంగా పేర్కొనకపోతే అన్ని మలుపులు 90 డిగ్రీల మలుపులు మాత్రమే)

- Ans
- ☒ A. ఉత్తరం
 - ☒ B. తూర్పు
 - ☒ C. పడమర
 - ☒ D. దక్షిణం

Q.29 ఒక వస్తువు ₹300కి కొనుగోలు చేయబడింది మరియు దాని ధర 5.5% పెంచబడింది. ఫలితంగా వచ్చిన ధరను 8% తగ్గిస్తే, తుది అమ్మకపు ధరను కనుగొనండి.

- Ans
- ☒ A. ₹288.24
 - ☒ B. ₹291.18
 - ☒ C. ₹284.45
 - ☒ D. ₹296.46

Q.30 What is the primary role of the Central Processing Unit (CPU) in a computer system?

- Ans
- ☒ A. To store long-term data
 - ☒ B. To display output on the screen
 - ☒ C. To manage network connections
 - ☒ D. To execute program instructions

Q.31 ఇచ్చిన అక్షర శ్రేణిని చూసి క్రింది ప్రశ్నకు సమాధానం ఇవ్వండి.

(ఎడమ) A X T N K R Q K C P S I D F J U D O R G Z M B E L (కుడి)

కుడి చివర నుండి నాలుగవ అక్షరానికి మరియు ఎడమ చివర నుండి మూడవ అక్షరానికి మధ్య ఆంగ్ల అక్షర క్రమంలో ఎన్ని అక్షరాలు ఉన్నాయి?

- Ans
- ☒ A. 5
 - ☒ B. 6
 - ☒ C. 4
 - ☒ D. 3

Q.32 క్రింది వాటిలో ఏది ఒక వాహనంలోని స్పీడ్మీటర్ యొక్క పనితీరును అత్యంత ఉత్తమంగా వివరిస్తుంది?

- Ans
- ☒ A. ఇది ప్రయాణంలో సగటు వేగాన్ని లెక్కిస్తుంది.
 - ☒ B. ఇది వాహనం యొక్క వేగం మారే రేటును చూపుతుంది.
 - ☒ C. ఇది వాహనం కదులుతున్న ప్రస్తుత వేగాన్ని ప్రదర్శిస్తుంది.
 - ☒ D. ఇది వాహనం ప్రయాణించిన మొత్తం దూరాన్ని కొలుస్తుంది.

Q.33 Which factor increases the amount of heat produced in a wire when an electric current flows through it for a fixed time?

- Ans
- ☒ A. Making the wire thicker
 - ☒ B. Increasing the resistance of the wire
 - ☒ C. Reducing the current in the wire
 - ☒ D. Decreasing the length of the wire

Q.34 ఈ క్రింది వాటిలో 'ఇంజనీరింగ్ డ్రాయింగ్'లో ఉపయోగించే 'త్రిభుజం (ట్రయాంగిల్)'ను ఉత్తమంగా వివరించే ప్రకటన ఏది?

- Ans
- ☒ A. ఒక త్రిభుజంలో అన్ని భుజాలు ఎల్లప్పుడూ సమాన పొడవును కలిగి ఉండాలి.
 - ☒ B. ఒక త్రిభుజం అనేది నాలుగు సరళ భుజాలు మరియు నాలుగు కోణాలు కలిగిన ఒక బహుభుజి.
 - ☒ C. ఒక త్రిభుజం అనేది మూడు వక్ర భుజాలు కలిగిన ఒక బహుభుజి.
 - ☒ D. ఒక త్రిభుజం అనేది మూడు సరళ భుజాలు మరియు మూడు కోణాలు కలిగిన ఒక బహుభుజి.

Q.35 ఈ క్రింది సమాసాన్ని సూక్ష్మీకరించండి:

11 of 7 + 125 ÷ 5 + 99 ÷ 11 × 7 - 17 of 7 + 7 × 6 - (91 ÷ 7 + 7 × 5)

- Ans
- ☒ A. 36
 - ☒ B. 40
 - ☒ C. 48
 - ☒ D. 44

Q.36 ఉపయోగించిన తర్వాత ఒక వర్క్ షాప్ లాథేను క్లీన్ చేసేటప్పుడు, గాయాలు కాకుండా నివారించడానికి ఏ టూల్ భద్రతా చర్య అత్యంత ఉత్తమమైనది?

- Ans
- ☒ A. లాథే నుండి లోహపు ధూళిని తొలగించడానికి ఒక రాగ్ ను ఉపయోగించడం
 - ☒ B. లాథే చుట్టూ ఉన్న చిప్స్ ను కంప్రెస్డ్ ఎయిర్ తో ఊది తొలగించడం
 - ☒ C. లాథే నుండి లోహపు చిప్స్ ను తొలగించడానికి ఒక బ్రష్ ను ఉపయోగించడం
 - ☒ D. లోహపు చిప్స్ ను నేరుగా ఒట్టి చేతులతో తుడవడం

Q.37 భూమిపై ఒక వ్యోమగామి బరువు 600 N గా ఉండి, చంద్రమండల యాత్రలో భాగంగా, ఆమె చంద్రునిపై తన బరువును కొలవడానికి ఒక ప్రయోగాన్ని నిర్వహిస్తుంది. ఈ క్రింది వాటిలో చంద్రునిపై ఆమె ఆశించిన బరువుకు అత్యంత దగ్గరగా ఉండే విలువ ఏది మరియు ఎందుకు?

- Ans
- ☒ A. 200 N, ఎందుకంటే చంద్రుని గురుత్వాకర్షణ శక్తి, భూమి గురుత్వాకర్షణ శక్తిలో సుమారు మూడింట ఒక వంతు ఉంటుంది.
 - ☒ B. 600 N, ఎందుకంటే చంద్రునిపై ఒక వ్యక్తి బరువు మారకుండా అలాగే ఉంటుంది.
 - ☒ C. 300 N, ఎందుకంటే చంద్రుని గురుత్వాకర్షణ శక్తి, భూమి గురుత్వాకర్షణ శక్తిలో సుమారుగా సగం ఉంటుంది.
 - ☒ D. 100 N, ఎందుకంటే చంద్రుని గురుత్వాకర్షణ శక్తి, భూమి గురుత్వాకర్షణ శక్తిలో సుమారు ఆరింట ఒక వంతు ఉంటుంది.

Q.38 ఒక టేబోరేటరీ థర్మామీటర్ పరిధి -10 డిగ్రీల సెల్సియస్ నుండి 110 డిగ్రీల సెల్సియస్ వరకు ఉండి, 120 సమాన భాగాలుగా విభజించబడి ఉన్నట్లయితే, ఈ థర్మామీటర్ కొలవగలిగే అత్యల్ప విలువ ఎంత ఉంటుంది?

- Ans
- ☒ A. 2 డిగ్రీల సెల్సియస్
 - ☒ B. 1 డిగ్రీ సెల్సియస్
 - ☒ C. 0.5 డిగ్రీల సెల్సియస్
 - ☒ D. 10 డిగ్రీల సెల్సియస్

Q.39 రహదారిపై ఉండే ఒక కిలోమీటరు రాయి ప్రయాణికులకు ఏ సమాచారాన్ని అందిస్తుంది?

- Ans
- ☒ A. గమ్యస్థానాన్ని చేరుకోవడానికి పట్టే కాలం
 - ☒ B. వాహనం యొక్క వేగం
 - ☒ C. ప్రయాణ దిశ
 - ☒ D. ఒక సూచన స్థానం(రిఫెరెన్స్ పాయింట్) నుండి దూరం

Q.40 ఐదుగురు విద్యార్థులు, N, O, R, S మరియు T లు వేర్వేరు ఎత్తులను కలిగి ఉన్నారు. T అనే వ్యక్తి N కంటే పొడవైనవాడు. R అనే వ్యక్తి S కంటే పొడవైనవాడు కానీ O కంటే పొట్టివాడు. S అనే వ్యక్తి N కంటే పొడవైనవాడు. T కంటే ఇద్దరు వ్యక్తులు పొడవైనవారు. R కంటే ఎంత మంది వ్యక్తులు పొట్టివారు?

- Ans
- ☒ A. ఇద్దరు
 - ☒ B. ఒకరు
 - ☒ C. ఎవరూ లేరు
 - ☒ D. ముగ్గురు

Q.41 ఆంగ్ల అక్షరక్రమం ఆధారంగా ఇచ్చిన శ్రేణిలోని ప్రశ్నార్థకం (?) స్థానంలో ఏమి వస్తుంది?

MDB PHE SLH VPK ?

- Ans
- ☒ A. XSM
 - ☒ B. ZUO
 - ☒ C. YTN
 - ☒ D. ZTM

Q.42 ఒక ప్రశ్నను అనుసరించి (I) మరియు (II) అనే రెండు ప్రకటనలు అనుసరిస్తాయి. ప్రశ్నకు సమాధానం ఇవ్వడానికి ప్రకటనలలో అందించిన డేటా సరిపోతుందా అనేది మీరు నిర్ణయించాలి. ప్రకటనలు రెండింటినీ చదివి తగిన సమాధానాన్ని నిర్ణయించండి. 5 కర్రలలో, B, U, N, M మరియు D ప్రతి ఒక్కటి వేర్వేరు ఎత్తులను కలిగి ఉంటాయి, వీటిలో అతి చిన్నది ఏది?
(I) D అనేది U కంటే చిన్నది. M అనేది B కంటే చిన్నది.
(II) M అనేది D కంటే పొడవైనది.

- Ans ☒ A. ప్రశ్నకి సమాధానం ఇవ్వడానికి ప్రకటన I లోని డేటా మాత్రమే సరిపోతుంది అయితే ప్రకటన II లోని డేటా సరిపోదు
☒ B. I మరియు II అనే రెండు ప్రకటనలు కలిసి (మరియు ప్రకటన I లేదా ప్రకటన II మాత్రమే కాదు) ప్రశ్నకు సమాధానం ఇవ్వడానికి సరిపోతాయి
☒ C. ప్రశ్నకి సమాధానం ఇవ్వడానికి ప్రకటన II లోని డేటా మాత్రమే సరిపోతుంది అయితే ప్రకటన I లోని డేటా సరిపోదు
☒ D. I మరియు II రెండూ కలిసి ప్రశ్నకు సమాధానం ఇవ్వడానికి సరిపోవు

Q.43 S, T, U, V, W, X మరియు Y అనే ఏడు పెట్టెలు ఒకదానిపై ఒకటి ఉంచబడతాయి, కానీ అవి అదే క్రమంలో ఉండవలసిన అవసరం లేదు. పై నుండి సరిగ్గా మూడవ స్థానంలో U ఉంచబడింది. U మరియు Tల మధ్య ఒక పెట్టె మాత్రమే ఉంచబడింది. Tకి తక్షణమే పైన W ఉంచబడింది. X మరియు Sల మధ్య మూడు పెట్టెలు మాత్రమే ఉంచబడ్డాయి. Yకి కింద ఉన్న స్థానాలలో ఏదో ఒకదానిలో V ఉంచబడింది. U మరియు Sల మధ్య రెండు పెట్టెలు మాత్రమే ఉంచబడ్డాయి. పై నుండి రెండవ స్థానంలో ఏ పెట్టె ఉంచబడింది?

- Ans ☒ A. T
☒ B. U
☒ C. V
☒ D. X

Q.44 ఒకవేళ ఒక దీర్ఘచతురస్రాకార పొలం యొక్క పొడవు 120 మీటర్లు మరియు వెడల్పు 75 మీటర్లుగా కొలవబడినట్లయితే, SI ప్రమాణాలలో దాని వైశాల్యం ఎంత ఉంటుంది?

- Ans ☒ A. 15000 చదరపు మీటర్లు
☒ B. 9000 చదరపు మీటర్లు
☒ C. 1800 చదరపు మీటర్లు
☒ D. 19500 చదరపు మీటర్లు

Q.45 వృత్తిపరమైన భద్రతలో 'HAZOP' అనే పదం దేనిని సూచిస్తుంది?

- Ans ☒ A. హజార్డస్ ఆపరేషన్ స్టాండర్డ్ (Hazardous Operation Standard)
☒ B. హ్యాండిలింగ్ అండ్ ఆర్గనైజింగ్ సేఫ్టీ (Handling and Organizing Safety)
☒ C. హజార్డస్ ఆపరేషన్స్ సేఫ్టీ (Hazardous Operations Safety)
☒ D. హజార్డ్ అండ్ ఆపెరబిలిటీ స్టడీ (Hazard and Operability Study)

Q.46 ఒక వజ్రం ధర, దాని బరువు వర్గానికి ప్రత్యక్షంగా అనుపాతంలో ఉండి, 2:4:1:3 నిష్పత్తి గల బరువులతో నాలుగు ముక్కలుగా విరిగింది. ఒకవేళ అది నాలుగు సమాన ముక్కలుగా విరిగి ఉంటే, వచ్చే నష్టం ₹60,000 అయ్యేది. అయితే, ఆ వజ్రం అసలు ధర ఎంత?

- Ans ☒ A. ₹75,000
☒ B. ₹82,000
☒ C. ₹80,000
☒ D. ₹78,000

Q.47 '+' మరియు '-' లను, అలాగే '*' మరియు '/' లను పరస్పరం మార్చినచో, క్రింది సమీకరణంలోని '?' స్థానంలో ఏమి వస్తుంది?

$$5 \div 3 + 15 \times 5 - 3 = ?$$

- Ans ☒ A. 9
☒ B. 18
☒ C. 15
☒ D. 12

Q.48 ఇచ్చిన ప్రకటనలు మరియు తీర్మానాలను జాగ్రత్తగా చదవండి. ప్రకటనలలో ఇచ్చిన సమాచారం సత్యమని భావించి, అవి మనకి సాధారణంగా తెలిసిన వాస్తవాలకు భిన్నంగా ఉన్నట్లు అనిపించినప్పటికీ, ఇచ్చిన తీర్మానాలలో ఏది/ఏవి ప్రకటనలను తార్కికంగా అనుసరిస్తుందో/స్తాయో నిర్ణయించండి.

ప్రకటనలు:
చాక్లెట్లన్నీ పన్నీర్లు.
పన్నీర్ ఏదీ పాలు కాదు.

తీర్మానాలు:
(I) చాక్లెట్ ఏదీ పాలు కాదు.
(II) కొన్ని పాలు పన్నీర్లు.

- Ans
- ☒ A. తీర్మానాలు (I) మరియు (II) రెండూ అనుసరిస్తాయి.
 - ☒ B. తీర్మానం (II) మాత్రమే అనుసరిస్తుంది
 - ☒ C. తీర్మానం (I) లేదా (II) ఏదీ అనుసరించదు.
 - ☒ D. తీర్మానం (I) మాత్రమే అనుసరిస్తుంది.

Q.49 ఇంజనీరింగ్ పీల్ పై రిపీటెడ్ 67° యాంగిల్స్ డ్రా చేసేప్పుడు, క్యుములేటివ్ అలైన్మెంట్ ఎర్రర్స్ తగ్గించడానికి ఏ పద్ధతి ఉత్తమంగా సహాయపడుతుంది?

- Ans
- ☒ A. ఇంటర్మీడియట్ వెరిఫికేషన్ లేకుండా అన్ని యాంగిల్స్ నిరంతరాయంగా డ్రా చేయబడడం
 - ☒ B. రిపీటెడ్ యాంగిల్స్ అన్నింటి కొరకు ఒకే రిఫరెన్స్ లైన్ ఉపయోగించడం
 - ☒ C. ఫైనలైజింగ్ చేసే ముందు అన్ని యాంగిల్స్ పెన్సిల్తో లైట్గా మార్క్ చేయబడడం
 - ☒ D. అన్ని యాంగిల్స్ కోసం కేవలం ప్రారంభ ప్రోట్రాక్టర్ అలైన్మెంట్ పై మాత్రమే ఆధారపడటం

Q.50 ఈ క్రింది అక్షర-సంఖ్య సమాహారంలో, ఇవ్వబడిన శ్రేణిని తార్కికంగా పూర్తి చేయడానికి, ప్రశ్నార్థకం (?) స్థానంలో ఏమి వస్తుంది?

GXM 5, JVN 11, MTO 24, PRP 51, ?

- Ans
- ☒ A. TPQ 106
 - ☒ B. TPQ 107
 - ☒ C. SPQ 106
 - ☒ D. SPQ 107

Q.51 ఈ క్రింది అక్షర శ్రేణిని చూసి, ప్రశ్నకు సమాధానం ఇవ్వండి. (లెక్కింపు ఎడమవైపు నుండి కుడివైపుకు మాత్రమే చేయాలి.)

(ఎడమ) Q K Q N X K G G V M L A W T W K N G V (కుడి)

ప్రతిదానికి తక్షణమే ముందు ఒక అచ్చు మరియు తక్షణమే తర్వాత ఒక హల్లు ఉండేటటువంటి హల్లులు ఎన్ని ఉన్నాయి?

- Ans
- ☒ A. ఒకటి
 - ☒ B. మూడు
 - ☒ C. రెండు
 - ☒ D. ఏదీ లేదు

Q.52 కొన్ని రసాయన శీతలీకరణాలను (refrigerants) పరిమితం చేయడం వల్ల 'ఓజోన్ పొర'కు జరిగే నష్టం ఎందుకు సమర్థవంతంగా తగ్గుతుంది?

- Ans
- ☒ A. శీతలీకరణాలలో హానికరమైన UV కాంతిని శోషించుకునే కణాలు ఉంటాయి.
 - ☒ B. శీతలీకరణాలు ఓజోన్ విచ్ఛిన్నతను ఉత్ప्रेరకపరిచే పదార్థాలను విడుదల చేస్తాయి.
 - ☒ C. శీతలీకరణాలు ఆక్సిజన్ ఉత్పత్తిని పెంచి, ఓజోన్ పునరుద్ధరణకు తోడ్పడతాయి.
 - ☒ D. శీతలీకరణాలు స్ట్రాటోఆవరణను వేడి చేసే హరితగృహ వాయువులను విడుదల చేస్తాయి.

Q.53 ఒక ఘన క్రమ వృత్తాకార శంకువు 7 cm ఎత్తు, మరియు భూవ్యాసార్థం 22.2 cm కలిగి ఉంటుంది. దానిని కరిగించి, భూ వ్యాసార్థం 3.7 cm గల క్రమ వృత్తాకార శంకువుగా మార్చబడింది. అప్పుడు శంకువు యొక్క ఎత్తు (cm లలో) _____.

- Ans
- ☒ A. 267
 - ☒ B. 159
 - ☒ C. 252
 - ☒ D. 185

Q.54 ఒక ప్రశ్న మరియు దాని కింద (I) మరియు (II) అని సంఖ్యలు ఇవ్వబడిన రెండు ప్రకటనలు ఉన్నాయి. ఆ ప్రకటనలలో ఇచ్చిన సమాచారం ప్రశ్నకు సమాధానం ఇవ్వడానికి సరిపోతుందో లేదో మీరు నిర్ణయించాలి. రెండు ప్రకటనలను చదివి సరైన సమాధానాన్ని ఎంచుకోండి.

ప్రశ్న:

వేర్వేరు ఎత్తులు కలిగిన N, O, R, S మరియు T అనే ఐదు చెట్లలో అన్నింటికంటే పొడవైన చెట్టు ఏది?

ప్రకటనలు:

(I) T అనేది R కంటే పొడవైనది. N అనేది T కంటే పొడవైనది.

(II) R అనేది O కంటే పొట్టిది, కానీ S కంటే పొడవైనది.

- Ans
- ☒ A. ప్రకటన I లోని డేటా ఒక్కటే ప్రశ్నకు సమాధానం ఇవ్వడానికి సరిపోతుంది, అయితే ప్రకటన II లోని డేటా సరిపోదు
 - ☒ B. ప్రకటన II లోని డేటా ఒక్కటే ప్రశ్నకు సమాధానం ఇవ్వడానికి సరిపోతుంది, అయితే ప్రకటన I లోని డేటా సరిపోదు
 - ☒ C. ప్రశ్నకు సమాధానం ఇవ్వడానికి I మరియు II అనే రెండు ప్రకటనలు (మరియు కేవలం ప్రకటన I లేదా ప్రకటన II మాత్రమే కాదు) సరిపోతాయి
 - ☒ D. I మరియు II అనే రెండు ప్రకటనలూ కలిసి ప్రశ్నకు సమాధానం ఇవ్వడానికి సరిపోవు

Q.55 $x + \frac{1}{x} = 5$ అయితే, $\frac{x^3 - 5x^2 + 5x}{x^2 + 1}$ అనేది దేనికి సమానం?

- Ans
- ☒ A. $\frac{2}{5}$
 - ☒ B. $\frac{4}{5}$
 - ☒ C. $\frac{3}{5}$
 - ☒ D. $\frac{1}{5}$

Q.56 ఒక క్రేన్ 200 kg బరువున్న వస్తువును 10 సెకన్లలో 15 మీటర్ల ఎత్తుకు పైకి లేపుతుంది. గురుత్వ త్వరణం 10 m/s^2 అని మరియు శక్తి నష్టం చాలా తక్కువగా ఉందని భావిస్తే, ఈ ప్రక్రియలో ఆ క్రేన్ యొక్క సామర్థ్యం (పవర్ అవుట్పుట్) ఎంత?

- Ans
- ☒ A. 3000 W
 - ☒ B. 1000 W
 - ☒ C. 1500 W
 - ☒ D. 2000 W

Q.57 సాధారణ మునిసిపల్ వ్యర్థాలతో పోలిస్తే బయోమెడికల్ వ్యర్థాలకు ప్రత్యేక నిర్వహణ ఎందుకు అవసరం?

- Ans
- ☒ A. ఇందులో ఆరోగ్య ప్రమాదాలను కలిగించే అంటువ్యాధి కారకాలు ఉండవచ్చు.
 - ☒ B. ఇందులో రసాయన పదార్థాలు ఎక్కువగా ఉంటాయి మరియు ఇది ఎల్లప్పుడూ విషపూరితమైనది.
 - ☒ C. ఇది ఎల్లప్పుడూ రేడియోధార్మికతను కలిగి ఉంటుంది మరియు భారీ పీల్చింగ్ అవసరం.
 - ☒ D. ఇతర రకాల వ్యర్థాల కంటే దీనిని రీసైకిల్ చేసే అవకాశం ఎక్కువ ఉంటుంది.

Q.58 A, B, C, D, X, Y మరియు Zలు ఒక వృత్తాకార బల్ల చుట్టూ, బల్ల కేంద్రానికి అభిముఖంగా కూర్చున్నారు. C కి ఎడమవైపు నుండి లెక్కించినప్పుడు, Y మరియు C మధ్య ఇద్దరు వ్యక్తులు మాత్రమే కూర్చున్నారు. B కి ఎడమవైపు మూడవ స్థానంలో D కూర్చున్నాడు. B కి తక్షణమే కుడివైపు A కూర్చున్నాడు. Y కి ఎడమవైపు రెండవ స్థానంలో A కూర్చున్నాడు. D కి Z తక్షణ పొరుగువాడు కాదు. X కి కుడివైపు మూడవ స్థానంలో ఎవరు కూర్చున్నారు?

Ans ☒ A. A
☒ B. D
☒ C. Y
☒ D. C

Q.59 'CD' యొక్క పూర్తి రూపం మరియు దానిలో డేటాను స్టోర్ చేయడానికి ఉపయోగించే 'టెక్నాలజీ' ఏది?

Ans ☒ A. Compact Drive, Optical Storage
☒ B. Compact Disc, Optical Storage
☒ C. Compact Disc, Magnetic Storage
☒ D. Compact Drive, Magnetic Storage

Q.60 అంతర్జాతీయ ప్రమాణాల ప్రకారం పారిశ్రామిక వర్క్ ఫ్లేస్ లలో అత్యవసర నిష్క్రమణ సూచిక(ఎమర్జెన్సీ ఎగ్జిట్ సైన్లు)లకు సార్వత్రికంగా ఏ రంగును కేటాయిస్తారు?

Ans ☒ A. ఆకుపచ్చ రంగు బ్యాక్ గ్రౌండ్ పై తెలుపు రంగు అక్షరాలు లేదా చిహ్నాలు
☒ B. ఎరుపు రంగు బ్యాక్ గ్రౌండ్ పై తెలుపు రంగు అక్షరాలు లేదా చిహ్నాలు
☒ C. నీలి రంగు బ్యాక్ గ్రౌండ్ పై తెలుపు రంగు అక్షరాలు లేదా చిహ్నాలు
☒ D. పసుపు రంగు బ్యాక్ గ్రౌండ్ పై నలుపు రంగు అక్షరాలు లేదా చిహ్నాలు

Q.61 ఒక సైకిల్ తోక్కే వ్యక్తి, 52 కిలోమీటర్ రాయి వద్ద నుండి 79 కిలోమీటర్ రాయి వరకు ప్రయాణించినట్లయితే, ఆ వ్యక్తి ప్రయాణించే 'దూరం' ఎంత?

Ans ☒ A. 131 కిలోమీటర్లు
☒ B. 52 కిలోమీటర్లు
☒ C. 31 కిలోమీటర్లు
☒ D. 27 కిలోమీటర్లు

Q.62 ఒక నిర్దిష్ట కోడ్ భాషలో,

A + B అంటే 'Bకి తల్లి A',
A - B అంటే 'Bకి సోదరుడు A',
A × B అంటే 'Bకి భార్య A' మరియు
A % B అంటే 'Bకి తండ్రి A'.

'Satish + Deep × Piyush - Hitesh % Mayank' అయితే, 'Mayank'కు 'Satish' ఏమి అవుతారు?

Ans ☒ A. తండ్రి సోదరుడికి భార్య సోదరి
☒ B. తండ్రి సోదరుడికి భార్య తల్లి
☒ C. తల్లి సోదరుడికి భార్య సోదరి
☒ D. తల్లి సోదరుడికి భార్య తల్లి

Q.63 What is the primary color used in warning signs to alert workers of potential hazards?

Ans ☒ A. Green with white symbol or text
☒ B. Blue with white symbol or text
☒ C. Yellow with black symbol or text
☒ D. Red with white symbol or text

Q.64 ఒక ఇంజనీర్, ఒక ట్రోల్ ప్యానెల్ యొక్క స్కీమాటిక్ను అప్డేట్ చేస్తున్నప్పుడు, ఒక నార్మల్ కోడ్ పుష్ బటన్ను సూచించాల్సి ఉంటుంది. అయితే, ప్రామాణిక ఇంజనీరింగ్ డ్రాయింగ్లను చూసే ఇంజనీర్లందరికీ ఆ సంకేతం సార్వత్రికంగా అర్థమయ్యేలా ఉత్తమంగా నిర్ధారించే విధానం ఏది?

- Ans
- ☒ A. స్కీమాటిక్ డయాగ్రామ్లో నార్మల్ కోడ్ పుష్ బటన్ను పదాలలో స్పష్టంగా వివరించడం
 - ☒ B. పుష్ బటన్ యొక్క పనితీరును వివరించే గమనికతో, దానిని చేతితో గీసిన చిత్రాన్ని రూపొందించడం.
 - ☒ C. నార్మల్ కోడ్ పుష్ బటన్ సంకేతానికి బదులుగా జనరల్ స్విచ్ సంకేతంను ప్రత్యామ్నాయంగా వాడడం
 - ☒ D. నిబంధనల ప్రకారం, నార్మల్ కోడ్ పుష్ బటన్కు ప్రామాణీకరించిన సంకేతం ఉపయోగించడం

Q.65 $3x - 2y + 3z = 8$, $4x - 3y + 2z = 4$ మరియు $2x + y - z = 1$ అయితే, వరుసగా x , y మరియు z లని కనుగొనండి.

- Ans
- ☒ A. 2, 3 మరియు 1
 - ☒ B. 3, 1 మరియు 2
 - ☒ C. 1, 2 మరియు 3
 - ☒ D. 2, 1 మరియు 3

Q.66 ఒక కారు 'A' బిందువు నుండి 'B' బిందువుకు జిగ్ జాగ్ మార్గంలో ప్రయాణిస్తూ మొత్తం 200 మీటర్ల దూరాన్ని పూర్తి చేసింది. ఒకవేళ 'A' మరియు 'B' బిందువుల మధ్య గల అత్యల్ప సరళరేఖా దూరం (స్ట్రైట్ లైన్ డిస్టెన్స్) 120 మీటర్లు అయితే, ఆ కారు ప్రయాణించిన దూరం మరియు స్థానభ్రంశాన్ని క్రింది వాటిలో ఏ ప్రకటన ఉత్తమంగా వివరిస్తుంది?

- Ans
- ☒ A. దూరం 120 మీటర్లు; స్థానభ్రంశం 120 మీటర్లు
 - ☒ B. దూరం 200 మీటర్లు; స్థానభ్రంశం 200 మీటర్లు
 - ☒ C. దూరం 120 మీటర్లు; స్థానభ్రంశం 200 మీటర్లు
 - ☒ D. దూరం 200 మీటర్లు; స్థానభ్రంశం 120 మీటర్లు

Q.67 ఒక రూమ్ థర్మామీటర్ను సాధారణంగా గోడపై నిలుపుగా ఎందుకు అమర్చుతారు?

- Ans
- ☒ A. ఇది థర్మామీటర్ శరీర ఉష్ణోగ్రతను వేగంగా కొలవడానికి సహాయపడుతుంది
 - ☒ B. ఇది థర్మామీటర్ లోపల ఉన్న ద్రవం గడ్డకట్టకుండా నిరోధిస్తుంది
 - ☒ C. ఇది బల్బును గదిలోని గాలికి బహిర్గతం చేయడం ద్వారా ఖచ్చితమైన రీడింగ్ను అందిస్తుంది.
 - ☒ D. ఇది థర్మామీటర్ను సులభంగా విరిగిపోకుండా రక్షిస్తుంది.

Q.68 ఈ ప్రశ్నలో, ఒక సంఖ్య/సంకేత సమూహానికి క్రింద ఇవ్వబడిన కోడ్లు మరియు వాటిని అనుసరించే షరతుల ప్రకారం అక్షర కోడ్లు ఇవ్వబడ్డాయి. ఈ షరతులను అనుసరించి సరైన కోడ్ కలయికయే మీ సమాధానం.
గమనిక: ఏ షరతులు వర్తించకపోతే, పట్టికలో ఇచ్చిన విధంగా ఆయా సంఖ్య/సంకేతంకు సంబంధించిన కోడ్లను నేరుగా ఉపయోగించాలి.

సంఖ్య/సంకేతం	3	@	8	4	\$	&	2	%	#	1	+	9	7	5
కోడ్	U	G	B	K	M	F	X	R	E	Q	S	C	V	T

షరతులు -

- (i) మొదటి మూలకం ఒక సంకేతం మరియు చివరి మూలకం బేసి సంఖ్య అయితే, ఈ రెండింటి (మొదటి మరియు చివరి మూలకాల) కోడ్లను పరస్పరం మార్చాలి.
- (ii) మొదటి మూలకం బేసి సంఖ్య మరియు చివరిది సరి సంఖ్య అయితే, మొదటి మరియు చివరి మూలకాలను @గా కోడ్ చేయాలి.
- (iii) రెండవ మరియు మూడవ మూలకాలు రెండూ పరిపూర్ణ వర్గాలు అయితే, మూడవ మూలకాన్ని రెండవ మూలకం యొక్క కోడ్గా కోడ్ చేయాలి.

ఈ క్రింది సమూహానికి సరైన కోడ్ ఏది?
& 8 \$ 9 5

- Ans
- ☒ A. FCBMT
 - ☒ B. TCMBF
 - ☒ C. FBMCT
 - ☒ D. TBMCF

Q.69

ఒక ఇంజనీరింగ్ సంస్థకు ఒక భారీ ప్రాజెక్ట్ కోసం సాంకేతిక డ్రాయింగ్ల సముదాయాన్ని రూపొందించే బాధ్యత అప్పగించబడింది. డ్రాయింగ్ స్కేల్ను తగ్గించకుండా, అన్ని భాగాలు ఒకే షీట్పై సరిపోవాలని, మరియు అవసరమైన మొత్తం డ్రాయింగ్ వైశాల్యం సుమారుగా 1 చదరపు మీటరు ఉండాలని క్లయింట్ నిర్దేశించారు. ప్రామాణిక డ్రాయింగ్ షీట్ పరిమాణాల ఆధారంగా, ఈ అవసరాలను ఉత్తమంగా తీర్చడానికి ఆ సంస్థ ఏ షీట్ను ఎంచుకోవాలి?

Ans

- ☐ A. A1 సైజు షీట్
- ☐ B. A3 సైజు షీట్
- ☐ C. A2 సైజు షీట్
- ☒ D. A0 సైజు షీట్

Q.70

ప్లాస్టిక్ వ్యర్థాల నిర్వహణకు సంబంధించిన ప్రధాన పర్యావరణ సవాళ్లను ఉత్తమంగా వివరించే కలయిక ఏది?

Ans

- ☐ A. ఉష్ణ కాలుష్యం మరియు సమర్థవంతమైన కంపోస్టింగ్
- ☒ B. పర్యావరణంలో మన్నిక మరియు మైక్రోప్లాస్టిక్ ఏర్పడటం
- ☐ C. వేగవంతమైన జీవశైథిల్యం మరియు రసాయన నిక్షాళనం
- ☐ D. తటస్థీకరణ మరియు సులభమైన రీసైక్లింగ్

Q.71

ఇంజనీరింగ్ డ్రాయింగ్లో సైడ్ వ్యూ(side view)ను ఉత్తమంగా వివరించే ప్రకటన ఏది?

Ans

- ☐ A. ఇది ఆబ్జెక్ట్ను పై నుండి లేదా క్రింద నుండి చూసినట్లుగా చూపుతుంది
- ☐ B. ఇది ఆబ్జెక్ట్ను ముందు నుండి స్పష్టంగా చూసినట్లుగా చూపుతుంది
- ☐ C. ఇది ఆబ్జెక్ట్ను యొక్క అన్ని వ్యూస్ యొక్క కలయికను చూపుతుంది
- ☒ D. ఇది ఆబ్జెక్ట్ను ఎడమ లేదా కుడి వైపు నుండి చూసినట్లుగా చూపుతుంది

Q.72

ఒక నిర్దిష్ట కోడ్ భాషలో, 'SOIL' అనేది '1547' గా మరియు 'COIL' అనేది '7124' గా కోడ్ చేయబడింది. ఇవ్వబడిన కోడ్ భాషలో 'C' యొక్క కోడ్ ఏమిటి?

Ans

- ☐ A. 4
- ☒ B. 2
- ☐ C. 1
- ☐ D. 7

Q.73

ఒక వ్యక్తి జీతం వరుసగా మూడు సంవత్సరాలలో 10%, 20% మరియు 25% చొప్పున పెరిగినట్లయితే, మూడవ సంవత్సరం చివరి నాటికి జీతంలో మొత్తం శాతం పెరుగుదలను కనుగొనండి.

Ans

- ☐ A. 30%
- ☐ B. 50%
- ☒ C. 65%
- ☐ D. 60%

Q.74

ఒక ఇంజనీరింగ్ డ్రాయింగ్లోని 'ఫ్రంట్ వ్యూ'ను ఉత్తమంగా వివరించే ప్రకటన ఏది?

Ans

- ☒ A. ఇది ముందు నుండి చూసినప్పుడు, వస్తువు యొక్క ఎత్తు మరియు వెడల్పును చూపిస్తుంది
- ☐ B. ఇది పక్క నుండి చూసినప్పుడు, వస్తువు యొక్క లోతు మరియు ఎత్తును చూపిస్తుంది
- ☐ C. ఇది వస్తువు యొక్క అడుగు భాగం లేదా కుడి వైపును మాత్రమే చూపిస్తుంది
- ☐ D. ఇది వస్తువు యొక్క ఏకమితిని మాత్రమే చూపిస్తుంది

Q.75

G అనే వ్యక్తి Yకి తల్లి, Y అనే వ్యక్తి Vకి సోదరి, S అనే వ్యక్తి Lకి తండ్రి, L అనే వ్యక్తి Vకి కుమారుడైతే, Lకి G ఏమవుతారు?

Ans

- ☒ A. తల్లికి తల్లి
- ☐ B. తల్లికి సోదరి
- ☐ C. సోదరి
- ☐ D. తల్లి

Q.76 ఒక వ్యాపారి, ఒక టేబుల్ ను ₹2,750 కి కొనుగోలు చేసి, మొదట దానిని 28% ఎక్కువకి మార్క్ చేసి, ఆపై ఒక వినియోగదారుడికి 12% తగ్గింపు(డిస్కంట్) ఇచ్చాడు. వినియోగదారుడు అమ్మకపు ధరపై అదనంగా 5% GST కూడా చెల్లించినట్లయితే, వ్యాపారి పొందిన లాభ శాతం (GST మినహాయించి) కనుగొనండి?

- Ans ☒ A. 12.64%
- ☒ B. 13.81%
- ☒ C. 15.12%
- ☒ D. 10.36%

Q.77 గృహోపకరణాలలోని ఎలెక్ట్రిక్ వైరులకి సాధారణంగా ప్లాస్టిక్ లేదా రబ్బరు కోటింగ్ కవరింగ్ ఎందుకు చేయబడుతుంది?

- Ans ☒ A. వైరులని బరువుగా చేయడానికి
- ☒ B. ఇన్సులేషన్ ద్వారా విద్యుత్ షాక్లను నివారించడానికి
- ☒ C. ఎక్కువ ఉష్ణాన్ని ఉత్పత్తి చేయడానికి
- ☒ D. కరెంట్ ప్రవాహాన్ని పెంచడానికి

Q.78 వడ్డీని అర్థ-సంవత్సరానికి ఒకసారి లెక్కించే పద్ధతిలో, ₹5,70,000లపై, సంవత్సరానికి 10% వడ్డీ రేటుతో 1.5 సంవత్సరాలకు అయ్యే చక్రవర్తీని కనుగొనండి.

- Ans ☒ A. ₹89,946.25
- ☒ B. ₹92,846.25
- ☒ C. ₹88,846.25
- ☒ D. ₹89,846.25

Q.79 క్రింది వాటిలో, 'సహ-ప్రధాన సంఖ్యల జత' ఏది?

- Ans ☒ A. (17, 54)
- ☒ B. (28, 49)
- ☒ C. (14, 28)
- ☒ D. (21, 33)

Q.80 లోకల్ ఏరియా నెట్వర్క్ (LAN) యొక్క ప్రాథమిక ప్రయోజనం ఏమిటి?

- Ans ☒ A. ఒక చిన్న భౌగోళిక ప్రాంతంలో కంప్యూటర్లను కనెక్ట్ చేయడానికి
- ☒ B. సోపల్ మీడియా అకౌంటులని కనెక్ట్ చేయడానికి
- ☒ C. గ్లోబల్ నెట్వర్కులని కనెక్ట్ చేయడానికి
- ☒ D. వైరెస్ పరికరాలను మాత్రమే లింక్ చేయడానికి

Q.81 ఒక గోడకు ఆనుకుని ఉన్న ఒక నిచ్చెన, భూమితో 60° కోణాన్ని చేస్తుంది. నిచ్చెన పొడవు 24 m అయితే, గోడ నుండి నిచ్చెన అడుగు భాగం యొక్క దూరాన్ని కనుగొనండి?

- Ans ☒ A. 18 m
- ☒ B. 15 m
- ☒ C. 12 m
- ☒ D. 9 m

Q.82 మొదటి దుకాణదారుడు 3% మరియు 7% అనే రెండు వరుస తగ్గింపులను ఇవ్వగా, రెండవ దుకాణదారుడు 2% మరియు 8% అనే రెండు వరుసగా తగ్గింపులను ఇచ్చాడు. మూడవ దుకాణదారుడు అదే వస్తువుపై 10% తగ్గింపును ఇచ్చాడు. మూడు దుకాణాలలో ప్రకటిత ధర ఒకేలా ఉంటే కొనుగోలుదారుడు ఏ దుకాణదారుడి నుండి కొనుగోలు చేయాలి?

- Ans ☒ A. మొదటి దుకాణదారుడి నుండి కొనుగోలు చేయడం
- ☒ B. రెండవ దుకాణదారుడి నుండి కొనుగోలు చేయడం
- ☒ C. రెండూ ఒకేలా ఉన్నందున మొదటి లేదా రెండవ దుకాణదారుడి నుండి కొనుగోలు చేయడం
- ☒ D. మూడవ దుకాణదారుడి నుండి కొనుగోలు చేయడం

Q.83 ఇచ్చిన ప్రకటనలు మరియు తీర్మానాలను జాగ్రత్తగా చదవండి. ప్రకటనలలో ఇచ్చిన సమాచారం సత్యమని భావించి, అవి మనకి సాధారణంగా తెలిసిన వాస్తవాలకు భిన్నంగా ఉన్నట్లు అనిపించినప్పటికీ, ఇచ్చిన తీర్మానాలలో ఏది/ఏవి ప్రకటనలను తార్కికంగా అనుసరిస్తుందో/స్తాయో నిర్ణయించండి.

ప్రకటనలు:
కొన్ని రగ్గులు ఫ్యాన్లు.
ఏ ఫ్యాన్ కూడా కారు కాదు.

తీర్మానం (I) : కొన్ని రగ్గులు కార్లు.
తీర్మానం (II) : కొన్ని ఫ్యాన్లు రగ్గులు.

- Ans
- ☒ A. తీర్మానాలు (I) మరియు (II) రెండూ అనుసరిస్తాయి
 - ☒ B. తీర్మానం (I) మాత్రమే అనుసరిస్తుంది.
 - ☒ C. తీర్మానం (II) మాత్రమే అనుసరిస్తుంది.
 - ☒ D. తీర్మానం (I) కానీ లేదా (II) కానీ ఏదీ అనుసరించదు.

Q.84 ఒక బాలుడు ఇసుకను మోయడానికి చేతిబండిని ఉపయోగిస్తాడు. చక్రం ఇరుసుగా పనిచేస్తుంది, ఇసుకను శ్రేణిలో ఉంచుతారు, మరియు బాలుడు హ్యాండిల్స్ ను పైకి ఎత్తుతాడు. ఈ అమరికలో, ఇసుక _____ ను సూచిస్తుంది.

- Ans
- ☒ A. ఎఫ్ ట్
 - ☒ B. ఆర్
 - ☒ C. లోడ్
 - ☒ D. ఫుల్క్రమ్

Q.85 వింటర్ టెంపరేచర్ ఇన్వర్షన్ (శీతాకాలపు ఉష్ణోగ్రతా విలోమం) సమయంలో భూస్థాయి కాలుష్య కారకాల గాఢత (గ్రౌండ్-లెవల్ పొల్యూటెంట్ కాన్సెంట్రేషన్)లను క్రింది వాటిలో ఏ చర్య అత్యంత సమర్థవంతంగా తగ్గిస్తుంది?

- Ans
- ☒ A. ఉధార వనరుల సమీపంలో ఉపరితల ఉష్ణోగ్రతలను పెంచడం
 - ☒ B. క్షితిజసమాంతర విక్షేపణాన్ని తగ్గించడానికి స్థానిక గాలి వేగాన్ని తగ్గించడం
 - ☒ C. ఆర్టిఫిషియల్ టర్బులెన్స్ (కృత్రిమ అలజడి) ద్వారా నిలువు గాలి (వర్టికల్ ఎయిర్) మిశ్రమాన్ని పెంపొందించడం
 - ☒ D. ఉధార వనరులను విలోమన పొరల కంటే ఎక్కువ ఎత్తుకు పెంచడం

Q.86 ఆంగ్ల అక్షర క్రమం ఆధారంగా, క్రింది నాలుగు అక్షర-సమూహ జతల్లో మూడు ఒక నిర్దిష్ట మార్గంలో ఒకేలా ఉండి, ఒక సమూహాన్ని ఏర్పరుస్తాయి. ఆ సమూహానికి చెందని అక్షర-సమూహ జత ఏది?

(గమనిక: భిన్నమైన అక్షర-సమూహ జత అనేది హల్లులు/అచ్చుల సంఖ్య లేదా అక్షర సమూహంలో వాటి స్థానాలపై ఆధారపడదు.)

- Ans
- ☒ A. PJ-QK
 - ☒ B. RL-SN
 - ☒ C. HB-IC
 - ☒ D. FZ-GA

Q.87 కొంత సొమ్మును బారువడ్డికి పెట్టుబడి పెట్టినప్పుడు, 5 సంవత్సరాలలో ₹21,500 మరియు 8 సంవత్సరాలలో ₹26,000 అయితే, అసలు మొత్తాన్ని (₹ లలో) కనుగొనండి?

- Ans
- ☒ A. 12,000
 - ☒ B. 7,500
 - ☒ C. 14,000
 - ☒ D. 15,500

Q.88 ఒక నిర్దిష్ట తర్కాన్ని అనుసరించి, 12 అనేది 1730కి, అలాగే 13 అనేది 2199కి సంబంధించినది. అదే తర్కాన్ని అనుసరిస్తూ, ఇచ్చిన ఐచ్ఛికాలలో 11 అనేది దేనికి సంబంధించినది?
(గమనిక: సంఖ్యలను విడివిడి అంకెలుగా విడగొట్టుకుండా, మొత్తం సంఖ్యలపై పరిక్రియలు చేయాలి. ఉదా. 13 కి కలపడం/13 నుంచి తీసివేయడం/13 తో గుణించడం వంటి పరిక్రియలను 13 పై చేయవచ్చు కానీ 13ని 1 మరియు 3గా విడగొట్టి, ఆపై 1 మరియు 3లపై గణిత పరిక్రియలు చేయడం అనుమతించబడదు.)

Ans ☒ A. 1443
☒ B. 1333
☒ C. 1543
☒ D. 1433

Q.89 ఒక పర్యవేక్షకుడు, భూమి పైనుండి ఒక బ్యాక్‌ఫ్యాక్‌ను భూమికి 2 మీటర్ల ఎత్తులో ఉన్న ఒక లెడ్జ్ పైకి లేపుతాడు. ఏ సందర్భంలో ఆ బ్యాక్‌ఫ్యాక్ యొక్క గురుత్వాకర్షణ స్థితి శక్తి (gravitational potential energy) అత్యధికంగా పెరుగుతుంది?

Ans ☒ A. అదే బ్యాక్‌ఫ్యాక్‌ను 1-మీటర్ లెడ్జ్ పైకి ఎత్తడం
☒ B. తేలికైన బ్యాక్‌ఫ్యాక్‌ను అదే 2-మీటర్ల లెడ్జ్ పైకి ఎత్తడం
☒ C. అదే బ్యాక్‌ఫ్యాక్‌ను అదే 2 మీటర్ల దూరం మోయడం
☒ D. బరువైన బ్యాక్‌ఫ్యాక్‌ను అదే 2-మీటర్ల లెడ్జ్ పైకి ఎత్తడం

Q.90 ఆంగ్ల అక్షరక్రమం ఆధారంగా, ఒక నిర్దిష్ట మార్గంలో 'SANZ' అనేది 'YUTT'కి, అలాగే, 'MTHM' అనేది 'SNNG'కి సంబంధించినది. అదే తర్కాన్ని అనుసరించి, క్రింది వాటిలో 'LJRE' అనేది దేనికి సంబంధించినది?

Ans ☒ A. RDXV
☒ B. QEYZ
☒ C. REXZ
☒ D. QDYY

Q.91 పరిమిత ప్రదేశాలలో గాలిలో తేలియాడే రసాయన కణాలు ఉన్నప్పుడు, పని చేయడానికి అత్యంత అనుకూలంగా ఉండే 'వ్యక్తిగత రక్షణ పరికరాల రకం' ఏది?

Ans ☒ A. రసాయన నిరోధక చేతి తొడుగులను ఉపయోగించి చేతులకు రక్షణ
☒ B. పారిశ్రామిక స్థాయి దృఢమైన శిరస్సాణాలతో తలకు రక్షణ
☒ C. అగ్ని నిరోధక దుస్తులతో శరీరానికి రక్షణ
☒ D. సగం ముఖాన్ని కప్పే మాస్కుల వంటి శ్వాసకోశ రక్షణ పరికరాలు

Q.92 ఈ క్రింది వాటిలో 'పురపాలక ఘన వ్యర్థానికి' ఒక ఉత్తమ ఉదాహరణ ఏది?

Ans ☒ A. గనుల వ్యర్థాలు
☒ B. పారిశ్రామిక ప్రక్రియ వ్యర్థాలు
☒ C. అసుపత్రి బయోమెడికల్ వ్యర్థాలు
☒ D. ఇంటి వంటగది చెత్త

Q.93 ఇవ్వబడిన శ్రేణిలో ప్రశ్నార్థకం (?) స్థానంలో ఏమి రావాలి?

1 2 7 20 61 ?

Ans ☒ A. 183
☒ B. 182
☒ C. 181
☒ D. 185

Q.94 ఇంజనీరింగ్ డ్రాయింగ్ లో ఉపయోగించే క్యూబాయిడ్ ను ఈ క్రింది వాటిలో ఏ ప్రకటన ఉత్తమంగా వివరిస్తుంది?

- Ans ☒ A. ఒక క్యూబాయిడ్ అనేది ఆరు దీర్ఘచతురస్రాకార ముఖాలు కలిగిన ఒక ఘనాకారం(సాలిడ్), మరియు దాని ఎదురెదురు ముఖాలు సమానంగా ఉంటాయి.
- ☒ B. క్యూబాయిడ్ అనేది ఒక ఘనాకారం(సాలిడ్), దీనిలోని అన్ని ముఖాలు సమాంతర చతుర్భుజాలుగా ఉంటాయి, కానీ అవి తప్పనిసరిగా దీర్ఘచతురస్రాలు కానవసరం లేదు.
- ☒ C. ఒక క్యూబాయిడ్ అన్ని భుజాలు మరియు కోణాలు సమానంగా కలిగి ఉంటుంది, అందువల్ల అది ఘనాన్ని పోలి ఉంటుంది.
- ☒ D. ఒక క్యూబాయిడ్ లోని అన్ని ముఖాలు సమాన పరిమాణం గల చతురస్రాలుగా ఉంటాయి.

Q.95 ఐదు సంఖ్యల సగటు 30. సంఖ్యలలో నాలుగు 25, 35, 28 మరియు 32 అయితే, ఐదవ సంఖ్య ఎంత?

- Ans ☒ A. 35
- ☒ B. 30
- ☒ C. 32
- ☒ D. 28

Q.96 కంప్యూటింగ్ లో 'CPU' అంటే ఏమిటి?

- Ans ☒ A. Core Processing Unit
- ☒ B. Control Processing Unit
- ☒ C. Computer Processing Unit
- ☒ D. Central Processing Unit

Q.97 ఒక వస్తువు యొక్క 'ద్రవ్యరాశి'ని స్థిరంగా ఉంచి, దాని 'ఎత్తు'ను రెట్టింపు చేసినట్లయితే, దాని 'గురుత్వాకర్షణ స్థితిజ శక్తి' ఏమి అవుతుంది?

- Ans ☒ A. రెట్టింపు అవుతుంది
- ☒ B. మారదు
- ☒ C. సగం అవుతుంది
- ☒ D. నాలుగింట ఒక వంతు అవుతుంది

Q.98 ఈ క్రింది దత్తాంశం యొక్క సగటు 45 అయితే, x విలువ ఎంత?

తరగతి	10-20	20-30	30-40	40-50	50-60
పౌనఃపున్యం	23	30	31	45	X

- Ans ☒ A. 160
- ☒ B. 162
- ☒ C. 180
- ☒ D. 188

Q.99 11 సంఖ్యల సగటు 10.9. మొదటి 6 సంఖ్యల సగటు 10.5 మరియు చివరి 6 సంఖ్యల సగటు 11.4 అయితే, 6వ సంఖ్యను కనుగొనండి.

- Ans ☒ A. 11
- ☒ B. 10.5
- ☒ C. 11.5
- ☒ D. 10

Q.100 P, Q మరియు R లు ముగ్గురు బ్యాట్స్మెన్. ఒక నిర్దిష్ట మ్యాచ్‌లో వారు సాధించిన పరుగుల నిష్పత్తులు ఇలా ఉన్నాయి:

P : Q = 5 : 7 మరియు Q : R = 2 : 3.

వారు మొత్తం 765 పరుగులు చేస్తే, R చేసిన పరుగుల సంఖ్యను కనుగొనండి.

- Ans
- ✓ A. 357
 - ✗ B. 378
 - ✗ C. 336
 - ✗ D. 350

Section : PART-B

Q.1 'అడిషనల్ ప్రొడక్షన్ ఇమేజెస్'కు బహిర్గతం అయిన తర్వాత, 'AI-ఆధారిత ఇన్ సైక్స్ సిస్టమ్' లోపాలను వర్గీకరించే 'యదార్థత(యాక్యూరసీ)' నిరంతరం మెరుగుపరుచుకుంటుంది. ఇక్కడ ప్రధానంగా ప్రదర్శించబడుతున్న సామర్థ్యం ఏది?

- Ans
- ✗ A. ప్రీ-డిఫైన్డ్ ఎగ్జిక్యూషన్ రోటీన్ల పునరావృతం ద్వారా డిటర్మినిస్టిక్ కంట్రోల్
 - ✗ B. స్థిర గణన మార్గాలను అమలు చేయడం ద్వారా సీక్వెన్షియల్ ప్రాసెసింగ్
 - ✗ C. ప్రీ-డిఫైన్డ్ ఆపరేటింగ్ పరిమితుల అప్లికేషన్ ద్వారా ఫ్లాటిక్ ఆప్టిమైజేషన్
 - ✓ D. ఇంటర్మిట్ డెసిషన్ పారామితులను అనుసరించడం ద్వారా ఇంక్రిమెంటల్ లెర్నింగ్

Q.2 ఒక 'మెషిన్ సేఫ్టీ సిస్టమ్'లో, నాలుగు ఎమర్జెన్సీ స్విచ్‌లు ఒక 'OR' గేట్ ద్వారా కనెక్ట్ చేయబడి ఉంటాయి. అయితే, అవుట్పుట్ 'HIGH'గా ఉండే కండిషన్ ఏది?

- Ans
- ✗ A. అన్ని స్విచ్‌లు ONలో ఉన్నప్పుడు మాత్రమే
 - ✓ B. కనీసం ఒక స్విచ్ ONలో ఉన్నప్పుడు
 - ✗ C. అన్ని స్విచ్‌లు OFFలో ఉన్నప్పుడు మాత్రమే
 - ✗ D. రెండు స్విచ్‌లు ONలో ఉన్నప్పుడు మాత్రమే

Q.3 ఒక నిచ్చెన వర్క్‌షాప్ గోడకు ఆనించి ఉంచబడింది, ఇది నేలతో 60 డిగ్రీల కోణాన్ని చేస్తుంది. ఒకవేళ ఆ నిచ్చెన పొడవు 5 మీటర్లు అయితే, ఫ్లోర్ నుండి నిచ్చెన పైభాగం వరకు గల నిలువు ఎత్తు ఎంత?

- Ans
- ✓ A. 4.33 మీటర్లు
 - ✗ B. 3.75 మీటర్లు
 - ✗ C. 2.5 మీటర్లు
 - ✗ D. 5 మీటర్లు

Q.4 గ్రెండింగ్ చేసేటప్పుడు, సాధారణ గ్రెండింగ్ పనుల కోసం పెడెస్టల్ గ్రెండింగ్ వీల్ యొక్క ప్రక్క ఉపరితలాన్ని ఉపయోగించడం ఎందుకు సురక్షితం కాదు?

- Ans
- ✗ A. ప్రక్క ఉపరితలం సురక్షిత పరిమితులు దాటి పదార్థ తొలగింపు రేటును పెంచుతుంది
 - ✓ B. సాధారణ గ్రెండింగ్ ఫోర్సెస్‌ను తట్టుకునే విధంగా ప్రక్క ఉపరితలం డిజైన్ చేయబడదు
 - ✗ C. ప్రక్క ఉపరితలం అన్ని గ్రెండింగ్ ఆపరేషన్లలో ఆటోమేటిక్ అసమతుల్యతను కలిగిస్తుంది
 - ✗ D. ప్రక్క ఉపరితలం అనేది కేవలం పాలిషింగ్ ఆపరేషన్లకు మాత్రమే సరిపోతుంది

Q.5 'పాస్' మరియు 'హబ్' అసెంబ్లీకి 'స్టాండర్డ్ సైడ్ క్లియరెన్స్'తో కూడిన 'ఫ్యారలెల్ కీ' అవసరం ఉంటుంది. 'కీవే(keyway)'లో 'కీ(key)' సరిగ్గా ఫిట్ అవడాన్ని నిర్ధారించే అంశం ఏది?

- Ans
- ✗ A. 'కీ' ఎత్తు అనేది 'కీవే' లోతు కంటే ఎక్కువగా ఉండాలి
 - ✓ B. 'కీ' వెడల్పు అనేది 'కీవే' వెడల్పు కంటే కొద్దిగా తక్కువగా ఉండాలి
 - ✗ C. 'కీ' పాస్ డయామీటర్ కంటే పొడవుగా ఉండాలి
 - ✗ D. 'కీ' వెడల్పు అనేది 'కీవే' వెడల్పుకు ఖచ్చితంగా సమానంగా ఉండాలి

Q.6 గరిష్ఠ గ్రేస్ మరియు సురక్షితమైన ఆపరేషన్ అందించడానికి పైపు రెంచ్ దవడలు సరిగ్గా సర్దుబాటు చేయబడ్డాయని ఏ విధానం సరిగ్గా నిర్ధారిస్తుంది?

- Ans ☒ A. అంచుల వద్ద రెంచ్ పొజిషనులో ఉంచడం
☒ B. దవడలకు గ్రీజు పూయడం
☒ C. దవడలను వదులుగా అమర్చడం
☒ D. దవడలు పూర్తిగా కాంటాక్ట్లో ఉండేలా నిర్ధారించడం

Q.7 ఫిట్టింగ్ ప్రక్రియలో డెప్త్ గేజ్ ఉపయోగించడం ద్వారా ఏ ఆపరేషన్ ఎక్కువ ప్రయోజనం పొందుతుంది?

- Ans ☒ A. కీవే స్లాట్ యొక్క లోతును తనిఖీ చేయడం
☒ B. డ్రెడ్ యొక్క పిచ్ని అంచనా వేయడం
☒ C. వాషర్ యొక్క వ్యాసాన్ని నిర్ణయించడం
☒ D. లోహ ఫలకం యొక్క మందాన్ని కొలవడం

Q.8 ఒక పారిశ్రామిక కన్వేయర్ వ్యవస్థలో, ఒక స్పీడ్ సెన్సార్ బెల్ట్ వేగాన్ని నిరంతరం పర్యవేక్షిస్తూ, వేగాన్ని స్థిరంగా ఉంచడానికి మోటార్ వోల్టేజీను స్వయంచాలకంగా సర్దుబాటు చేస్తుంది, అప్పుడు ఉపయోగించడే నియంత్రణ వ్యవస్థ రకం ఏది?

- Ans ☒ A. మాన్యువల్ కంట్రోల్ వ్యవస్థ
☒ B. ఓపెన్-లూప్ వ్యవస్థ
☒ C. నాన్-ఫీడ్బ్యాక్ వ్యవస్థ
☒ D. ఫీడ్-లూప్ వ్యవస్థ

Q.9 కొత్తగా ఇన్స్టాల్ చేసిన కన్వేయర్ సిస్టమ్ ఎలాంటి స్పష్టమైన బాహ్య నష్టం చూపించకుండానే విపరీతంగా కంపనం చెందడం ప్రారంభించిన సందర్భంలో, ఈ సన్నివేశంలో దాని మూల కారణాన్ని గుర్తించడానికి మెయింటెనెన్స్ టీమ్ ఏ ఇన్స్పెక్షన్ వ్యూహాన్ని అవలంబించాలి?

- Ans ☒ A. కదిలే అన్ని భాగాలకు లూబ్రికేషన్ చేసి, కంపనాన్ని మానిటర్ చేయడం
☒ B. అన్ని ఎక్స్టర్నల్ ఫాస్టెనర్లను బిగించి, వెంటనే ఏమైనా ఇంప్రూవ్మెంట్ ఉందేమో అని చెక్ చేయడం
☒ C. అలైన్మెంట్, బ్యాలెన్స్, మరియు అంతర్గత అరుగుదలపై దృష్టి పెడుతూ ఒక వివరణాత్మక ఇన్స్పెక్షన్ నిర్వహించడం
☒ D. సర్వేస్ డిఫెక్ట్స్ (ఉపరితల లోపాలు) కోసం విజువల్ ఇన్స్పెక్షన్ల యొక్క ఫ్రీక్వెన్సీని పెంచడం

Q.10 'త్రి-జా చక్ (Three-jaw chuck)' కంటే 'ఫేస్ ప్లేట్ (Faceplate)' ఎక్కువ అనుకూలంగా ఉండే పరిస్థితి ఏది?

- Ans ☒ A. చిన్న భాగాల వేగవంతమైన క్లోపింగ్
☒ B. క్రమరహిత ఆకారపు వర్క్ పీస్లను హోల్డ్ చేయడం
☒ C. ప్రామాణిక స్టాపకార్ పాట్లను మెషీనింగ్ చేయడం
☒ D. గుండ్రని బార్లని స్వయంచాలకంగా సెంటరింగ్ చేయడం

Q.11 2 mm లోతు కలిగిన ఒక స్లాట్ను మెషీనింగ్ చేయడానికి ఒక షేపర్ ఉపయోగించబడుతోంది. టూల్ మరియు మెటీరియల్ కోసం ప్రతి పాస్కు సిఫార్సు చేయబడిన గరిష్ఠ కట్ డెప్త్ 1 mm అయితే, ఆపరేటర్ ఎన్ని పాస్లు ప్లాన్ చేయాలి?

- Ans ☒ A. 4 పాస్లు
☒ B. 2 పాస్లు
☒ C. 3 పాస్లు
☒ D. 1 పాస్

Q.12 Which device uses a chain and pulley arrangement to lift heavy loads in a workshop?

- Ans ☒ A. Chain block
☒ B. Belt conveyor
☒ C. Pulley wheel
☒ D. Jib crane

Q.13 ఒక 'థర్డ్ యాంగిల్ ప్రొజెక్షన్ సింబల్'తో ఉన్న 'షీట్-మెటల్ ఫ్యాబ్రికేషన్ డ్రాయింగ్'ను అర్థం చేసుకునేటప్పుడు, 'ఫ్రంట్ వ్యూ'కి సంబంధించి, 'లెఫ్ట్ సైడ్ వ్యూ' యొక్క సరైన స్థానం ఏది?

- Ans
- ✓ A. 'లెఫ్ట్ సైడ్ వ్యూ' అనేది 'ఫ్రంట్ వ్యూ'కి ఎడమ వైపున ఉంచబడుతుంది
 - ✗ B. 'లెఫ్ట్ సైడ్ వ్యూ' అనేది 'ఫ్రంట్ వ్యూ'కి కుడి వైపున ఉంచబడుతుంది
 - ✗ C. 'లెఫ్ట్ సైడ్ వ్యూ' అనేది 'టాప్ వ్యూ'కి పైన ఉంచబడుతుంది
 - ✗ D. 'లెఫ్ట్ సైడ్ వ్యూ' అనేది 'ఫ్రంట్ వ్యూ'కి కింద ఉంచబడుతుంది

Q.14 ఫారడే నియమం ప్రకారం, క్రింది వాటిలో దేనిలో మార్పు వచ్చినప్పుడు ప్రేరిత EMF ఉత్పత్తి అవుతుంది?

- Ans
- ✗ A. నిరోధకత(రెసిస్టెన్స్)
 - ✓ B. అయస్కాంత అభివాహం
 - ✗ C. పవర్
 - ✗ D. ఉష్ణోగ్రత

Q.15 ఒక మాన్యుఫ్యాక్చర్డ్ కాంపౌనెంట్ ఆమోదన(యాక్సెప్టెన్స్)కి ఏ డైమెన్షనల్ విలువ అప్పర్ మరియు లోవర్ పరిమితుల్లో ఉండాలి?

- Ans
- ✗ A. పునరావృత కొలత ప్రక్రియ నుండి పొందిన సగటు డైమెన్షన్
 - ✗ B. ఇంజనీరింగ్ డ్రాయింగ్ షీట్లో పేర్కొన్న నామమాత్రపు డైమెన్షన్
 - ✗ C. డిజైన్ దశలో టాలరెన్స్ స్పెసిఫికేషన్ కోసం ఉపయోగించే ప్రాథమిక పరిమాణం
 - ✓ D. మెషినింగ్ తర్వాత మాన్యుఫ్యాక్చర్డ్ కాంపౌనెంట్ యొక్క వాస్తవ కొలత పరిమాణం

Q.16 A textile mill located in a humid coastal region requires a belt drive system for continuous operation. Which type of belt is most suitable for this environment based on weather conditions?

- Ans
- ✗ A. Plastic belt
 - ✗ B. Fabric belt
 - ✗ C. Leather belt
 - ✓ D. Rubber belt

Q.17 What is the shape of a Woodruff key used in machine assemblies?

- Ans
- ✗ A. Wedge shape
 - ✗ B. Rectangular bar
 - ✗ C. Flat plate
 - ✓ D. Semicircular disc

Q.18 స్పార్క్ ఫ్యాక్షరీలో, ఒక ఇంటెలిజెంట్ కన్వేయర్ సిస్టమ్ జామ్ని గుర్తించి, డిజిటల్ ఇంటిగ్రేషన్ను ఉపయోగించి ఉత్పత్తులను స్వయంచాలకంగా వేరే మార్గంలోకి మళ్లిస్తుంది. ఈ సందర్భం ఏ ఇండస్ట్రీ 4.0 ఫీచర్ను ఉత్తమంగా వివరిస్తుంది?

- Ans
- ✗ A. ప్రివెంటివ్ మెయింటెనెన్స్ సైకిల్ కోసం సమయం ఆధారిత పెడ్యూలింగ్
 - ✓ B. డిస్ట్రిబ్యూటెడ్ కంట్రోల్ సిస్టమ్ ద్వారా రియల్-టైమ్ ప్రాసెస్ అడాప్టేషన్
 - ✗ C. హ్యూమన్-మెషిన్ ఇంటర్ ఫేస్ల ద్వారా కేంద్రీకృత మాన్యువల్ ఓవర్ రైడ్ చేయడం
 - ✗ D. పెడ్యూల్డ్ విశ్లేషణ కోసం హిస్టారికల్ డేటా యొక్క బ్యాచ్ ప్రాసెసింగ్

Q.19 ఒక మెయింటెనెన్స్ మేనేజర్, 'హై-స్పీడ్ టర్బైన్' కోసం 'ప్రిడిక్టివ్ మెయింటెనెన్స్'తో 'కాన్వెన్షనల్ ప్రివెంటివ్ మెయింటెనెన్స్'ను కంపేర్ చేస్తున్నాడు. 'ప్రొడక్షన్ కంటిన్యూటీ' ఆప్టిమైజ్ చేయడం మరియు 'స్పెర్-పార్ట్స్ ఇన్వెంటరీ'ని తగ్గించడంలో 'ప్రిడిక్టివ్ మెయింటెనెన్స్' యొక్క ప్రయోజనాన్ని ఉత్తమంగా ప్రదర్శించే 'దృష్టాంతం' ఏది?

- Ans
- ✗ A. అన్ఎక్స్ పెక్టెడ్ ఎక్స్పెంట్ బ్రేకడౌన్ నిర్వహించడానికి లార్డ్ స్పెర్-పార్ట్స్ ఇన్వెంటరీని నిరంతరం నిర్వహించడం
 - ✗ B. యాక్చువల్ ఎక్స్పెంట్ కండిషన్తో సంబంధం లేకుండా ప్రతి పెడ్యూల్డ్ పట్డౌన్ సమయంలో భాగాలను మార్చడం
 - ✓ C. వేర్ క్రెండ్లు రిస్క్ డ్రెస్టోల్లను క్రాస్ చేసినప్పుడు మాత్రమే కాంపౌనెంట్ రీప్లేస్మెంట్ పెడ్యూల్ చేయడానికి సెన్సార్ డేటాను ఉపయోగించడం
 - ✗ D. కండిషన్ మనిటర్ చేయకుండా ఫిక్స్డ్ క్యాలెండర్ ఇంటర్వెల్లో రోటీన్ కాంపౌనెంట్ను భర్తీ చేయడం

Q.20 'మెజరింగ్ టూల్'ల 'యాక్యూరసీ' మరియు 'ఎఫెక్టివెస్'ను కాపాడడానికి సహాయపడే ఆచరణ ఏది?

- Ans
- ☒ A. వాటిని ఇతర టూల్లకు ప్రత్యామ్నాయంగా ఉపయోగించడం
 - ☒ B. వాటిని తెరిచి ఉన్న టూల్ బాక్స్ లలో ఉంచడం
 - ☒ C. వాటిని ప్రొటెక్టివ్ కేస్ లలో స్టోర్ చేయడం
 - ☒ D. స్పష్టంగా మురికిగా కనిపించినప్పుడు, మాత్రమే వాటిని శుభ్రం చేయడం

Q.21 మిల్లింగ్ కట్టర్ నామకరణంలో, కటింగ్ చేసేటప్పుడు ఘర్షణను తగ్గించడం కోసం కటింగ్ ఎడ్జ్ వెనుక అందించబడే కోణాన్ని ఏమంటారు?

- Ans
- ☒ A. హెలిక్స్ కోణం
 - ☒ B. క్లియరెన్స్ కోణం
 - ☒ C. కటింగ్ కోణం
 - ☒ D. రేక్ కోణం

Q.22 A PLC program uses a retentive timer (RTO) set for 30 seconds. The timer is enabled for 10 seconds, then disabled for 5 seconds, and enabled again for 20 seconds. What is the final accumulated value of the timer?

- Ans
- ☒ A. 0
 - ☒ B. 30
 - ☒ C. 10
 - ☒ D. 20

Q.23 'ఫ్యాబ్రికేషన్ వర్క్ షాప్'లలో 'మెషిన్ ఫౌండేషన్ లేఅవుట్'లకు 'ఎన్ లార్డ్డ్ స్కేల్' కంటే 'రెడ్యూస్డ్ స్కేల్'కు ఎందుకు ప్రాధాన్యత ఇవ్వబడుతుంది?

- Ans
- ☒ A. లార్డ్డ్ డ్రాయింగ్ ల కోసం ఎల్లప్పుడూ ఎన్ లార్డ్డ్ స్కేల్ లు ఉపయోగించబడతాయి
 - ☒ B. ఫౌండేషన్ లు లార్డ్డ్ గా ఉండి, స్టాండర్డ్ డ్రాయింగ్ షీట్ లపై తప్పక ఫిట్ అవ్వాలి
 - ☒ C. రెడ్యూస్డ్ స్కేల్ తో కొలత ఖచ్చితత్వం మెరుగుపడుతుంది
 - ☒ D. ఫౌండేషన్ లకు అనుపాత ప్రాతినిధ్యం అవసరం ఉండదు

Q.24 అధిక-ఖచ్చితత్వ(హై-ప్రెసిషన్) CNC మెషీనింగ్ పనులలో, ఓపెన్ లూప్ కంట్రోల్ కంటే క్లోజ్డ్ లూప్ కంట్రోల్ కు ఎందుకు ప్రాధాన్యత ఇవ్వబడుతుంది?

- Ans
- ☒ A. మెషీనింగ్ ప్రక్రియ పూర్తయిన తర్వాత లోపాలను తనిఖీ చేస్తుంది
 - ☒ B. మెషీనింగ్ సమయంలో లోపాలను స్వయంచాలకంగా సరిచేస్తుంది
 - ☒ C. ఆపరేటర్ పర్యవేక్షణ అవసరాన్ని తగ్గిస్తుంది
 - ☒ D. చిన్న చిన్న అంతరాయాలను విస్మరించి మెషీనింగ్ ను వేగవంతం చేస్తుంది

Q.25 ఒక ఇంజనీరింగ్ డ్రాయింగ్ లో, బేసిక్ సింబల్ కు క్రింద ఒక బార్ జోడించబడిన సర్వేస్ ఫినిష్ సింబల్ ఇవ్వబడింది. ఈ సింబల్ అనేది తయారీ ప్రక్రియ గురించి దేనిని సూచిస్తుంది?

- Ans
- ☒ A. మ్యాక్సిమం రఫ్ నెస్ వ్యాల్యూ పేర్కొనబడింది
 - ☒ B. మెషినింగ్ ద్వారా మెటీరియల్ రిమూవల్ అవసరం
 - ☒ C. ఎటువంటి నిర్దిష్ట సర్వేస్ ఫినిష్ అవసరం లేదు
 - ☒ D. సర్వేస్ ని అలాగే కాస్ట్ రూపంలో వదిలివేయాడం

Q.26 లోహపు పని(మెటల్ వర్కింగ్)లో ఒక ఫైల్ యొక్క నిర్మాణం దాని పనితీరు సామర్థ్యాన్ని ఎలా మెరుగుపరుస్తుంది?

- Ans
- ☒ A. ఫైలుపై వర్కింగ్ పార్ట్ ఒక ట్యాంగ్ మాత్రమే
 - ☒ B. అన్ని భాగాలు గ్రిప్పింగ్ కోసం మాత్రమే ఉపయోగించబడతాయి
 - ☒ C. నిర్దిష్ట భాగాలు ఫైలింగ్ లో విభిన్న పాత్రలను పోషిస్తాయి
 - ☒ D. కోణాలను కొలవడానికి పాయింట్ ఉపయోగించబడుతుంది

Q.27 ఒక పవర్ సిస్టమ్ ప్రొజెక్షన్లో, ఫాల్ట్ కరెంట్ను గుర్తించి సర్క్యూట్ బ్రేకర్కు ట్రిప్ సిగ్నల్ పంపే 'పరికరం' ఏది?

- Ans ☒ A. రిలే
☒ B. అమ్మీటర్
☒ C. ఫ్యూజ్ వైరు
☒ D. కెపాసిటర్

Q.28 సప్లయి వోల్టేజ్ కంటే తక్కువ కాయిల్ వోల్టేజ్ రేటింగ్ కలిగిన రిలేని ఉపయోగించడం వల్ల కలిగే పరిణామం ఏమిటి?

- Ans ☒ A. కాయిల్ అతిగా వేడెక్కి పాడైపోవచ్చు
☒ B. రిలే సాధారణ వేగంతో పనిచేస్తుంది
☒ C. కాంటాక్ట్ అరుగుదల తగ్గుతుంది
☒ D. రిలే పనితీరును మెరుగుపరుస్తుంది

Q.29 న్యూమాటిక్ AND ఫంక్షన్ను పెర్ఫార్మ్ చేయడానికి సాధారణంగా ఏ కాంపోనెంట్ సింబల్ ఉపయోగించబడుతుంది?

- Ans ☒ A. షటిల్ వాల్వ్
☒ B. టూ-ప్రెజర్ వాల్వ్
☒ C. ప్రెజర్ రెగ్యులేటర్
☒ D. క్విక్ ఎగ్జాస్ట్ వాల్వ్

Q.30 ఫస్ట్ యాంగిల్ ప్రొజెక్షన్లోని ఒక అసెంబ్లీ లేఅవుట్, వాలుగా ఉన్న మెషీన్ కాంపోనెంట్ కోసం ఆక్సిలరీ వ్యూస్ను ఉపయోగిస్తుంది. అయితే ఈ ఆక్సిలరీ వ్యూస్ను చేర్చడం వల్ల కలిగే ప్రధాన ప్రయోజనం ఏమిటి?

- Ans ☒ A. ఫస్ట్ యాంగిల్ ప్రొజెక్షన్లో కేవలం సాఫ్టవ వస్తువులకు మాత్రమే ఆక్సిలరీ వ్యూస్ అవసరం
☒ B. ఆక్సిలరీ వ్యూస్ ఫస్ట్ యాంగిల్ ప్రొజెక్షన్లోని అన్ని సైడ్ మరియు టాప్ వ్యూస్లను రీఫ్లేస్ చేస్తాయి
☒ C. ఆక్సిలరీ వ్యూస్ అనేవి మెయిన్ వ్యూస్లో కనిపించని, వాలుగా ఉన్న సర్ఫేస్ల యొక్క నిజమైన ఆకారాన్ని మరియు పరిమాణాన్ని తెలియజేస్తాయి.
☒ D. ఆక్సిలరీ వ్యూస్ ప్రధానంగా సాలిడ్ సర్ఫేస్ల వెనుక దాగి ఉన్న ఫీచర్ల(లక్షణాల)ను ప్రదర్శిస్తాయి.

Q.31 స్క్రా డ్రెడ్జింగ్లో, 'రూట్(root)' అనే పదం దేనిని సూచిస్తుంది?

- Ans ☒ A. డ్రెడ్జ్ రిడ్జ్ పై భాగం
☒ B. డ్రెడ్జ్ ప్రొఫైల్ పక్కభాగం
☒ C. డ్రెడ్జ్ గ్రూవ్ అడుగుభాగం
☒ D. డ్రెడ్జ్ మధ్య దూరం

Q.32 ఒక టెక్నిషియన్ గేర్ ట్రైన్ను అసెంబుల్ చేస్తున్నాడు, ఇందులో డ్రైవర్ గేర్కు 24 పళ్ళు మరియు డ్రైవెన్ గేర్కు 72 పళ్ళు ఉన్నాయి. అయితే ఈ సెటప్లో వేగ నిష్పత్తి ఎంత?

- Ans ☒ A. 1:1.5
☒ B. 1.5:1
☒ C. 2:1
☒ D. 3:1

Q.33 వర్క్ షాప్లో మీడియం-వెయిట్ మెషీన్ భాగాన్ని లిఫ్ట్ చేయడానికి మనీలా రోప్ (Manila rope) ఏ ధర్మం దానిని అనుకూలంగా చేస్తుంది?

- Ans ☒ A. తక్కువ ధర మరియు ఆకర్షణీయమైన ఉపరితల రూపం
☒ B. అధిక వ్యతమ మరియు తగిన తన్యత బలం
☒ C. అల్లులు మరియు రసాయనాలకు అధిక నిరోధకత
☒ D. పారిశ్రామిక ఉపయోగం కోసం మంచి విద్యుత్ వాహకత

Q.34 ఒక లిఫ్టింగ్ మెషిన్, ఒక 500 N లోడ్‌ను 10 సెకండ్లలో 4 మీటర్ల ఎత్తుకు పైకి లేపుతుంది. అయితే, ఆ మెషిన్ డాలివర్ చేసే 'మెకానికల్ పవర్' ఎంత ఉంటుంది?

- Ans
- ☒ A. 125 వాట్స్
 - ☒ B. 250 వాట్స్
 - ☒ C. 200 వాట్స్
 - ☒ D. 100 వాట్స్

Q.35 న్యూమాటిక్ సిస్టమ్ లో అధిక పీడనాన్ని నిరోధించడానికి ఏ రకమైన వాల్వ్ బాగా సరిపోతుంది?

- Ans
- ☒ A. దిశ నియంత్రణ వాల్వ్
 - ☒ B. ప్రవాహ నియంత్రణ వాల్వ్
 - ☒ C. నాన్-రిటర్న్ వాల్వ్
 - ☒ D. పీడన నియంత్రణ వాల్వ్

Q.36 A machine requires the transmission of motion between two parallel shafts with uniform velocity ratio. Which type of gear is most suitable for this application?

- Ans
- ☒ A. Worm gear
 - ☒ B. Bevel gear
 - ☒ C. Spur gear
 - ☒ D. Helical gear

Q.37 ఒక స్పర్ గేర్ 40 పళ్లను మరియు 80 mm పిచ్ వ్యాసాన్ని కలిగి ఉంటుంది. అయిన ఈ గేర్ యొక్క డయామెట్రల్ పిచ్ ఎంత?

- Ans
- ☒ A. ప్రతి mmకి 0.2 పళ్ళు
 - ☒ B. ప్రతి mmకి 1 పన్ను
 - ☒ C. ప్రతి mmకు 2 పళ్ళు
 - ☒ D. ప్రతి mmకి 0.5 పళ్ళు

Q.38 ఒక CNC ప్రోగ్రామ్‌లో 'అప్రోచ్(approach)' మరియు 'రిట్రాక్ట్(retract)' మూవ్‌మెంట్‌లను వెరిఫై చేయకపోవడం వల్ల కలిగే ప్రధాన ప్రమాదం ఏమిటి?

- Ans
- ☒ A. టూల్ వర్క్‌పీస్‌ను ఢీకొనవచ్చు
 - ☒ B. స్పిండిల్ వేగం చాలా తక్కువగా సెట్ చేసి ఉండవచ్చు
 - ☒ C. ఫీడ్ రేట్ చాలా ఎక్కువగా ఉండవచ్చు
 - ☒ D. కూలెంట్ ఫ్లో టూల్‌కు చేరకపోవచ్చు

Q.39 షాఫ్ట్ అలైన్మెంట్ లేదా దానిపై అమర్చిన భాగాలకు అంతరాయం కలిగించకుండా షాఫ్ట్ పైన్ పెద్ద పుల్లీని మార్చడానికి ఒక ఫిట్టర్ అవసరం. ఈ సన్నివేశంలో ఏ రకమైన పుల్లీని ఎంచుకోవాలి?

- Ans
- ☒ A. లూజ్ పుల్లీ
 - ☒ B. స్క్విట్ పుల్లీ
 - ☒ C. షాఫ్ట్ పుల్లీ
 - ☒ D. ఘన పుల్లీ

Q.40 CNC ప్లానింగ్‌లో వివరణాత్మక ప్రాసెస్ డాక్యుమెంటేషన్ వల్ల కలిగే ప్రధాన ప్రయోజనం ఏమిటి?

- Ans
- ☒ A. అన్ని కట్టింగ్ టూల్స్ యొక్క జీవితకాలాన్ని పెంచడం
 - ☒ B. భాగాల నాణ్యతలో స్థిరత్వాన్ని(కన్సిస్టెన్సీని) నిర్వహించడం
 - ☒ C. యంత్రాల కొనుగోలు ఖర్చులను తగ్గించడం
 - ☒ D. అపరేటర్ కుర్చీ సౌకర్యాన్ని మెరుగుపరచడం

Q.41 X0 Y10, X10 Y0, X0 Y-10, X-10 Y0 అనే ఇంక్రిమెంటల్ కోఆర్డినేట్ సీక్వెన్స్ వల్ల ఏ జ్యామితీయ నమూనా ఏర్పడుతుంది?

- Ans
- ☒ A. సరళ రేఖ
 - ☒ B. వృత్తం
 - ☒ C. త్రిభుజం
 - ☒ D. చతురస్రం

Q.42 రెండు సమాన నిరోధకాలను సమాంతరంగా అనుసంధానించబడినప్పుడు వాటి మొత్తం నిరోధకత ఏమవుతుంది?

- Ans
- ☒ A. ఒక నిరోధకం విలువలో అది సగం అవుతుంది
 - ☒ B. ఒక నిరోధకంతో పోలితే అది రెట్టింపు అవుతుంది
 - ☒ C. ఇది శూన్యం అవుతుంది
 - ☒ D. ఇది ఒక నిరోధకంతో సమానంగా ఉంటుంది

Q.43 షటిల్ వాల్స్ లోపల ఇన్లెట్లలో ఒకదానిని బ్లాక్ చేయడానికి కదిలే భాగం ఏది?

- Ans
- ☒ A. బాల్ ఎలిమెంట్
 - ☒ B. పిస్టన్
 - ☒ C. స్ప్రింగ్
 - ☒ D. డయాఫ్రామ్

Q.44 సమర్థవంతమైన ఆక్సి-ఎసిటిలీన్ కటింగ్ ఆపరేషన్లను నిర్వహించడానికి కటింగ్ టార్ప్లోని ఏ లక్షణం సహాయపడుతుంది?

- Ans
- ☒ A. టార్ప్ లోపల కూలింగ్ ఫ్లాష్ ఉండటం
 - ☒ B. విద్యుత్ నిరోధక తాపనాన్ని(రెసిస్టెన్స్ హీటింగ్) ఉత్పత్తి చేయగల సామర్థ్యం
 - ☒ C. ఆపరేటర్ ఫ్యాటిగ్ని తగ్గించడానికి చెక్క హ్యాండిల్ని ఉపయోగించడం
 - ☒ D. హై-ప్రెజర్ ఆక్సిజన్ జెట్ను సరఫరా చేయగల సామర్థ్యం

Q.45 ఒక మెషినుని బ్రుబుల్ ఘాట్ చేసేటప్పుడు, ఉపయోగించడానికి సిఫార్సు చేయబడిన లుబ్రికేషన్ ఆయిల్ రకం మీకు ఎక్కడ కనిపిస్తుంది?

- Ans
- ☒ A. నిర్వహణ లాగ్ లోన ప్రీవియస్ ఎంట్రీ
 - ☒ B. ఆపరేటర్ పిస్ట్ పెడ్యూల్ పేజీ
 - ☒ C. స్పేర్ భాగాల లిస్ట్ టేబుల్
 - ☒ D. మెషిన్ మాన్యువల్

Q.46 మాన్యువల్ ఆర్క్ వెల్డింగ్ జరిగే సమయంలో వెల్డ్ పెనెట్రేషన్ యొక్క లోతును నియంత్రించడానికి ఏ పరామితి(పారామీటర్)ని సర్దుబాటు చేయాలి?

- Ans
- ☒ A. ట్రావెల్ స్పీడ్
 - ☒ B. ఎలక్ట్రోడ్ యాంగిల్
 - ☒ C. వెల్డింగ్ కరెంట్
 - ☒ D. ఆర్క్ వోల్టేజ్

Q.47 An operator selects a grinding wheel for finishing a hardened steel shaft. Which structure type should be chosen to minimize the risk of workpiece overheating while ensuring efficient chip removal?

- Ans
- ☒ A. Dense structure wheel
 - ☒ B. Compact structure wheel
 - ☒ C. Open structure wheel
 - ☒ D. Medium structure wheel

Q.48 ప్రధాన పురపాలక నీటి సరఫరా వ్యవస్థలలో రెట్రోఫిట్టింగ్ సమయంలో ప్లాస్టిక్ పైపుల కంటే GI (గాల్వనైజ్డ్ ఐరన్) పైపుల వాడకాన్ని వాటి యొక్క ఏ ముఖ్యమైన లక్షణం సమర్థిస్తుంది?

- Ans
- ☒ A. ప్లాస్టిక్ పైపుల కంటే తక్కువ ధర
 - ☒ B. సంక్లిష్ట మార్గాలకు ఎక్కువ వశ్యత(ఫ్లెక్సిబిలిటీ)
 - ☒ C. అన్ని రసాయనాలకు మెరుగైన నిరోధకత(రెసిస్టెన్స్)
 - ☒ D. అధిక యాంత్రిక బలం(మెకానికల్ స్ట్రెంత్)

Q.49 ఒక స్కాఫోల్డ్ నిర్మాణంలోని వేర్వేరు స్థాయిలలో వివిధ జట్లు పనిచేస్తున్నప్పుడు భద్రత కోసం క్రింది వాటిలో దేనిని ఖచ్చితంగా నిర్ధారించుకోవాలి?

- Ans
- ☒ A. ప్రతి స్థాయికి ఒక సూపర్వైజర్ ను కేటాయించడం
 - ☒ B. ప్రతి జట్టుకు కఠినమైన సమయ పరిమితు(టైమ్ లిమిట్స్)లను నిర్ణయించడం
 - ☒ C. పని జరుగుతున్న సమయంలో ఒక స్థాయికి ప్రవేశాన్ని లాక్ చేయడం
 - ☒ D. టూల్స్ క్రిందికి పడకుండా నిరోధించడానికి పనిని కోఆర్డినేట్ (సమన్వయం) చేసుకోవడం

Q.50 నార్మలైజింగ్ ప్రక్రియలో, ఒక ఉక్కు భాగాన్ని దాని అప్పర్ క్రిటికల్ ఉష్ణోగ్రత కంటే ఎక్కువగా వేడి చేసి, ఆపై గాలిలో చల్లబరుస్తారు. అనీలింగ్ లోని ఫర్మిస్ లో చల్లబరచడంతో పోలిస్తే, నార్మలైజింగ్ లో గాలిలో చల్లబరచడం అనేది దాని చివరి మైక్రోస్ట్రక్చర్ ను ఎలా ప్రభావితం చేస్తుంది?

- Ans
- ☒ A. ఇది కోర్న్ పెర్లైట్ (pearlite) మరియు పెద్ద గ్రైన్స్ ఏర్పడటానికి దారితీస్తుంది
 - ☒ B. ఇది ఫైనర్ పెర్లైట్ (pearlite) మరియు స్మాలర్ గ్రైన్స్ ను ఉత్పత్తి చేస్తుంది
 - ☒ C. ఇది మార్టెన్సైట్ ఏర్పడటానికి దారితీస్తుంది
 - ☒ D. ఇది ఎక్కువగా బైనైట్ తో కూడిన ఒక నిర్మాణాన్ని సృష్టిస్తుంది

Q.51 ఒక మెయింటెనెన్స్ మెకానిక్ 0.15 mm/rev ఫీడ్ మరియు 600 rpm స్పిండిల్ వేగంతో 12 mm హూల్ డ్రిల్ చేస్తాడు. నిమిషానికి టోటల్ ఫీడ్ డిస్టెన్స్ ఎంత?

- Ans
- ☒ A. నిమిషానికి టోటల్ ఫీడ్ డిస్టెన్స్ 72 mm
 - ☒ B. నిమిషానికి టోటల్ ఫీడ్ డిస్టెన్స్ 90 mm
 - ☒ C. నిమిషానికి టోటల్ ఫీడ్ డిస్టెన్స్ 180 mm
 - ☒ D. నిమిషానికి టోటల్ ఫీడ్ డిస్టెన్స్ 12 mm

Q.52 మెయింటెనెన్స్ డాష్ బోర్డ్ ప్రకారం A పంప్ 2 గంటల MTTR మరియు B పంప్ 4 గంటల MTTR, రెండూ దాదాపు ఒకే విధమైన ఫెయిల్యూర్ రేట్లను కలిగి ఉన్నాయి. అయిన పంప్ B కోసం ఏ మెయింటెనెన్స్ ఇంప్రూవ్మెంట్ యాక్షన్ కొరకు ప్రాధాన్యత ఇవ్వాలి?

- Ans
- ☒ A. పంప్ B కోసం ఫెయిల్యూర్ రిపోర్టింగ్ ప్రీక్వెన్సీ పెంచండి
 - ☒ B. MTTR బేధాన్ని విస్తరించండి, ఎందుకంటే అది డౌన్ టైమ్ ను ప్రభావితం చేయదు.
 - ☒ C. అదనపు డేటాను సేకరించడానికి మరిన్ని బ్రేక్ డౌన్ లను పెడ్యూల్ చేయండి
 - ☒ D. మెరుగైన ప్రణాళిక మరియు శిక్షణ ద్వారా రిపేయర్ వ్యవధిని తగ్గించండి

Q.53 ఒక కంప్రెసర్ ఫ్రేమ్ ఇంజనీరింగ్ డ్రాయింగ్ లో, రిఫరెన్స్ లైన్ క్రింద ఒక ఫిల్లెట్ ట్రయ్యాంగిల్ తో కూడిన వెల్డింగ్ సింబల్ చూపబడింది, దాని ఎడమ వైపున డ్రెమెన్షన్ '6' మరియు కుడి వైపున '100' ఉన్నాయి. ఇది దేనిని సూచిస్తుంది?

- Ans
- ☒ A. బాణం వైపున 100 mm పొడవు గల 6 mm గ్రూవ్ వెల్డ్
 - ☒ B. అవతలి వైపున 100 mm పొడవు గల 6 mm ఫిల్లెట్ వెల్డ్
 - ☒ C. రెండు వైపులా 100 mm పిచ్ తో 6 mm ఫిల్లెట్ వెల్డ్
 - ☒ D. బాణం వైపున 100 mm పొడవు గల 6 mm ఫిల్లెట్ వెల్డ్

Q.54 బ్రిటిష్ స్టాండర్డ్ సిస్టమ్ ఆఫ్ లిమిట్స్ అండ్ ఫిట్స్ లో, టాలరెన్సెస్ ని పేర్కొనడానికి ప్రధాన ఆధారం ఏది?

- Ans
- ☒ A. తనిఖీ కొలతల నుండి పొందిన సగటు తయారీ పరిమాణం
 - ☒ B. మెషిన్ ఆపరేటర్లు ఎంచుకున్న ఆర్బిట్రరీ డ్రెమెన్షన్ వేరియేషన్స్
 - ☒ C. ప్రాథమిక పరిమాణానికి సంబంధించి స్టాండర్డ్ టాలరెన్స్ గ్రేడ్లు మరియు ప్రాథమిక విచలనాలు
 - ☒ D. టాలరెన్స్ వేరియేషన్ లను నిర్ణయించే టెక్నిక్స్

Q.55 పైపు కట్టర్ యొక్క కటింగ్ వీల్ పైపు ఉపరితలంపై సున్నితంగా కదులేలా చేసే ప్రధాన భాగం ఏది?

- Ans
- ☒ A. అడ్జస్టింగ్ స్క్రూ
 - ☒ B. ఫ్రేమ్
 - ☒ C. హ్యాండిల్
 - ☒ D. గైడ్ రోల్లు

Q.56 ఒక కంప్రెసర్ పిస్టన్ అసెంబ్లీలో 'పిస్టన్ రింగ్'ల ప్రధాన విధి ఏమిటి?

- Ans
- ☒ A. పిస్టన్ గుండా ఎయిర్ లీకేజీని నివారించడం
 - ☒ B. పిస్టన్ భ్రమణ వేగాన్ని పెంచడం
 - ☒ C. పిస్టన్ మొత్తం బరువును తగ్గించడం
 - ☒ D. పిస్టన్ సర్వేస్ ఫినిష్ని మెరుగుపరచడం

Q.57 ప్రామాణిక 2-ఇన్నుల్డ్ AND గేట్ యొక్క పని సూత్రాన్ని సూచించే ఎలక్ట్రికల్ సిస్ట్ కానిగరేషన్(అమరిక) ఏది?

- Ans
- ☒ A. ఎలక్ట్రికల్ లోడ్కు శ్రేణి అమరికలో అనుసంధానించబడిన రెండు సిస్ట్లు.
 - ☒ B. ఎమర్జెన్సీ స్టాప్ బటన్తో సమాంతరంగా వైర్ చేయబడిన సాధారణంగా క్లోజ్డ్ లిమిట్ సిస్ట్.
 - ☒ C. ఎలక్ట్రికల్ లోడ్కు సమాంతర అమరికలో అనుసంధానించబడిన రెండు సిస్ట్లు.
 - ☒ D. ఒక సింగిల్-ఫోల్ డబుల్-త్రి (SPDT) టూ-వే స్వెయిచ్ సిస్ట్ నెట్వర్క్.

Q.58 ప్లాట్ పుల్లీపై ఉన్న బెల్ట్ ఆపరేషన్ సమయంలో ఆఫ్-సెంటర్(కేంద్రం నుండి పక్కకు వెళుతున్నట్లు)గా ట్రాక్ అవుతున్నట్లు ఒక ఇంజనీర్ గమనించాడు. ఈ సమస్యను సరిచేయడానికి క్రొనింగ్(crowning)కు సంబంధించిన ఏ సర్దుబాటు ఎక్కువగా ఉపయోగపడుతుంది?

- Ans
- ☒ A. పుల్లీ వ్యాసాన్ని మాత్రమే తగ్గించడం
 - ☒ B. పుల్లీ సెంటర్ వద్ద క్రొనింగ్ని పెంచడం
 - ☒ C. పుల్లీ ఫేస్ని పూర్తిగా ప్లాట్ చేయడం
 - ☒ D. పుల్లీ సెంటర్ వద్ద క్రొనింగ్ని తగ్గించడం

Q.59 'న్యూమాటిక్ కన్వేయింగ్'లో సాధారణంగా ఉపయోగించే 'బ్లోవర్(blower)' ఏది?

- Ans
- ☒ A. ఎగ్జాస్ట్ బ్లోవర్(Exhaust blower)
 - ☒ B. రూట్స్ బ్లోవర్(Roots blower)
 - ☒ C. ప్రొపెల్లర్ బ్లోవర్(Propeller blower)
 - ☒ D. యాక్సియల్ బ్లోవర్(Axial blower)

Q.60 ఒక నిటూరైన పంప్ కోసం ఫౌండేషన్ను నిర్మిస్తున్నప్పుడు, కట్టర్ బోల్డ్ సరైన నామినల్ సైజ్లో ఉన్నప్పటికీ, అది దాని స్లాట్లో సరిగ్గా సరిపోవడం లేదని ఫిట్టర్ గమనించారు. ఈ సమస్యకు అత్యంత సంభావ్య కారణం ఏమిటి?

- Ans
- ☒ A. ఆ అసెంబ్లీకి కట్టర్ బోల్డ్ చాలా చిన్నదిగా ఉంటుంది
 - ☒ B. కాటర్ బోల్డ్పై ఉన్న డ్రెడ్ పిచ్, నట్తో మ్యాచ్ అవ్వడం లేదు
 - ☒ C. ఆ స్లాట్ లేదా రంధ్రం కావలసిన టాలరెన్స్ కు తగినట్లుగా మెషినింగ్ చేయబడలేదు
 - ☒ D. ఎక్కువ లూబ్రికేషన్ వల్ల కట్టర్ బోల్డ్ సరిగ్గా పట్టకుండా చేస్తుంది

Q.61 ఆటోమేషన్లో, 'సోలనోయిడ్ వాల్వ్' స్థితిని పర్యవేక్షించడానికి ఉపయోగించగల 'ఫీడ్బ్యాక్ రకం' ఏది?

- Ans
- ☒ A. పెద్ద సోలెనోయిడ్ కాయిల్ను ఉపయోగించడం
 - ☒ B. వాల్వ్ను మాన్యువల్గా తనిఖీ చేయడం
 - ☒ C. గాలి ఉష్ణోగ్రతను తనిఖీ చేయడం
 - ☒ D. వాల్వ్ పాజిషన్ను డిటెక్ట్ చేయడం

Q.62 ఒక 'న్యూమాటిక్ సిస్టమ్'లో ఒక 'సీక్వెన్స్ వాల్వ్' దేనికి ఉపయోగించబడుతుంది?

- Ans
- ☒ A. ప్రవాహ రేటును నియంత్రించడానికి
 - ☒ B. వాయు ప్రవాహాన్ని నిర్దేశించడానికి
 - ☒ C. సిస్టమ్ పీడనాన్ని నిర్వహించడానికి
 - ☒ D. అపరేషన్లు జరిగేలా చూడడానికి

Q.63 బహుళ పంప్ ల నివారక నిర్వహణ(పీరియాడిక్ వైబ్రేషన్) షెడ్యూల్ లో పీరియాడిక్ వైబ్రేషన్ అనాలసిస్ చేయడం వల్ల కలిగే కీలక ప్రధాన ప్రయోజనం ఏమిటి?

- Ans
- ☒ A. పంప్ ఎఫిషియెన్సీని వెంటనే మెరుగుపరుస్తుంది
 - ☒ B. పంప్ విద్యుత్ వినియోగాన్ని తగ్గిస్తుంది
 - ☒ C. పంప్ ప్రవాహం రేటును పెంచుతుంది
 - ☒ D. భాగాల క్షీణత(కాంపొనెంట్ డిటీరియోరేషన్) సంకేతాలను గుర్తిస్తుంది

Q.64 క్రింది వాటిలో, మెకానికల్ వర్క్ షాప్ లలో సంభవించే విద్యుత్ ప్రమాదాలకు ప్రాథమిక కారణం ఏమిటి?

- Ans
- ☒ A. పని చేస్తున్నప్పుడు ఇన్సులేటెడ్ గ్లోవ్స్ ఉపయోగించడం
 - ☒ B. ఇన్సులేషన్ లేకుండా లైవ్ వైర్లను పట్టుకోవడం(హ్యాండిల్ చేయడం)
 - ☒ C. పని చేస్తున్నప్పుడు టూల్స్ ను పొడిగా ఉంచడం
 - ☒ D. రబ్బర్ సోల్డ్ బూట్లు ధరించడం

Q.65 PLC యొక్క ల్యాడర్ డయాగ్రామ్ లోని ఒక 'రంగ్' (rung)లో ఒక కొంటర్ (C1) ఉంటుంది; ఇన్పుట్ 12 ఆన్ (ON) అయిన ప్రతిసారి దీని విలువ పెరుగుతుంది. ఒకవేళ 12 ని అయిదు సార్లు పల్స్ ON మరియు OFF చేస్తే, C1 లో నిల్వ చేయబడిన విలువ ఎంత?

- Ans
- ☒ A. 5
 - ☒ B. 1
 - ☒ C. 10
 - ☒ D. 0

Q.66 ఒక బృందం, ఒక మెకానికల్ వర్క్ షాప్ లో 'షిఫ్ట్ మార్పు'కు సిద్ధమవుతున్నారు. అయితే, పని ప్రదేశాన్ని శుభ్రంగా ఉంచడానికి సంబంధించిన ఉత్తమ విధానాల ప్రకారం, వర్క్ షేప్ ను నుండి బయలు దేరడానికి ముందు తీసుకోవాల్సిన చర్య ఏమిటి?

- Ans
- ☒ A. తర్వాత తొలగించడానికి వ్యర్థాలను పని బల్లల కింద నిల్వ చేయడం
 - ☒ B. వ్యర్థాలను పారవేసి, పనిముట్లను(టూల్స్) కేటాయించిన ప్రదేశాలలో తిరిగి ఉంచడం
 - ☒ C. తర్వాత పని చేసే బృందం కోసం పనిముట్లను బల్లపైనే వదిలివేయడం
 - ☒ D. నేలను మాత్రమే ఊడ్చి, వస్తువులను బయట వదిలివేయడం

Q.67 ఒక మెషిన్ వర్క్ షాప్ లో, కార్మికులు నిర్వహణ పనుల సమయంలో తరచుగా ఆయిల్ లు, రసాయనాలు మరియు లోహ కణాలతో వ్యవహరిస్తారు. అయితే, చర్మ సంబంధిత వ్యాధులను నివారించడంలో అత్యంత ప్రభావవంతంగా ఉండే వృత్తిపరమైన ఆరోగ్య పద్ధతి ఏది?

- Ans
- ☒ A. నిర్వహణ పని సమయంలో ఫ్యాన్లను స్విచ్ ఆఫ్ చేయడం
 - ☒ B. నిర్వహణ పని సమయంలో రక్షణ గ్లవ్ లు ధరించడం
 - ☒ C. నిర్వహణ పని తర్వాత పనిముట్లను సరిగ్గా భద్రపరచడం
 - ☒ D. నిర్వహణ పని సమయంలో యంత్ర వేగాన్ని పెంచడం

Q.68 గేర్ బాక్స్ నుండి తీసిన 'ఆయిల్ శాంపిల్'లో అధిక మొత్తంలో ఇనుప (ఫెర్రస్) కణాలు ఉన్నట్లు తేలింది, అయితే 'ఆయిల్ విస్కాసిటీ (స్నిగ్ధత)' సాధారణంగానే ఉంది మరియు నీరు కూడా లేదు. అటువంటి పరిస్థితులలో మొదటగా ఏమి చేయాలి?

- Ans
- ☒ A. ట్రెండ్ మానిటరింగ్ కోసం ఆయిల్ శాంప్లింగ్ ఫ్రీక్వెన్సీని మాత్రమే పెంచాలి
 - ☒ B. గేర్ బాక్స్ అపరేటింగ్ ఉష్ణోగ్రత సెట్ పాయింట్ ను తగ్గించాలి
 - ☒ C. వైఫల్యాన్ని నివారించడానికి లూబ్రికెంట్ ను వెంటనే మార్చాలి
 - ☒ D. అసాధారణ గేర్ లేదా బెయింట్ అవస్థను తనిఖీ చేయడానికి గేర్ బాక్స్ ను తనిఖీ చేయాలి

Q.69 అట్లాసోనిక్ సెన్సార్‌ని గణనీయంగా ప్రభావితం చేయని లక్షిత వస్తువు యొక్క ధర్మం ఏది?

- Ans
- ☒ A. ధ్వని పరావర్తనం
 - ☒ B. ఆకారం మరియు దూరం
 - ☒ C. ఉపరితల స్థానం
 - ☒ D. వస్తువు యొక్క రంగు

Q.70 ఒక శంకువు ఆకారపు తొట్టి యొక్క భూ వ్యాసం(బేస్ డయామీటర్) 1.2 m మరియు ఎత్తు 2 m ఉన్నచో, ఘనపు మీటర్లు(క్యూబిక్ మీటర్స్)లో దాని మొత్తం సామర్థ్యం ఎంత?

- Ans
- ☒ A. 0.377 m³
 - ☒ B. 1.507 m³
 - ☒ C. 0.754 m³
 - ☒ D. 2.712 m³

Q.71 ఒక వర్క్‌షాప్‌లో, ఒక యంత్రం మోటారు నుండి కొద్ది దూరంలో ఉంచిన సున్నితమైన మరియు నిశ్శబ్దమైన పనితీరు అవసరమయిన గ్రైండింగ్ వీల్‌కు చలనాన్ని బదిలీ చేయాలి. పవర్ ట్రాన్సిస్మిట్ చేయడానికి ఏ పద్ధతి అత్యంత అనుకూలంగా ఉంటుంది?

- Ans
- ☒ A. పాస్ట్‌ల మధ్య బెల్ట్ డ్రైవ్ ఉపయోగించడం
 - ☒ B. పాజిటివ్ పవర్ ట్రాన్సిస్మిషన్ కోసం చెయిన్ డ్రైవ్ ఉపయోగించడం
 - ☒ C. సుదూర పవర్ ట్రాన్సిస్మిషన్ కోసం రోప్ డ్రైవ్ ఉపయోగించడం
 - ☒ D. అధిక టార్క్ ట్రాన్సిస్మిషన్ కోసం గేర్ డ్రైవ్ ఉపయోగించడం

Q.72 ఒక BIS సంజ్ఞామానంలో, 'టాలరెన్స్ గ్రేడ్' ప్రధానంగా దేనిని ప్రభావితం చేస్తుంది?

- Ans
- ☒ A. ఇంజనీరింగ్ డ్రాయింగ్‌లో పేర్కొన్న ప్రాథమిక పరిమాణం
 - ☒ B. జీరో టైన్‌కు సాపేక్షంగా టాలరెన్స్ జోన్ యొక్క స్థానం
 - ☒ C. టాలరెన్స్ జోన్ యొక్క పరిమాణం లేదా వెడల్పు
 - ☒ D. తనిఖీ సమయంలో లభించిన కొలిచిన పరిమాణం

Q.73 ఈ క్రింది వాటిలో స్కూత్ ఆపరేషన్ నిర్వహించడానికి బెంచ్ వైస్ నుండి క్రమం తప్పకుండా తొలగించవలసినవి ఏవి?

- Ans
- ☒ A. హ్యాండిల్ గ్రీప్
 - ☒ B. దుమ్ము మరియు లోహ చిప్స్
 - ☒ C. గైడ్ రాడ్స్
 - ☒ D. జా ఫ్లేట్లు

Q.74 అవుట్‌సైడ్ మైక్రోమీటర్‌ని ఎందుకు డ్రాప్ చేయకూడదు లేదా రఫ్‌గా హ్యాండిల్ చేయకూడదు?

- Ans
- ☒ A. ఇది స్క్రా పిచ్ పెంచుతుంది
 - ☒ B. ఇది థింబుల్ గ్రాడ్యుయేషన్‌ని మార్చుతుంది
 - ☒ C. ఇది క్రమాంకనం మరియు అలైన్‌మెంట్‌ని చెదర గొట్టవచ్చు
 - ☒ D. ఇది కొలత సామర్థ్యాన్ని పెంచుతుంది

Q.75 ఒక తాపీ పనివాడు, ఒక రాత్రి దిమ్మెలో డోవ్‌టైల్ ఆకారంలో రంధ్రం చేసి, బిగుతుగా చేసినప్పుడు, పక్కలకు విస్తరించే ఒక ఎత్తే పరికరాన్ని చొప్పిస్తుంది, తద్వారా రాయిని ఎత్తడానికి వీలు కల్పిస్తుంది. అయితే, ఇక్కడ ఉపయోగించబడే పరికరం ఏది?

- Ans
- ☒ A. లూయిస్ బోల్ట్
 - ☒ B. రివెల్
 - ☒ C. ఐ బోల్ట్
 - ☒ D. డబుల్ హుక్

Railway BABA



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	2:30 PM - 5:00 PM
Subject	ALP Stage 2 Wiremen

* Note

Correct Answer will carry 1 mark per Question.

Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.

2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : PART-A

Q.1 Why is a room thermometer generally mounted vertically on a wall?

- Ans**
- ☒ A. It ensures accurate reading by keeping the bulb exposed to room air.
 - ☐ B. It prevents the liquid from freezing inside the thermometer.
 - ☐ C. It helps the thermometer measure body temperature faster.
 - ☐ D. It protects the thermometer from breaking easily.

Q.2 An engineer is updating a schematic for a control panel and needs to indicate a normally closed push button. Which approach best ensures the symbol is universally understood among engineers referring to standard engineering drawings?

- Ans**
- ☒ A. Use the standardized symbol for a normally closed push button as per conventions
 - ☐ B. Substitute the normally closed push button symbol with a general switch symbol
 - ☐ C. Draw a hand made representation of the push button with a note explaining function
 - ☐ D. Describe the normally closed push button in words within the schematic diagram clearly

Q.3 Which type of personal protective equipment is most suitable for tasks involving airborne chemical particles in confined spaces?

- Ans**
- ☐ A. Hand protection using chemical-resistant gloves
 - ☒ B. Respiratory protection devices such as half-face masks
 - ☐ C. Head protection with industrial-grade hard hats
 - ☐ D. Body protection with flame-retardant suits

Q.4 A car travels from point A to point B in a zigzag path, covering a total distance of 200 meters. If the shortest straight-line distance between A and B is 120 meters, which statement best describes the car's distance and displacement?

- Ans**
- ☐ A. The distance is 120 meters; the displacement is 120 meters
 - ☐ B. The distance is 120 meters; the displacement is 200 meters
 - ☒ C. The distance is 200 meters; the displacement is 120 meters
 - ☐ D. The distance is 200 meters; the displacement is 200 meters

Q.5 Pipes A and B can fill an entire tank in 8 hours and 12 hours, respectively. The water tank is one-fourth full. If both the pipes are opened together, then how long will it take to fill the remaining part of the tank?

- Ans**
- ☐ A. 3 hours 26 minutes
 - ☒ B. 3 hours 36 minutes
 - ☐ C. 3 hours 6 minutes
 - ☐ D. 3 hours 16 minutes

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Q.6 A dealer buys a table for ₹2,750. He first marks it up by 28%, then allows a 12% discount to a customer. If the customer also pays 5% GST on the selling price, find the profit percentage (excluding GST) made by the dealer.

- Ans**
- ✓ A. 12.64%
 - ✗ B. 13.81%
 - ✗ C. 10.36%
 - ✗ D. 15.12%

Q.7 What information does a kilometer stone provide to travelers on a road?

- Ans**
- ✗ A. Time taken to reach destination
 - ✗ B. Speed of the vehicle
 - ✗ C. Direction of travel
 - ✓ D. Distance from a reference point

Q.8 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?
(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ✗ A. SJ – TK
 - ✗ B. DG – EH
 - ✗ C. KE – LF
 - ✓ D. IT – KV

Q.9 If $3x - 2y + 3z = 8$, $4x - 3y + 2z = 4$ and $2x + y - z = 1$, then find x, y and z, respectively.

- Ans**
- ✗ A. 2, 3 and 1
 - ✗ B. 3, 1 and 2
 - ✗ C. 2, 1 and 3
 - ✓ D. 1, 2 and 3

Q.10 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GXM 5, JVN 11, MTO 24, PRP 51, ?

- Ans**
- ✗ A. SPQ 107
 - ✗ B. TPQ 106
 - ✗ C. TPQ 107
 - ✓ D. SPQ 106

Q.11 Which of the following correctly states the full form of CD and the technology used to store data on it?

- Ans**
- ✗ A. Compact Disc, Magnetic Storage
 - ✗ B. Compact Drive, Optical Storage
 - ✓ C. Compact Disc, Optical Storage
 - ✗ D. Compact Drive, Magnetic Storage

Q.12 If the height of an object is doubled while its mass remains constant, its gravitational potential energy will be:

- Ans**
- ✗ A. unchanged
 - ✓ B. doubled
 - ✗ C. decreased to one-fourth
 - ✗ D. halved

Q.13 G is the mother of Y. Y is the sister of V. S is the father of L. L is the son of V. How is G related to L?

- Ans**
- ☐ A. Mother
 - ☐ B. Sister
 - ☐ C. Mother's sister
 - ☒ D. Mother's mother

Q.14 Which intervention most effectively reduces ground-level pollutant concentrations during a winter temperature inversion?

- Ans**
- ☐ A. Increasing surface temperatures near emission sources
 - ☐ B. Reducing local wind speed to minimize horizontal dispersion
 - ☒ C. Enhancing vertical air mixing through artificial turbulence
 - ☐ D. Elevating emission sources above inversion layers

Q.15 Which of the following is the best example of municipal solid waste?

- Ans**
- ☐ A. Industrial process waste
 - ☐ B. Hospital biomedical waste
 - ☐ C. Mining tailings
 - ☒ D. Household kitchen garbage

Q.16 What should come in place of '?' in the given series?
11, 22, 44, 88, 176, ?

- Ans**
- ☐ A. 358
 - ☐ B. 342
 - ☐ C. 356
 - ☒ D. 352

Q.17 Which of the following pairs of numbers is co-prime?

- Ans**
- ☐ A. (14, 28)
 - ☐ B. (21, 33)
 - ☒ C. (17, 54)
 - ☐ D. (28, 49)

Q.18 Refer to the given letter series and answer the question that follows.

(Left) A X T N K R Q K C P S I D F J U D O R G Z M B E L (Right)

How many letters are there in the English alphabetical series between the letter that is fourth from the right end and the letter that is third from the left end of the series?

- Ans**
- ☒ A. 6
 - ☐ B. 5
 - ☐ C. 4
 - ☐ D. 3

Q.19 SANZ is related to YUTT in a certain way based on the English alphabetical order. In the same way, MTHM is related to SNNG. To which of the following is LJRE related to following the same logic?

- Ans**
- ☐ A. QEYZ
 - ☐ B. REXZ
 - ☒ C. RDX Y
 - ☐ D. QDYY

Q.20 Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given sets? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

6 – 16 – 23 – 32; 7 – 19 – 26 – 35

- Ans**
- ☐ A. 4 – 14 – 21 – 30
 - ☒ B. 12 – 34 – 41 – 50
 - ☐ C. 8 – 22 – 15 – 24
 - ☐ D. 11 – 31 – 38 – 29

Q.21 Which combination best describes the main environmental challenges associated with plastic waste management?

- Ans**
- ☒ A. Persistence in the environment and microplastic formation
 - ☐ B. Thermal pollution and effective composting
 - ☐ C. Rapid biodegradation and chemical leaching
 - ☐ D. Neutralization and easy recycling

Q.22 Why does restricting certain chemical refrigerants effectively reduce damage to the ozone layer?

- Ans**
- ☐ A. Refrigerants emit greenhouse gases that warm the stratosphere.
 - ☐ B. Refrigerants contain particles that absorb harmful UV light.
 - ☒ C. Refrigerants release substances that catalyze ozone breakdown.
 - ☐ D. Refrigerants increase oxygen production, supporting ozone recovery.

Q.23 Sohan covers a total distance of 760 km to reach his home, traveling partly by train and partly by car. He takes 8 hours when he travels 160 km by train and the rest by car. If he travels 240 km by train and the remaining distance by car, his journey takes 12 minutes longer. Find the difference between the speeds of the train and the car.

- Ans**
- ☐ A. 21 km/h
 - ☐ B. 27 km/h
 - ☐ C. 23 km/h
 - ☒ D. 20 km/h

Q.24 A laboratory thermometer has a range from -10 degrees Celsius to 110 degrees Celsius and 120 equal divisions. What is the smallest value that this thermometer can read?

- Ans**
- ☐ A. 10 degrees Celsius
 - ☐ B. 2 degrees Celsius
 - ☒ C. 1 degree Celsius
 - ☐ D. 0.5 degrees Celsius

Q.25 A ramp is used to lift a box to a platform 2 m high. To reduce the effort required, the ramp length is increased from 4 m to 8 m. Assuming negligible friction, what remains unchanged?

- Ans**
- ☐ A. The distance moved along the ramp
 - ☐ B. The mechanical advantage
 - ☐ C. The force required
 - ☒ D. The work done in raising the box

Q.26 A sum of money invested at simple interest amounts to ₹21,500 in 5 years and ₹26,000 in 8 years. Find the principal amount (in ₹).

- Ans**
- ☐ A. 15,500
 - ☐ B. 12,000
 - ☐ C. 7,500
 - ☒ D. 14,000

Q.27 A plane parallel to the base divides a cone of height 40 cm into two parts. If the volume of the upper smaller cone formed is $\frac{1}{64}$ of the volume of the original cone, calculate the height of the plane from the base of the cone.

- Ans**
- ☐ A. 40 cm
 - ☐ B. 10 cm
 - ☐ C. 20 cm
 - ☒ D. 30 cm

Q.28 Five students, N, O, R, S and T, have different heights. T is taller than N. R is taller than S but shorter than O. S is taller than N. More than two people are taller than T. How many people are shorter than R?

- Ans**
- ☒ A. Three
 - ☐ B. One
 - ☐ C. None
 - ☐ D. Two

Q.29 The first shopkeeper allows two successive discounts of 3% and 7%, while a second shopkeeper allows two successive discounts of 2% and 8%. A third shopkeeper allows 10% discount on the same item. From which shopkeeper should a customer buy if the marked price is the same at the three shops?

- Ans**
- ☐ A. Buy from the first or the second shopkeeper as both are the same.
 - ☐ B. Buy from the second shopkeeper
 - ☐ C. Buy from the first shopkeeper
 - ☒ D. Buy from the third shopkeeper

Q.30 The cost of a diamond varies directly with the square of its weight. A diamond broke into four pieces with weights in the ratio 2:4:1:3. If it had been broken into four equal pieces, the loss would have been ₹60,000. What was the original cost of the diamond?

- Ans**
- ☐ A. ₹78,000
 - ☐ B. ₹75,000
 - ☒ C. ₹80,000
 - ☐ D. ₹82,000

Q.31 A cyclist travels 120 km in 3 hours, rests for 1 hour, and then travels another 80 km in 2 hours. To determine the cyclist's average speed for the entire journey, which of the following quantities should be used?

- Ans**
- ☐ A. Distance travelled in a particular direction divided by time
 - ☒ B. Total distance travelled divided by the total time taken
 - ☐ C. Total displacement divided by total time taken
 - ☐ D. Change in velocity divided by total time taken

Q.32 A crane lifts a 200 kg load to a height of 15 meters in 10 seconds. Assuming acceleration due to gravity is 10 m/s^2 and energy loss is negligible, what is the power output of the crane during this operation?

- Ans**
- ☐ A. 1500 W
 - ☒ B. 3000 W
 - ☐ C. 2000 W
 - ☐ D. 1000 W

Q.33 A ladder is leaning against a wall and makes an angle of 60° with the ground. If the length of the ladder is 24 m, find the distance of the foot of the ladder from the wall.

- Ans**
- ☒ A. 12 m
 - ☐ B. 18 m
 - ☐ C. 9 m
 - ☐ D. 15 m

Q.34 Find the compound interest on ₹5,70,000 for 1.5 years at 10% per annum compounded half-yearly.

- Ans**
- ☒ A. ₹89,846.25
 - ☐ B. ₹89,946.25
 - ☐ C. ₹88,846.25
 - ☐ D. ₹92,846.25

Q.35 A pump can fill a tank in 3 hours. Due to a leak in the tank, it takes 4.5 hours to fill the tank. In how much time can the leak empty the full tank if no other entry or exit routes are open?

- Ans**
- ☒ A. 9 hours
 - ☐ B. 6 hours
 - ☐ C. 8 hours
 - ☐ D. 7 hours

Q.36 A, B, C, D and E have different heights. E is taller than C but shorter than A. Only one person is taller than A. D is shorter than C. Who amongst them is the third tallest?

- Ans**
- ☐ A. C
 - ☐ B. B
 - ☒ C. E
 - ☐ D. A

Q.37 Seven boxes S, T, U, V, W, X, and Y are kept one over the other but not necessarily in the same order. U is kept exactly third from the top. Only one box is kept between U and T. W is kept immediately above T. Only three boxes are kept between X and S. V is kept on one of the positions below Y. Only two boxes are kept between U and S. Which box is kept second from the top?

- Ans**
- ☐ A. U
 - ☐ B. T
 - ☐ C. V
 - ☒ D. X

Q.38 What does the term 'HAZOP' stand for in occupational safety?

- Ans**
- ☐ A. Hazardous Operation Standard
 - ☐ B. Handling and Organizing Safety
 - ☒ C. Hazard and Operability Study
 - ☐ D. Hazardous Operations Safety

Q.39 If a rectangular field is measured to be 120 meters long and 75 meters wide, what is its area in SI units?

- Ans**
- ☐ A. 1800 square meters
 - ☐ B. 19500 square meters
 - ☒ C. 9000 square meters
 - ☐ D. 15000 square meters

Q.40 A cyclist travels from the kilometer stone marked 52 to the stone marked 79. How far has the cyclist traveled?

- Ans**
- ✔ A. 27 kilometers
 - ✗ B. 52 kilometers
 - ✗ C. 131 kilometers
 - ✗ D. 31 kilometers

Q.41 In a certain code language,
A + B means 'A is the mother of B',
A – B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Satish related to Mayank if 'Satish + Deep × Piyush – Hitesh % Mayank'?

- Ans**
- ✗ A. Father's brother's wife's sister
 - ✗ B. Mother's brother's wife's sister
 - ✗ C. Mother's brother's wife's mother
 - ✔ D. Father's brother's wife's mother

Q.42 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

- Ans**
- ✗ A. PJ-QK
 - ✗ B. HB-IC
 - ✗ C. FZ-GA
 - ✔ D. RL-SN

Q.43 The average of five numbers is 30. If four of the numbers are 25, 35, 28 and 32, then what is the fifth number?

- Ans**
- ✔ A. 30
 - ✗ B. 35
 - ✗ C. 28
 - ✗ D. 32

Q.44 What does CPU stand for in computing?

- Ans**
- ✔ A. Central Processing Unit
 - ✗ B. Core Processing Unit
 - ✗ C. Control Processing Unit
 - ✗ D. Computer Processing Unit

Q.45 A 42-litre solution has sugar and water in the ratio 2 : 5. If, due to evaporation, the volume is reduced by 35%, and only water evaporates, what is the new ratio of sugar to water?

- Ans**
- ✗ A. 31 : 50
 - ✗ B. 51 : 42
 - ✔ C. 40 : 51
 - ✗ D. 40 : 41

Q.46 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Among 5 sticks, B, U, N, M and D, each having a different height, which stick is the shortest?

(I) D is shorter than U. M is shorter than B.

(II) M is taller than D.

- Ans**
- ☒ A. Both statements I and II together are NOT sufficient to answer the question
 - ☐ B. Data in statement II alone is sufficient to answer the question while data in statement I is not
 - ☐ C. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☐ D. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question

Q.47 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

MDB PHE SLH VPK ?

- Ans**
- ☐ A. ZTM
 - ☒ B. YTN
 - ☐ C. ZUO
 - ☐ D. XSM

Q.48 Refer to the following letter series and answer the question that follows. (Counting to be done from left to right only.)

(Left) Q K Q N X K G G V M L A W T W K N G V (Right)

How many such consonants are there each of which is immediately preceded by a vowel and also immediately followed by a consonant?

- Ans**
- ☐ A. Two
 - ☐ B. None
 - ☒ C. One
 - ☐ D. Three

Q.49 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

ZOT - TLP

NIL - HFH

- Ans**
- ☒ A. BCD - VZZ
 - ☐ B. VZZ - BCD
 - ☐ C. BOC - VZT
 - ☐ D. ABD - VZZ

Q.50 What should come in place of the question mark (?) in the given series?

1 2 7 20 61 ?

- Ans**
- ☒ A. 182
 - ☐ B. 183
 - ☐ C. 181
 - ☐ D. 185

Q.51 The price of sugar is increased by 20%. Manoj can increase his expenditure on sugar by only 15% from his income. In order to balance his expenditure, by what percentage should he reduce the quantity of sugar consumed?

- Ans**
- ☒ A. $4\frac{1}{6}\%$
 - ☐ B. 6.5%
 - ☐ C. $5\frac{1}{3}\%$
 - ☐ D. 5%

Q.52 Simplify the following expression.

$$11 \text{ of } 7 + 125 \div 5 + 99 \div 11 \times 7 - 17 \text{ of } 7 + 7 \times 6 - (91 \div 7 + 7 \times 5)$$

- Ans**
- ☐ A. 48
 - ☐ B. 44
 - ☒ C. 40
 - ☐ D. 36

Q.53 An astronaut weighs 600 N on Earth. During a moon mission, she performs an experiment to measure her weight on the moon. Which value is closest to her expected weight on the moon, and why?

- Ans**
- ☒ A. 100 N, because the Moon's gravity is about one-sixth of Earth's.
 - ☐ B. 600 N, because a person's weight remains unchanged on the Moon.
 - ☐ C. 200 N, because the Moon's gravity is about one-third of Earth's.
 - ☐ D. 300 N, because the Moon's gravity is about one-half of Earth's.

Q.54 What is a key feature of single stroke lettering in technical drawings?

- Ans**
- ☐ A. Each character is made with several parallel lines.
 - ☐ B. Each character is outlined and then filled.
 - ☒ C. Each character is made with one continuous stroke.
 - ☐ D. Each character is shaded after drawing.

Q.55 If 2 is subtracted from each odd digit and 2 is added to each even digit in the number 235234796423, what will be the sum of the digits that are third from the left and third from the right?

- Ans**
- ☐ A. 8
 - ☒ B. 9
 - ☐ C. 7
 - ☐ D. 6

Q.56 A solid right circular cone is 7 cm high, and the radius of its base is 22.2 cm. It is melted and recast into a right circular cone with radius of its base 3.7 cm. Then the height (in cm) of the cone is _____.

- Ans**
- ☒ A. 252
 - ☐ B. 159
 - ☐ C. 185
 - ☐ D. 267

Q.57 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and select the most appropriate answer.

Question:

Among five trees N, O, R, S, and T, each having a different height, which tree is the tallest?

Statements:

(I) T is taller than R. N is taller than T.

(II) R is shorter than O but taller than S.

- Ans**
- ☒ A. Data in Statement I alone is sufficient to answer the question while data in statement II is not
 - ☒ B. Data in Statement II alone is sufficient to answer the question while data in statement I is not
 - ☒ C. Both statements I and II together are NOT sufficient to answer the question
 - ☒ D. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question

Q.58 P, Q and R are three batsmen. The ratios of runs scored by them in a certain match were as follows:

P : Q = 5 : 7 and Q : R = 2 : 3.

If they scored a total of 765 runs, then find the number of runs scored by R.

- Ans**
- ☒ A. 378
 - ☒ B. 350
 - ☒ C. 357
 - ☒ D. 336

Q.59 Two trains are moving in opposite directions. The first train is 120 m long and runs at 54 km/h. The second train is 180 m long and runs at 72 km/h. How much time will they take to cross each other completely?
(Rounded up to two decimal places)

- Ans**
- ☒ A. 8.43 seconds
 - ☒ B. 7.57 seconds
 - ☒ C. 8.57 seconds
 - ☒ D. 9.25 seconds

Q.60 If $x + \frac{1}{x} = 5$, then $\frac{x^3 - 5x^2 + 5x}{x^2 + 1}$ is equal to:

- Ans**
- ☒ A. $\frac{3}{5}$
 - ☒ B. $\frac{4}{5}$
 - ☒ C. $\frac{1}{5}$
 - ☒ D. $\frac{2}{5}$

Q.61 What is the primary purpose of a Local Area Network (LAN)?

- Ans**
- ☒ A. To connect global networks
 - ☒ B. To connect social media accounts
 - ☒ C. To connect computers within a small geographical area
 - ☒ D. To link wireless devices only

Q.62 Let C be a circle, and AB and DE be two chords on C such that AB = BE. In the quadrilateral ABED, let AE and BD intersect at F, $\angle DBE = 55^\circ$ and $\angle BAE = 40^\circ$. Find $\angle FED$.

- Ans**
- ☒ A. 45°
 - ☐ B. 55°
 - ☐ C. 110°
 - ☐ D. 60°

Q.63 When a cutting plane line passes through a hole and a rib, which feature should be sectioned in the resulting view according to standard conventions?

- Ans**
- ☒ A. The hole is sectioned but the rib is shown unsectioned
 - ☐ B. The rib is sectioned but the hole is left unsectioned
 - ☐ C. Both the hole and the rib are shown sectioned
 - ☐ D. Both the hole and the rib are shown unsectioned

Q.64 Which scenario best demonstrates proactive workplace safety behavior?

- Ans**
- ☐ A. Discussing only past safety problems in meetings
 - ☒ B. Identifying and correcting hazards before accidents occur
 - ☐ C. Waiting for a supervisor to notice hazards
 - ☐ D. Reporting hazards after incidents happen

Q.65 Why does biomedical waste require special handling compared to general municipal waste?

- Ans**
- ☒ A. It may contain infectious agents that pose health risks.
 - ☐ B. It is more likely to be recycled than other types of waste.
 - ☐ C. It has higher chemical content and is always toxic.
 - ☐ D. It is always radioactive and requires heavy shielding.

Q.66 When drawing repeated 67° angles on an engineering sheet, which practice best helps minimize cumulative alignment errors?

- Ans**
- ☐ A. Marking all angles lightly with a pencil before finalizing
 - ☐ B. Drawing all angles continuously without intermediate verification
 - ☒ C. Using the same reference line for all repeated angles
 - ☐ D. Relying solely on the initial protractor alignment for all angles

Q.67 What will come in place of the question mark (?) in the following equation if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $42 \times 6 \div 7 - 35 + 19 = ?$

- Ans**
- ☒ A. 65
 - ☐ B. 69
 - ☐ C. 67
 - ☐ D. 63

Q.68 What is the primary role of the Central Processing Unit (CPU) in a computer system?

- Ans**
- ☐ A. To display output on the screen
 - ☒ B. To execute program instructions
 - ☐ C. To store long-term data
 - ☐ D. To manage network connections

Q.69 Which statement best describes the side view in engineering drawing?

- Ans**
- ☒ A. It shows a combination of all views of the object
 - ☒ B. It shows the object as seen from left or right side
 - ☒ C. It shows the object as seen clearly from the front
 - ☒ D. It shows the object as seen from above or below

Q.70 The mean of 11 numbers is 10.9. If the mean of the first 6 numbers is 10.5 and the mean of the last 6 numbers is 11.4, then find the 6th number.

- Ans**
- ☒ A. 11.5
 - ☒ B. 10
 - ☒ C. 11
 - ☒ D. 10.5

Q.71 An article is bought for ₹300 and its price is increased by 5.5%. The resulting price is then reduced by 8%. Find the final selling price.

- Ans**
- ☒ A. ₹288.24
 - ☒ B. ₹296.46
 - ☒ C. ₹291.18
 - ☒ D. ₹284.45

Q.72 Which factor increases the amount of heat produced in a wire when an electric current flows through it for a fixed time?

- Ans**
- ☒ A. Decreasing the length of the wire
 - ☒ B. Increasing the resistance of the wire
 - ☒ C. Reducing the current in the wire
 - ☒ D. Making the wire thicker

Q.73 A hiker lifts a backpack from the ground to a ledge 2 meters above the ground. Which situation would result in the greatest increase in the backpack's gravitational potential energy?

- Ans**
- ☒ A. Lifting a lighter backpack to the same 2-meter ledge
 - ☒ B. Carrying the same backpack horizontally for 2 meters
 - ☒ C. Lifting a heavier backpack to the same 2-meter ledge
 - ☒ D. Lifting the same backpack to a 1-meter ledge

Q.74 Srinu starts from his home and drives 2 km towards the south, then takes a right turn and drives 5 km. He then takes a right turn and drives 6 km before taking a right turn again and driving 4 km further. Srinu finally takes a right turn and drives 4 km before stopping at his office. In which direction should Srinu drive to reach his home again? (All turns are 90-degree turns only unless specified.)

- Ans**
- ☒ A. East
 - ☒ B. West
 - ☒ C. North
 - ☒ D. South

Q.75 Which of the following statements best describes a triangle as used in engineering drawing?

- Ans**
- ☒ A. A triangle must always have all sides of equal length.
 - ☒ B. A triangle is a polygon with three straight sides and three angles.
 - ☒ C. A triangle is a polygon having three curved sides.
 - ☒ D. A triangle is a polygon with four straight sides and four angles.

Q.76 Refer to the given letter series and answer the question that follows. Counting to be done from left to right only.

(Left) H S A N D D I A D F P A J O S K I O Z O T X (Right)

How many such consonants are there, each of which is immediately preceded by a consonant and also immediately followed by a vowel?

- Ans
- ☒ A. Six
 - ☒ B. Four
 - ☒ C. Five
 - ☒ D. Three

Q.77 What is the primary color used in warning signs to alert workers of potential hazards?

- Ans
- ☒ A. Blue with white symbol or text
 - ☒ B. Yellow with black symbol or text
 - ☒ C. Red with white symbol or text
 - ☒ D. Green with white symbol or text

Q.78 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. There are exactly two boxes between T and P. Only Q is kept above U. No box is kept below P. S is kept somewhere below W but above V. Based on the given information, which box is kept third above V?

- Ans
- ☒ A. S
 - ☒ B. T
 - ☒ C. W
 - ☒ D. P

Q.79 Why are electric wires in household appliances usually covered with plastic or rubber coating?

- Ans
- ☒ A. To prevent electric shocks by insulation
 - ☒ B. To produce more heat
 - ☒ C. To make the wires heavier
 - ☒ D. To increase the flow of current

Q.80 A boy uses a wheelbarrow to carry sand. The wheel acts as the pivot, the sand is placed in the tray, and the boy lifts the handles. In this arrangement, the sand represents _____.

- Ans
- ☒ A. Load
 - ☒ B. Arm
 - ☒ C. Effort
 - ☒ D. Fulcrum

Q.81 Which one of the following statements correctly describes a characteristic of WANs?

- Ans
- ☒ A. WANs typically use only wireless media to connect distant LANs.
 - ☒ B. WANs can be built by connecting multiple LANs via wired or wireless links.
 - ☒ C. WANs are always public networks managed solely by Internet Service Providers (ISPs).
 - ☒ D. WANs are limited to connecting devices within a radius of 1 to 2 km.

Q.82 Which statement best describes the front view in an engineering drawing?

- Ans
- ☒ A. It shows only one dimension of the object
 - ☒ B. It shows only the object's bottom or right side
 - ☒ C. It shows the object's height and width as seen from the front
 - ☒ D. It shows the object's depth and height as seen from the side

Q.83 In a certain code language, 'SOIL' is coded as '1547' and 'COIL' is coded as '7124'. What is the code for 'C' in the given code language?

- Ans**
- ☒ A. 1
 - ☒ B. 2
 - ☒ C. 7
 - ☒ D. 4

Q.84 A cyclist rides 60 meters north, then 80 meters south, and finally 70 meters north. What is the total distance the cyclist has traveled?

- Ans**
- ☒ A. 150 meters
 - ☒ B. 60 meters
 - ☒ C. 10 meters
 - ☒ D. 210 meters

Q.85 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:
Some rugs are fans.
No fan is a car.

Conclusion (I) : Some rugs are cars.
Conclusion (II) : Some fans are rugs.

- Ans**
- ☒ A. Only conclusion (II) follows
 - ☒ B. Both conclusions (I) and (II) follow
 - ☒ C. Neither conclusion (I) nor (II) follows
 - ☒ D. Only conclusion (I) follows

Q.86 Which of the following statements best describes a cuboid as used in engineering drawing?

- Ans**
- ☒ A. A cuboid has all faces as squares of equal size.
 - ☒ B. A cuboid is a solid where all faces are parallelograms but not necessarily rectangles.
 - ☒ C. A cuboid has all sides and angles equal, making it similar to a cube.
 - ☒ D. A cuboid is a solid with six rectangular faces, and opposite faces are equal.

Q.87 A technician needs to select a fuse wire for a room heater. Which property should be considered most important for safety based on the heating effect of electric current?

- Ans**
- ☒ A. The fuse wire must have a low melting point to break the circuit during excess current.
 - ☒ B. The fuse wire must have a shiny surface for efficient cooling.
 - ☒ C. The fuse wire must have a high melting point for durability.
 - ☒ D. The fuse wire must have high resistance and be thick to prevent melting.

Q.88 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table.
Only two people sit between Y and C when counted from the left of C. D sits third to the left of B. A sits to the immediate right of B. A sits second to the left of Y. Z is not an immediate neighbor of D.
Who sits third to the right of X?

- Ans**
- ☒ A. Y
 - ☒ B. D
 - ☒ C. A
 - ☒ D. C

Q.89 An engineering firm is tasked with creating a set of technical drawings for a large-scale project. The client specifies that all components must fit on a single sheet without reducing the drawing scale, and the total drawing area required is approximately 1 square meter. Based on standard drawing sheet sizes, which sheet should the firm select to best meet these requirements?

- Ans**
- ☐ A. A3 size sheet
 - ☐ B. A2 size sheet
 - ☒ C. A0 size sheet
 - ☐ D. A1 size sheet

Q.90 If the mean of the following data is 45, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	23	30	31	45	X

- Ans**
- ☐ A. 162
 - ☒ B. 160
 - ☐ C. 188
 - ☐ D. 180

Q.91 12 is related to 1730 following a certain logic. Following the same logic, 13 is related to 2199. To which of the given options is 11 related, following the same logic? (NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☒ A. 1333
 - ☐ B. 1433
 - ☐ C. 1443
 - ☐ D. 1543

Q.92 The salary of a person is increased by 10%, 20% and 25% successively in three consecutive years. Find the overall percentage increase in the salary at the end of the third year.

- Ans**
- ☒ A. 65%
 - ☐ B. 50%
 - ☐ C. 60%
 - ☐ D. 30%

Q.93 Which of the following best describes the function of a speedometer in a vehicle?

- Ans**
- ☒ A. It displays the current speed at which the vehicle is moving.
 - ☐ B. It shows the rate at which the vehicle's speed changes.
 - ☐ C. It measures the total distance the vehicle has traveled.
 - ☐ D. It calculates the average speed over a journey.

Q.94 Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All chocolates are paneers.
No paneer is a milk.

Conclusions:

(I) No chocolate is a milk.

(II) Some milks are paneers.

- Ans**
- ☐ A. Neither conclusion (I) nor (II) follows.
 - ☒ B. Only conclusion (I) follows.
 - ☐ C. Only conclusion (II) follows.
 - ☐ D. Both conclusions (I) and (II) follow.

Q.95 Which symbol best represents a battery in an electric circuit diagram according to standard conventions?

- Ans**
- ☐ A. A single long line only
 - ☒ B. A pair of long and short parallel lines placed alternately
 - ☐ C. Two short lines placed together
 - ☐ D. Two circles connected in series

Q.96 What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $5 \div 3 + 15 \times 5 - 3 = ?$

- Ans**
- ☐ A. 18
 - ☐ B. 12
 - ☐ C. 9
 - ☒ D. 15

Q.97 Which statement best describes how the mass and speed of an object affect its kinetic energy?

- Ans**
- ☐ A. An object with same mass but higher speed will have less kinetic energy.
 - ☐ B. An object with greater mass but lower speed will have more kinetic energy.
 - ☐ C. An object with less mass and lower speed will have more kinetic energy.
 - ☒ D. An object with greater mass and higher speed will have more kinetic energy.

Q.98 Which tool safety measure best prevents injuries when cleaning a workshop lathe after use?

- Ans**
- ☒ A. Using a brush to remove metal chips from the lathe
 - ☐ B. Blowing chips away with compressed air around the lathe
 - ☐ C. Wiping metal chips using bare hands directly
 - ☐ D. Using a rag to remove metal dust from the lathe

Q.99 A group of numbers/symbols is coded using letter codes as per the codes given below and the conditions that follow. The correct combination of codes following the conditions is your answer.

Note: If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	3	@	8	4	\$	&	2	%	#	1	+	9	7	5
Code	U	G	B	K	M	F	X	R	E	Q	S	C	V	T

Conditions –

(i) If the first element is a symbol and the last element an odd number, the codes for these two (the first and the last elements) are to be interchanged.

(ii) If the first element is an odd number and the last an even number, the first and the last elements are to be coded as ©

(iii) If both second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?

& 8 \$ 9 5

- Ans**
- ✓ A. TBMCF
 - ✗ B. TCMBF
 - ✗ C. FBMCT
 - ✗ D. FCBMT

Q.100 Which color is universally associated with emergency exit signs in industrial workplaces under international standards?

- Ans**
- ✓ A. Green background with white text or symbols
 - ✗ B. Yellow background with black text or symbols
 - ✗ C. Blue background with white text or symbols
 - ✗ D. Red background with white text or symbols

Section : PART-B

Q.1 Which part of a Vacuum Circuit Breaker (VCB) helps to maintain insulation and protects the breaker from external environmental influences?

- Ans**
- ✗ A. Vacuum interrupter unit
 - ✗ B. Trip coil assembly
 - ✓ C. Insulating casing
 - ✗ D. Drive rod assembly

Q.2 A circuit contains three resistors connected in series with resistances of 2 Ω , 3 Ω , and 5 Ω across a 20 V DC power supply. According to Kirchhoff's Voltage Law, what is the voltage drop across the 3 Ω resistor?

- Ans**
- ✓ A. 6 V
 - ✗ B. 8 V
 - ✗ C. 2 V
 - ✗ D. 10 V

Q.3 If 5 workers, working at the same rate, complete a job in 12 days, how many days will 10 workers take to complete the same job?

- Ans**
- ✓ A. 6 days
 - ✗ B. 5 days
 - ✗ C. 12 days
 - ✗ D. 10 days

Q.4 Why is it necessary to monitor isolation resistance in fuel cell electric vehicles?

- Ans**
- ☐ A. To improve the acceleration performance
 - ☐ B. To increase the driving range of the vehicle
 - ☐ C. To reduce the emission levels of the vehicle
 - ☒ D. To prevent potential electric shock to users and maintenance personnel

Q.5 What should a Process Hazard Analysis methodology be based on?

- Ans**
- ☐ A. The production schedule and operating time requirements
 - ☐ B. The size of the workforce involved in the process
 - ☒ C. The complexity of the process and associated hazards
 - ☐ D. A random selection of hazards and process conditions

Q.6 A control circuit uses a timer relay to switch ON a load after a set delay. If the load energizes immediately when the circuit is powered, what is most likely wrong?

- Ans**
- ☒ A. The timer relay is bypassed or its contacts are shorted
 - ☐ B. The load is faulty and not responding
 - ☐ C. The control transformer is incorrectly rated
 - ☐ D. The timer setting is longer than required

Q.7 Which part of a wattmeter connects in parallel with the load to measure voltage?

- Ans**
- ☐ A. Fixed coil
 - ☐ B. Current coil
 - ☒ C. Potential coil
 - ☐ D. Shunt capacitor

Q.8 A transformer is designed to operate with maximum efficiency near full-load conditions and is installed in a grid substation. It is classified as a/an:

- Ans**
- ☐ A. Isolation transformer
 - ☐ B. Instrument transformer
 - ☐ C. Distribution transformer
 - ☒ D. Power transformer

Q.9 What will happen if the secondary winding of a current transformer remains open while the transformer is energized?

- Ans**
- ☐ A. It will ensure accurate current measurement by reducing the current at the secondary
 - ☒ B. It will induce high voltage at secondary winding and cause equipment damage
 - ☐ C. It will prevent overheating of the conductors of the supply lines
 - ☐ D. It will protect the power system from the short circuited faults

Q.10 Why a cumulative compound DC motor is considered for heavy-duty machines with varying loads, such as rolling mills?

- Ans**
- ☐ A. It offers the fastest speed changes
 - ☐ B. It always runs at maximum efficiency
 - ☐ C. It prevents any speed drop under load
 - ☒ D. It combines good starting torque and stable speed

Q.11 If 5 identical components weigh 20 kg, what is the weight of one component?

- Ans**
- ☐ A. 2 kg
 - ☐ B. 5 kg
 - ☐ C. 10 kg
 - ☒ D. 4 kg

Q.12 What is the function of dilute sulfuric acid electrolyte in a lead-acid battery?

- Ans**
- ☐ A. Serves as the active material of the negative electrode plate
 - ☐ B. Acts as the separator and prevents direct contact between the electrodes
 - ☐ C. Functions as an insulator and prevents electrical conduction between the electrodes
 - ☒ D. Acts as the electrolyte and allows ionic conduction between the electrodes

Q.13 For a pure sinusoidal AC voltage, the RMS value is obtained by multiplying the peak value by _____.

- Ans**
- ☐ A. 1
 - ☐ B. $\sqrt{2}$
 - ☒ C. $\frac{1}{\sqrt{2}}$
 - ☐ D. $\frac{1}{2}$

Q.14 Which geometric shape is most commonly used for title blocks and object outlines in engineering drawings?

- Ans**
- ☐ A. Pentagon
 - ☐ B. Hexagon
 - ☒ C. Rectangle
 - ☐ D. Triangle

Q.15 Which component in a solar DC domestic system prevents overcharging of the battery?

- Ans**
- ☒ A. Charge controller
 - ☐ B. Solar panel
 - ☐ C. Inverter
 - ☐ D. Battery

Q.16 Which safety measure should be followed when replacing a CFL or LED lamp connected to a DC power supply?

- Ans**
- ☐ A. Wear gloves while replacing the lamp
 - ☐ B. Replace the lamp as quickly as possible
 - ☐ C. Use a wet cloth to hold the lamp
 - ☒ D. Turn off the power supply before handling the lamp

Q.17 Which standard grading is typically used for cables in a domestic three-phase supply system?

- Ans**
- ☐ A. Extra-high voltage cable insulation
 - ☐ B. Grade III insulation cable
 - ☐ C. Bare conductor without insulation
 - ☒ D. Grade I insulation cable

Q.18 When drawing a complex assembly with hidden details, which instrument is crucial for accurately representing hidden lines?

- Ans**
- ☐ A. Protractor
 - ☐ B. Scale
 - ☒ C. Mini-drafter
 - ☐ D. Eraser

Q.19 What is the effect on the synchronous speed of a three-phase induction motor when the supply frequency is increased while keeping the number of poles constant?

- Ans**
- ☐ A. The synchronous speed remains unchanged
 - ☐ B. The synchronous speed decreases
 - ☐ C. The synchronous speed reverses direction
 - ☒ D. The synchronous speed increases

Q.20 Which type of wire is recommended for heavy current carrying in main distribution boards?

- Ans**
- ☒ A. Single core wire
 - ☐ B. Twin flexible wire
 - ☐ C. Flexible wire
 - ☐ D. Multi-strand bell wire

Q.21 Which of the following describes the purpose of portable earthing during electrical maintenance?

- Ans**
- ☒ A. It provides a temporary path for fault current to flow safely to ground.
 - ☐ B. It prevents earth leakage from electrical panels.
 - ☐ C. It is used to test insulation resistance of conductors.
 - ☐ D. It disconnects equipment from the supply for repairs.

Q.22 During precision assembly, which caliper type is least likely to introduce parallax error?

- Ans**
- ☐ A. Spring caliper with pointed measuring legs
 - ☐ B. Transfer caliper for internal measurements
 - ☐ C. Steel rule used with inside calipers
 - ☒ D. Vernier caliper with clear scale markings

Q.23 A distributed winding is being designed for a stator core with 48 slots and 8 poles for a three-phase system. What will be the slots per pole per phase?

- Ans**
- ☐ A. 6
 - ☒ B. 2
 - ☐ C. 4
 - ☐ D. 3

Q.24 A theater manager is selecting lamps for stage lighting, aiming to minimize both heat generation and maintenance costs. Considering lamp disadvantages, which type of lamp should NOT be used to achieve these goals?

- Ans**
- ☐ A. LED lamp
 - ☐ B. Halogen lamp
 - ☒ C. Incandescent lamp
 - ☐ D. Fluorescent lamp

Q.25 What is the purpose of using earth connection in electrical appliances?

- Ans**
- ☐ A. To improve the overall performance of appliances
 - ☐ B. To decrease the electrical energy consumed daily
 - ☒ C. To enhance safety against electric shock hazards
 - ☐ D. To reduce the manufacturing cost of appliances

Q.26 A mercury tilt switch is mainly operated by _____.

- Ans**
- ☐ A. Magnetic force
 - ☒ B. Gravity action
 - ☐ C. Temperature change
 - ☐ D. Air pressure

Q.27 A motor stator requires six coils to be wound using concentric winding. If the smallest coil has 10 turns, and each subsequent layer increases by 2 turns, how many turns will the largest coil have?

- Ans**
- ☒ A. 20 turns
 - ☐ B. 14 turns
 - ☐ C. 16 turns
 - ☐ D. 22 turns

Q.28 A fan circuit's regulator has multiple resistance steps. What happens electrically when the knob is turned to a higher setting?

- Ans**
- ☐ A. Circuit resistance increases, decreasing fan current
 - ☒ B. Circuit resistance decreases, increasing voltage at fan
 - ☐ C. Fan motor receives less voltage, slowing speed
 - ☐ D. Fan is disconnected from supply temporarily

Q.29 An industrial plant in a region with frequent electrical storms wants to protect both its equipment and personnel from electrical faults. Which approach addresses safety and equipment protection based on the distinction between grounding and earthing?

- Ans**
- ☐ A. Connecting all equipment directly to ground without separate grounding for electronics
 - ☒ B. Connecting equipment frames to the earth to divert fault currents and using a separate grounding system for sensitive electronics
 - ☐ C. Isolating equipment from both ground and earth to avoid surges
 - ☐ D. Using only grounding to protect personnel without earth connection for equipment

Q.30 Which safety device is designed to detect cable electrical leakage and disconnect the circuit?

- Ans**
- ☒ A. Earth leakage circuit breaker
 - ☐ B. Relay
 - ☐ C. Fuse
 - ☐ D. Miniature circuit breaker

Q.31 Which of the following is NOT a purpose of using dividers in fitting operations?

- Ans**
- ☐ A. Transferring distances from a rule
 - ☒ B. Measuring the thickness of plates
 - ☐ C. Marking circles on a surface
 - ☐ D. Dividing a line into equal parts

Q.32 What is the purpose of a pre-molded joint in underground cables?

- Ans**
- ☐ A. To terminate the cable at equipment
 - ☐ B. To regulate the cable voltage
 - ☒ C. To securely connect two or more cables
 - ☐ D. To insulate the cable ends

Q.33 Which function is performed by turning the selector switch on a digital multimeter?

- Ans**
- ☐ A. Adjusting display brightness
 - ☒ B. Choosing measurement type
 - ☐ C. Resetting the instrument
 - ☐ D. Storing readings

Q.34 How many terminals are available for connection in a single-pole, two-way switch?

Ans ☒ A. Three terminals

☐ B. Four terminals

☐ C. Five terminals

☐ D. Two terminals

Q.35 Which type of cell can be recharged by passing electric current in the reverse direction?

Ans ☐ A. Dry cell

☒ B. Secondary cell

☐ C. Primary cell

☐ D. Fuel cell

Q.36 Which of the following steps helps prevent void formation during epoxy resin casting in underground cable joints?

Ans ☒ A. Slowly pour resin while tapping the joint body

☐ B. Mix resin near the joint after sealing

☐ C. Pour resin quickly to finish before hardening

☐ D. Seal the joint body before pouring resin

Q.37 An electrical panel needs connections that resist corrosion in a coastal environment. Which wire type is best suited?

Ans ☐ A. Aluminum wire

☐ B. PVC insulated copper wire

☐ C. Bare copper wire

☒ D. Tinned copper wire

Q.38 A panel has wires labeled with cable markers like 1A, 1B, 2A, 2B. What does this labeling system most likely indicate?

Ans ☐ A. The labels show only the wire size and insulation type.

☒ B. Each wire is paired according to circuit numbers and phase identifiers.

☐ C. It indicates the manufacturer and batch number of the wire.

☐ D. It is a color code for distinguishing between wire colors.

Q.39 An industrial workshop requires 300 lux of uniform illumination on workbenches. The area to be illuminated is 120 square meters. If the utilization factor is 0.7 and the maintenance factor is 0.8, what should be the total luminous flux provided by the lighting installation?

Ans ☐ A. 54000 lumens

☐ B. 42800 lumens

☐ C. 37500 lumens

☒ D. 64286 lumens

Q.40 Which component in the wind power generating station ensures that the wind turbine faces the wind direction for maximum efficiency?

Ans ☐ A. Tower

☒ B. Yaw mechanism

☐ C. Brake system

☐ D. Gearbox

Q.41 Which parameter must be regulated by a charge controller to prevent battery overcharging in a solar plant?

- Ans**
- ☒ A. Voltage applied to battery terminals
 - ☐ B. Tilt angle of the solar panel
 - ☐ C. Solar irradiance level
 - ☐ D. AC output frequency of inverter

Q.42 Four resistors of $5\ \Omega$ each are connected in series. What is the equivalent resistance of the circuit?

- Ans**
- ☒ A. $20\ \Omega$
 - ☐ B. $10\ \Omega$
 - ☐ C. $5\ \Omega$
 - ☐ D. $15\ \Omega$

Q.43 A technician receives a mild shock when touching a faulty machine but does not lose consciousness. What is the most likely effect of the electric current in this scenario?

- Ans**
- ☐ A. Immediate cardiac arrest leading to complete unconsciousness
 - ☐ B. Sudden respiratory paralysis resulting in a prolonged coma
 - ☐ C. Widespread internal tissue destruction and severe skin burns
 - ☒ D. Involuntary muscle contraction and a sharp tingling sensation

Q.44 Which symbol is commonly used in wiring diagrams to represent a single-pole switch?

- Ans**
- ☐ A. A continuous zigzag layout featuring multiple sharp alternating bends
 - ☐ B. A plain rectangle layout featuring two horizontal internal detail lines
 - ☐ C. A small circle layout featuring a centered dot and no attached lines
 - ☒ D. A straight line layout featuring a center break and a diagonal lever

Q.45 Which part of a die ensures the alignment of the die with the workpiece during threading?

- Ans**
- ☐ A. The central hole
 - ☐ B. The adjusting screw
 - ☒ C. The lead-in chamfer
 - ☐ D. The split slot

Q.46 In a control panel, why is it necessary to select a contactor with a higher making capacity than the running current of the connected load?

- Ans**
- ☐ A. To reduce the overall cost of the control panel
 - ☐ B. To ensure the contactor has a higher voltage rating
 - ☒ C. To withstand inrush currents during circuit switching
 - ☐ D. To provide overload protection for the main circuit

Q.47 What best describes a short circuit in an electrical system?

- Ans**
- ☐ A. A connection with unusually high resistance
 - ☐ B. A connection where no current flows due to a break
 - ☒ C. An unintended path with zero or very low resistance
 - ☐ D. An intended path with normal resistance

Q.48 Which factors determine the synchronous speed of the rotating magnetic field in a three-phase induction motor?

- Ans**
- ☐ A. Rotor resistance and load torque
 - ☐ B. Stator voltage and power factor
 - ☒ C. Supply frequency and number of poles
 - ☐ D. Rotor current and motor slip

Q.49 A raceway is used in electrical and control panel installations. What is the primary purpose of using a raceway in wiring systems?

- Ans**
- ☐ A. To convert AC supply into DC supply for control circuits
 - ☒ B. To carry and organize wires neatly between components
 - ☐ C. To reduce the resistance of conductors during operation
 - ☐ D. To increase the voltage capacity of electrical wires

Q.50 A rod of length 2 m is cut into 1/4m pieces. How many pieces are obtained?

- Ans**
- ☐ A. 10
 - ☐ B. 6
 - ☒ C. 8
 - ☐ D. 4

Q.51 According to Indian Electricity (IE) safety practices, what is the first mandatory action before performing maintenance on a commercial electrical wiring installation?

- Ans**
- ☐ A. Increase the supply voltage to check load condition
 - ☐ B. Connect all exposed conductors together before inspection
 - ☐ C. Tighten all terminal connections in the distribution board
 - ☒ D. Isolate and switch OFF the main electrical supply

Q.52 Which type of commercial wiring system uses low-resistance copper conductors of suitable current-carrying capacity to distribute electrical power to lighting circuits and socket outlets?

- Ans**
- ☐ A. Communication wiring
 - ☒ B. Power wiring
 - ☐ C. Entertainment wiring
 - ☐ D. Control wiring

Q.53 What is a critical step before distributing PPE to workers in a new manufacturing plant?

- Ans**
- ☐ A. Schedule regular inspections and maintenance of all PPE
 - ☐ B. Purchase sufficient quantities of PPE for all workers
 - ☒ C. Assess workplace hazards and select appropriate PPE
 - ☐ D. Provide orientation on workplace rules and procedures

Q.54 What will be the impact on solar panel performance if a high-latitude installation uses the same tilt angle as an equatorial installation?

- Ans**
- ☒ A. Solar panels capture less sunlight in winter months
 - ☐ B. Solar panels overheat throughout the year
 - ☐ C. Solar panels degrade rapidly in high temperatures
 - ☐ D. Solar panels experience frequent wiring faults

Q.55 What is the effect of using a conductor with insufficient current-carrying capacity in a low-voltage (LV) distribution system?

- Ans**
- ☐ A. It improves system efficiency by reducing conductor resistance
 - ☐ B. It increases the transmission capacity of the feeder
 - ☒ C. It causes overheating, voltage drop, and increased power losses
 - ☐ D. It maintains stable voltage regardless of load conditions

Q.56 An industrial panel uses a cartridge fuse rated at 250V, 32A. If a technician replaces it with a 16A fuse of the same voltage rating, what is the likely outcome during normal operation at 28A?

- Ans**
- ☒ A. The fuse will blow even during normal load conditions.
 - ☐ B. The fuse will allow equipment to run at a higher current safely.
 - ☐ C. The fuse will offer improved protection from overloads without any drawback.
 - ☐ D. The fuse voltage rating will cause insulation breakdown in the circuit.

Q.57 Which type of MCB tripping curve is most appropriate for protecting standard domestic lighting circuits?

- Ans**
- ☐ A. Type A MCB
 - ☒ B. Type B MCB
 - ☐ C. Type D MCB
 - ☐ D. Type C MCB

Q.58 A technician is using the Murray loop test to locate a ground fault in a two-core cable. Which essential component must be connected to complete the test setup?

- Ans**
- ☒ A. A known resistance bridge circuit
 - ☐ B. A digital voltmeter
 - ☐ C. A clamp meter or tong tester
 - ☐ D. An earth leakage relay

Q.59 A drawing specifies a hole with 12.00 +0.02/-0.00 mm. What is the minimum permissible diameter of the hole?

- Ans**
- ☐ A. 12.01 mm
 - ☒ B. 12.00 mm
 - ☐ C. 12.02 mm
 - ☐ D. 12.20 mm

Q.60 Which factor is important when selecting a location for a distribution board in domestic wiring?

- Ans**
- ☒ A. Proximity to the load centre.
 - ☐ B. Brand of the distribution board.
 - ☐ C. Type of wiring used.
 - ☐ D. Number of rooms in the building.

Q.61 If a lightly loaded DC shunt generator experiences a continuous increase in its external load, how will its efficiency behave?

- Ans**
- ☐ A. Efficiency will increase at a constant rate with load.
 - ☐ B. Efficiency will remain constant at all load levels.
 - ☐ C. Efficiency will decrease steadily as load increases.
 - ☒ D. Efficiency will initially increase then decrease after a certain point.

Q.62 A house has a three-phase supply, but only single-phase loads are connected. How should the distribution board be configured?

- Ans**
- ☐ A. Install a single-phase distribution board
 - ☐ B. Use only one phase for all circuits
 - ☐ C. Connect all loads to a single phase busbar
 - ☒ D. Distribute single-phase loads evenly across all three phases

Q.63 When testing a three-phase motor feeder, the insulation resistance readings between phase conductors are as follows: L1-L2: 60 MΩ, L2-L3: 58 MΩ, L1-L3: 61 MΩ. What does this indicate about the wiring?

- Ans**
- ☐ A. The feeder has an open circuit in one of the phases
 - ☐ B. There is an inter-turn short circuit in the motor windings
 - ☐ C. Immediate replacement of the cable is required
 - ☒ D. The insulation between phase conductors is satisfactory

Q.64 During the short circuit test of a single-phase transformer, the wattmeter reading indicates which type of loss in a transformer?

- Ans**
- ☒ A. Copper loss at rated-current operating condition
 - ☐ B. Dielectric loss inside transformer insulation oil
 - ☐ C. Hysteresis loss under no-load operating condition
 - ☐ D. Core eddy current loss at rated magnetic flux

Q.65 Which of the following best describes the primary function of control wiring in appliance circuits?

- Ans**
- ☐ A. To provide direct power supply to appliances
 - ☐ B. To ground the electrical system for safety
 - ☐ C. To connect only protective devices
 - ☒ D. To transmit commands between control devices and lighting

Q.66 What is the power factor of a purely resistive AC circuit?

- Ans**
- ☐ A. It is less than 1
 - ☐ B. It is equal to 0
 - ☐ C. It is greater than 1
 - ☒ D. It is equal to 1

Q.67 A project manager is preparing a cost estimate for a new wiring installation. The estimate accounts for materials, labor, overhead, and profit. Which method best ensures the project stays financially secure if unexpected price increases or additional work occur?

- Ans**
- ☒ A. Including an appropriate contingency allowance in the estimate
 - ☐ B. Excluding the contingency from the estimate
 - ☐ C. Relying solely on historical cost data
 - ☐ D. Ignoring potential risks in the estimate

Q.68 If a differential compound generator is used in variable load applications, what will be the effect on terminal voltage?

- Ans**
- ☐ A. Terminal voltage remains unchanged with increasing load
 - ☒ B. Terminal voltage decreases with increase in load current
 - ☐ C. Terminal voltage fluctuates randomly
 - ☐ D. Terminal voltage increases with increasing load

Q.69 Which device is commonly used to measure voltage in a circuit with a digital display?

- Ans**
- ☒ A. Digital voltmeter
 - ☐ B. Digital ohmmeter
 - ☐ C. Digital ammeter
 - ☐ D. Digital wattmeter

Q.70 In an electric vehicle, which approach ensures both physical and visual safety when accessing high voltage components during maintenance?

Ans ☐ A. Marking high voltage areas with non-standard symbols

☐ B. Using enclosures without any color coding

☐ C. Applying only color coding without physical barriers

☒ D. Using enclosures with electrical protection barriers and standardized high voltage color coding

Q.71 Which part of an electric iron controls the temperature by switching the current on or off?

Ans ☐ A. Heating coil

☐ B. Soleplate

☒ C. Thermostat

☐ D. Indicator lamp

Q.72 A technician needs to maximize the lifespan of a lead-acid battery used in a solar backup system. Which charging and discharging practice should they strictly avoid to prevent weakening of the battery's plate structure?

Ans ☐ A. Charging the battery at a moderate rate over long periods

☐ B. Discharging the battery under light loads

☐ C. Maintaining the battery at constant voltage during use

☒ D. Charging and discharging the battery rapidly

Q.73 Which of the following statements describes a difference between incandescent lamps and fluorescent lamps used in illumination?

Ans ☐ A. Incandescent lamps are mainly used for decorative lighting, while fluorescent lamps are only for commercial use.

☐ B. Incandescent lamps are always tube-shaped, while fluorescent lamps are always round-shaped.

☒ C. Incandescent lamps produce light by heating a filament, while fluorescent lamps use a gas discharge process.

☐ D. Incandescent lamps are found only in table lamps, while fluorescent lamps are used only in ceiling fixtures.

Q.74 Which action causes the failure of voltage buildup in a self-excited DC generator?

Ans ☐ A. Maintaining proper residual magnetism

☐ B. Connecting the load after voltage builds up

☐ C. Running the generator at rated speed

☒ D. Increasing the field resistance beyond the critical resistance

Q.75 Which of the following is an example of equipment that uses mercury cells?

Ans ☐ A. Kitchen ovens

☐ B. Televisions

☐ C. Ceiling fans

☒ D. Calculators