



रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS
सीईएन - 05/25 - जेई, डीएमएस, सीएमए - CEN - 05/25 - JE, DMS, CMA



Test Date	02/07/2026
Test Time	9:00 AM - 11:00 AM
Subject / Exam Group	RRB JE Stage 2 Civil and Allied Engineering

* 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 : General Abilities

Q.1 If cell A1 = 10 and B1 = 20, what will `=A1+B1` return?

- Ans
- ☒ 1. Error
 - ☒ 2. 1020
 - ☒ 3. 30
 - ☒ 4. 200

Q.2 A construction worker needs to lift a heavy metal beam using a lever but has a limited length of plank. Which adjustment would allow the worker to lift the beam with the least effort if the position of the fulcrum can be changed but the plank length remains constant?

- Ans
- ☒ 1. Keep the fulcrum fixed at any point
 - ☒ 2. Move the fulcrum closer to the worker
 - ☒ 3. Move the fulcrum closer to the beam
 - ☒ 4. Place the fulcrum at the center of the plank

Q.3 Which new warship was commissioned by the Indian Navy in November, 2025, to strengthen anti-submarine and coastal defence capabilities?

- Ans
- ☒ 1. INS Mahe
 - ☒ 2. INS Vikrant
 - ☒ 3. INS Arnala
 - ☒ 4. INS Ikshak

Q.4 Which condition is required for a displacement reaction between a metal and salt solution?

- Ans
- ☒ 1. Metal must be same as salt constituent
 - ☒ 2. Salt must be insoluble in water
 - ☒ 3. Metal must be higher in reactivity series
 - ☒ 4. Reaction must be endothermic

Q.5 Which of the following statements is true about the Outbox?

- Ans
- ☒ 1. It is used to receive incoming emails.
 - ☒ 2. It holds emails that have been successfully sent.
 - ☒ 3. It temporarily stores emails that are queued for sending.
 - ☒ 4. It contains emails that are currently being drafted.

Q.6 The primary method of managing biodegradable domestic waste after collection is _____.

- Ans**
- ☐ 1. burnt in open air
 - ☒ 2. conversion into compost
 - ☐ 3. sending for recycling
 - ☐ 4. throwing into sewers

Q.7 A field exposed to excessive pesticide use shows a sharp decline in earthworm population. The resulting effect on soil is:

- Ans**
- ☐ 1. Increased water retention
 - ☐ 2. Enhanced decomposition
 - ☐ 3. Improved aeration
 - ☒ 4. Reduced soil fertility

Q.8 Who won the maximum number of medals at the 38th National Games of India?

- Ans**
- ☐ 1. Neeraj Chopra
 - ☐ 2. Manu Bhaker
 - ☒ 3. Dhinidhi Desinghu
 - ☐ 4. Bajrang Punia

Q.9 According to the Article 75 of the Indian Constitution, the total number of ministers (including the Prime Minister) in the Council of Ministers shall NOT exceed what percentage of the total members of the House of the People, i.e., Lok Sabha?

- Ans**
- ☒ 1. 15%
 - ☐ 2. 25%
 - ☐ 3. 20%
 - ☐ 4. 10%

Q.10 Which of the following is/are the primary reasons to fall in the trap of Email fraud or phishing?

- A) Paying attention to lucrative offers.
B) Not checking on links or attachments from unknown senders
C) Providing official information via email
D) Paying attention to the company logo sent in the email

- Ans**
- ☐ 1. A only
 - ☐ 2. A, B, D Only
 - ☐ 3. A, B Only
 - ☒ 4. A, B, C Only

Q.11 The atmospheric component that remains largely unreactive is _____.

- Ans**
- ☐ 1. Methane
 - ☒ 2. Argon
 - ☐ 3. Carbon dioxide
 - ☐ 4. Oxygen

Q.12 What is the main reason sulfur dioxide irritates the upper respiratory mucous membrane?

- Ans**
- ☐ 1. It combines with other pollutants and polymerizes in the lungs
 - ☐ 2. It oxidizes to sulphur trioxide and inhaled deep into lung
 - ☒ 3. It dissolves in moisture in upper respiratory tract and forms irritant
 - ☐ 4. It combines with haemoglobin and effect the oxygen transport

Q.13 In a real-life scenario, a chemist discovers a compound with the formula $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{OH}$. What is the correct IUPAC name for this compound?

- Ans**
- ☒ 1. 2-methylhexanol
 - ☒ 2. 3-methylpentan-1-ol
 - ☒ 3. 3-methylhexanol
 - ☒ 4. 4-methylpentanol

Q.14 On which date is National Handloom Day observed in India?

- Ans**
- ☒ 1. 2 October
 - ☒ 2. 5 September
 - ☒ 3. 18 August
 - ☒ 4. 7 August

Q.15 What is the general formula of alkenes?

- Ans**
- ☒ 1. $\text{C}_n\text{H}_{2n-2}$
 - ☒ 2. $\text{C}_n\text{H}_{2n+2}$
 - ☒ 3. C_nH_n
 - ☒ 4. C_nH_{2n}

Q.16 Biomedical waste handlers in a hospital are at risk of occupational hazards. The most effective way to protect them from exposure to infectious materials is:

- Ans**
- ☒ 1. Regular medical check-ups
 - ☒ 2. Segregation of waste into color-coded bins
 - ☒ 3. Use of protective equipment and safe handling
 - ☒ 4. Vaccination against common infections

Q.17 Which type of computer virus attaches itself to executable files and gets activated when the file is run?

- Ans**
- ☒ 1. Macro Virus
 - ☒ 2. Boot Sector Virus
 - ☒ 3. File Infector Virus
 - ☒ 4. Worm

Q.18 The primary goal of the Pradhan Mantri Gram Sadak Yojana (PMGSY) is to:

- Ans**
- ☒ 1. Develop urban infrastructure
 - ☒ 2. Provide rural connectivity through road construction
 - ☒ 3. Enhance telecommunication services in cities
 - ☒ 4. Promote renewable energy usage

Q.19 Which function returns the smallest value?

- Ans**
- ☒ 1. COUNT()
 - ☒ 2. MAX()
 - ☒ 3. AVERAGE
 - ☒ 4. MIN()

Q.20 Which of the following Articles states about the right of individual to form associations or unions or co-operative societies?

- Ans**
- ☒ 1. Article 19 (1) (a)
 - ☒ 2. Article 19 (1) (b)
 - ☒ 3. Article 19 (1) (d)
 - ☒ 4. Article 19 (1) (c)

Q.21 A student accidentally spills some hydrochloric acid on a table. Which substance should be used to neutralise the acid safely?

- Ans**
- ☐ 1. Vinegar
 - ☐ 2. Lemon juice
 - ☒ 3. Baking soda solution
 - ☐ 4. Sugar solution

Q.22 Which pair of sectors is commonly addressed together in State Action Plan on Climate Change (SAPCC) adaptation planning?

- Ans**
- ☐ 1. Textile design and fashion marketing
 - ☒ 2. Water resources and health systems
 - ☐ 3. Heavy industry and entertainment
 - ☐ 4. Information technology and space research

Q.23 The term 'smog' is a combination of _____.

- Ans**
- ☐ 1. Smog and mist
 - ☒ 2. Smoke and fog
 - ☐ 3. Smoke and haze
 - ☐ 4. Fog and clouds

Q.24 Match the following columns.

Pardoning power	Function
1. Commutation	a. Removes both sentence and the conviction.
2. Reprieve	b. Lesser sentence than originally given, in special cases
3. Respite	c. Reducing the period of sentence without changing the nature of the sentence.
4. Remission	d. Temporary stay on the execution of a sentence.
5. Pardon	e. Substitution of one form of punishment to a lighter one

- Ans**
- ☒ 1. 1-e, 2-d, 3-b, 4-c, 5-a
 - ☐ 2. 1-c, 2-e, 3-b, 4-a, 5-d
 - ☐ 3. 1-a, 2-c, 3-d, 4-e, 5-b
 - ☐ 4. 1-d, 2-b, 3-e, 4-c, 5-a

Q.25 Which British colonial building in Mumbai, completed in 1888, showcases a blend of Victorian Gothic and Indian architectural elements?

- Ans**
- ☐ 1. Bombay Town Hall
 - ☐ 2. Gateway of India
 - ☐ 3. Rajabai Clock Tower
 - ☒ 4. Chhatrapati Shivaji Maharaj Terminus

Q.26 Which of the following options must be DISABLED before manually setting the date and time in Windows?

- Ans**
- ☐ 1. Set time zone globally
 - ☒ 2. Set time automatically
 - ☐ 3. Night Light
 - ☐ 4. Enable multiple clocks

Q.27 The Atal Bhujal Yojana 2020 focused on improving water resources management of how many states?

- Ans**
- ☐ 1. five
 - ☒ 2. seven
 - ☐ 3. eight
 - ☐ 4. ten

Q.28 A student pushes a heavy box that is already moving across a rough floor. If the force applied by the student is exactly equal to the frictional force opposing the motion, what will happen to the box?

- Ans**
- ☐ 1. The box will gradually come to rest
 - ☒ 2. The box will move at a constant speed
 - ☐ 3. The box will accelerate forward
 - ☐ 4. The box will move at increasing speed

Q.29 How can we locate a file with a known extension but an unknown name in a large directory?

- Ans**
- ☐ 1. Through File Explorer
 - ☒ 2. Using the Search box in File Explorer with *.ext
 - ☐ 3. Checking the Recycle Bin
 - ☐ 4. Using the dir command

Q.30 Which of the following statements best describes how the power of accommodation enables the human eye to focus on both near and distant objects?

- Ans**
- ☐ 1. The cornea provides all the focusing power required for clear vision
 - ☐ 2. The retina moves forward and backward to adjust the focus
 - ☒ 3. The eye lens changes its focal length by altering its shape through ciliary muscle action
 - ☐ 4. The iris controls the amount of light entering and helps to focus

Q.31 According to Thomson's model, how are electrons arranged in an atom?

- Ans**
- ☐ 1. Moving in fixed orbits around the nucleus
 - ☐ 2. Randomly placed inside the nucleus
 - ☒ 3. Embedded in a positively charged sphere like seeds in a watermelon
 - ☐ 4. Orbiting around neutrons in elliptical paths

Q.32 Consider the following statements regarding chemical reactions and choose the correct option.

Statement I: Every reaction in which two or more reactants combine to form a single product is classified as a combination reaction regardless of heat change.

Statement II: The reaction $\text{CaO(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Ca(OH)}_2\text{(aq)} + \text{heat}$ is both a combination reaction and an exothermic reaction.

- Ans**
- ☒ 1. Both statements are correct
 - ☐ 2. Both statements are incorrect
 - ☐ 3. Only Statement I is correct
 - ☐ 4. Only Statement II is correct

Q.33 Which of the following best describes the velocity-time graph for an object moving with uniform velocity?

- Ans**
- ☒ 1. A straight horizontal line parallel to the time axis
 - ☐ 2. A curved line above the time axis
 - ☐ 3. A straight line sloping upwards from the time axis
 - ☐ 4. A line starting from the origin and sloping upwards

Q.34 Which of the following indicators is NOT typically used to measure sustainable development?

- Ans**
- ☐ 1. Biocapacity
 - ☐ 2. Human Development Index (HDI)
 - ☒ 3. Gross Domestic Product (GDP) growth rate
 - ☐ 4. Ecological Footprint

Q.35 You want to automatically advance slides with narration and animations during a presentation. Which MS PowerPoint feature should you use to achieve this?

- Ans**
- ☐ 1. Slide Sorter
 - ☐ 2. Action Buttons
 - ☒ 3. Rehearse Timings
 - ☐ 4. Presenter View

Q.36 The pollutant group commonly associated with oil spills in oceans is _____.

- Ans**
- ☐ 1. agricultural pesticides
 - ☐ 2. chemical fertilizers
 - ☒ 3. petroleum products
 - ☐ 4. synthetic detergents

Q.37 A farmer applies large amounts of chemical fertilizers over several years. Which consequence most likely results from this practice leading to soil pollution?

- Ans**
- ☐ 1. Faster plant growth every season
 - ☐ 2. Increase in earthworm population
 - ☒ 3. Accumulation of toxic substances in soil
 - ☐ 4. Erosion of surface soil layers

Q.38 When was the 11th National Handloom Day celebrated across India under the coordination of the Ministry of Textiles?

- Ans**
- ☐ 1. October 7, 2025
 - ☐ 2. September 7, 2025
 - ☒ 3. August 7, 2025
 - ☐ 4. November 7, 2025

Q.39 Which Quick Style type is applied only to selected words or individual characters within a paragraph in MS Word 2010?

- Ans**
- ☒ 1. Character styles
 - ☐ 2. Linked styles
 - ☐ 3. Paragraph styles
 - ☐ 4. Page styles

Q.40 The Mappila Uprisings of the 19th century occurred mainly in which region of India?

- Ans**
- ☐ 1. Coromandel Coast of Tamil Nadu
 - ☐ 2. Sunderbans region of West Bengal
 - ☐ 3. Konkan region of Maharashtra
 - ☒ 4. Malabar region of Kerala

Q.41 Which of the following best describes how sound travels through air?

- Ans**
- ☐ 1. The air particles move in circular paths as the wave passes
 - ☐ 2. The air particles remain stationary while the wave moves through
 - ☐ 3. The air particles vibrate up and down perpendicular to the direction of the wave
 - ☒ 4. The air particles vibrate back and forth parallel to the direction of the wave

Q.42 The Kol Rebellion (1831–32) mainly affected which plateau region?

- Ans**
- ☒ 1. Chotanagpur Plateau
 - ☐ 2. Malwa Plateau
 - ☐ 3. Deccan Plateau
 - ☐ 4. Meghalaya Plateau

Q.43 If 10 grams of salt are dissolved in 100 mL of water, which component is the solute?

- Ans**
- ☐ 1. Neither
 - ☐ 2. Water only
 - ☐ 3. Both salt and water
 - ☒ 4. Salt only

Q.44 A factory plans to install a powerful electromagnet for lifting metal scraps. To maximize the magnetic field strength around the coil, which of the following combinations would be most effective?

- Ans**
- ☒ 1. Using a soft iron core, increasing coil turns, and increasing current through the coil
 - ☐ 2. Using an air core, decreasing coil turns, and keeping current constant
 - ☐ 3. Using a copper core, increasing coil turns, and lowering current
 - ☐ 4. Using a steel core, decreasing coil turns, and lowering current

Q.45 Which of the following satellites was launched on November 2, 2025, to enhance the Indian Navy's secure communication network and maritime surveillance capabilities?

- Ans**
- ☐ 1. Cartosat-3
 - ☐ 2. RISAT-2B
 - ☒ 3. CMS-03 (GSAT-7R)
 - ☐ 4. GSAT-6A

Q.46 What file extension is used to save an MS PowerPoint 2021 presentation?

- Ans**
- ☐ 1. .docx
 - ☐ 2. .pdf
 - ☒ 3. .pptx
 - ☐ 4. .xlsx

Q.47 Which of the following rivers forms a delta along the eastern coastal plains?

- Ans**
- ☐ 1. Ganga
 - ☐ 2. Narmada
 - ☐ 3. Tapi
 - ☒ 4. Godavari

Q.48 Which experimental discovery contradicted Thomson's model of the atom and led to its rejection?

- Ans**
- ☒ 1. Alpha particle scattering showing deflection at large angles
 - ☐ 2. Discovery of the neutron by James Chadwick
 - ☐ 3. Measurement of atomic radius using X-ray diffraction
 - ☐ 4. Observation of line spectra of hydrogen by Bohr

Q.49 Which of the following is a primary mission under India's National Action Plan on Climate Change (NAPCC)?

- Ans**
- ☐ 1. National Nutrition Mission
 - ☐ 2. National Highway Development Project
 - ☒ 3. National Solar Mission
 - ☐ 4. National Rural Livelihood Mission

Q.50 Which of the following statements best describes the behavior of magnetic field lines around a straight current-carrying conductor?

- Ans**
- ☒ 1. They form concentric circles centered on the conductor.
 - ☐ 2. They radiate straight outward from the wire.
 - ☐ 3. They are parallel straight lines along the wire.
 - ☐ 4. They change direction randomly along the wire.

Section : Technical Abilities

Q.1 What is the importance of the narrower bottom in oval-shaped sewers during low-flow conditions?

- Ans**
- ☐ 1. Easier maintenance access
 - ☐ 2. Enhanced structural strength
 - ☒ 3. Maintained higher flow velocity
 - ☐ 4. Reduced construction cost

Q.2 A summit curve is provided on a road profile where:

- Ans**
- ☐ 1. Two ascending gradients intersect smoothly
 - ☒ 2. An ascending gradient meets a falling one
 - ☐ 3. Two descending gradients come together
 - ☐ 4. A descending gradient meets a level section

Q.3 The primary function of the switch rails in a turnout is to:

- Ans**
- ☒ 1. Guide wheels from main line to turnout line
 - ☐ 2. Provide structural stability
 - ☐ 3. Provide a smooth passage through the crossing
 - ☐ 4. Maintain proper gauge

Q.4 Which material is preferred for railway track ballast?

- Ans**
- ☐ 1. Sand
 - ☐ 2. Gravel
 - ☒ 3. Crushed stone
 - ☐ 4. Lime

Q.5 How does a barrage differ from a dam?

- Ans**
- ☒ 1. A barrage regulates river flow using gates, while a dam stores water in a reservoir.
 - ☐ 2. A dam controls only floods, while a barrage is used for irrigation.
 - ☐ 3. A barrage is used for hydroelectric power generation, whereas a dam is not.
 - ☐ 4. A dam is always smaller in height compared to a barrage.

Q.6 For compression members, the I-section is preferred because it _____.

- Ans**
- ☐ 1. requires more material to provide equivalent strength
 - ☐ 2. has better resistance to lateral-torsional buckling
 - ☒ 3. has a lower weight for the same strength
 - ☐ 4. is more flexible compared to other sections

Q.7 The primary purpose of a seal coat in bituminous pavement construction is to:

- Ans**
- ☐ 1. replace the bituminous binder layer
 - ☐ 2. strengthen the granular base
 - ☐ 3. improve the compaction of subgrade soil
 - ☒ 4. provide skid resistance and waterproofing

Q.8 The property of timber which enables it to absorb sudden shocks or impact loads is called _____.

- Ans**
- ☐ 1. Tenacity
 - ☐ 2. Elasticity
 - ☐ 3. Hardness
 - ☒ 4. Toughness

Q.9 In urban planning, GIS is commonly used to:

- Ans**
- ☒ 1. analyse traffic patterns and optimise signal timings
 - ☐ 2. calculate the cost of concrete per cubic meter
 - ☐ 3. determine the color scheme of buildings
 - ☐ 4. measure the weight of vehicles directly

Q.10 Which of the following advanced technologies is commonly used to ensure uniform compaction of concrete in modern construction projects?

- Ans**
- ☐ 1. Manual tamping methods
 - ☐ 2. Laser levelling devices
 - ☐ 3. High-pressure water jets
 - ☒ 4. Vibratory compaction equipment

Q.11 Which combination of factors is most likely to result in cracks due to shrinkage in plaster?

- Ans**
- ☐ 1. Thick coat with slow drying conditions
 - ☐ 2. Thin coat and moist curing process
 - ☐ 3. Thin coat with slow drying conditions
 - ☒ 4. Application of thick coat and rapid drying

Q.12 Higher water absorption in coarse aggregates indicates:

- Ans**
- ☐ 1. increased workability of concrete
 - ☐ 2. better bonding with cement
 - ☒ 3. higher porosity and lower strength
 - ☐ 4. higher durability of concrete

Q.13 Which of the following best explains why timber with straight grains is often preferred for structural use?

- Ans**
- ☐ 1. Straight grains reduce the weight of the timber.
 - ☐ 2. Straight grains make the timber more flexible.
 - ☒ 3. Straight grains provide uniform strength.
 - ☐ 4. Straight grains increase the hardness significantly.

Q.14 As per Indian Railways standards, what is the degree of curvature for a railway curve with a radius of 875 m?

- Ans**
- ☐ 1. 3°
 - ☒ 2. 2°
 - ☐ 3. 4°
 - ☐ 4. 1°

Q.15 As per IRC:SP:90-2010, the minimum vertical clearance requirement for road underpasses is:

- Ans**
- ☐ 1. 3.5 m for minor roads only
 - ☐ 2. 6.25 m above railway track level
 - ☐ 3. 4.5 m in all cases
 - ☒ 4. 5.0 m in general and 5.5 m in urban areas

Q.16 Which of the following statements is NOT correct about working drawings?

- Ans**
- ☐ 1. They are detailed drawings of the building.
 - ☐ 2. They are drawn to a suitable scale.
 - ☒ 3. They do not include schedule of openings.
 - ☐ 4. They are fully dimensioned.

Q.17 Which of the following should be minimized in the design of a tension member?

- Ans**
- ☐ 1. Gross sectional area
 - ☐ 2. Allowable stress in tension
 - ☒ 3. Deduction for rivet and bolt holes
 - ☐ 4. Net sectional area

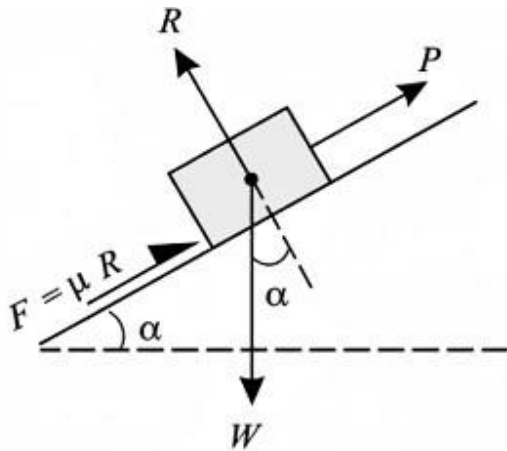
Q.18 A drafter needs to create a parallel copy of an existing line at a specified distance while keeping the original line unchanged. Which AutoCAD command is most suitable for this task?

- Ans**
- ☐ 1. Extend
 - ☐ 2. Stretch
 - ☒ 3. Offset
 - ☐ 4. Break

Q.19 A uniform bar is heated uniformly but prevented from expanding in any direction. What type of internal stress develops as a result?

- Ans**
- ☐ 1. Tensile stress
 - ☐ 2. No stress
 - ☐ 3. Bending stress
 - ☒ 4. Compressive stress

- Q.20** A block of weight (W) rests on a rough inclined plane with an angle of inclination α shown in the figure. The coefficient of friction between the block surface and the plane is μ , R is the normal reaction perpendicular to the inclined plane. A force (P) is applied parallel to the plane to prevent the block from sliding down. Which of the following represents the minimum value of (P) required to maintain equilibrium?



- Ans**
- ☒ 1. $P = W (\cos \alpha - \mu \sin \alpha)$
 - ☒ 2. $P = W (\sin \alpha - \mu \cos \alpha)$
 - ☒ 3. $P = W (\cos \alpha - \tan \alpha)$
 - ☒ 4. $P = W (\sin \alpha + \mu \cos \alpha)$

- Q.21** Which statement best describes the primary structural function of pile caps in foundation systems?

- Ans**
- ☒ 1. Connecting foundation piles directly to floor beams
 - ☒ 2. Protecting exposed pile surfaces from environmental damage
 - ☒ 3. Providing waterproof protection around foundation piles
 - ☒ 4. Distributing structural loads among supporting piles

- Q.22** Which layer of soil is compacted to increase its bearing strength and reduce settlement in construction work?

- Ans**
- ☒ 1. Base layer
 - ☒ 2. Surface layer
 - ☒ 3. Subgrade layer
 - ☒ 4. Topsoil layer

- Q.23** In the context of brick masonry, what distinguishes modular bricks from traditional bricks?

- Ans**
- ☒ 1. Traditional bricks are produced in larger standard sizes
 - ☒ 2. Modular bricks are produced with standardized dimensions
 - ☒ 3. Modular bricks are manufactured mainly by manual methods
 - ☒ 4. Traditional bricks are manufactured using lightweight materials

- Q.24** The minimum slope for an accessible ramp as per most building codes is _____.

- Ans**
- ☒ 1. 1 : 12
 - ☒ 2. 1 : 25
 - ☒ 3. 1 : 15
 - ☒ 4. 1 : 20

Q.25 Under which of the following types of the dampness-checking materials categories, does cement concrete fall?

- Ans**
- ☐ 1. flexible
 - ☒ 2. rigid
 - ☐ 3. grout
 - ☐ 4. temporary

Q.26 Which type of glass is commonly used in doors and windows?

- Ans**
- ☐ 1. Flint glass
 - ☐ 2. Lead glass
 - ☐ 3. Borosilicate glass
 - ☒ 4. Soda-lime glass

Q.27 Which layer prevents leachate migration in landfills?

- Ans**
- ☐ 1. Soil Cover
 - ☐ 2. Gas Vent
 - ☒ 3. Impermeable Liner
 - ☐ 4. Waste Layer

Q.28 Which of the following types of flooring is preferably used in dancing halls and in auditoriums?

- Ans**
- ☐ 1. Brick Flooring
 - ☐ 2. Porcelain Tile flooring
 - ☒ 3. Timber Flooring
 - ☐ 4. Ceramic Tile flooring

Q.29 Which method is primarily used to fill cracks, voids, and fissures in loose gravels and rocky strata?

- Ans**
- ☒ 1. Grouting
 - ☐ 2. Cavity wall construction
 - ☐ 3. Surface treatment
 - ☐ 4. Guniting

Q.30 A louvered door is ideal for which type of location within a building?

- Ans**
- ☐ 1. Main entrance
 - ☒ 2. Laundry room
 - ☐ 3. Garage door
 - ☐ 4. Emergency exit

Q.31 In a micro-optic theodolite, the optical path used for reading angles is typically:

- Ans**
- ☒ 1. Optical and magnified via micrometer eyepiece
 - ☐ 2. Manual and scale-based
 - ☐ 3. Satellite via micrometer eyepiece
 - ☐ 4. Interferometric

Q.32 Which of the following is the function of a head regulator in a barrage?

- Ans**
- ☐ 1. To prevent erosion of riverbanks
 - ☐ 2. To prevent the river from outflanking the barrage
 - ☒ 3. To admit water into the off taking canal
 - ☐ 4. To serve as one side wall of fish ladder

Q.33 The quantity estimation of structural timber work (wooden beams) is generally calculated based on:

- Ans**
- ☒ 1. Volume of timber used
 - ☐ 2. Number of rooms
 - ☐ 3. Weight of timber used
 - ☐ 4. Floor area of building

Q.34 A door designed with inclined slats to permit ventilation while restricting direct visibility is classified as which type?

- Ans**
- ☐ 1. Panel door
 - ☐ 2. Flush door
 - ☒ 3. Louvered door
 - ☐ 4. Collapsible door

Q.35 The assumption in pure bending that plane sections remain plane after bending leads to which stress distribution?

- Ans**
- ☐ 1. Parabolic stress variation
 - ☐ 2. Uniform stress throughout the depth
 - ☐ 3. Exponential stress variation
 - ☒ 4. Linear stress variation

Q.36 In soil mechanics, the seepage velocity is related to the discharge velocity and porosity of the soil. Which of the following statements is correct?

- Ans**
- ☐ 1. Seepage velocity is independent of soil porosity.
 - ☒ 2. Seepage velocity is equal to discharge velocity divided by porosity.
 - ☐ 3. Seepage velocity is equal to discharge velocity multiplied by porosity.
 - ☐ 4. Seepage velocity is always less than discharge velocity.

Q.37 Which of the following types of welds is primarily designed to transmit shear forces in a connection?

- Ans**
- ☐ 1. Butt weld
 - ☐ 2. Groove weld
 - ☒ 3. Fillet weld
 - ☐ 4. Slot weld

Q.38 What is the recommended sequence for setting CAD software on a computer without operating system (OS)?

- Ans**
- ☐ 1. Download drawing - Start drawing - Install CAD
 - ☒ 2. Install OS - Install CAD software - Configure settings
 - ☐ 3. Launch Software - Install key drivers - Install OS
 - ☐ 4. Create layers - Save file - Install OS

Q.39 Which modelling method in CAD is used for creating and manipulating the external, visible surfaces of a 3D object, focusing on the shape, aesthetics, and form rather than its internal structure?

- Ans**
- ☐ 1. Solid modelling
 - ☒ 2. Surface modelling
 - ☐ 3. Isometric projection
 - ☐ 4. Parametric modelling

Q.40 In fluid mechanics, zero absolute pressure corresponds to which condition?

- Ans**
- ☒ 1. Perfect vacuum
 - ☐ 2. Atmospheric pressure
 - ☐ 3. Gauge pressure
 - ☐ 4. Superheated steam

Q.41 _____ formwork is used for continuous vertical structures like chimneys, silos, and towers.

- Ans**
- ☒ 1. Slip
 - ☐ 2. Steel
 - ☐ 3. Plastic
 - ☐ 4. Timber

Q.42 Which of the following is a necessary condition for plane table surveying?

- Ans**
- ☒ 1. The plane table must be levelled and properly oriented at each station
 - ☐ 2. Only a single station is required for the entire survey
 - ☐ 3. Contours must be measured and plotted before starting the survey
 - ☐ 4. All the stations must be established on a slope of the terrain

Q.43 Which of the following correctly represents the concrete contribution to shear strength V_c in Limit State Method (LSM) design?

- Ans**
- ☐ 1. V_c is neglected entirely in shear design
 - ☐ 2. V_c is always taken equal to the total applied shear force
 - ☒ 3. V_c is calculated based on concrete grade (f_{ck})
 - ☐ 4. V_c depends only on the tensile strength of concrete

Q.44 The amber signal in traffic control is meant to:

- Ans**
- ☐ 1. Function as a flashing warning light during off-peak hours
 - ☐ 2. Indicate that crossing traffic has the right of way
 - ☐ 3. Indicate that vehicles must continue moving without interruption for same movement
 - ☒ 4. Indicate transition between stop and go, warning drivers to clear or prepare to stop

Q.45 Which equipment is most suitable for tunnel excavation in medium-strength rock where precise profiling is required?

- Ans**
- ☐ 1. Dragline excavator
 - ☐ 2. Hydraulic hammer
 - ☒ 3. Tunnel Boring Machine (TBM)
 - ☐ 4. Explosives

Q.46 In considering thermosetting plastics versus thermoplastics for a high-heat application, which type should be chosen and why?

- Ans**
- ☐ 1. Thermosetting plastics, because they get remoulded upon heating
 - ☐ 2. Thermoplastics, because they do not soften on heating
 - ☒ 3. Thermosetting plastics, because they do not soften on heating
 - ☐ 4. Thermoplastics, because they are heat resistant

Q.47 In a reinforced concrete beam, the development length is provided to prevent _____.

- Ans**
- ☐ 1. crushing of concrete
 - ☐ 2. torsional failure
 - ☐ 3. excessive deflection
 - ☒ 4. slipping of reinforcement

Q.48 Which of the following is a direct health effect of prolonged exposure to high levels of noise pollution?

- Ans**
- ☐ 1. Improved memory
 - ☐ 2. Increased appetite
 - ☐ 3. Skin irritation
 - ☒ 4. High blood pressure

Q.49 The friction factor used in geometric design of highways is provided by the:

- Ans**
- ☒ 1. Indian Road Congress (IRC)
 - ☐ 2. Bureau of Indian Standards (BIS)
 - ☐ 3. Ministry of Railways
 - ☐ 4. National Highways Authority

Q.50 Which material in section is represented by the hatch shared below as per IS 982 (1989)?



- Ans**
- ☒ 1. Concrete
 - ☐ 2. Earth
 - ☐ 3. Brick
 - ☐ 4. Wood

Q.51 Which type of soil requires deeper excavation to avoid structural damage due to swelling and shrinkage?

- Ans**
- ☐ 1. Sandy soil
 - ☒ 2. Black cotton soil
 - ☐ 3. Gravelly soil
 - ☐ 4. Loamy soil

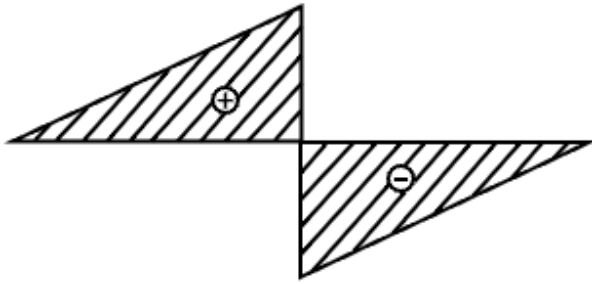
Q.52 With respect to shear strength of soils, refer to the following Assertion and Reason and select the correct statement from the options given.

Assertion (A): For cohesionless soils, the failure does not occur on the plane of maximum shear stress.

Reason (R): Failure in soil takes place due to shear failure when compressive load is applied.

- Ans**
- ☐ 1. Both A and R are true and R is the correct explanation of A.
 - ☐ 2. A is false and R is true.
 - ☒ 3. Both A and R are true and R is not the correct explanation of A.
 - ☐ 4. A is true and R is false.

Q.53 The following bending moment diagram corresponds to a simply supported beam. The diagram shows a sudden jump (discontinuity) in bending moment at a point between the supports. Which of the following loading conditions produces this type of bending moment diagram?



B.M. Diagram

- Ans**
- ☒ 1. A concentrated load acting at the midpoint of the beam
 - ☒ 2. A uniformly distributed load acting over the entire span
 - ☒ 3. A couple acting at a point between the supports
 - ☒ 4. Equal and opposite vertical forces acting at the supports

Q.54 What is a common shape of steel fibers used in fiber-reinforced concrete?

- Ans**
- ☒ 1. Cylindrical
 - ☒ 2. Cubic
 - ☒ 3. Round
 - ☒ 4. Hooked-end

Q.55 The cut section in the method of sections must satisfy which of the following conditions? (Consider that not more than two members are meeting at a joint.)

- Ans**
- ☒ 1. It should be made parallel to the support reactions.
 - ☒ 2. It should pass through at most three members of a truss.
 - ☒ 3. It should be taken only at the midpoint of the truss.
 - ☒ 4. It should pass through at least four members.

Q.56 Removal of topsoil, grading to formation level, and forming cuttings or embankments during earthworks is most effectively carried out using which of the following equipment?

- Ans**
- ☒ 1. Concrete mixer
 - ☒ 2. Pile driver
 - ☒ 3. Tower crane
 - ☒ 4. Tractor shovel with a 4-in-1 bucket

Q.57 Which of the following is an essential component commonly included in a construction tender document?

- Ans**
- ☒ 1. Project drawings prepared without technical specifications
 - ☒ 2. Technical specifications describing project requirements
 - ☒ 3. Promotional brochures issued for project advertisement
 - ☒ 4. Financial records of all participating contractors

Q.58 What is the primary risk of placing concrete in cold weather?

- Ans**
- ☒ 1. Higher heat of hydration
 - ☒ 2. Increased setting time
 - ☒ 3. Increased air content
 - ☒ 4. Increased hydration rate

Q.59 Which of the following is the non-recording type of rain gauge prescribed by the India Meteorological Department?

- Ans**
- ☐ 1. Weighted bucket rain gauge
 - ☒ 2. Symon's rain gauge
 - ☐ 3. Tipping bucket rain gauge
 - ☐ 4. Float type rain gauge

Q.60 Soda-lime glass is predominantly utilised in architectural construction for:

- Ans**
- ☐ 1. thermal insulation boards
 - ☐ 2. fire-resistant partitions
 - ☒ 3. transparent window panes and glazing
 - ☐ 4. structural load-bearing components

Q.61 According to IS 1892:2021, for a compact building site of about 0.4 hectare area, what is the recommended minimum number and location of boreholes or test pits for soil investigation?

- Ans**
- ☐ 1. Boreholes spaced uniformly every 50 meters over the site
 - ☐ 2. One borehole or test pit at the center of the site only
 - ☐ 3. At least ten boreholes evenly spaced regardless of site size
 - ☒ 4. One borehole or test pit at each corner and one at the center

Q.62 Which type of shoring is used when a building needs to be temporarily supported due to excavation nearby?

- Ans**
- ☐ 1. Flying shoring
 - ☐ 2. Dead shoring
 - ☒ 3. Raking shoring
 - ☐ 4. Underpinning

Q.63 Which is the most appropriate definition of the origin point in an AutoCAD 2D co-ordinate system?

- Ans**
- ☐ 1. Measured distance from the cursor to previous location
 - ☐ 2. Measured distance from a fixed reference point
 - ☒ 3. 0,0 location
 - ☐ 4. Effective diameter of the cursor on screen

Q.64 During a rapid field test for identifying fine-grained soil, a wetted sample is shaken vigorously in the palm of the hand. If the surface quickly becomes glossy or wet (exhibits 'quicker' behavior), and the gloss disappears immediately upon squeezing the sample, which soil type is the sample most likely to be?

- Ans**
- ☐ 1. Highly plastic clay (CH)
 - ☐ 2. Organic clay (OH)
 - ☐ 3. Lean clay (CL)
 - ☒ 4. Inorganic silt (ML)

Q.65 What is an effective way to limit settlement due to subsoil moisture movement?

- Ans**
- ☐ 1. Increasing the height of the masonry wall structure
 - ☒ 2. Providing plinth protection and proper compaction
 - ☐ 3. Adding additional reinforcement within the foundation system
 - ☐ 4. Reducing the thickness of the foundation wall structure

- Q.66** Which of the following sets of details is typically shown in a building section drawing?
- Ans**
- ☒ 1. Plinth height, storey heights, thickness of walls, and sizes of structural members
 - ☐ 2. Site boundaries, north direction, plot dimensions, and road access information
 - ☐ 3. Location of furniture, electrical switch positions, drainage lines, and door numbers
 - ☐ 4. Carpet area, number of rooms, exterior color, and type of flooring used

- Q.67** When reactions are found graphically for a simply supported beam with vertical point loads, the length of the reaction vector is proportional to:
- Ans**
- ☐ 1. The span length of the beam only
 - ☐ 2. The distance between loads
 - ☐ 3. The beam's deflection at mid span
 - ☒ 4. The magnitude of reaction force at the support

- Q.68** For a symmetrical channel section with a moment of inertia $I_{xx} = 9.45 \times 10^7 \text{ mm}^4$ and an area $A = 4500 \text{ mm}^2$, what is its radius of gyration k_{xx} ?
- Ans**
- ☐ 1. 175.48 mm
 - ☐ 2. 159.56 mm
 - ☒ 3. 144.92 mm
 - ☐ 4. 116.34 mm

- Q.69** Identify the correct statement(s) about a change point in a levelling operation.
- Statement I : It is also known as turning point.
Statement II : The plus sight is taken on the change point on one set of instrument to ascertain the elevation of the point.
Statement III : The minus sight is taken on the change point to establish the new height of the instrument.
- Ans**
- ☒ 1. Statement I and III only
 - ☐ 2. Statement I and II only
 - ☐ 3. Statement I only
 - ☐ 4. Statement III only

- Q.70** Which of the following is a limitation of the Direct Shear Test?
- Ans**
- ☐ 1. The test cannot measure shear strength parameters like cohesion and angle of internal friction.
 - ☒ 2. The failure plane is predetermined and may not be the weakest plane in the soil specimen.
 - ☐ 3. It can only be used for clayey soils and not for sandy soils.
 - ☐ 4. It requires a very long time to conduct, making it unsuitable for quick analysis.

- Q.71** Which of the following automatic rain gauges gives a continuous graph of rainfall vs. time?
- Ans**
- ☐ 1. Symons gauge
 - ☐ 2. Non-recording gauge
 - ☒ 3. Float type recording gauge
 - ☐ 4. Tipping bucket gauge

- Q.72** In a homogenous and prismatic continuous beam under uniformly distributed load, the bending moment at an intermediate support is:
- (Consider that the length of each intermediate span measures the same.)
- Ans**
- ☐ 1. sagging
 - ☐ 2. equal to the midspan moment
 - ☐ 3. zero
 - ☒ 4. hogging

Q.73 During maintenance, a valve in a water supply system needs to be shut. To avoid water hammer, the valve should be:

- Ans**
- ☐ 1. Left open
 - ☐ 2. Closed halfway
 - ☒ 3. Closed gradually
 - ☐ 4. Closed immediately

Q.74 The fineness of cement is generally expressed in terms of specific surface, which is measured in:

- Ans**
- ☐ 1. kg/cm²
 - ☐ 2. cm²-g
 - ☒ 3. m²/kg
 - ☐ 4. m²-g

Q.75 In energy recovery systems, which of the following pollutants is/are carefully monitored due to health hazards during incineration?

- Ans**
- ☐ 1. Methane
 - ☐ 2. Oxygen
 - ☒ 3. Dioxins
 - ☐ 4. Nitrogen

Q.76 In a building drawing, a sectional elevation is prepared by imagining a vertical cut through the structure from top to bottom. Which additional information is mainly obtained from a sectional elevation compared to a front elevation?

- Ans**
- ☐ 1. Plot boundaries, setback distances, and site alignment details
 - ☐ 2. Location of rooms, circulation passages, and furniture arrangement details
 - ☐ 3. External appearance of walls, front architectural style, and side view details
 - ☒ 4. Cut portions of structural elements, plinth levels, and foundation details

Q.77 Which type of engineering contract involves payment for actual quantities of work done at agreed rates?

- Ans**
- ☐ 1. Lump sum contract
 - ☐ 2. Turnkey contract
 - ☐ 3. Cost-plus contract
 - ☒ 4. Item rate contract

Q.78 The maximum stress induced in a member is always:

- Ans**
- ☐ 1. equal to the minimum stress
 - ☐ 2. less than the average stress
 - ☐ 3. zero in tension
 - ☒ 4. greater than or equal to the average stress

Q.79 Which of the following is NOT a type of clay tile for roofing?

- Ans**
- ☐ 1. Spanish tile
 - ☐ 2. Mangalore pattern tile
 - ☒ 3. Terracotta Jali
 - ☐ 4. Allahabad tile

Q.80 If the calculated nominal shear stress τ_v in a reinforced concrete beam exceeds the maximum permissible shear stress in concrete $\tau_{c, \max}$ as per IS 456:2000, what is the appropriate course of action?

- Ans**
- ☐ 1. Use a lower grade of concrete to reduce stress
 - ☐ 2. Increase the beam width only
 - ☐ 3. Provide additional shear reinforcement only
 - ☒ 4. Increase the effective depth of the beam or redesign the section

Q.81 Which roof type is most suitable for covering spans greater than 9 m?

- Ans**
- ☐ 1. Aisle Roof
 - ☐ 2. King post truss
 - ☒ 3. Queen post truss
 - ☐ 4. Couple Roof

Q.82 A body is resting on a rough inclined plane. If the frictional force is equal to the component of weight along the plane, the body is in:

- Ans**
- ☐ 1. free fall
 - ☐ 2. acceleration
 - ☐ 3. uniform motion
 - ☒ 4. equilibrium

Q.83 Which type of stone is laid with its length perpendicular to the face of the wall so that it extends into the thickness of the wall in stone masonry?

- Ans**
- ☐ 1. Tail
 - ☐ 2. Stretcher
 - ☒ 3. Header
 - ☐ 4. Bed

Q.84 A simply supported beam has a span of 6 m with an overhang of 4 m. A uniformly distributed load (UDL) of 6 kN/m acts over the overhang length of 4 m. What is the reaction at the nearest support?

- Ans**
- ☒ 1. 32 kN
 - ☐ 2. 24 kN
 - ☐ 3. 6 kN
 - ☐ 4. 10 kN

Q.85 What is the primary purpose of pressure grouting in building foundation treatment work?

- Ans**
- ☒ 1. Improving soil strength and reducing water penetration below foundation structures
 - ☐ 2. Supporting internal wall finishes against mechanical damage during building service
 - ☐ 3. Applying protective surface coating for improving appearance of foundation surfaces
 - ☐ 4. Increasing thermal insulation performance within external foundation wall assemblies

Q.86 As per IS 17953 : 2023 (uPVC Profiles for Windows and Doors — Specification), for the determination of resistance to weathering, the range of the radiant exposure wavelength used is _____.

- Ans**
- ☐ 1. 150 nm to 300 nm
 - ☒ 2. 300 nm to 800 nm
 - ☐ 3. 200 nm to 500 nm
 - ☐ 4. 50 nm to 150 nm

Q.87 Which of the following RCC elements transfers the Floor finish load to supporting beams?

- Ans**
- ☐ 1. Parapet wall
 - ☐ 2. Lintel
 - ☐ 3. Column
 - ☒ 4. Slab

Q.88 According to Euler's theory, the design load for a column depends on:

- Ans**
- ☒ 1. The column's length and radius of gyration
 - ☐ 2. The bending moment applied at the column's base
 - ☐ 3. The material's ultimate tensile strength
 - ☐ 4. The moment of inertia and shear stress

Q.89 The short piece that connects the ledger to the structure itself in single-frame scaffolding is called ____.

- Ans**
- ☐ 1. Toe board
 - ☐ 2. Guardrail
 - ☒ 3. Putlog
 - ☐ 4. Brace

Q.90 Which statement correctly distinguishes administrative approval from technical sanction in civil engineering estimation?

- Ans**
- ☐ 1. Administrative approval checks material quality, while technical sanction determines project duration
 - ☐ 2. Administrative approval authorizes procurement, while technical sanction approves staffing requirements
 - ☐ 3. Administrative approval controls work execution, while technical sanction manages contractor payments
 - ☒ 4. Administrative approval accepts project necessity, while technical sanction verifies design and estimates

Q.91 The bending moment diagram (BMD) for a simply supported beam carrying a uniformly distributed load over its entire span is:

- Ans**
- ☐ 1. linear in shape
 - ☐ 2. triangular in shape
 - ☒ 3. parabolic in shape
 - ☐ 4. rectangular in shape

Q.92 A water pipe has a smooth interior. Over the time, scaling increases the roughness. What happens to the frictional head loss for the same flow rate?

- Ans**
- ☐ 1. Decreases
 - ☐ 2. Becomes zero
 - ☒ 3. Increases
 - ☐ 4. Remains same

Q.93 In disaster management, GIS plays an important role mainly because it:

- Ans**
- ☐ 1. measures permeability of soil samples for hazard mapping
 - ☐ 2. calculates settlement in shallow foundations for hazard mapping
 - ☐ 3. determines tensile strength of steel reinforcement for hazard mapping
 - ☒ 4. integrates spatial and attributes data for hazard mapping

Q.94 For a column with both ends hinged (pinned–pinned), the effective length L_{eff} is _____ times the actual length of the column.

- Ans**
- ☒ 1. equal to 1
 - ☐ 2. equal to 1.5
 - ☐ 3. equal to 0.5
 - ☐ 4. equal to 2

Q.95 Which types of piles are typically used in areas with expansive soils?

- Ans**
- ☐ 1. Friction piles
 - ☒ 2. Under-reamed piles
 - ☐ 3. Screw piles
 - ☐ 4. Sheet piles

Q.96 In a multi-story portal frame, how does increasing the number of stories affect the moment distribution in the frame?

- Ans**
- ☐ 1. The moment at the base of the frame decreases as more stories are added
 - ☐ 2. The number of stories does not affect the moment distribution
 - ☒ 3. The moments in the lower stories increase, while the upper stories experience lesser moments
 - ☐ 4. The moments are uniformly distributed across all stories

Q.97 Which of the following flooring is most suitable for a luxurious appearance in a high-end hotel lobby?

- Ans**
- ☒ 1. Marble flooring
 - ☐ 2. Linoleum flooring
 - ☐ 3. Cement concrete flooring
 - ☐ 4. PVC flooring

Q.98 The layout for substructure work must consider nearby underground based utilities because:

- Ans**
- ☐ 1. They reduce need for detailed site survey work during excavation
 - ☒ 2. Existing underground services may get damaged during excavation
 - ☐ 3. They make excavation operations easier on site
 - ☐ 4. They improve overall appearance of building layout during excavation

Q.99 In geometric design of highways, while on rolling terrain, design speeds are generally:

- Ans**
- ☒ 1. Lower than plain terrain
 - ☐ 2. Same as mountainous terrain
 - ☐ 3. Higher than plain terrain
 - ☐ 4. Unrelated to terrain type

Q.100 Pipes of different diameters and lengths connected end to end to form a pipe line are called _____.

- Ans**
- ☐ 1. Equivalent pipes
 - ☐ 2. Branched pipes
 - ☒ 3. Compound pipes
 - ☐ 4. Pipes in parallel



रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS
सीईएन - 05/25 - जेई, डीएमएस, सीएमए - CEN - 05/25 - JE, DMS, CMA



Test Date	02/07/2026
Test Time	9:00 AM - 11:00 AM
Subject / Exam Group	RRB JE Stage 2 Electronics and Allied Engineering

* 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 : General Abilities

Q.1 The primary method of managing biodegradable domestic waste after collection is _____.

- Ans
- ☒ 1. sending for recycling
 - ☒ 2. conversion into compost
 - ☐ 3. burnt in open air
 - ☐ 4. throwing into sewers

Q.2 Which new warship was commissioned by the Indian Navy in November, 2025, to strengthen anti-submarine and coastal defence capabilities?

- Ans
- ☒ 1. INS Mahe
 - ☐ 2. INS Vikrant
 - ☐ 3. INS Arnala
 - ☐ 4. INS Ikshak

Q.3 Which of the following satellites was launched on November 2, 2025, to enhance the Indian Navy's secure communication network and maritime surveillance capabilities?

- Ans
- ☐ 1. GSAT-6A
 - ☐ 2. Cartosat-3
 - ☒ 3. CMS-03 (GSAT-7R)
 - ☐ 4. RISAT-2B

Q.4 Which of the following indicators is NOT typically used to measure sustainable development?

- Ans
- ☒ 1. Gross Domestic Product (GDP) growth rate
 - ☐ 2. Biocapacity
 - ☐ 3. Human Development Index (HDI)
 - ☐ 4. Ecological Footprint

Q.5 Which of the following statements best describes the behavior of magnetic field lines around a straight current-carrying conductor?

- Ans
- ☐ 1. They radiate straight outward from the wire.
 - ☐ 2. They are parallel straight lines along the wire.
 - ☒ 3. They form concentric circles centered on the conductor.
 - ☐ 4. They change direction randomly along the wire.

Q.6 The Kol Rebellion (1831–32) mainly affected which plateau region?

- Ans**
- ☒ 1. Deccan Plateau
 - ☒ 2. Chotanagpur Plateau
 - ☒ 3. Meghalaya Plateau
 - ☒ 4. Malwa Plateau

Q.7 The atmospheric component that remains largely unreactive is _____.

- Ans**
- ☒ 1. Oxygen
 - ☒ 2. Argon
 - ☒ 3. Carbon dioxide
 - ☒ 4. Methane

Q.8 If 10 grams of salt are dissolved in 100 mL of water, which component is the solute?

- Ans**
- ☒ 1. Salt only
 - ☒ 2. Both salt and water
 - ☒ 3. Water only
 - ☒ 4. Neither

Q.9 According to the Article 75 of the Indian Constitution, the total number of ministers (including the Prime Minister) in the Council of Ministers shall NOT exceed what percentage of the total members of the House of the People, i.e., Lok Sabha?

- Ans**
- ☒ 1. 15%
 - ☒ 2. 10%
 - ☒ 3. 20%
 - ☒ 4. 25%

Q.10 A construction worker needs to lift a heavy metal beam using a lever but has a limited length of plank. Which adjustment would allow the worker to lift the beam with the least effort if the position of the fulcrum can be changed but the plank length remains constant?

- Ans**
- ☒ 1. Keep the fulcrum fixed at any point
 - ☒ 2. Place the fulcrum at the center of the plank
 - ☒ 3. Move the fulcrum closer to the worker
 - ☒ 4. Move the fulcrum closer to the beam

Q.11 The term 'smog' is a combination of _____.

- Ans**
- ☒ 1. Fog and clouds
 - ☒ 2. Smoke and fog
 - ☒ 3. Smog and mist
 - ☒ 4. Smoke and haze

Q.12 According to Thomson's model, how are electrons arranged in an atom?

- Ans**
- ☒ 1. Embedded in a positively charged sphere like seeds in a watermelon
 - ☒ 2. Randomly placed inside the nucleus
 - ☒ 3. Orbiting around neutrons in elliptical paths
 - ☒ 4. Moving in fixed orbits around the nucleus

Q.13 A field exposed to excessive pesticide use shows a sharp decline in earthworm population. The resulting effect on soil is:

- Ans**
- ☒ 1. Increased water retention
 - ☒ 2. Reduced soil fertility
 - ☒ 3. Improved aeration
 - ☒ 4. Enhanced decomposition

Q.14 A student pushes a heavy box that is already moving across a rough floor. If the force applied by the student is exactly equal to the frictional force opposing the motion, what will happen to the box?

- Ans**
- ☒ 1. The box will move at a constant speed
 - ☐ 2. The box will gradually come to rest
 - ☐ 3. The box will move at increasing speed
 - ☐ 4. The box will accelerate forward

Q.15 When was the 11th National Handloom Day celebrated across India under the coordination of the Ministry of Textiles?

- Ans**
- ☐ 1. October 7, 2025
 - ☐ 2. November 7, 2025
 - ☐ 3. September 7, 2025
 - ☒ 4. August 7, 2025

Q.16 Which pair of sectors is commonly addressed together in State Action Plan on Climate Change (SAPCC) adaptation planning?

- Ans**
- ☒ 1. Water resources and health systems
 - ☐ 2. Heavy industry and entertainment
 - ☐ 3. Information technology and space research
 - ☐ 4. Textile design and fashion marketing

Q.17 Which function returns the smallest value?

- Ans**
- ☐ 1. MAX()
 - ☐ 2. AVERAGE
 - ☐ 3. COUNT()
 - ☒ 4. MIN()

Q.18 Which Quick Style type is applied only to selected words or individual characters within a paragraph in MS Word 2010?

- Ans**
- ☐ 1. Linked styles
 - ☒ 2. Character styles
 - ☐ 3. Page styles
 - ☐ 4. Paragraph styles

Q.19 Which of the following is/are the primary reasons to fall in the trap of Email fraud or phishing?

- A) Paying attention to lucrative offers.
B) Not checking on links or attachments from unknown senders
C) Providing official information via email
D) Paying attention to the company logo sent in the email

- Ans**
- ☐ 1. A, B Only
 - ☐ 2. A, B, D Only
 - ☒ 3. A, B, C Only
 - ☐ 4. A only

Q.20 Which of the following options must be DISABLED before manually setting the date and time in Windows?

- Ans**
- ☐ 1. Enable multiple clocks
 - ☒ 2. Set time automatically
 - ☐ 3. Set time zone globally
 - ☐ 4. Night Light

Q.21 Which type of computer virus attaches itself to executable files and gets activated when the file is run?

- Ans**
- ☐ 1. Worm
 - ☒ 2. File Infector Virus
 - ☐ 3. Macro Virus
 - ☐ 4. Boot Sector Virus

Q.22 Which of the following Articles states about the right of individual to form associations or unions or co-operative societies?

- Ans**
- ☐ 1. Article 19 (1) (a)
 - ☐ 2. Article 19 (1) (d)
 - ☐ 3. Article 19 (1) (b)
 - ☒ 4. Article 19 (1) (c)

Q.23 Which of the following best describes the velocity-time graph for an object moving with uniform velocity?

- Ans**
- ☐ 1. A curved line above the time axis
 - ☒ 2. A straight horizontal line parallel to the time axis
 - ☐ 3. A straight line sloping upwards from the time axis
 - ☐ 4. A line starting from the origin and sloping upwards

Q.24 A factory plans to install a powerful electromagnet for lifting metal scraps. To maximize the magnetic field strength around the coil, which of the following combinations would be most effective?

- Ans**
- ☐ 1. Using a steel core, decreasing coil turns, and lowering current
 - ☐ 2. Using an air core, decreasing coil turns, and keeping current constant
 - ☐ 3. Using a copper core, increasing coil turns, and lowering current
 - ☒ 4. Using a soft iron core, increasing coil turns, and increasing current through the coil

Q.25 How can we locate a file with a known extension but an unknown name in a large directory?

- Ans**
- ☐ 1. Using the dir command
 - ☒ 2. Using the Search box in File Explorer with *.ext
 - ☐ 3. Through File Explorer
 - ☐ 4. Checking the Recycle Bin

Q.26 You want to automatically advance slides with narration and animations during a presentation. Which MS PowerPoint feature should you use to achieve this?

- Ans**
- ☒ 1. Rehearse Timings
 - ☐ 2. Slide Sorter
 - ☐ 3. Action Buttons
 - ☐ 4. Presenter View

Q.27 Which of the following statements best describes how the power of accommodation enables the human eye to focus on both near and distant objects?

- Ans**
- ☐ 1. The cornea provides all the focusing power required for clear vision
 - ☐ 2. The iris controls the amount of light entering and helps to focus
 - ☐ 3. The retina moves forward and backward to adjust the focus
 - ☒ 4. The eye lens changes its focal length by altering its shape through ciliary muscle action

Q.28 A student accidentally spills some hydrochloric acid on a table. Which substance should be used to neutralise the acid safely?

- Ans**
- ☐ 1. Lemon juice
 - ☒ 2. Baking soda solution
 - ☐ 3. Vinegar
 - ☐ 4. Sugar solution

Q.29 Which of the following is a primary mission under India's National Action Plan on Climate Change (NAPCC)?

- Ans**
- ☐ 1. National Nutrition Mission
 - ☐ 2. National Highway Development Project
 - ☐ 3. National Rural Livelihood Mission
 - ☒ 4. National Solar Mission

Q.30 Biomedical waste handlers in a hospital are at risk of occupational hazards. The most effective way to protect them from exposure to infectious materials is:

- Ans**
- ☒ 1. Use of protective equipment and safe handling
 - ☐ 2. Segregation of waste into color-coded bins
 - ☐ 3. Regular medical check-ups
 - ☐ 4. Vaccination against common infections

Q.31 The Mappila Uprisings of the 19th century occurred mainly in which region of India?

- Ans**
- ☐ 1. Konkan region of Maharashtra
 - ☐ 2. Coromandel Coast of Tamil Nadu
 - ☐ 3. Sunderbans region of West Bengal
 - ☒ 4. Malabar region of Kerala

Q.32 In a real-life scenario, a chemist discovers a compound with the formula $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{OH}$. What is the correct IUPAC name for this compound?

- Ans**
- ☐ 1. 2-methylhexanol
 - ☐ 2. 3-methylhexanol
 - ☒ 3. 3-methylpentan-1-ol
 - ☐ 4. 4-methylpentanol

Q.33 If cell A1 = 10 and B1 = 20, what will `=A1+B1` return?

- Ans**
- ☒ 1. 30
 - ☐ 2. 200
 - ☐ 3. Error
 - ☐ 4. 1020

Q.34 Which British colonial building in Mumbai, completed in 1888, showcases a blend of Victorian Gothic and Indian architectural elements?

- Ans**
- ☒ 1. Chhatrapati Shivaji Maharaj Terminus
 - ☐ 2. Gateway of India
 - ☐ 3. Bombay Town Hall
 - ☐ 4. Rajabai Clock Tower

Q.35 Consider the following statements regarding chemical reactions and choose the correct option.

Statement I: Every reaction in which two or more reactants combine to form a single product is classified as a combination reaction regardless of heat change.

Statement II: The reaction $\text{CaO(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Ca(OH)}_2\text{(aq)} + \text{heat}$ is both a combination reaction and an exothermic reaction.

- Ans**
- ☐ 1. Only Statement I is correct
 - ☐ 2. Both statements are incorrect
 - ☒ 3. Both statements are correct
 - ☐ 4. Only Statement II is correct

Q.36 Who won the maximum number of medals at the 38th National Games of India?

- Ans**
- ☒ 1. Dhinidhi Desinghu
 - ☐ 2. Neeraj Chopra
 - ☐ 3. Manu Bhaker
 - ☐ 4. Bajrang Punia

Q.37 Which of the following rivers forms a delta along the eastern coastal plains?

- Ans**
- ☐ 1. Narmada
 - ☒ 2. Godavari
 - ☐ 3. Ganga
 - ☐ 4. Tapi

Q.38 On which date is National Handloom Day observed in India?

- Ans**
- ☐ 1. 5 September
 - ☐ 2. 18 August
 - ☒ 3. 7 August
 - ☐ 4. 2 October

Q.39 The pollutant group commonly associated with oil spills in oceans is _____.

- Ans**
- ☐ 1. agricultural pesticides
 - ☐ 2. chemical fertilizers
 - ☐ 3. synthetic detergents
 - ☒ 4. petroleum products

Q.40 Which experimental discovery contradicted Thomson's model of the atom and led to its rejection?

- Ans**
- ☐ 1. Measurement of atomic radius using X-ray diffraction
 - ☒ 2. Alpha particle scattering showing deflection at large angles
 - ☐ 3. Observation of line spectra of hydrogen by Bohr
 - ☐ 4. Discovery of the neutron by James Chadwick

Q.41 A farmer applies large amounts of chemical fertilizers over several years. Which consequence most likely results from this practice leading to soil pollution?

- Ans**
- ☒ 1. Accumulation of toxic substances in soil
 - ☐ 2. Faster plant growth every season
 - ☐ 3. Erosion of surface soil layers
 - ☐ 4. Increase in earthworm population

Q.42 The Atal Bhujal Yojana 2020 focused on improving water resources management of how many states?

- Ans**
- ☒ 1. eight
 - ☒ 2. seven
 - ☐ 3. ten
 - ☐ 4. five

Q.43 Match the following columns.

Pardoning power	Function
1. Commutation	a. Removes both sentence and the conviction.
2. Reprieve	b. Lesser sentence than originally given, in special case
3. Respite	c. Reducing the period of sentence without changing the nature of the sentence.
4. Remission	d. Temporary stay on the execution of a sentence.
5. Pardon	e. Substitution of one form of punishment to a lighter one

- Ans**
- ☒ 1. 1-e, 2-d, 3-b, 4-c, 5-a
 - ☐ 2. 1-c, 2-e, 3-b, 4-a, 5-d
 - ☐ 3. 1-a, 2-c, 3-d, 4-e, 5-b
 - ☐ 4. 1-d, 2-b, 3-e, 4-c, 5-a

Q.44 What file extension is used to save an MS PowerPoint 2021 presentation?

- Ans**
- ☒ 1. .pttx
 - ☐ 2. .xlsx
 - ☐ 3. .docx
 - ☐ 4. .pdf

Q.45 What is the general formula of alkenes?

- Ans**
- ☐ 1. C_nH_{2n-2}
 - ☐ 2. C_nH_{2n+2}
 - ☒ 3. C_nH_{2n}
 - ☐ 4. C_nH_n

Q.46 Which of the following statements is true about the Outbox?

- Ans**
- ☒ 1. It temporarily stores emails that are queued for sending.
 - ☐ 2. It holds emails that have been successfully sent.
 - ☐ 3. It is used to receive incoming emails.
 - ☐ 4. It contains emails that are currently being drafted.

Q.47 What is the main reason sulfur dioxide irritates the upper respiratory mucous membrane?

- Ans**
- ☐ 1. It combines with other pollutants and polymerizes in the lungs
 - ☐ 2. It combines with haemoglobin and effect the oxygen transport
 - ☐ 3. It oxidizes to sulphur trioxide and inhaled deep into lung
 - ☒ 4. It dissolves in moisture in upper respiratory tract and forms irritant

Q.48 The primary goal of the Pradhan Mantri Gram Sadak Yojana (PMGSY) is to:

- Ans**
- ☒ 1. Provide rural connectivity through road construction
 - ☐ 2. Promote renewable energy usage
 - ☐ 3. Enhance telecommunication services in cities
 - ☐ 4. Develop urban infrastructure

Q.49 Which condition is required for a displacement reaction between a metal and salt solution?

- Ans**
- ☐ 1. Reaction must be endothermic
 - ☒ 2. Metal must be higher in reactivity series
 - ☐ 3. Salt must be insoluble in water
 - ☐ 4. Metal must be same as salt constituent

Q.50 Which of the following best describes how sound travels through air?

- Ans**
- ☐ 1. The air particles vibrate up and down perpendicular to the direction of the wave
 - ☒ 2. The air particles vibrate back and forth parallel to the direction of the wave
 - ☐ 3. The air particles move in circular paths as the wave passes
 - ☐ 4. The air particles remain stationary while the wave moves through

Section : Technical Abilities

Q.1 In a monostable configuration of IC 555, why is the Discharge pin (Pin 7) connected directly to the Threshold pin (Pin 6)?

- Ans**
- ☐ 1. To prevent the capacitor from ever reaching $\frac{2}{3} V_{cc}$
 - ☒ 2. To ensure the capacitor is instantly discharged once the threshold is reached.
 - ☐ 3. To allow the capacitor to charge very slowly for stable output.
 - ☐ 4. To trigger the next pulse automatically.

Q.2 What are the statements that begin with # symbol called in C programming language?

- Ans**
- ☐ 1. Comments
 - ☒ 2. Preprocessor Directives
 - ☐ 3. Control statements
 - ☐ 4. Function declarations

Q.3 Which cable transmits data using light signals?

- Ans**
- ☐ 1. Twisted pair cable
 - ☐ 2. Coaxial cable
 - ☐ 3. USB cable
 - ☒ 4. Fiber optic cable

Q.4 In a centralized switching system, what is the Control Unit responsible for?

- Ans**
- ☐ 1. Generating the ringing voltage only
 - ☒ 2. Processing dialed digits and managing call setup
 - ☐ 3. Generating the voice of the caller
 - ☐ 4. Physically moving the copper wires

Q.5 Consider the following statements about RS-232 ports and connectors.

S1: DB9 connector is associated with RS-232

S2: RS-232 uses RJ45 connector for standard serial communication

S3: RS-232 communication is point-to-point

Which statements are TRUE?

- Ans**
- ☒ 1. Only S1 and S3
 - ☐ 2. Only S2 and S3
 - ☐ 3. Only S1
 - ☐ 4. Only S1 and S2

Q.6 Which of the following statements is TRUE about data transmission modes?

- Ans**
- ☐ 1. Serial transmission always requires more communication lines
 - ☐ 2. Serial transmission sends multiple bits simultaneously
 - ☒ 3. Parallel transmission can transmit multiple bits simultaneously
 - ☐ 4. Parallel transmission sends one bit at a time

Q.7 Which characteristic primarily defines how accurately the vertical deflection system of a CRO displays signals of different amplitudes and frequencies?

- Ans**
- ☐ 1. Operation of the sweep circuit and retrace interval
 - ☐ 2. Phosphor persistence on the CRT screen
 - ☐ 3. Accelerating anode voltage in the electron gun
 - ☒ 4. The gain and frequency response of the vertical amplifier

Q.8 During insulation testing of a long underground cable, a technician observes higher leakage current compared to a shorter cable of the same type. What is the most likely reason?

- Ans**
- ☐ 1. The increased cable length reduces the dielectric strength of the insulation.
 - ☐ 2. Leakage current is independent of cable length for the same insulation material.
 - ☐ 3. A longer cable always has higher insulation resistance than a shorter cable.
 - ☒ 4. The larger insulation surface area provides more leakage paths to ground.

Q.9 In the 8085 microprocessor, what operation is performed by the instruction SUI 20H?

- Ans**
- ☒ 1. Subtracts 20H from the accumulator
 - ☐ 2. Subtracts 20H from the accumulator with borrow
 - ☐ 3. Adds 20H to the accumulator
 - ☐ 4. Compares with 20H with the accumulator

Q.10 What is the output of the give C language code snippet?

```
void f(int x)
{
    x = x + 5;
}
int main()
{
    int a = 10;
    f(a);
    printf("%d",a);
    return 0;
}
```

- Ans**
- ☐ 1. 5
 - ☐ 2. 15
 - ☒ 3. 10
 - ☐ 4. Garbage value

Q.11 Why is a high-sensitivity voltmeter preferred for accurate circuit measurements?

- Ans**
- ☒ 1. It minimizes loading effect by drawing very small current
 - ☐ 2. It increases the operating frequency of the circuit
 - ☐ 3. It reduces the response time of the instrument
 - ☐ 4. It increases the power consumption of the measuring circuit

Q.12 A transmission line has a characteristic impedance of 50 ohm and is connected to a load of 100 ohm. The VSWR is _____.

- Ans
- ☐ 1. 0.5
 - ☐ 2. 4
 - ☐ 3. 1
 - ☒ 4. 2

Q.13 Which of the following contains only valid octal digits?

- Ans
- ☐ 1. 2, 4, 6, 9
 - ☐ 2. 3, 5, 7, 9
 - ☒ 3. 0, 3, 5, 7
 - ☐ 4. 1, 5, 7, 8

Q.14 The current flows directly into the input terminals of an ideal op-amp is _____ due to _____ input impedance.

- Ans
- ☒ 1. zero; infinite
 - ☐ 2. 1 milliAmpere; zero
 - ☐ 3. dependent on the supply voltage; zero
 - ☐ 4. 1 Ampere; moderate

Q.15 An op amp acting as a comparator typically operates in:

- Ans
- ☐ 1. Closed-loop mode with negative feedback
 - ☐ 2. Unity gain mode
 - ☐ 3. Linear region only
 - ☒ 4. Open-loop mode

Q.16 Consider the following statements about routing in computer networks.

S1: Routers operate at the network layer
S2: Routing determines packet forwarding paths
S3: Static routing updates automatically
S4: Dynamic routing protocols exchange routing information

Which of the given statements are **TRUE**?

- Ans
- ☐ 1. Only S1 and S2
 - ☐ 2. Only S2 and S3
 - ☒ 3. Only S1, S2 and S4
 - ☐ 4. Only S1 and S4

Q.17 Consider the following code snippet in C programming language.

```
int n = 5;  
int m = n++;  
What is the value of m after execution?
```

- Ans
- ☒ 1. 5
 - ☐ 2. 6
 - ☐ 3. 0
 - ☐ 4. 1

Q.18 Which statement is TRUE about if statement in the C programming language?

- Ans
- ☒ 1. A non-zero value written in the condition means True
 - ☐ 2. A value of 0 written in the condition means True
 - ☐ 3. Every if statement must have a matching else
 - ☐ 4. if statement cannot be nested

Q.19 For Astable Multivibrator using IC 555, to increase the frequency of an astable 555 circuit without changing the duty cycle ratio, what should a designer do? Assume standard terminologies and resistor names.

- Ans**
- ☐ 1. Increase the value of R_A
 - ☐ 2. Decrease the supply voltage
 - ☐ 3. Increase the value of Capacitor C
 - ☒ 4. Decrease the value of C while keeping resistors R_A and R_B constant

Q.20 Which of the following is a false statement regarding the non-inverting amplifier using OP-AMP?

- Ans**
- ☐ 1. It offers high input impedance
 - ☐ 2. It provides higher magnitude gain for the same resistor values when compared to the inverting amplifier
 - ☐ 3. It is ideal for use in instrumentation and buffer circuits
 - ☒ 4. It is limited to handling only DC signals

Q.21 The output of the phase detector in a phase-locked loop is _____.

- Ans**
- ☐ 1. A maximum constant voltage when the phase detector is in a free-running state.
 - ☐ 2. Zero when the phase detector finds the input and oscillator phases are perfectly aligned.
 - ☐ 3. An alternating current signal when the phase detector locks the loop.
 - ☒ 4. A proportional error voltage when the phase detector identifies a phase difference between input and the VCO signal

Q.22 What is the purpose of the Back-off technique in transponder power amplifiers related to Satellite communication?

- Ans**
- ☐ 1. To save satellite battery life during the night
 - ☒ 2. To reduce intermodulation distortion when multiple carriers are present
 - ☐ 3. To increase the speed of data transmission
 - ☐ 4. To increase the maximum output power

Q.23 Which of the following statements about the Harvard architecture used in the 8051 microcontroller is correct?

- Ans**
- ☐ 1. Uses single memory for program and data
 - ☐ 2. Has no external memory support
 - ☐ 3. Uses only RAM
 - ☒ 4. Uses separate memory for program and data

Q.24 In a LAN environment, switches improve network efficiency primarily by:

- Ans**
- ☒ 1. Forwarding frames selectively using MAC addresses
 - ☐ 2. Increasing collision occurrences and retransmitting
 - ☐ 3. Broadcasting all frames to every device in the network
 - ☐ 4. Converting digital signal to analog signal

Q.25 What does the remanence (B_r) indicate in a magnetic hysteresis loop?

- Ans**
- ☐ 1. It is the maximum magnetic flux density reached in the loop.
 - ☐ 2. It is the applied field needed to reduce flux to zero.
 - ☒ 3. It is the residual magnetic flux density after removing the applied field.
 - ☐ 4. It is the area enclosed by the hysteresis loop.

Q.26 In 8051, consider the following instructions:
MOV PSW, #18H
MOV R3, #55H
MOV A, R3

From which register bank is R3 selected in the instruction MOV A, R3?

- Ans**
- ☒ 1. Bank 3
 - ☐ 2. Bank 0
 - ☐ 3. Bank 2
 - ☐ 4. Bank 1

Q.27 In the Hexagonal cell model, where is the Base Transceiver Station (BTS) typically located to provide uniform coverage?

- Ans**
- ☐ 1. Outside the cell boundary to avoid interference
 - ☐ 2. At any one of the six corners
 - ☐ 3. Along the longest edge of the cell
 - ☒ 4. Exactly at the center of the hexagon

Q.28 In the 8085 microprocessor, what happens to the Stack Pointer after execution of PUSH instruction?

- Ans**
- ☐ 1. Incremented by 2
 - ☒ 2. Decrement by 2
 - ☐ 3. Unchanged
 - ☐ 4. Incremented by 1

Q.29 The LPF in a PLL determines which of the following dynamic characteristics?

- Ans**
- ☐ 1. The input impedance of the phase detector.
 - ☐ 2. The free-running frequency of the VCO.
 - ☐ 3. The maximum output power of the circuit.
 - ☒ 4. Settling time and loop stability.

Q.30 If the same quantity is measured several times and the readings vary slightly each time, which type of error is most likely present?

- Ans**
- ☐ 1. Calibration error
 - ☒ 2. Random error
 - ☐ 3. Systematic error
 - ☐ 4. Parallax error

Q.31 In an LCD display, what is the main purpose of the liquid crystal layer positioned between the two glass plates?

- Ans**
- ☐ 1. To store electrical energy for the display circuit
 - ☒ 2. To control the transmission of light through the display
 - ☐ 3. To act as a light source for displaying characters
 - ☐ 4. To increase the operating voltage of the display segment

Q.32 Which of the following best describes packet switching in computer network?

- Ans**
- ☐ 1. Entire message transmitted as one continuous signal
 - ☒ 2. Data divided into smaller packets transmitted independently
 - ☐ 3. Dedicated physical path between sender and receiver
 - ☐ 4. Fixed bandwidth allocated permanently to users

Q.33 When a NOR-based SR flip-flop with active HIGH inputs receives a momentary logic high on its S (set) input while the R (reset) input remains low, what will be the resulting state of the Q output?

- Ans**
- ☒ 1. Q becomes HIGH and remains latched HIGH
 - ☐ 2. Both outputs will become high during the pulse
 - ☐ 3. The Q output will become low after S returns to low
 - ☐ 4. The Q output will toggle between high and low repeatedly

Q.34 What allows a Radar system to detect the presence of a target?

- Ans**
- ☒ 1. Electromagnetic wave reflection
 - ☐ 2. Acoustic resonance
 - ☐ 3. Atmospheric refraction
 - ☐ 4. Chemical ionization

Q.35 Which operator is used for dynamic memory allocation in C++?

- Ans**
- ☐ 1. delete
 - ☐ 2. allocate
 - ☒ 3. new
 - ☐ 4. alloc

Q.36 Which arrangement is used in a CRT of Cathode Ray Oscilloscope (CRO) to achieve proper electrostatic focusing of the electron beam?

- Ans**
- ☐ 1. A cathode at high potential followed by only high potential accelerating anodes
 - ☐ 2. A fluorescent screen at lower potential placed after the high potential accelerating anodes
 - ☒ 3. A focusing anode at lower potential placed between two high potential accelerating anodes
 - ☐ 4. Two accelerating anodes at equal potential without a focusing anode

Q.37 Which shape is used to represent a decision in a flowchart?

- Ans**
- ☐ 1. Parallelogram
 - ☒ 2. Diamond
 - ☐ 3. Oval
 - ☐ 4. Rectangle

Q.38 In the 8085 microprocessor, what will be the value of the Program Counter after execution of the instruction RST 3?

- Ans**
- ☐ 1. 0030H
 - ☐ 2. 0024H
 - ☒ 3. 0018H
 - ☐ 4. 0003H

Q.39 A synchronous counter is a counter in which:

- Ans**
- ☐ 1. Only one flip-flop is used
 - ☒ 2. All flip-flops are triggered simultaneously
 - ☐ 3. No clock is used
 - ☐ 4. Flip-flops are triggered one by one

Q.40 A 2-input NOR gate has one input permanently connected to logic LOW (0). How does the output behave with respect to the other input?

- Ans**
- ☐ 1. Output is always LOW
 - ☐ 2. Output is always HIGH
 - ☒ 3. Output is the complement of the other input
 - ☐ 4. Output follows the other input directly

Q.41 A resistor connected to a DC supply of 20 V produces the same heating effect as an AC supply connected across the same resistor. What is the RMS value of the AC voltage?

- Ans**
- ☐ 1. 10 V
 - ☐ 2. 28.28 V
 - ☒ 3. 20 V
 - ☐ 4. 14.14 V

Q.42 In the 8085 microprocessor, if SP = 3FFFH and memory contains:
3FFE H = 20H
3FFF H = 20H
4000 H = 10H
4001 H = 10H

After executing POP H, what will be the contents of HL?

- Ans**
- ☐ 1. 2020H
 - ☐ 2. 2010H
 - ☐ 3. 1010H
 - ☒ 4. 1020H

Q.43 Which action is the most important for maintaining accurate measurements in an instrument?

- Ans**
- ☒ 1. Calibrate the instrument using a standard reference
 - ☐ 2. Operating the instrument always at maximum frequency range.
 - ☐ 3. Reduce the sensitivity of the instrument
 - ☐ 4. Setting the amplifier gain of the instrument to zero

Q.44 What is the main reason high-frequency Carrier signals are used in modulation?

- Ans**
- ☐ 1. To amplify the original message signal.
 - ☐ 2. To make the signal move at the speed of light.
 - ☐ 3. To eliminate the need for a receiver.
 - ☒ 4. To reduce the physical size of the required antenna.

Q.45 Signal A passes through a NOT gate and then through an AND gate where the second input is permanently set to logic 1. What is the final output expression?

- Ans**
- ☐ 1. $Y = \text{Always } 0$
 - ☐ 2. $Y = A$
 - ☒ 3. $Y = \bar{A}$
 - ☐ 4. $Y = \text{Always } 1$

Q.46 Consider an abrupt p-n junction under thermal equilibrium. If the acceptor doping concentration (N_A) in the p-region is made significantly larger than the donor doping concentration (N_D) in the n-region (i.e., $N_A \gg N_D$), how is the depletion region physically distributed?

- Ans**
- ☒ 1. It extends primarily into the lightly doped n-type region.
 - ☐ 2. It extends equally into both the p-type and n-type regions.
 - ☐ 3. It extends primarily into the heavily doped p-type region.
 - ☐ 4. It is confined strictly to the metallurgical junction with zero penetration into either region.

Q.47 In a graded-index Optical fiber, how is the refractive index distributed?

- Ans**
- ☒ 1. Decreasing continuously from center to edge
 - ☐ 2. Higher in the cladding than the core
 - ☐ 3. Increasing from center to edge
 - ☐ 4. Uniformly throughout the core

Q.48 What is the BCD code for decimal digit 3?

- Ans**
- ☒ 1. 0011
 - ☐ 2. 0110
 - ☐ 3. 0101
 - ☐ 4. 0001

Q.49 According to Carson's Rule, the approximate bandwidth of a frequency modulation signal is _____.

- Ans**
- ☐ 1. Infinite
 - ☐ 2. Equal to the carrier frequency
 - ☒ 3. Twice the sum of the frequency deviation and the highest modulating frequency
 - ☐ 4. Twice the carrier frequency

Q.50 In a pulsed radar system, the _____ power is the maximum instantaneous power delivered during the pulse width, whereas the _____ power is the mean power output calculated over the total transmission cycle.

- Ans**
- ☐ 1. Pulsed; Continuous
 - ☐ 2. Effective; Gain
 - ☐ 3. Average; Peak
 - ☒ 4. Peak; Average

Q.51 What is the function of the INTA' signal in the 8085 microprocessor?

- Ans**
- ☐ 1. To enable interrupts
 - ☒ 2. To acknowledge an interrupt request
 - ☐ 3. To disable interrupts
 - ☐ 4. To reset the processor

Q.52 What is the output of the following C programming language code?

```
#include<stdio.h>
int main()
{
int x = 10;
int *p = &x;
*p = *p + 5;
printf("%d %d", x, *p);
return 0;
}
```

- Ans**
- ☐ 1. 10 10
 - ☐ 2. 15 10
 - ☐ 3. 10 15
 - ☒ 4. 15 15

Q.53 In the magnetic trip mechanism of an MCB, which sequence correctly describes the tripping action during a short circuit?

- Ans**
- ☐ 1. Fault current → contact resistance increases → plunger attracted → latch released
 - ☐ 2. Fault current → plunger released → magnetic field generated → contacts open
 - ☐ 3. Fault current → bimetal strip bends → latch released → contacts open
 - ☒ 4. Fault current → magnetic field generated → plunger attracted → latch released

Q.54 What happens to the amount of substance deposited if the time for which current flows through an electrolyte is doubled?

- Ans**
- ☐ 1. It remains unchanged
 - ☐ 2. It becomes zero
 - ☐ 3. It becomes half
 - ☒ 4. It also doubles

Q.55 What is the output the given C language code snippet?
#include<stdio.h>

```
int main()
{
int x[] = {10,20,30};
int *p = x;
p++;
printf("%d",*p);
return 0;
}
```

Ans  1. Garbage value

 2. 30

 3. 10

 4. 20

Q.56 Consider the following statements regarding modems used in computer network:

S1: Modems are required when communication medium carries analog signals

S2: Modulation converts digital data into analog form

S3: Demodulation converts analog data into digital form

S4: Modems assign MAC addresses to computers

Which statements are TRUE?

Ans  1. Only S1, S3 and S4

 2. Only S1 and S4

 3. Only S1, S2 and S3

 4. Only S1 and S2

Q.57 A 4 KB EPROM is organized with 8 data lines. How many address lines does it have?

Ans  1. 14

 2. 10

 3. 12

 4. 8

Q.58 How many PN junctions are present in the structure of a Silicon Controlled Rectifier (SCR)?

Ans  1. Two

 2. One

 3. Four

 4. Three

Q.59 Which mechanical property allows a conductor to be drawn into thin wires without breaking?

Ans  1. Ductility

 2. Elasticity

 3. Hardness

 4. Brittleness

Q.60 What does the instruction ORA B do in 8085?

Ans  1. Subtracts B from accumulator

 2. Performs AND between accumulator and B

 3. Adds B to accumulator

 4. Performs logical OR between accumulator and B

Q.61 What happens to the frequency of an astable multivibrator if the value of ONLY the timing capacitor is doubled?

- Ans**
- ✓ 1. The frequency is reduced by half.
 - ✗ 2. The frequency remains the same.
 - ✗ 3. The frequency increases fourfold.
 - ✗ 4. The frequency doubles.

Q.62 In a CRO time-base circuit, why is constant-current charging preferred for generating the sweep voltage?

- Ans**
- ✓ 1. It ensures the capacitor voltage rises uniformly over time, forming a linear sweep
 - ✗ 2. It causes the capacitor voltage to rise exponentially with time, distorting the sweep
 - ✗ 3. It makes the retrace interval longer than the sweep interval
 - ✗ 4. It relies on the transistor's collector current to set the linearity

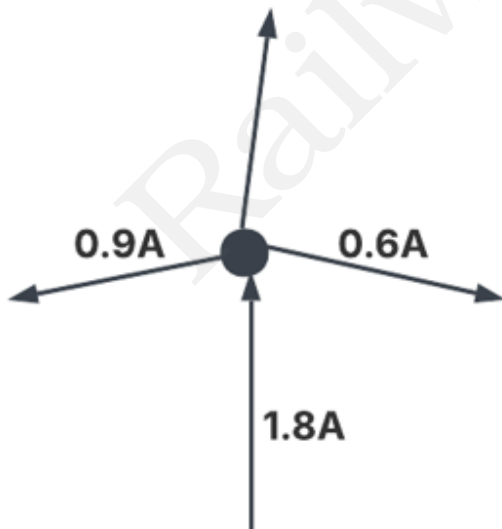
Q.63 A motor draws a starting current much higher than its running current. What should be considered when selecting a relay?

- Ans**
- ✓ 1. Relay contact rating must exceed the motor's peak starting current
 - ✗ 2. Relay contact rating should match only the motor running current
 - ✗ 3. Relay selection depends solely on the coil voltage specification.
 - ✗ 4. Relay selection should focus only on minimum coil voltage

Q.64 A magnetic material has a hysteresis loop area of 0.4 J for each cycle. If the material is subjected to a frequency of 40 Hz, what is the total hysteresis loss per second?

- Ans**
- ✓ 1. 16 W
 - ✗ 2. 20 W
 - ✗ 3. 12 W
 - ✗ 4. 10 W

Q.65 A DC node has 1.8 A entering it. Two branches carry 0.6 A and 0.9 A away from the node. Assuming the remaining branch current is also leaving the node, what is its value?



- Ans**
- ✗ 1. 1.2 A
 - ✓ 2. 0.3 A
 - ✗ 3. 0.5 A
 - ✗ 4. 0.9 A

Q.66 Why should electrical connections be regularly tightened in high-current circuits?

Ans

- ☐ 1. Tight connections ensure lower circuit voltage
- ☐ 2. It prevents accidental current reversal
- ☒ 3. Loose connections cause localized heating and fire risk
- ☐ 4. It avoids electromagnetic interference

Q.67 A designer is selecting an LED driver for an outdoor display exposed to dust and rain. Which specification should be examined first to determine whether the driver can withstand these environmental conditions?

Ans

- ☐ 1. Dimming compatibility
- ☐ 2. Power factor rating
- ☒ 3. Ingress Protection (IP) rating
- ☐ 4. Output current tolerance

Q.68 In a 4-to-2 priority encoder, if both D1 and D3 are HIGH, which input determines the output and why?

Ans

- ☐ 1. The output is undefined due to multiple actives
- ☐ 2. Both D1 and D3 set the output together
- ☐ 3. D1 determines the output because it is the lower number
- ☒ 4. D3 determines the output because it has higher priority

Q.69 A coil is placed in a uniform magnetic field. If the area of the coil is doubled while the magnetic field strength and orientation remain unchanged, how will the magnetic flux through the coil be affected assuming the initial magnetic flux is a non-zero finite value?

Ans

- ☐ 1. The magnetic flux will remain the same
- ☐ 2. The magnetic flux will decrease to half
- ☐ 3. The magnetic flux will become four times
- ☒ 4. The magnetic flux will double

Q.70 The transition of an SCR from the forward blocking state to the conduction state is called:

Ans

- ☐ 1. Avalanche breakdown
- ☐ 2. Commutation
- ☐ 3. Forward recovery
- ☒ 4. Triggering

Q.71 An engineer is designing a feedback control system using a potentiometer transducer to measure angular position. What is the primary effect if a voltmeter with low resistance is connected to measure the potentiometer output?

Ans

- ☐ 1. It increases output signal noise regardless of wiper position
- ☐ 2. It maximizes sensitivity and accuracy of the measuring instrument
- ☐ 3. It reduces the mechanical lifespan of the potentiometer due to excess current
- ☒ 4. It causes loading error, resulting in nonlinear output voltage relative to wiper position

Q.72 What does PPP stand for in Wide Area Network (WAN) communication?

Ans

- ☐ 1. Private Port Protocol
- ☒ 2. Point-to-Point Protocol
- ☐ 3. Public Packet Protocol
- ☐ 4. Packet Transfer Protocol

Q.73 Which class of IPv4 addresses supports the largest number of host addresses in a computer network?

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

Q.74 If the modulating signal is a constant DC voltage, the output of a Phase Modulator will be:

- Ans**
- ☐ 1. Zero.
 - ☐ 2. A signal with increasing frequency.
 - ☒ 3. A constant frequency signal with a fixed phase shift.
 - ☐ 4. A signal with varying amplitude.

Q.75 A constant negative DC voltage is applied to the input of an inverting integrator. Assuming the op-amp starts at zero volts and remains unsaturated, the output will be:

- Ans**
- ☐ 1. A square wave
 - ☒ 2. A positive-going linear ramp
 - ☐ 3. A negative-going linear ramp
 - ☐ 4. A constant DC voltage

Q.76 Assume an SCR is operating in the forward blocking state. Once a sufficient positive current pulse is applied to the gate terminal, the SCR triggers into the conduction state. What happens if the gate signal is completely removed immediately after conduction starts?

- Ans**
- ☐ 1. The SCR will immediately turn off.
 - ☐ 2. The anode current will drop by exactly 50%.
 - ☐ 3. The SCR will begin to oscillate between the ON and OFF states.
 - ☒ 4. The SCR will continue to conduct until the anode current drops below the holding current.

Q.77 In the 8085 microprocessor, what does the instruction PCHL do?

- Ans**
- ☒ 1. Loads the PC with HL
 - ☐ 2. Pops the PC from the stack
 - ☐ 3. Loads HL with the PC
 - ☐ 4. Pushes PC onto the stack

Q.78 Which protocol is responsible for delivering web pages over the Internet?

- Ans**
- ☐ 1. SMTP
 - ☐ 2. ARP
 - ☐ 3. FTP
 - ☒ 4. HTTP

Q.79 How does the shading coil in an AC relay minimize contact chatter during operation?

- Ans**
- ☐ 1. It delays the movement of the relay armature during release.
 - ☒ 2. It maintains a holding magnetic force during current zero crossing.
 - ☐ 3. It changes the relay's operating voltage rating.
 - ☐ 4. It maintains the spacing between relay contacts during operation.

Q.80 The holding current of an SCR is defined as the:

- Ans**
- ☐ 1. Minimum anode current required to turn on the SCR
 - ☒ 2. Minimum anode current required to keep the SCR in conduction state
 - ☐ 3. Gate current required to turn off the SCR
 - ☐ 4. Maximum anode current the SCR can withstand

Q.81 The primary reason for the increase in resistance of metallic conductors with temperature is _____.

- Ans**
- ☒ 1. Atomic collisions inside the conductor increase
 - ☐ 2. Atomic vibrations inside the conductor decrease
 - ☐ 3. Number of free electrons becomes zero
 - ☐ 4. Conducting path inside the material becomes shorter

Q.82 Why is earthing necessary for electrical equipment?

- Ans**
- ☐ 1. To decrease power consumption
 - ☐ 2. To increase wire length
 - ☐ 3. To improve light brightness
 - ☒ 4. To protect people from electric shock

Q.83 In Boolean algebra, what is the value of $C + C'$?

- Ans**
- ☐ 1. C
 - ☐ 2. $C \cdot C'$
 - ☒ 3. 1
 - ☐ 4. 0

Q.84 At room temperature, the region in a PN junction diode where there are no mobile electrons or holes is called _____.

- Ans**
- ☐ 1. N-type region
 - ☐ 2. P-type region
 - ☒ 3. Depletion region
 - ☐ 4. Ohmic terminal interface

Q.85 A technician is troubleshooting a circuit where the fuse does not blow during an overcurrent fault. What is the most likely cause?

- Ans**
- ☐ 1. The fuse is connected in parallel with the load.
 - ☐ 2. The fuse wire has low resistance
 - ☐ 3. The fuse is installed after the protective relay.
 - ☒ 4. The fuse rating is higher than the circuit's safe current.

Q.86 What is the output of the given C language code snippet?
`#include<stdio.h>`

```
void f(int n)
{
    if(n==0)
        return;
    printf("%d ",n);
    f(n-1);
}
```

```
int main()
{
    f(3);
    return 0;
}
```

- Ans**
- ☐ 1. 3 2 1 0
 - ☐ 2. 1 2 3
 - ☐ 3. Infinite loop
 - ☒ 4. 3 2 1

Q.87 A single-phase AC circuit contains a resistive inductive load. The current lags behind the voltage by an angle greater than 0° and less than 90° . What is the power factor of the circuit called?

- Ans**
- ☐ 1. Zero power factor
 - ☒ 2. Lagging power factor
 - ☐ 3. Leading power factor
 - ☐ 4. Unity power factor

Q.88 If the strength of the current in a straight wire is doubled, how does the magnitude of the magnetic field at a fixed distance from the wire change?

- Ans**
- ☐ 1. The field strength is halved
 - ☒ 2. The field strength doubles
 - ☐ 3. The field strength remains unchanged
 - ☐ 4. The field strength quadruples

Q.89 Why does charging a lead-acid secondary cell increase the specific gravity of the electrolyte?

- Ans**
- ☒ 1. Active materials reform and increase acid concentration
 - ☐ 2. It decreases due to formation of water from hydrogen and oxygen
 - ☐ 3. It increases due to hydrogen gas raising electrolyte density
 - ☐ 4. It stays the same because separators control dilution

Q.90 In an analog Stored Program Control (SPC) system, the Program manages:

- Ans**
- ☒ 1. The electronic connection of the analog matrix
 - ☐ 2. The digital conversion of the voice signal
 - ☐ 3. The brightness of the telephone screen
 - ☐ 4. The internet connection of the subscriber

Q.91 Which instruction is used to return from a subroutine in 8085?

- Ans**
- ☒ 1. RET
 - ☐ 2. RST
 - ☐ 3. CALL
 - ☐ 4. JMP

Q.92 Which internal component of the IC 555 is responsible for resetting the flip-flop when the voltage at Pin 6 exceeds two-thirds of V_{cc} supply?

- Ans**
- ☒ 1. The Upper Comparator
 - ☐ 2. The Voltage Divider Network
 - ☐ 3. The Lower Comparator
 - ☐ 4. The Discharge Transistor

Q.93 You need to read a floating-point value from the user in the C programming language. Which of the following statements correctly performs this task?

- Ans**
- ☒ 1. `float x; scanf("%f", &x);`
 - ☐ 2. `float x; scanf("%d" , &x);`
 - ☐ 3. `float x; scanf("%f", *x);`
 - ☐ 4. `float x; scanf("%f" , x);`

Q.94 A user wants to transmit uncompressed digital audio and video between a computer and a display using a single cable. Which connector type is most appropriate?

- Ans**
- ☐ 1. F connector
 - ☐ 2. RCA connector
 - ☐ 3. BNC connector
 - ☒ 4. HDMI connector

Q.95 What would happen if an electrical device is not earthed and a fault occurs?

- Ans**
- ☐ 1. The resistance of the device will increase
 - ☒ 2. The exposed metal parts may carry dangerous voltage
 - ☐ 3. The device will automatically shut down
 - ☐ 4. The supply voltage will decrease

Q.96 If a communication system performs effectively in between 200 Hz to 3.4 kHz, what is its bandwidth?

- Ans**
- ☐ 1. 3.6 kHz
 - ☐ 2. 3.4 kHz
 - ☐ 3. 200 Hz
 - ☒ 4. 3.2 kHz

Q.97 A 1 mA, 100 Ω meter movement is converted to a 100 mA ammeter using a parallel shunt resistor. If this shunt resistor suddenly becomes open-circuited while a steady line current of 80 mA is passing through the meter, what is the most likely outcome?

- Ans**
- ☐ 1. The meter indication drops to zero due to loss of shunt current
 - ☐ 2. The meter continues to indicate the measured current correctly
 - ☒ 3. Excessive current may flow through the meter movement and damage it
 - ☐ 4. The meter becomes more sensitive and shows larger deflections

Q.98 Which type of network typically experiences the lowest transmission delay?

- Ans**
- ☐ 1. WAN
 - ☐ 2. Satellite Network
 - ☐ 3. MAN
 - ☒ 4. LAN

Q.99 Using De Morgan's law, what is the equivalent of $\overline{(P \cdot Q \cdot R)}$?

- Ans**
- ☐ 1. $P + Q + R$
 - ☐ 2. $\overline{P} \cdot \overline{Q} \cdot \overline{R}$
 - ☐ 3. $P \cdot Q \cdot R$
 - ☒ 4. $\overline{P} + \overline{Q} + \overline{R}$

Q.100 Under forward-bias conditions, what is the primary mechanism that creates forward current across a PN junction?

- Ans**
- ☐ 1. The drift of majority carriers due to the enhanced internal barrier electric field.
 - ☐ 2. The millions of protons creation inside the depletion region
 - ☐ 3. The freezing of movement for free electrons across the metallurgical junction.
 - ☒ 4. Majority carriers crossing the junction to become injected minority carriers that diffuse through the neutral regions



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सीईएन - 05/25 - जेई, डीएमएस, सीएमए - CEN - 05/25 - JE, DMS, CMA



Test Date	02/07/2026
Test Time	9:00 AM - 11:00 AM
Subject / Exam Group	RRB JE Stage 2 Mechanical and Allied Engineering

* 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 : General Abilities

Q.1 If 10 grams of salt are dissolved in 100 mL of water, which component is the solute?

- Ans
- ☒ 1. Both salt and water
 - ☒ 2. Salt only
 - ☐ 3. Neither
 - ☐ 4. Water only

Q.2 Which of the following indicators is NOT typically used to measure sustainable development?

- Ans
- ☐ 1. Biocapacity
 - ☒ 2. Gross Domestic Product (GDP) growth rate
 - ☐ 3. Human Development Index (HDI)
 - ☐ 4. Ecological Footprint

Q.3 A field exposed to excessive pesticide use shows a sharp decline in earthworm population. The resulting effect on soil is:

- Ans
- ☒ 1. Reduced soil fertility
 - ☐ 2. Enhanced decomposition
 - ☐ 3. Improved aeration
 - ☐ 4. Increased water retention

Q.4 The term 'smog' is a combination of _____.

- Ans
- ☐ 1. Smog and mist
 - ☐ 2. Smoke and haze
 - ☐ 3. Fog and clouds
 - ☒ 4. Smoke and fog

Q.5 Biomedical waste handlers in a hospital are at risk of occupational hazards. The most effective way to protect them from exposure to infectious materials is:

- Ans
- ☒ 1. Use of protective equipment and safe handling
 - ☐ 2. Segregation of waste into color-coded bins
 - ☐ 3. Vaccination against common infections
 - ☐ 4. Regular medical check-ups

Q.6 Which new warship was commissioned by the Indian Navy in November, 2025, to strengthen anti-submarine and coastal defence capabilities?

- Ans**
- ☐ 1. INS Ikshak
 - ☒ 2. INS Mahe
 - ☐ 3. INS Vikrant
 - ☐ 4. INS Arnala

Q.7 Which condition is required for a displacement reaction between a metal and salt solution?

- Ans**
- ☐ 1. Salt must be insoluble in water
 - ☐ 2. Metal must be same as salt constituent
 - ☒ 3. Metal must be higher in reactivity series
 - ☐ 4. Reaction must be endothermic

Q.8 The primary method of managing biodegradable domestic waste after collection is _____.

- Ans**
- ☒ 1. conversion into compost
 - ☐ 2. sending for recycling
 - ☐ 3. throwing into sewers
 - ☐ 4. burnt in open air

Q.9 A student pushes a heavy box that is already moving across a rough floor. If the force applied by the student is exactly equal to the frictional force opposing the motion, what will happen to the box?

- Ans**
- ☐ 1. The box will gradually come to rest
 - ☐ 2. The box will move at increasing speed
 - ☐ 3. The box will accelerate forward
 - ☒ 4. The box will move at a constant speed

Q.10 Which of the following satellites was launched on November 2, 2025, to enhance the Indian Navy's secure communication network and maritime surveillance capabilities?

- Ans**
- ☐ 1. RISAT-2B
 - ☐ 2. GSAT-6A
 - ☒ 3. CMS-03 (GSAT-7R)
 - ☐ 4. Cartosat-3

Q.11 What is the general formula of alkenes?

- Ans**
- ☐ 1. C_nH_{2n-2}
 - ☒ 2. C_nH_{2n}
 - ☐ 3. C_nH_n
 - ☐ 4. C_nH_{2n+2}

Q.12 A student accidentally spills some hydrochloric acid on a table. Which substance should be used to neutralise the acid safely?

- Ans**
- ☒ 1. Baking soda solution
 - ☐ 2. Lemon juice
 - ☐ 3. Vinegar
 - ☐ 4. Sugar solution

Q.13 The Atal Bhujal Yojana 2020 focused on improving water resources management of how many states?

- Ans**
- ☒ 1. seven
 - ☐ 2. ten
 - ☐ 3. five
 - ☐ 4. eight

Q.14 Which of the following statements best describes the behavior of magnetic field lines around a straight current-carrying conductor?

- Ans**
- ☒ 1. They form concentric circles centered on the conductor.
 - ☐ 2. They are parallel straight lines along the wire.
 - ☐ 3. They change direction randomly along the wire.
 - ☐ 4. They radiate straight outward from the wire.

Q.15 Who won the maximum number of medals at the 38th National Games of India?

- Ans**
- ☒ 1. Dhinidhi Desinghu
 - ☐ 2. Manu Bhaker
 - ☐ 3. Neeraj Chopra
 - ☐ 4. Bajrang Punia

Q.16 The Kol Rebellion (1831–32) mainly affected which plateau region?

- Ans**
- ☐ 1. Malwa Plateau
 - ☒ 2. Chotanagpur Plateau
 - ☐ 3. Deccan Plateau
 - ☐ 4. Meghalaya Plateau

Q.17 Which of the following statements best describes how the power of accommodation enables the human eye to focus on both near and distant objects?

- Ans**
- ☐ 1. The cornea provides all the focusing power required for clear vision
 - ☐ 2. The iris controls the amount of light entering and helps to focus
 - ☐ 3. The retina moves forward and backward to adjust the focus
 - ☒ 4. The eye lens changes its focal length by altering its shape through ciliary muscle action

Q.18 Which function returns the smallest value?

- Ans**
- ☐ 1. AVERAGE
 - ☒ 2. MIN()
 - ☐ 3. MAX()
 - ☐ 4. COUNT()

Q.19 Which of the following is a primary mission under India's National Action Plan on Climate Change (NAPCC)?

- Ans**
- ☐ 1. National Nutrition Mission
 - ☐ 2. National Highway Development Project
 - ☐ 3. National Rural Livelihood Mission
 - ☒ 4. National Solar Mission

Q.20 When was the 11th National Handloom Day celebrated across India under the coordination of the Ministry of Textiles?

- Ans**
- ☒ 1. August 7, 2025
 - ☐ 2. September 7, 2025
 - ☐ 3. November 7, 2025
 - ☐ 4. October 7, 2025

Q.21 Which Quick Style type is applied only to selected words or individual characters within a paragraph in MS Word 2010?

- Ans**
- ☐ 1. Page styles
 - ☐ 2. Paragraph styles
 - ☒ 3. Character styles
 - ☐ 4. Linked styles

Q.22 Which of the following Articles states about the right of individual to form associations or unions or co-operative societies?

- Ans**
- ☒ 1. Article 19 (1) (c)
 - ☐ 2. Article 19 (1) (a)
 - ☐ 3. Article 19 (1) (d)
 - ☐ 4. Article 19 (1) (b)

Q.23 You want to automatically advance slides with narration and animations during a presentation. Which MS PowerPoint feature should you use to achieve this?

- Ans**
- ☐ 1. Slide Sorter
 - ☒ 2. Rehearse Timings
 - ☐ 3. Presenter View
 - ☐ 4. Action Buttons

Q.24 Consider the following statements regarding chemical reactions and choose the correct option.

Statement I: Every reaction in which two or more reactants combine to form a single product is classified as a combination reaction regardless of heat change.
Statement II: The reaction $\text{CaO(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Ca(OH)}_2\text{(aq)} + \text{heat}$ is both a combination reaction and an exothermic reaction.

- Ans**
- ☐ 1. Both statements are incorrect
 - ☒ 2. Both statements are correct
 - ☐ 3. Only Statement I is correct
 - ☐ 4. Only Statement II is correct

Q.25 The primary goal of the Pradhan Mantri Gram Sadak Yojana (PMGSY) is to:

- Ans**
- ☐ 1. Develop urban infrastructure
 - ☐ 2. Promote renewable energy usage
 - ☐ 3. Enhance telecommunication services in cities
 - ☒ 4. Provide rural connectivity through road construction

Q.26 How can we locate a file with a known extension but an unknown name in a large directory?

- Ans**
- ☐ 1. Checking the Recycle Bin
 - ☐ 2. Using the dir command
 - ☐ 3. Through File Explorer
 - ☒ 4. Using the Search box in File Explorer with *.ext

Q.27 What is the main reason sulfur dioxide irritates the upper respiratory mucous membrane?

- Ans**
- ☐ 1. It combines with haemoglobin and effect the oxygen transport
 - ☐ 2. It oxidizes to sulphur trioxide and inhaled deep into lung
 - ☒ 3. It dissolves in moisture in upper respiratory tract and forms irritant
 - ☐ 4. It combines with other pollutants and polymerizes in the lungs

Q.28 According to Thomson's model, how are electrons arranged in an atom?

- Ans**
- ☒ 1. Moving in fixed orbits around the nucleus
 - ☒ 2. Embedded in a positively charged sphere like seeds in a watermelon
 - ☒ 3. Orbiting around neutrons in elliptical paths
 - ☒ 4. Randomly placed inside the nucleus

Q.29 If cell A1 = 10 and B1 = 20, what will `=A1+B1` return?

- Ans**
- ☒ 1. Error
 - ☒ 2. 1020
 - ☒ 3. 200
 - ☒ 4. 30

Q.30 The pollutant group commonly associated with oil spills in oceans is _____.

- Ans**
- ☒ 1. synthetic detergents
 - ☒ 2. agricultural pesticides
 - ☒ 3. petroleum products
 - ☒ 4. chemical fertilizers

Q.31 Match the following columns.

Pardoning power	Function
1. Commutation	a. Removes both sentence and the conviction.
2. Reprieve	b. Lesser sentence than originally given, in special case
3. Respite	c. Reducing the period of sentence without changing the nature of the sentence.
4. Remission	d. Temporary stay on the execution of a sentence.
5. Pardon	e. Substitution of one form of punishment to a lighter one

- Ans**
- ☒ 1. 1-d, 2-b, 3-e, 4-c, 5-a
 - ☒ 2. 1-e, 2-d, 3-b, 4-c, 5-a
 - ☒ 3. 1-a, 2-c, 3-d, 4-e, 5-b
 - ☒ 4. 1-c, 2-e, 3-b, 4-a, 5-d

Q.32 Which of the following best describes how sound travels through air?

- Ans**
- ☒ 1. The air particles vibrate up and down perpendicular to the direction of the wave
 - ☒ 2. The air particles move in circular paths as the wave passes
 - ☒ 3. The air particles remain stationary while the wave moves through
 - ☒ 4. The air particles vibrate back and forth parallel to the direction of the wave

Q.33 According to the Article 75 of the Indian Constitution, the total number of ministers (including the Prime Minister) in the Council of Ministers shall NOT exceed what percentage of the total members of the House of the People, i.e., Lok Sabha?

- Ans**
- ☒ 1. 15%
 - ☒ 2. 20%
 - ☒ 3. 25%
 - ☒ 4. 10%

Q.34 The atmospheric component that remains largely unreactive is _____.

- Ans**
- ☒ 1. Carbon dioxide
 - ☒ 2. Methane
 - ☒ 3. Argon
 - ☒ 4. Oxygen

Q.35 Which experimental discovery contradicted Thomson's model of the atom and led to its rejection?

- Ans**
- ☐ 1. Observation of line spectra of hydrogen by Bohr
 - ☐ 2. Measurement of atomic radius using X-ray diffraction
 - ☐ 3. Discovery of the neutron by James Chadwick
 - ☒ 4. Alpha particle scattering showing deflection at large angles

Q.36 Which of the following is/are the primary reasons to fall in the trap of Email fraud or phishing?

- A) Paying attention to lucrative offers.
B) Not checking on links or attachments from unknown senders
C) Providing official information via email
D) Paying attention to the company logo sent in the email

- Ans**
- ☐ 1. A, B, D Only
 - ☐ 2. A only
 - ☒ 3. A, B, C Only
 - ☐ 4. A, B Only

Q.37 A construction worker needs to lift a heavy metal beam using a lever but has a limited length of plank. Which adjustment would allow the worker to lift the beam with the least effort if the position of the fulcrum can be changed but the plank length remains constant?

- Ans**
- ☐ 1. Place the fulcrum at the center of the plank
 - ☐ 2. Keep the fulcrum fixed at any point
 - ☐ 3. Move the fulcrum closer to the worker
 - ☒ 4. Move the fulcrum closer to the beam

Q.38 Which type of computer virus attaches itself to executable files and gets activated when the file is run?

- Ans**
- ☒ 1. File Infector Virus
 - ☐ 2. Boot Sector Virus
 - ☐ 3. Macro Virus
 - ☐ 4. Worm

Q.39 What file extension is used to save an MS PowerPoint 2021 presentation?

- Ans**
- ☐ 1. .pdf
 - ☐ 2. .docx
 - ☐ 3. .xlsx
 - ☒ 4. .pptx

Q.40 On which date is National Handloom Day observed in India?

- Ans**
- ☒ 1. 7 August
 - ☐ 2. 5 September
 - ☐ 3. 2 October
 - ☐ 4. 18 August

Q.41 Which of the following options must be DISABLED before manually setting the date and time in Windows?

- Ans**
- ☐ 1. Night Light
 - ☐ 2. Enable multiple clocks
 - ☒ 3. Set time automatically
 - ☐ 4. Set time zone globally

Q.42 Which pair of sectors is commonly addressed together in State Action Plan on Climate Change (SAPCC) adaptation planning?

- Ans**
- ✓ 1. Water resources and health systems
 - ✗ 2. Textile design and fashion marketing
 - ✗ 3. Information technology and space research
 - ✗ 4. Heavy industry and entertainment

Q.43 A factory plans to install a powerful electromagnet for lifting metal scraps. To maximize the magnetic field strength around the coil, which of the following combinations would be most effective?

- Ans**
- ✓ 1. Using a soft iron core, increasing coil turns, and increasing current through the coil
 - ✗ 2. Using a steel core, decreasing coil turns, and lowering current
 - ✗ 3. Using an air core, decreasing coil turns, and keeping current constant
 - ✗ 4. Using a copper core, increasing coil turns, and lowering current

Q.44 Which of the following rivers forms a delta along the eastern coastal plains?

- Ans**
- ✗ 1. Tapi
 - ✗ 2. Narmada
 - ✗ 3. Ganga
 - ✓ 4. Godavari

Q.45 The Mappila Uprisings of the 19th century occurred mainly in which region of India?

- Ans**
- ✗ 1. Konkan region of Maharashtra
 - ✗ 2. Sunderbans region of West Bengal
 - ✓ 3. Malabar region of Kerala
 - ✗ 4. Coromandel Coast of Tamil Nadu

Q.46 In a real-life scenario, a chemist discovers a compound with the formula $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{OH}$. What is the correct IUPAC name for this compound?

- Ans**
- ✗ 1. 3-methylhexanol
 - ✓ 2. 3-methylpentan-1-ol
 - ✗ 3. 2-methylhexanol
 - ✗ 4. 4-methylpentanol

Q.47 Which British colonial building in Mumbai, completed in 1888, showcases a blend of Victorian Gothic and Indian architectural elements?

- Ans**
- ✗ 1. Rajabai Clock Tower
 - ✗ 2. Bombay Town Hall
 - ✓ 3. Chhatrapati Shivaji Maharaj Terminus
 - ✗ 4. Gateway of India

Q.48 A farmer applies large amounts of chemical fertilizers over several years. Which consequence most likely results from this practice leading to soil pollution?

- Ans**
- ✗ 1. Erosion of surface soil layers
 - ✓ 2. Accumulation of toxic substances in soil
 - ✗ 3. Increase in earthworm population
 - ✗ 4. Faster plant growth every season

Q.49 Which of the following best describes the velocity-time graph for an object moving with uniform velocity?

- Ans**
- ☐ 1. A straight line sloping upwards from the time axis
 - ☐ 2. A line starting from the origin and sloping upwards
 - ☒ 3. A straight horizontal line parallel to the time axis
 - ☐ 4. A curved line above the time axis

Q.50 Which of the following statements is true about the Outbox?

- Ans**
- ☐ 1. It is used to receive incoming emails.
 - ☒ 2. It temporarily stores emails that are queued for sending.
 - ☐ 3. It contains emails that are currently being drafted.
 - ☐ 4. It holds emails that have been successfully sent.

Section : Technical Abilities

Q.1 A hollow shaft is designed to transmit a torque of 40000 N-m. The polar moment of inertia (J) is 0.004 m^4 . The ratio of inside diameter to outside diameter of the hollow shaft (D_i/D_o) is 0.8. The inside diameter is 400 mm. What is the maximum induced shear stress ($\tau_{\max}$) at the outer fiber of the shaft?

- Ans**
- ☐ 1. 2500 MPa
 - ☒ 2. 2.5 MPa
 - ☐ 3. 250 MPa
 - ☐ 4. 0.25 MPa

Q.2 In a scenario where excessive spatter occurs during arc welding, which adjustment is most likely to mitigate the issue without compromising weld quality?

- Ans**
- ☐ 1. Switching to a larger electrode
 - ☒ 2. Reducing arc length slightly
 - ☐ 3. Decreasing base metal thickness
 - ☐ 4. Increasing travel speed marginally

Q.3 A mechanical engineer needs to choose a steel for a structural component that requires moderate ductility and high weldability. Based on the chemical composition and classification, which steel type should be recommended?

- Ans**
- ☒ 1. Mild steel with low carbon and minimal alloying elements
 - ☐ 2. Alloy steel with high chromium and nickel content
 - ☐ 3. Alloy steel with high manganese and vanadium content
 - ☐ 4. Mild steel with increased silicon and phosphorus content

Q.4 The ideal gas law for isothermal process can be represented as _____, (P is the pressure and V is the volume of the gas at any stage).

- Ans**
- ☐ 1. $P = \text{constant}$.
 - ☒ 2. $PV = \text{Constant}$.
 - ☐ 3. $V = \text{constant}$.
 - ☐ 4. $P/V = \text{Constant}$.

Q.5 Which two types of thermodynamic processes constitute the Carnot cycle in an ideal heat engine?

- Ans**
- ☐ 1. Adiabatic and isochoric
 - ☒ 2. Isothermal and adiabatic
 - ☐ 3. Isothermal and isochoric
 - ☐ 4. Isobaric and isochoric

Q.6 Which property of rubber-based coatings makes them suitable for protecting steel pipes in industrial environments?

- Ans**
- ☐ 1. The coating improves the electrical conductivity of the pipe surface
 - ☐ 2. The coating provides high levels of thermal conductivity for the pipes
 - ☒ 3. The coating's flexibility prevents cracking under vibration and resists chemical attack
 - ☐ 4. The coating's color remains durable even with prolonged sunlight exposure

Q.7 Intensity of pressure at a point in a fluid is:

- Ans**
- ☐ 1. Pressure includes both normal and shear stresses acting simultaneously at a point
 - ☐ 2. Total normal force acting uniformly over a surface, independent of area and location within the fluid
 - ☐ 3. Pressure at a point varies significantly with direction even in a static fluid
 - ☒ 4. Normal force per unit area at a point in the fluid, scalar intensity independent of direction

Q.8 Why is water mixed with oil often preferred as a grinding coolant over plain water?

- Ans**
- ☒ 1. It provides both cooling and lubrication
 - ☐ 2. It increases corrosion of metals
 - ☐ 3. It makes coolant less effective
 - ☐ 4. It decreases grinding time significantly

Q.9 The primary function of a sine bar is to:

- Ans**
- ☐ 1. calibrate pressure gauges
 - ☐ 2. check thread pitches
 - ☒ 3. measure angles with high accuracy
 - ☐ 4. measure linear dimensions

Q.10 Which of the following is a necessary modification in Newton's second law to derive D'Alembert's principle for a dynamic system?

- Ans**
- ☒ 1. Incorporate a fictitious force equal to "minus mass times acceleration"
 - ☐ 2. Omit all resistive forces acting on the system
 - ☐ 3. Replace all forces with their average values
 - ☐ 4. Include only gravitational forces in the analysis

Q.11 During the 'Shaping' operation conducted on a workpiece of aluminum material, the type of coolant used is:

- Ans**
- ☒ 1. kerosene
 - ☐ 2. cutting compound
 - ☐ 3. mineral hard oil
 - ☐ 4. dry kerosene turpentine

Q.12 During oxy-acetylene gas welding, improper adjustment of the neutral flame can most likely result in which weld defect on stainless steel?

- Ans**
- ☐ 1. Occurrence of incomplete root fusion in the joint
 - ☐ 2. Formation of significant undercut along the joint
 - ☐ 3. Development of porosity within the weld metal
 - ☒ 4. Excessive oxidation at the weld bead surface

Q.13 What is the heat supplied to a Carnot engine that produces 100 kW of useful work at an efficiency of 35%?

- Ans**
- ☐ 1. 300 kW
 - ☐ 2. 150 kW
 - ☐ 3. 200 kW
 - ☒ 4. 285.7 kW

Q.14 Which of the following properties is used as the basis for temperature measurement in constant volume thermometers?

- Ans**
- ✓ 1. Pressure
 - ✗ 2. Volume
 - ✗ 3. Entropy
 - ✗ 4. Enthalpy

Q.15 Which material handling equipment would be most suitable for transferring bulk granular materials over a long horizontal distance within a factory?

- Ans**
- ✗ 1. Forklift transportation
 - ✗ 2. Overhead crane arrangement
 - ✓ 3. Belt conveyor system
 - ✗ 4. Pallet truck operation

Q.16 Which of the following is considered a common surface defect in welding processes?

- Ans**
- ✓ 1. Undercut along the weld bead
 - ✗ 2. Excessive spatter deposits
 - ✗ 3. Lamellar tearing in plate
 - ✗ 4. Incomplete penetration at root

Q.17 What type of measurement does a 'comparator' work on?

- Ans**
- ✗ 1. Absolute measurement
 - ✗ 2. Basic measurement
 - ✗ 3. Direct measurement
 - ✓ 4. Relative measurement

Q.18 A component in a high-impact environment requires resistance to fracture with minimal deformation. Which material property would be most critical to avoid premature failure?

- Ans**
- ✗ 1. High brittleness with low ductility
 - ✓ 2. Low brittleness with high toughness
 - ✗ 3. High brittleness with high elasticity
 - ✗ 4. Low brittleness with low stiffness

Q.19 In high-performance applications such as turbine shafts and precision gears, alloy steels are favored over mild steels primarily because they:

- Ans**
- ✗ 1. Require less alloying and heat treatment to achieve desired strength
 - ✗ 2. Exhibit superior machinability due to refined ferritic microstructure
 - ✗ 3. Possess lower density and improved dimensional stability
 - ✓ 4. Retain mechanical integrity and hardness under conditions of elevated temperature and cyclic stress

Q.20 Which type of flux is most suitable for minimizing oxidation in high-temperature aluminum welding applications involving magnesium alloys?

- Ans**
- ✓ 1. Fluoride-based flux
 - ✗ 2. Borax-based flux
 - ✗ 3. Zinc chloride-based flux
 - ✗ 4. Rosin-based flux

Q.21 Which of the following is a limitation of conventional oxy-fuel gas cutting?

- Ans**
- ✓ 1. Cannot cut stainless steel efficiently
 - ✗ 2. Cannot cut mild steel plates
 - ✗ 3. Cannot cut thick carbon steels
 - ✗ 4. Requires electrical input for operation

Q.22 A technician wants to improve flatness and surface quality of a gauge block using lapping. What is the most important factor to control?

- Ans**
- ☐ 1. Applying excessive force to speed up lapping
 - ☐ 2. Using coarse abrasives for faster removal
 - ☒ 3. Uniform pressure and movement across the surface
 - ☐ 4. High temperature and fast lap speed

Q.23 Which type of friction occurs when surfaces are lubricated with a fluid?

- Ans**
- ☐ 1. Rolling friction
 - ☒ 2. Film friction
 - ☐ 3. Dry friction
 - ☐ 4. Static friction

Q.24 In ABC analysis, the letter 'C' is designated to:

- Ans**
- ☐ 1. high valued items, smaller in number
 - ☐ 2. high valued items, larger in number
 - ☐ 3. low valued items, smaller in number
 - ☒ 4. low valued items, larger in number

Q.25 Which of the following best describes the principle of parkerising?

- Ans**
- ☒ 1. A phosphate layer forms by chemical reaction
 - ☐ 2. A paint coating is applied to the surface
 - ☐ 3. A polymer coating is sprayed on the surface
 - ☐ 4. Surface roughness is increased mechanically

Q.26 Which component is essential in a profile projection method for accurately displaying the outline of a machine part?

- Ans**
- ☒ 1. Collimated light source with precise screen alignment
 - ☐ 2. Simple lamp with diffused translucent screen
 - ☐ 3. Curved screen with angled light projection
 - ☐ 4. Non-reflective surface with ambient room lighting

Q.27 The lathe bed is designed with which type of guideways?

- Ans**
- ☐ 1. Circular
 - ☐ 2. Rectangular
 - ☐ 3. Triangular
 - ☒ 4. Inverted V and flat combination

Q.28 The functioning of a comparator is based on:

- Ans**
- ☐ 1. The use of limit gauges
 - ☐ 2. An optical measuring system
 - ☐ 3. The use of an accurately calibrated scale
 - ☒ 4. Comparison with a known standard, such as slip gauges

Q.29 For shafts designed to transmit the same torque, which statement is generally true when comparing a solid shaft to a hollow shaft of the same material and outer diameter?

- Ans**
- ☐ 1. The hollow shaft has a lower torsional stiffness but lower weight.
 - ☐ 2. The hollow shaft has a higher torsional stiffness and higher weight.
 - ☒ 3. The solid shaft has a higher torsional stiffness and lower weight.
 - ☐ 4. Both shafts have equal torsional stiffness and equal weight.

Q.30 The shape of the bending moment diagram for a cantilever beam subjected to a uniformly distributed load (UDL) over the whole length is ____.

- Ans**
- ☐ 1. Rectangular
 - ☐ 2. Triangular
 - ☐ 3. Trapezoidal
 - ☒ 4. Parabolic

Q.31 What type of efficiency is most important for an axial flow compressor in high-speed applications?

- Ans**
- ☐ 1. Volumetric efficiency
 - ☒ 2. Isentropic efficiency
 - ☐ 3. Thermal efficiency
 - ☐ 4. Mechanical efficiency

Q.32 Water as a cutting fluid does NOT spread well over a surface to wet it because of ____.

- Ans**
- ☐ 1. low surface tension
 - ☐ 2. high buoyancy force
 - ☐ 3. high volatility
 - ☒ 4. high surface tension

Q.33 Determine the gauge pressure given an absolute pressure of 2 atm and atmospheric pressure of 1 atm.

- Ans**
- ☐ 1. 2 atm
 - ☒ 2. 1 atm
 - ☐ 3. 3 atm
 - ☐ 4. 0.5 atm

Q.34 Radial flow pumps are preferred when:

- Ans**
- ☐ 1. Flow is very viscous
 - ☐ 2. Only low suction head is available
 - ☐ 3. High flow, low head is required
 - ☒ 4. Low flow, high head is required

Q.35 For a simply supported beam with multiple point loads, maximum bending moment occurs where:

- Ans**
- ☐ 1. Reaction = 0
 - ☐ 2. Load = 0
 - ☐ 3. Deflection = 0
 - ☒ 4. Shear force = 0

Q.36 The area under load v/s elongation diagram for a ductile material upto fracture indicates ____.

- Ans**
- ☐ 1. Resilience
 - ☐ 2. Modulus of toughness
 - ☐ 3. Modulus of resilience
 - ☒ 4. Toughness

Q.37 Why does the vapor pressure of a liquid increase with an increase in temperature?

- Ans**
- ☒ 1. Molecules gain kinetic energy to escape into vapor
 - ☐ 2. Surface tension remains constant
 - ☐ 3. Viscosity reduces exponentially
 - ☐ 4. Density reduces in a straight-line manner

Q.38 A synthetic oil is contained in an accelerating elevator moving upward with acceleration (a). If the pressure intensity at the free surface is atmospheric, the intensity of pressure at a depth (h) below the surface is [take (g) as the acceleration due to gravity]:

- Ans**
- ☐ 1. $P_{atm} - \rho gh$
 - ☐ 2. $P_{atm} - \rho(g-a)h$
 - ☒ 3. $P_{atm} + \rho(g+a)h$
 - ☐ 4. $P_{atm} + \rho gh$

Q.39 Which of the following is a primary application of interferometry in metrology?

- Ans**
- ☐ 1. Analyzing thermal conductivity of metals
 - ☒ 2. Measuring surface flatness with high precision
 - ☐ 3. Determining chemical composition by spectroscopy
 - ☐ 4. Calculating torque in shafts using sensors

Q.40 Which defect results from improper shielding during the welding process and causes gas pockets in the weld?

- Ans**
- ☐ 1. Slag inclusion
 - ☐ 2. Undercut
 - ☐ 3. Lack of fusion
 - ☒ 4. Porosity

Q.41 What is the typical least count of a bevel protractor with a vernier scale?

- Ans**
- ☐ 1. 1°
 - ☐ 2. 0.1°
 - ☐ 3. 10 minutes
 - ☒ 4. 5 minutes

Q.42 A cylindrical steel rod with a diameter of 20 mm is subjected to a tensile load of 40 kN. The material has a yield strength of 450 MPa. Assuming the deformation remains within the elastic limit, calculate the factor of safety based on the ultimate tensile strength and the yield strength. If the modulus of elasticity of the steel is 200 GPa, determine the elongation of the rod over a length of 500 mm under this load. Which of the following options correctly represents the factor of safety based on yield strength and the elongation?

- Ans**
- ☐ 1. Factor of Safety (Yield) = 3.58, Elongation = 0.8 mm
 - ☒ 2. Factor of Safety (Yield) = 3.58, Elongation = 0.318 mm
 - ☐ 3. Factor of Safety (Yield) = 2.25, Elongation = 0.5 mm
 - ☐ 4. Factor of Safety (Yield) = 2.25, Elongation = 0.318 mm

Q.43 Which manufacturing method is primarily used to harden and set silicate-bonded grinding wheels?

- Ans**
- ☐ 1. High-pressure forging of abrasive particles
 - ☐ 2. Low-temperature drying without firing
 - ☒ 3. Controlled firing at moderate temperature
 - ☐ 4. Chemical polymerization at room temperature

Q.44 When selecting a material for a component subjected to cyclic loading and impact, which mechanical property should be prioritized along with hardness?

- Ans**
- ☐ 1. Plasticity must be considered to increase mass
 - ☐ 2. Ductility must be considered to avoid oxidation
 - ☒ 3. Toughness must be considered to resist sudden failure
 - ☐ 4. Elasticity must be considered for better insulation

Q.45 Which of the following is an example of a positive displacement air compressor?

- Ans**
- ☐ 1. Centrifugal compressor
 - ☐ 2. Radial dynamic compressor
 - ☐ 3. Axial flow compressor
 - ☒ 4. Reciprocating piston compressor

Q.46 A force of 10 N acts along a line OB, which makes an angle of 60° with the horizontal line OA. What is the component of the force along the direction of the acute angle bisector of angle $\angle AOB$?

- Ans**
- ☐ 1. $10 \sin 30^\circ$ N
 - ☐ 2. 10 N
 - ☐ 3. $10 \cos 60^\circ$ N
 - ☒ 4. $10 \cos 30^\circ$ N

Q.47 Which of the following best describes the purpose of ABC analysis in inventory management?

- Ans**
- ☒ 1. To categorize inventory items based on significance in value and usage frequency
 - ☐ 2. To group inventory items based on supplier location and delivery schedule
 - ☐ 3. To organize inventory items solely by their production shelf life in warehouse
 - ☐ 4. To store inventory items according to their physical characteristics in the warehouse

Q.48 When a mild steel bar is loaded in tension within the elastic limit, the relation between stress and strain is:

- Ans**
- ☐ 1. $\text{Stress} \propto (\text{Strain})^2$
 - ☐ 2. $\text{Stress} \propto \sqrt{(\text{Strain})}$
 - ☐ 3. Stress independent of strain
 - ☒ 4. $\text{Stress} \propto \text{Strain}$

Q.49 If a block slides down a rough plane inclined at 30° with a coefficient of friction of 0.2, the net acceleration is:

- Ans**
- ☒ 1. 0.326 g
 - ☐ 2. 0.676 g
 - ☐ 3. Zero
 - ☐ 4. 0.5 g

Q.50 The horizontal and vertical components of a 100 N force inclined at 37° with the horizontal are: (consider the approximation of $\sin 37^\circ=0.6$, $\cos 37^\circ=0.8$ and $\tan 37^\circ=0.75$)

- Ans**
- ☒ 1. 80 N and 60 N
 - ☐ 2. 60 N and 80 N
 - ☐ 3. 100 N and 0 N
 - ☐ 4. 70 N and 70 N

Q.51 An LVDT (Linear Variable Differential Transformer) is primarily used in which type of comparator?

- Ans**
- ☒ 1. Electrical comparator
 - ☐ 2. Mechanical comparator
 - ☐ 3. Optical comparator
 - ☐ 4. Pneumatic comparator

Q.52 A force of 100 N acting on a rigid body is moved to another point along the same line of action. What is the effect on the external equilibrium of the body?

- Ans**
- ☐ 1. The external equilibrium changes
 - ☐ 2. The effect depends on the material
 - ☐ 3. The force magnitude becomes zero
 - ☒ 4. The external equilibrium remains unchanged

Q.53 Trackless cranes are mainly used for:

- Ans**
- ☒ 1. Lifting loads in confined or uneven areas
 - ☐ 2. Operations limited to fixed tracks
 - ☐ 3. Handling liquid materials only
 - ☐ 4. Continuous material transport

Q.54 Which characteristic best describes the arc in submerged arc welding?

- Ans**
- ☐ 1. The arc is exposed to the atmosphere during welding
 - ☐ 2. The arc is shielded only by inert gas during welding
 - ☒ 3. The arc is completely covered by a layer of flux
 - ☐ 4. The arc is visible and produces bright light during welding

Q.55 Which of the following is not a type of friction?

- Ans**
- ☐ 1. Rolling friction
 - ☐ 2. Static friction
 - ☒ 3. Gravitational friction
 - ☐ 4. Kinetic friction

Q.56 Which of the following best describes the function of a hoist in material handling systems?

- Ans**
- ☐ 1. Sorting materials by size during material handling
 - ☐ 2. Moving loads horizontally between different workstations
 - ☐ 3. Rotating loads for alignment during material handling
 - ☒ 4. Lifting and lowering loads vertically with controlled movement

Q.57 What is the main chemical change that occurs on the metal surface during anodizing?

- Ans**
- ☐ 1. Removal of the oxide layer
 - ☐ 2. Deposition of metallic ions
 - ☒ 3. Formation of a thick oxide layer
 - ☐ 4. Dissolving the metal away

Q.58 In a two-stroke diesel engine, the exhaust gases are removed through:

- Ans**
- ☒ 1. Ports
 - ☐ 2. Spark plug
 - ☐ 3. Carburetor
 - ☐ 4. Valves

Q.59 What is the nature of strain as a physical quantity?

- Ans**
- ☐ 1. It has units of length.
 - ☐ 2. It has units of force per area.
 - ☒ 3. It is dimensionless.
 - ☐ 4. It has units of volume.

Q.60 Which of the following best defines the specific weight of a fluid?

- Ans**
- ☐ 1. The weight of fluid per unit mass
 - ☐ 2. The weight of fluid per unit pressure
 - ☐ 3. The weight of fluid per unit force
 - ☒ 4. The weight of fluid per unit volume

Q.61 A centrifugal pump is designed to deliver water at a rate of $Q = 0.1 \text{ m}^3/\text{s}$ against a total head of $H = 25 \text{ m}$. If the overall efficiency of the pump is $\eta = 75\%$, what is the approximate power input required to drive the pump? (Assume the density of water is $\rho = 1000 \text{ kg/m}^3$ and the acceleration due to gravity is $g = 9.81 \text{ m/s}^2$).

- Ans**
- ☒ 1. 32.7 kW
 - ☐ 2. 43.6 kW
 - ☐ 3. 58.1 kW
 - ☐ 4. 24.5 kW

Q.62 Why is a steady rest sometimes used in cylindrical grinding?

- Ans**
- ☐ 1. To cool the workpiece during grinding
 - ☐ 2. To align the grinding wheel to the table
 - ☒ 3. To support long workpieces during rotation
 - ☐ 4. To hold abrasive materials for grinding

Q.63 A center drill is used before drilling because it:

- Ans**
- ☐ 1. Increases the temperature at the cutting zone
 - ☒ 2. Provides a pilot hole to guide the main drill
 - ☐ 3. Removes burrs and debris from the drilled hole
 - ☐ 4. Reduces the spindle rotation of the lathe

Q.64 A hollow shaft has an outer diameter twice its inner diameter of a solid shaft, both constructed from the same material, and having identical outer diameters. The ratio of their torsional strength is:

- Ans**
- ☐ 1. $\frac{13}{14}$
 - ☐ 2. $\frac{2}{3}$
 - ☒ 3. $\frac{15}{16}$
 - ☐ 4. $\frac{5}{9}$

Q.65 The most effective method for applying cutting fluid during high-speed machining is:

- Ans**
- ☐ 1. Atomized spray
 - ☐ 2. Drip system
 - ☐ 3. Hand pouring
 - ☒ 4. Flooding

Q.66 If the electrolyte does not contain metal ions of the plating metal, what is the most likely outcome?

- Ans**
- ☐ 1. The anode will become coated with metal
 - ☒ 2. No metal will deposit on the cathode
 - ☐ 3. The process will create a thick oxide layer
 - ☐ 4. The cathode will dissolve in the solution

Q.67 With an increase in angle of the inclined surface, the maximum angle at which a body starts sliding down the plane is called _____.

- Ans**
- ☐ 1. Static friction
 - ☐ 2. cone angle
 - ☐ 3. limiting friction
 - ☒ 4. angle of friction

Q.68 For a small spherical droplet of liquid with surface tension σ and diameter d , which of the following correctly expresses the pressure intensity inside the droplet p due to surface tension?

- Ans**
- ☐ 1. $p = \frac{2\sigma}{d}$
 - ☒ 2. $p = \frac{4\sigma}{d}$
 - ☐ 3. $p = \frac{6\sigma}{d}$
 - ☐ 4. $p = \frac{\sigma}{d}$

Q.69 After leaving the low-pressure cylinder in a two-stage air compressor, where does the air go next?

- Ans**
- ☒ 1. To the intercooler
 - ☐ 2. Back to the atmosphere
 - ☐ 3. To the high pressure cylinder directly
 - ☐ 4. To the air receiver tank

Q.70 Why is direct current (DC) commonly used in MIG (metal inert gas) welding?

- Ans**
- ☐ 1. It limits the types of metals that can be welded
 - ☒ 2. It offers a stable arc and consistent metal transfer
 - ☐ 3. It reduces penetration for thick materials
 - ☐ 4. It increases spatter for faster welding

Q.71 Which of the following plots is used for the classification of types of facilities and layouts used for different levels of the production?

- Ans**
- ☐ 1. Production mass vs. product variety plot
 - ☐ 2. Production quantity vs. product cost plot
 - ☒ 3. Production quantity vs. product variety plot
 - ☐ 4. Product cost vs. product variety plot

Q.72 The type of surface produced by a taper turning operation performed on a lathe machine is:

- Ans**
- ☐ 1. curved one
 - ☐ 2. flat
 - ☒ 3. conical
 - ☐ 4. cylindrical

Q.73 Which property most significantly differentiates mild steel from alloy steel when exposed to high-temperature mechanical stress in industrial applications?

- Ans**
- ☐ 1. Mild steel provides improved wear resistance under high temperatures compared to alloy steel
 - ☒ 2. Alloy steel maintains higher mechanical strength at elevated temperatures compared to mild steel
 - ☐ 3. Alloy steel demonstrates greater ductility at elevated temperatures than mild steel
 - ☐ 4. Mild steel has enhanced corrosion resistance at high temperatures compared to alloy steel

Q.74 Given are four concurrent forces: 10 N east, 20 N north, 15 N west, 25 N south. What is the direction of the resultant force?

- Ans**
- ☐ 1. North-east
 - ☒ 2. South-west
 - ☐ 3. South-east
 - ☐ 4. North-west

Q.75 _____ is used to measure the pressure difference in a Venturi meter.

- Ans**
- ☐ 1. Bourdon gauge
 - ☒ 2. Manometer
 - ☐ 3. Rotameter
 - ☐ 4. Pitot tube

Q.76 A company faces an annual demand of 10,000 units, a fixed ordering cost of ₹200 per order, and a holding cost of ₹4 per unit per year. What is the EOQ for this company?

- Ans**
- ☐ 1. The EOQ is 4000 units
 - ☒ 2. The EOQ is 1000 units
 - ☐ 3. The EOQ is 5000 units
 - ☐ 4. The EOQ is 2240 units

Q.77 In malleability, material is subjected to which of the following stresses?

- Ans**
- ☐ 1. Fatigue stress
 - ☐ 2. Shear stress
 - ☐ 3. Tensile stress
 - ☒ 4. Compressive stress

Q.78 Which of the following is NOT a type of water-based cutting fluid?

- Ans**
- ☐ 1. Dispersion
 - ☒ 2. Grease
 - ☐ 3. Emulsion
 - ☐ 4. Solution

Q.79 Which component in a cylindrical grinding machine provides longitudinal movement to the workpiece?

- Ans**
- ☐ 1. Wheel guard for safety
 - ☐ 2. Coolant system with pump
 - ☒ 3. Table with sliding mechanism
 - ☐ 4. Spindle for work rotation

Q.80 Under which scenario is a body on an inclined plane most likely to slip when subjected to a parallel force?

- Ans**
- ☐ 1. Frictional force equals weight of the body
 - ☒ 2. Coefficient of friction is less than tangent of inclination
 - ☐ 3. Normal reaction is greater than weight
 - ☐ 4. Parallel force is opposite to frictional force

Q.81 Which of the following can be measured using interferometry?

- Ans**
- ☐ 1. Frequency of vibration
 - ☐ 2. Linear displacement
 - ☒ 3. Surface roughness
 - ☐ 4. Depth of micro-grooves

Q.82 The saddle of a lathe carriage:

- Ans**
- ☐ 1. Moves the lead screw mechanism
 - ☒ 2. Supports the cross-slide and tool post
 - ☐ 3. Controls spindle speed automatically
 - ☐ 4. Rotates the workpiece against tool

Q.83 Why is facing operation critical for assembly parts?

- Ans**
- ☐ 1. It improves the cutting tool life during machining operation.
 - ☐ 2. It reduces the hardness of the material at the surface region.
 - ☒ 3. It ensures the end surface is flat and perpendicular to the axis.
 - ☐ 4. It increases the overall strength of the workpiece material.

Q.84 Which characteristic is assessed in the bend test for welded joints?

- Ans**
- ☒ 1. Ductility of the weld metal
 - ☐ 2. Magnetic properties check
 - ☐ 3. Surface finish of the weld
 - ☐ 4. Chemical composition check

Q.85 Mild steel shows poor corrosion resistance mainly because it:

- Ans**
- ☒ 1. Does not contain protective elements like chromium or nickel
 - ☐ 2. Forms a dense but non-protective oxide layer on the surface
 - ☐ 3. Contains a relatively high amount of carbon
 - ☐ 4. Possesses a non-uniform and less stable microstructure

Q.86 For drilling a hole on a lathe, the drilling tool is placed in the ____.

- Ans**
- ☐ 1. tool post
 - ☒ 2. tailstock
 - ☐ 3. chuck
 - ☐ 4. carriage

Q.87 What is the role of the acute angle attachment in a Bevel Protractor?

- Ans**
- ☐ 1. To adjust the stock
 - ☐ 2. To measure linear distances
 - ☒ 3. To measure acute angles less than 90°
 - ☐ 4. To lock the vernier scale

Q.88 Which of the following pair of processes in the Otto cycle are both isentropic?

- Ans**
- ☐ 1. Compression and heat rejection processes
 - ☐ 2. Heat addition and heat rejection processes
 - ☐ 3. Expansion and heat addition processes
 - ☒ 4. Compression and expansion processes

Q.89 The maximum bending moment for a simply supported beam of span L with uniformly distributed load (**UDL**) w per unit length is ____.

- Ans
- ☐ 1. $\frac{WL^2}{16}$
 - ☐ 2. $\frac{WL^2}{2}$
 - ☐ 3. $\frac{WL^2}{12}$
 - ☒ 4. $\frac{WL^2}{8}$

Q.90 You must inspect a welded aluminum structure for both surface and internal defects with minimal health risk to operators. Which combination of tests is most appropriate?

- Ans
- ☐ 1. Radiographic and magnetic particle testing
 - ☒ 2. Dye penetrant and ultrasonic testing
 - ☐ 3. Radiographic and ultrasonic testing
 - ☐ 4. Visual and magnetic particle testing

Q.91 The center of pressure for a submerged horizontal plane surface is:

- Ans
- ☐ 1. The point of total hydrostatic force, located below the centroid when the surface is inclined
 - ☒ 2. The centroid of the plane surface, representing the geometric center of the submerged area
 - ☐ 3. The top edge of the submerged surface, taken as the uppermost boundary of fluid contact
 - ☐ 4. A position independent of the depth of immersion, unaffected by how far the surface is submerged

Q.92 In _____ process, heat is added during Otto cycle.

- Ans
- ☐ 1. Isentropic compression
 - ☐ 2. Constant pressure
 - ☐ 3. Isothermal expansion
 - ☒ 4. Constant volume

Q.93 Which defect is most likely to result from excessive carburizing time in steel heat treatment?

- Ans
- ☐ 1. Increase in porosity throughout the component
 - ☐ 2. Development of coarse pearlite across the section
 - ☐ 3. Initiation of intergranular corrosion in the core
 - ☒ 4. Formation of excessive retained austenite at the surface

Q.94 Corrosion resistance of alloy steels can be increased further by:

- Ans
- ☐ 1. Improving surface finish through mechanical polishing
 - ☐ 2. Adding a small percentage of copper to the composition
 - ☒ 3. Using protective coatings or chemical passivation treatment
 - ☐ 4. Increasing the overall carbon content in the alloy

Q.95 A company manufactures a component at a variable cost of ₹40 per unit and incurs a fixed cost of ₹2,00,000 per year. An outside supplier offers the same component at ₹60 per unit. What should the company do if the annual demand is 12,000 units?

- Ans
- ☐ 1. Outsource production to the supplier as it saves more money
 - ☐ 2. Split production equally between manufacturing and outsourcing
 - ☒ 3. Continue manufacturing the component in-house as it is more cost-effective
 - ☐ 4. Reduce production and buy the remaining units from the supplier

Q.96 In a workshop, why might a lever-operated hoist be preferred over an electric hoist for certain applications?

- Ans**
- ☐ 1. Lower initial cost and larger load lifting capacity
 - ☐ 2. High lifting speed and remote control capabilities
 - ☐ 3. Continuous operation and automatic overload protection
 - ☒ 4. Portability and suitability for short, manual lifting operations

Q.97 Which of the following is a limitation of mechanical comparators?

- Ans**
- ☐ 1. They cannot measure linear dimensions
 - ☒ 2. Mechanical wear can reduce accuracy over time
 - ☐ 3. They cannot measure small deviations
 - ☐ 4. They require electricity

Q.98 The point of contraflexure occurs where ____.

- Ans**
- ☐ 1. Shear force is zero
 - ☒ 2. Bending moment changes sign
 - ☐ 3. Load intensity is zero
 - ☐ 4. Bending moment is maximum

Q.99 How do the gear mechanism and braking system in a hoist contribute to safe lifting operations?

- Ans**
- ☐ 1. The gear mechanism increases speed and the brake system adds force to lifting
 - ☐ 2. The brake system increases speed and the gear mechanism holds the load steady
 - ☐ 3. Both gear mechanism and brake system work only during lowering of load
 - ☒ 4. The gear mechanism reduces speed while the brake system holds the load steady

Q.100 When selecting an organic coating for a steel structure exposed to outdoor conditions, which combination of properties should be prioritized for effective long-term performance?

- Ans**
- ☒ 1. Strong adhesion to substrate and high resistance to ultraviolet radiation.
 - ☐ 2. Ability to dissolve in water and rapid drying at room temperature.
 - ☐ 3. High chemical reactivity and low cohesion with steel to form a sacrificial layer.
 - ☐ 4. Low viscosity and low electrical insulation properties in the formulation.



रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS
सीईएन - 05/25 - जेई, डीएमएस, सीएमए - CEN - 05/25 - JE, DMS, CMA



Test Date	02/07/2026
Test Time	9:00 AM - 11:00 AM
Subject / Exam Group	RRB JE Stage 2 Electrical and Allied Engineering

* 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 : General Abilities

Q.1 You want to automatically advance slides with narration and animations during a presentation. Which MS PowerPoint feature should you use to achieve this?

- Ans
- ☒ 1. Slide Sorter
 - ☒ 2. Rehearse Timings
 - ☒ 3. Presenter View
 - ☒ 4. Action Buttons

Q.2 Which of the following best describes the velocity-time graph for an object moving with uniform velocity?

- Ans
- ☒ 1. A line starting from the origin and sloping upwards
 - ☒ 2. A straight line sloping upwards from the time axis
 - ☒ 3. A straight horizontal line parallel to the time axis
 - ☒ 4. A curved line above the time axis

Q.3 The primary method of managing biodegradable domestic waste after collection is

- Ans
- ☒ 1. burnt in open air
 - ☒ 2. conversion into compost
 - ☒ 3. sending for recycling
 - ☒ 4. throwing into sewers

Q.4 What file extension is used to save an MS PowerPoint 2021 presentation?

- Ans
- ☒ 1. .xlsx
 - ☒ 2. .pdf
 - ☒ 3. .docx
 - ☒ 4. .pptx

Q.5 The Kol Rebellion (1831–32) mainly affected which plateau region?

- Ans
- ☒ 1. Deccan Plateau
 - ☒ 2. Chotanagpur Plateau
 - ☒ 3. Meghalaya Plateau
 - ☒ 4. Malwa Plateau

Q.6 Which of the following statements best describes how the power of accommodation enables the human eye to focus on both near and distant objects?

- Ans**
- ☐ 1. The cornea provides all the focusing power required for clear vision
 - ☐ 2. The iris controls the amount of light entering and helps to focus
 - ☐ 3. The retina moves forward and backward to adjust the focus
 - ☒ 4. The eye lens changes its focal length by altering its shape through ciliary muscle action

Q.7 What is the main reason sulfur dioxide irritates the upper respiratory mucous membrane?

- Ans**
- ☒ 1. It dissolves in moisture in upper respiratory tract and forms irritant
 - ☐ 2. It oxidizes to sulphur trioxide and inhaled deep into lung
 - ☐ 3. It combines with other pollutants and polymerizes in the lungs
 - ☐ 4. It combines with haemoglobin and effect the oxygen transport

Q.8 Which of the following is a primary mission under India's National Action Plan on Climate Change (NAPCC)?

- Ans**
- ☒ 1. National Solar Mission
 - ☐ 2. National Nutrition Mission
 - ☐ 3. National Rural Livelihood Mission
 - ☐ 4. National Highway Development Project

Q.9 A construction worker needs to lift a heavy metal beam using a lever but has a limited length of plank. Which adjustment would allow the worker to lift the beam with the least effort if the position of the fulcrum can be changed but the plank length remains constant?

- Ans**
- ☐ 1. Place the fulcrum at the center of the plank
 - ☐ 2. Move the fulcrum closer to the worker
 - ☐ 3. Keep the fulcrum fixed at any point
 - ☒ 4. Move the fulcrum closer to the beam

Q.10 When was the 11th National Handloom Day celebrated across India under the coordination of the Ministry of Textiles?

- Ans**
- ☒ 1. August 7, 2025
 - ☐ 2. September 7, 2025
 - ☐ 3. November 7, 2025
 - ☐ 4. October 7, 2025

Q.11 Which of the following rivers forms a delta along the eastern coastal plains?

- Ans**
- ☐ 1. Narmada
 - ☒ 2. Godavari
 - ☐ 3. Ganga
 - ☐ 4. Tapi

Q.12 The Mappila Uprisings of the 19th century occurred mainly in which region of India?

- Ans**
- ☐ 1. Konkan region of Maharashtra
 - ☐ 2. Sunderbans region of West Bengal
 - ☐ 3. Coromandel Coast of Tamil Nadu
 - ☒ 4. Malabar region of Kerala

Q.13 Which new warship was commissioned by the Indian Navy in November, 2025, to strengthen anti-submarine and coastal defence capabilities?

- Ans**
- ✔ 1. INS Mahe
 - ✗ 2. INS Ikshak
 - ✗ 3. INS Arnala
 - ✗ 4. INS Vikrant

Q.14 Which of the following Articles states about the right of individual to form associations or unions or co-operative societies?

- Ans**
- ✗ 1. Article 19 (1) (d)
 - ✔ 2. Article 19 (1) (c)
 - ✗ 3. Article 19 (1) (b)
 - ✗ 4. Article 19 (1) (a)

Q.15 Which of the following options must be DISABLED before manually setting the date and time in Windows?

- Ans**
- ✔ 1. Set time automatically
 - ✗ 2. Night Light
 - ✗ 3. Set time zone globally
 - ✗ 4. Enable multiple clocks

Q.16 Which of the following is/are the primary reasons to fall in the trap of Email fraud or phishing?

- A) Paying attention to lucrative offers.
- B) Not checking on links or attachments from unknown senders
- C) Providing official information via email
- D) Paying attention to the company logo sent in the email

- Ans**
- ✔ 1. A, B, C Only
 - ✗ 2. A only
 - ✗ 3. A, B Only
 - ✗ 4. A, B, D Only

Q.17 On which date is National Handloom Day observed in India?

- Ans**
- ✔ 1. 7 August
 - ✗ 2. 18 August
 - ✗ 3. 5 September
 - ✗ 4. 2 October

Q.18 Which function returns the smallest value?

- Ans**
- ✗ 1. COUNT()
 - ✗ 2. AVERAGE
 - ✗ 3. MAX()
 - ✔ 4. MIN()

Q.19 A farmer applies large amounts of chemical fertilizers over several years. Which consequence most likely results from this practice leading to soil pollution?

- Ans**
- ✔ 1. Accumulation of toxic substances in soil
 - ✗ 2. Erosion of surface soil layers
 - ✗ 3. Faster plant growth every season
 - ✗ 4. Increase in earthworm population

Q.20 Which pair of sectors is commonly addressed together in State Action Plan on Climate Change (SAPCC) adaptation planning?

- Ans**
- ✓ 1. Water resources and health systems
 - ✗ 2. Textile design and fashion marketing
 - ✗ 3. Heavy industry and entertainment
 - ✗ 4. Information technology and space research

Q.21 A student pushes a heavy box that is already moving across a rough floor. If the force applied by the student is exactly equal to the frictional force opposing the motion, what will happen to the box?

- Ans**
- ✓ 1. The box will move at a constant speed
 - ✗ 2. The box will gradually come to rest
 - ✗ 3. The box will move at increasing speed
 - ✗ 4. The box will accelerate forward

Q.22 Which of the following indicators is NOT typically used to measure sustainable development?

- Ans**
- ✗ 1. Biocapacity
 - ✗ 2. Ecological Footprint
 - ✗ 3. Human Development Index (HDI)
 - ✓ 4. Gross Domestic Product (GDP) growth rate

Q.23 Which British colonial building in Mumbai, completed in 1888, showcases a blend of Victorian Gothic and Indian architectural elements?

- Ans**
- ✓ 1. Chhatrapati Shivaji Maharaj Terminus
 - ✗ 2. Gateway of India
 - ✗ 3. Bombay Town Hall
 - ✗ 4. Rajabai Clock Tower

Q.24 Which experimental discovery contradicted Thomson's model of the atom and led to its rejection?

- Ans**
- ✓ 1. Alpha particle scattering showing deflection at large angles
 - ✗ 2. Measurement of atomic radius using X-ray diffraction
 - ✗ 3. Discovery of the neutron by James Chadwick
 - ✗ 4. Observation of line spectra of hydrogen by Bohr

Q.25 Match the following columns.

Pardoning power	Function
1. Commutation	a. Removes both sentence and the conviction.
2. Reprieve	b. Lesser sentence than originally given, in special cases.
3. Respite	c. Reducing the period of sentence without changing the nature of the sentence.
4. Remission	d. Temporary stay on the execution of a sentence.
5. Pardon	e. Substitution of one form of punishment to a lighter one.

- Ans**
- ✗ 1. 1-c, 2-e, 3-b, 4-a, 5-d
 - ✓ 2. 1-e, 2-d, 3-b, 4-c, 5-a
 - ✗ 3. 1-a, 2-c, 3-d, 4-e, 5-b
 - ✗ 4. 1-d, 2-b, 3-e, 4-c, 5-a

Q.26 The pollutant group commonly associated with oil spills in oceans is _____.

Ans

- ☐ 1. chemical fertilizers
- ☐ 2. agricultural pesticides
- ☐ 3. synthetic detergents
- ☒ 4. petroleum products

Q.27 A student accidentally spills some hydrochloric acid on a table. Which substance should be used to neutralise the acid safely?

Ans

- ☐ 1. Sugar solution
- ☐ 2. Vinegar
- ☒ 3. Baking soda solution
- ☐ 4. Lemon juice

Q.28 Which Quick Style type is applied only to selected words or individual characters within a paragraph in MS Word 2010?

Ans

- ☐ 1. Page styles
- ☐ 2. Linked styles
- ☒ 3. Character styles
- ☐ 4. Paragraph styles

Q.29 According to the Article 75 of the Indian Constitution, the total number of ministers (including the Prime Minister) in the Council of Ministers shall NOT exceed what percentage of the total members of the House of the People, i.e., Lok Sabha?

Ans

- ☐ 1. 25%
- ☐ 2. 10%
- ☒ 3. 15%
- ☐ 4. 20%

Q.30 In a real-life scenario, a chemist discovers a compound with the formula $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{OH}$. What is the correct IUPAC name for this compound?

Ans

- ☐ 1. 3-methylhexanol
- ☐ 2. 4-methylpentanol
- ☐ 3. 2-methylhexanol
- ☒ 4. 3-methylpentan-1-ol

Q.31 How can we locate a file with a known extension but an unknown name in a large directory?

Ans

- ☒ 1. Using the Search box in File Explorer with *.ext
- ☐ 2. Checking the Recycle Bin
- ☐ 3. Using the dir command
- ☐ 4. Through File Explorer

Q.32 The term 'smog' is a combination of _____.

Ans

- ☐ 1. Fog and clouds
- ☒ 2. Smoke and fog
- ☐ 3. Smoke and haze
- ☐ 4. Smog and mist

Q.33 According to Thomson's model, how are electrons arranged in an atom?

Ans

- ☐ 1. Moving in fixed orbits around the nucleus
- ☐ 2. Randomly placed inside the nucleus
- ☒ 3. Embedded in a positively charged sphere like seeds in a watermelon
- ☐ 4. Orbiting around neutrons in elliptical paths

Q.34 If cell A1 = 10 and B1 = 20, what will `=A1+B1` return?

- Ans
- ☐ 1. 1020
 - ☐ 2. 200
 - ☒ 3. 30
 - ☐ 4. Error

Q.35 The Atal Bhujal Yojana 2020 focused on improving water resources management of how many states?

- Ans
- ☐ 1. eight
 - ☐ 2. five
 - ☒ 3. seven
 - ☐ 4. ten

Q.36 Which of the following best describes how sound travels through air?

- Ans
- ☒ 1. The air particles vibrate back and forth parallel to the direction of the wave
 - ☐ 2. The air particles remain stationary while the wave moves through
 - ☐ 3. The air particles vibrate up and down perpendicular to the direction of the wave
 - ☐ 4. The air particles move in circular paths as the wave passes

Q.37 What is the general formula of alkenes?

- Ans
- ☐ 1. C_nH_n
 - ☒ 2. C_nH_{2n}
 - ☐ 3. C_nH_{2n+2}
 - ☐ 4. C_nH_{2n-2}

Q.38 Which type of computer virus attaches itself to executable files and gets activated when the file is run?

- Ans
- ☐ 1. Worm
 - ☐ 2. Boot Sector Virus
 - ☐ 3. Macro Virus
 - ☒ 4. File Infector Virus

Q.39 If 10 grams of salt are dissolved in 100 mL of water, which component is the solute?

- Ans
- ☐ 1. Water only
 - ☐ 2. Neither
 - ☐ 3. Both salt and water
 - ☒ 4. Salt only

Q.40 Biomedical waste handlers in a hospital are at risk of occupational hazards. The most effective way to protect them from exposure to infectious materials is:

- Ans
- ☒ 1. Use of protective equipment and safe handling
 - ☐ 2. Regular medical check-ups
 - ☐ 3. Segregation of waste into color-coded bins
 - ☐ 4. Vaccination against common infections

Q.41 Which of the following statements is true about the Outbox?

- Ans
- ☐ 1. It contains emails that are currently being drafted.
 - ☒ 2. It temporarily stores emails that are queued for sending.
 - ☐ 3. It holds emails that have been successfully sent.
 - ☐ 4. It is used to receive incoming emails.

Q.42 Who won the maximum number of medals at the 38th National Games of India?

- Ans**
- ☐ 1. Manu Bhaker
 - ☐ 2. Neeraj Chopra
 - ☒ 3. Dhinidhi Desinghu
 - ☐ 4. Bajrang Punia

Q.43 Which of the following satellites was launched on November 2, 2025, to enhance the Indian Navy's secure communication network and maritime surveillance capabilities?

- Ans**
- ☐ 1. RISAT-2B
 - ☐ 2. GSAT-6A
 - ☒ 3. CMS-03 (GSAT-7R)
 - ☐ 4. Cartosat-3

Q.44 Consider the following statements regarding chemical reactions and choose the correct option.

Statement I: Every reaction in which two or more reactants combine to form a single product is classified as a combination reaction regardless of heat change.

Statement II: The reaction $\text{CaO(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Ca(OH)}_2\text{(aq)} + \text{heat}$ is both a combination reaction and an exothermic reaction.

- Ans**
- ☐ 1. Both statements are incorrect
 - ☒ 2. Both statements are correct
 - ☐ 3. Only Statement I is correct
 - ☐ 4. Only Statement II is correct

Q.45 A field exposed to excessive pesticide use shows a sharp decline in earthworm population. The resulting effect on soil is:

- Ans**
- ☒ 1. Reduced soil fertility
 - ☐ 2. Increased water retention
 - ☐ 3. Enhanced decomposition
 - ☐ 4. Improved aeration

Q.46 Which of the following statements best describes the behavior of magnetic field lines around a straight current-carrying conductor?

- Ans**
- ☒ 1. They form concentric circles centered on the conductor.
 - ☐ 2. They change direction randomly along the wire.
 - ☐ 3. They are parallel straight lines along the wire.
 - ☐ 4. They radiate straight outward from the wire.

Q.47 Which condition is required for a displacement reaction between a metal and salt solution?

- Ans**
- ☒ 1. Metal must be higher in reactivity series
 - ☐ 2. Metal must be same as salt constituent
 - ☐ 3. Reaction must be endothermic
 - ☐ 4. Salt must be insoluble in water

Q.48 The atmospheric component that remains largely unreactive is _____.

- Ans**
- ☒ 1. Argon
 - ☐ 2. Carbon dioxide
 - ☐ 3. Methane
 - ☐ 4. Oxygen

Q.49 The primary goal of the Pradhan Mantri Gram Sadak Yojana (PMGSY) is to:

- Ans**
- ☐ 1. Enhance telecommunication services in cities
 - ☐ 2. Promote renewable energy usage
 - ☒ 3. Provide rural connectivity through road construction
 - ☐ 4. Develop urban infrastructure

Q.50 A factory plans to install a powerful electromagnet for lifting metal scraps. To maximize the magnetic field strength around the coil, which of the following combinations would be most effective?

- Ans**
- ☐ 1. Using a copper core, increasing coil turns, and lowering current
 - ☐ 2. Using a steel core, decreasing coil turns, and lowering current
 - ☐ 3. Using an air core, decreasing coil turns, and keeping current constant
 - ☒ 4. Using a soft iron core, increasing coil turns, and increasing current through the coil

Section : Technical Abilities

Q.1 An induction furnace operates at 10 kHz and is used to melt 100 kg of steel. If the efficiency is 60% and the energy required to melt steel is 1500 kWh/ton, what is the minimum energy input needed?

- Ans**
- ☒ 1. 250 kWh
 - ☐ 2. 150 kWh
 - ☐ 3. 180 kWh
 - ☐ 4. 90 kWh

Q.2 The curve obtained in the input characteristics of a BJT in common-emitter (CE) configuration is _____.

- Ans**
- ☐ 1. Similar to a reverse breakdown curve
 - ☐ 2. Linear for all voltages
 - ☒ 3. Similar to a forward diode curve
 - ☐ 4. A horizontal straight line

Q.3 A protective device with high rupturing capacity can:

- Ans**
- ☐ 1. Reduce transmission line inductance during balanced load operation only
 - ☐ 2. Improve voltage regulation of transformers during overload conditions
 - ☐ 3. Increase insulation resistance during normal system operating conditions
 - ☒ 4. Safely interrupt heavy fault currents without equipment damage occurrence

Q.4 A 12 μ F capacitor and a 4 μ F capacitor are connected in series. The ratio of voltages across them will be:

- Ans**
- ☐ 1. 4:1
 - ☐ 2. 1:4
 - ☐ 3. 3:1
 - ☒ 4. 1:3

Q.5 What is the purpose of a Buchholz relay in transformer protection?

- Ans**
- ☒ 1. To detect internal faults such as short circuits and arcing in oil
 - ☐ 2. To detect overvoltage
 - ☐ 3. To measure core flux
 - ☐ 4. To measure temperature rise

Q.6 In a series R-C circuit supplied with sinusoidal AC voltage, the current leads the applied voltage by an angle ϕ . Which of the following correctly expresses this phase angle?

Ans

☐ 1. $\tan \phi = \frac{R}{X_C}$

☐ 2. $\tan \phi = -\frac{R}{X_C}$

☒ 3. $\tan \phi = -\frac{X_C}{R}$

☐ 4. $\tan \phi = X_C R$

Q.7 Which of the following statements about damping in moving-iron instruments is correct?

Ans

☒ 1. Damping in MI instruments is usually provided by air friction

☐ 2. Damping in MI instruments is usually provided by eddy currents in an aluminium disc

☐ 3. Damping in MI instruments is usually not required because the pointer is very light

☐ 4. Damping in MI instruments is usually provided by a permanent magnet

Q.8 Which method is commonly used to reduce earth resistance in an electrical installation?

Ans

☐ 1. Increasing the supply voltage

☐ 2. Reducing the size of the earth conductor

☒ 3. Increasing the number of earth electrodes

☐ 4. Using a higher-rated fuse

Q.9 What happens to the magnetic field around a straight current-carrying conductor when the current through it is increased?

Ans

☐ 1. Magnetic field disappears

☒ 2. Magnetic field strength increases

☐ 3. Magnetic field strength remains the same

☐ 4. Magnetic field strength decreases

Q.10 How is the phase angle between voltage V and total current I_S in a parallel RLC circuit determined?

Ans

☐ 1. By comparing voltage drops across each element

☐ 2. From the angle between V and I_R

☐ 3. By subtracting I_L from I_C

☒ 4. From the angle between V and the vector sum of I_R , I_L , and I_C

Q.11 Consider the following statements about torque in synchronous motors.

I. The torque in a synchronous motor is produced only when the rotor is locked into synchronism.

II. The torque is directly proportional to the sine of the load angle (δ).

III. Synchronous motor develops starting torque proportional to the power input.

IV. Maximum torque occurs at $\delta = 180^\circ$.

Which of the above statements are correct?

Ans

☐ 1. Statements II, III & IV only

☐ 2. Statements II & IV only

☐ 3. Statements I, II & III only

☒ 4. Statements I & II only

Q.12 Which Law illustrates the relationship between induced electromotive force (EMF) and the time variation of magnetic flux in a coil?

- Ans**
- ☐ 1. Ampere Circuital Law
 - ☒ 2. Faraday Law of Induction
 - ☐ 3. Lenz's Law
 - ☐ 4. Columb's Law

Q.13 Which of the following statements about the atomic hydrogen arc welding process is correct?

- Ans**
- ☐ 1. It works with a consumable iron electrode in a hydrogen atmosphere.
 - ☒ 2. It employs two non-consumable tungsten electrodes to create an arc in a hydrogen atmosphere.
 - ☐ 3. It requires two non-consumable tungsten electrodes and an oxygen-rich atmosphere.
 - ☐ 4. It utilizes a single carbon electrode to generate heat in hydrogen atmosphere.

Q.14 For accurate measurement of inductors using Hay's bridge, which characteristic should the inductor primarily possess?

- Ans**
- ☒ 1. High Q-factor
 - ☐ 2. Medium Q-factor
 - ☐ 3. High resistance
 - ☐ 4. Low Q-factor

Q.15 In a three-phase induction motor, the phasor diagram shows an angle between the applied stator voltage and the resulting stator current. This angle primarily indicates:

- Ans**
- ☐ 1. Rotor frequency
 - ☐ 2. Synchronous speed
 - ☒ 3. Input power factor
 - ☐ 4. Rotor slip

Q.16 A low demand factor in an electrical installation indicates that:

- Ans**
- ☐ 1. Average electrical load remains equal to maximum system demand continuously
 - ☒ 2. Connected electrical load is much greater than maximum power demand
 - ☐ 3. Maximum electrical demand exceeds total connected electrical load capacity
 - ☐ 4. Individual consumer demands occur simultaneously during system operation

Q.17 In seam welding, the electrodes are made of _____.

- Ans**
- ☐ 1. aluminium
 - ☐ 2. brass
 - ☐ 3. tungsten
 - ☒ 4. copper alloys

Q.18 An oscilloscope displays a measured rise time of 10 ns when observing a fast pulse. If the oscilloscope itself has a specified rise time of 6 ns, then what is the approximate actual rise time of the signal being measured?

- Ans**
- ☐ 1. 4 ns
 - ☒ 2. 8 ns
 - ☐ 3. 6 ns
 - ☐ 4. 12 ns

Q.19 Which strategy reduces electricity charges under a power factor tariff system for a manufacturing plant with predominantly inductive loads?

- Ans**
- ☒ 1. Switching to higher voltage transformers without changing load characteristics
 - ☒ 2. Installing capacitors to improve the power factor of inductive loads
 - ☒ 3. Operating all equipment at full load constantly
 - ☒ 4. Increasing lighting hours during low demand periods

Q.20 Why does a squirrel cage induction motor not develop maximum starting torque?

- Ans**
- ☒ 1. Slip is less than unity at starting
 - ☒ 2. Rotor resistance is fixed and low
 - ☒ 3. Rotor reactance is zero at starting
 - ☒ 4. Rotor resistance can be externally varied at starting

Q.21 Which modification in an earthing system most directly reduces earth resistance by improving the contact area between the electrode and surrounding soil?

- Ans**
- ☒ 1. Connecting the earth conductor to the neutral wire only
 - ☒ 2. Increasing the effective contact area by using multiple or larger earth electrodes
 - ☒ 3. Using a higher supply voltage in the installation
 - ☒ 4. Increasing the rating of the protective fuse

Q.22 Which consideration is important while deciding the capacity of a power station?

- Ans**
- ☒ 1. Type of paint applied on generating station external building surfaces
 - ☒ 2. Number of ceiling fans installed inside administrative office sections
 - ☒ 3. Expected maximum electrical demand and future load growth requirements
 - ☒ 4. Shape of fencing structure surrounding the generating station premises

Q.23 What is the primary fuel used in a biomass power plant?

- Ans**
- ☒ 1. Natural gas
 - ☒ 2. Uranium
 - ☒ 3. Organic waste materials
 - ☒ 4. Coal

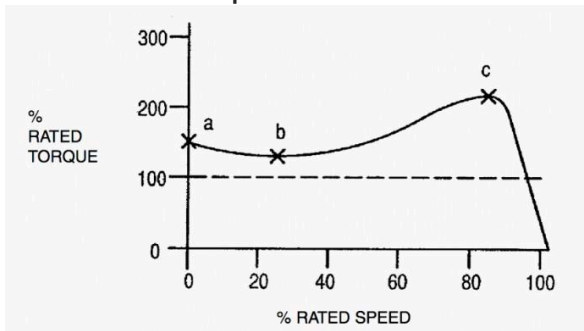
Q.24 A machine delivers power that is three times its original value, while the duration of operation stays unchanged. How does the work done by the machine change?

- Ans**
- ☒ 1. It becomes three times larger.
 - ☒ 2. It becomes one-third of the original.
 - ☒ 3. It remains unchanged.
 - ☒ 4. It becomes nine times larger.

Q.25 Which statement about magnetic flux is false?

- Ans**
- ☒ 1. Magnetic flux density unit is Tesla or weber per meter square (Wb/m^2).
 - ☒ 2. Magnetic flux does not have any SI unit.
 - ☒ 3. Magnetic flux is analogous to current in electric circuit.
 - ☒ 4. Magnetic flux density is the magnetic flux passing through per unit cross-section area.

Q.26 Which point or region represents the Pull-out Torque in the shown torque-speed characteristic of a 3-phase induction motor?



- Ans**
- ☒ 1. Point b
 - ☒ 2. Point a
 - ☒ 3. Anywhere between point a and b
 - ☒ 4. Point c

Q.27 Which set of statements correctly describes the steady state speed-torque characteristics of a three-phase synchronous motor?

- i) Runs at constant synchronous speed
- ii) Starting torque is zero
- iii) Torque increases significantly with slip
- iv) Not suitable for variable speed drives
- v) Maintains speed under varying loads

- Ans**
- ☒ 1. (i), (iii), (iv) and (v) only
 - ☒ 2. (i), (ii), (iii) and (v) only
 - ☒ 3. (i), (ii), and (v) only
 - ☒ 4. (i), (ii), (iii) and (iv) only

Q.28 Identify the correct equation for controlling torque (T_c) in a spring-controlled moving iron instrument, where K is the spring constant and θ is the deflection angle.

- Ans**
- ☒ 1. $T_c = \frac{K}{\theta}$
 - ☒ 2. $T_c = K + \theta$
 - ☒ 3. $T_c = K - \theta$
 - ☒ 4. $T_c = K\theta$

Q.29 In a closed electrical loop supplied by 10 V, two resistors produce voltage drops of 6 V and 4 V, respectively. Which statement correctly expresses Kirchhoff's Voltage Law for this loop?

- Ans**
- ☒ 1. The current through the two resistors is different
 - ☒ 2. The algebraic sum of all voltages around the loop is zero
 - ☒ 3. The source voltage is greater than the total voltage drop
 - ☒ 4. The source voltage is less than the total voltage drop

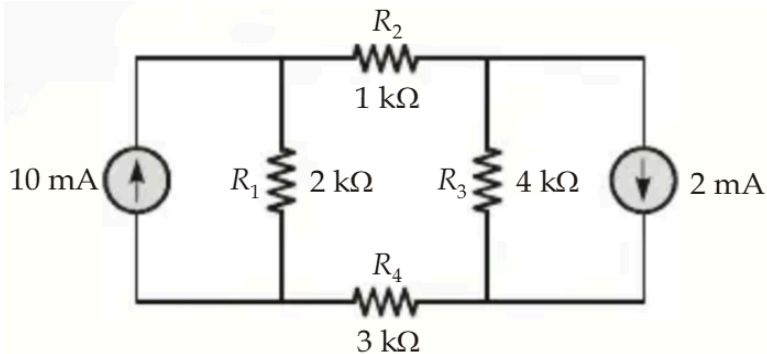
Q.30 A three-phase slip ring induction motor is preferred over a squirrel cage induction motor for which of the following application scenarios?

- Ans**
- ☒ 1. When highest efficiency is the only concern
 - ☒ 2. When constant speed under all load conditions is needed
 - ☒ 3. When variable speed and high starting torque are required
 - ☒ 4. When reduced maintenance is the top priority

Q.31 Which of the following devices provide rapid fault current interruption independently in a high-voltage power distribution system?

- Ans
- ✓ 1. HRC fuse
 - ✗ 2. Isolator
 - ✗ 3. Contactor
 - ✗ 4. Linear coupler

Q.32 For the circuit shown in the figure, the current through the resistor R_2 is _____.



- Ans
- ✗ 1. 1.8 mA
 - ✓ 2. 2.8 mA
 - ✗ 3. 4 mA
 - ✗ 4. 2 mA

Q.33 The hypotenuse of the power triangle represents which type of power?

- Ans
- ✗ 1. Reactive power
 - ✗ 2. Power factor
 - ✓ 3. Apparent power
 - ✗ 4. Active power

Q.34 What is the main purpose of providing a properly installed earthing system in electrical installations?

- Ans
- ✓ 1. To provide a safe path for leakage and fault currents to earth
 - ✗ 2. To increase the insulation resistance of conductors
 - ✗ 3. To reduce the reactance of the line conductors
 - ✗ 4. To improve the power factor of the electrical system

Q.35 A Squirrel cage induction generator operates at _____ speed for electric generation in wind turbines.

- Ans
- ✗ 1. variable
 - ✗ 2. slip
 - ✓ 3. constant
 - ✗ 4. negligible

Q.36 What is the main disadvantage of a half-wave rectifier?

- Ans
- ✓ 1. Utilizes only one half-cycle
 - ✗ 2. Ripple frequency equal to supply frequency
 - ✗ 3. Requires center-tap transformer
 - ✗ 4. High cost

Q.37 Determine whether $x(t) = \sin(3t) + \sin(5t)$ is periodic. If yes, find its fundamental period.

Ans ☒ 1. Non-periodic

☒ 2. $T = \pi/5$

☒ 3. $T = 2\pi$

☒ 4. $T = \pi$

Q.38 A maximum demand tariff is designed to encourage consumers to _____.

Ans ☒ 1. Adopt renewable energy sources

☒ 2. Increase energy production

☒ 3. Reduce overall energy consumption

☒ 4. Manage and reduce their peak power demand

Q.39 Which combination of the following statements about direct resistance heating are correct?

i) The process requires the charge to be electrically conductive.

ii) Electrodes are placed in direct contact with the charge.

iii) Heat is generated by induced eddy currents in the charge.

iv) The charge does not form part of the electric circuit.

Ans ☒ 1. (ii) and (iii) only

☒ 2. (iii) and (iv) only

☒ 3. (i) and (iv) only

☒ 4. (i) and (ii) only

Q.40 What does the Reduction Factor in illumination refer to?

Ans ☒ 1. The ratio of total luminous flux to the consumed electrical power

☒ 2. The ratio of actual illuminance to theoretical illuminance

☒ 3. The percentage of light lost due to reflection and absorption

☒ 4. The ratio of the illumination at a given point to the initial illumination

Q.41 In a single-phase parallel RL circuit connected to a single phase AC supply, which of the following is correct?

Ans ☒ 1. Power factor is unity

☒ 2. Current leads voltage

☒ 3. Power factor is leading

☒ 4. Current lags voltage

Q.42 On a CRO screen, a DC voltage causes a vertical deflection of 4 divisions. If the vertical sensitivity is 2 V/div, what is the value of the DC voltage?

Ans ☒ 1. 4 V

☒ 2. 8 V

☒ 3. 2 V

☒ 4. 6 V

Q.43 Which of the following is used to join two cable conductors?

Ans ☒ 1. Cable marking

☒ 2. Splicing

☒ 3. Surface coating

☒ 4. Insulation taping

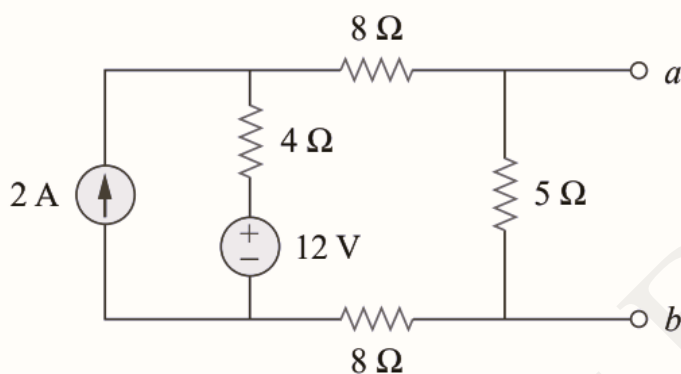
Q.44 A current I flows through a circular loop. If the radius of the loop is reduced to half and the current is doubled, the magnetic field intensity at the center becomes:

- Ans
- ☒ 1. Unchanged
 - ☒ 2. Four times the original value
 - ☒ 3. Twice the original value
 - ☒ 4. Eight times the original value

Q.45 A PNP transistor is operating in active region. If the emitter voltage decreases such that the emitter becomes less positive than the base while the biasing condition of the collector-base junction remains unchanged, the transistor will enter _____.

- Ans
- ☒ 1. Active region with higher gain
 - ☒ 2. Reverse active region
 - ☒ 3. Cut-off region
 - ☒ 4. Saturation region

Q.46 The Norton equivalent of the circuit shown in figure at terminals a-b are _____.



- Ans
- ☒ 1. $R_N = 4\Omega$, $I_N = 2\text{ A}$
 - ☒ 2. $R_N = 25\Omega$, $I_N = 1\text{ A}$
 - ☒ 3. $R_N = 4\Omega$, $I_N = 1\text{ A}$
 - ☒ 4. $R_N = 25\Omega$, $I_N = 3\text{ A}$

Q.47 Which statement correctly explains the principle of direct resistance heating?

- Ans
- ☒ 1. Heat is generated by the resistance of the material through which the current flows, and it is applied directly to the heating element
 - ☒ 2. Heat is produced through the conversion of mechanical energy into heat
 - ☒ 3. The heating element works by electromagnetic induction
 - ☒ 4. The process is based on the principle of convective heat transfer

Q.48 Which of the following is a key maintenance practice for reliable operation of a 3-phase induction motor?

- Ans
- ☒ 1. Regular lubrication of bearings and periodic insulation resistance testing.
 - ☒ 2. Short-circuiting the stator windings when the motor is idle.
 - ☒ 3. Increasing slip by intentionally weakening rotor bars.
 - ☒ 4. Running the motor continuously at no-load to avoid heating.

Q.49 Which of the following balanced phase-voltage phasor sets represents an abc positive-sequence system?

- Ans
- ☒ 1. $V_a = 0^\circ$, $V_b = 120^\circ$, $V_c = -120^\circ$
 - ☒ 2. $V_a = 0^\circ$, $V_b = -90^\circ$, $V_c = -180^\circ$
 - ☒ 3. $V_a = 0^\circ$, $V_b = -120^\circ$, $V_c = 120^\circ$
 - ☒ 4. $V_a = 0^\circ$, $V_b = 90^\circ$, $V_c = 180^\circ$

Q.50 In a DC generator, the magnitude of induced EMF is directly proportional to:

- Ans**
- ☒ 1. the inverse of number of conductors
 - ☒ 2. the product of flux per pole and speed
 - ☒ 3. the square of flux per pole
 - ☒ 4. the armature resistance

Q.51 A DC shunt motor is initially running at no load. What is the effect on its speed when the load is increased?

- Ans**
- ☒ 1. The speed decreases slightly
 - ☒ 2. The speed remains constant
 - ☒ 3. The speed increases slightly
 - ☒ 4. The speed decreases significantly

Q.52 A power factor tariff is introduced in energy billing to encourage consumers to _____.

- Ans**
- ☒ 1. Receive discounts based only on total energy consumption
 - ☒ 2. Improve their power factor for more efficient use of electrical power
 - ☒ 3. Reduce electricity consumption during peak hours
 - ☒ 4. Pay a fixed electricity charge regardless of usage pattern

Q.53 What is an advantage of a bridge rectifier over a center-tapped full-wave rectifier?

- Ans**
- ☒ 1. A bridge rectifier requires fewer diodes for rectification
 - ☒ 2. A bridge rectifier uses only half of the transformer secondary winding
 - ☒ 3. A bridge rectifier produces a higher ripple factor at the output
 - ☒ 4. A bridge rectifier can operate using diodes with lower peak inverse voltage rating

Q.54 In the graphical analysis of a FET amplifier, what is the primary purpose of the load line?

- Ans**
- ☒ 1. To determine the operating point of the FET
 - ☒ 2. To determine the input impedance of the FET
 - ☒ 3. To determine the power gain of the FET
 - ☒ 4. To determine the output impedance of the FET

Q.55 Three impedances, each of $(3-4j) \Omega$, are connected in delta to a 200 V, three-phase, 50 Hz balanced supply. What are the values of line current and phase current, respectively, in the delta-connected load?

- Ans**
- ☒ 1. 40 A and $40\sqrt{3}$ A
 - ☒ 2. $40\sqrt{3}$ A and 40 A
 - ☒ 3. 40 A and 40 A
 - ☒ 4. $40\sqrt{3}$ A and $40\sqrt{3}$ A

Q.56 What does the plant use factor represent?

- Ans**
- ☒ 1. The ratio of actual energy generated to the product of plant capacity and hours of use
 - ☒ 2. The ratio of actual energy generated to the total installed capacity
 - ☒ 3. The ratio of average load to maximum demand
 - ☒ 4. The ratio of maximum demand to the total installed capacity

Q.57 What is a typical starting torque characteristic of a shaded pole induction motor?

- Ans**
- ☒ 1. Low starting torque and low efficiency
 - ☒ 2. High starting torque and high efficiency
 - ☒ 3. High starting torque and low efficiency
 - ☒ 4. Low starting torque and high efficiency

Q.58 In a three-phase induction energy meter, the disc rotates due to the interaction between the magnetic fields produced by:

- Ans**
- ☐ 1. the shunt coil and the field winding
 - ☐ 2. the current and cooling coils
 - ☐ 3. the mechanical gears and shaft
 - ☒ 4. the pressure and current coils

Q.59 If the frequency of an AC source is doubled, the impedance of a pure resistor _____.

- Ans**
- ☒ 1. remains unchanged
 - ☐ 2. quadruples
 - ☐ 3. doubles
 - ☐ 4. halves

Q.60 In a radial distribution system, which factor causes an increase in voltage drop?

- Ans**
- ☒ 1. Increase in load current
 - ☐ 2. Increase in insulation
 - ☐ 3. Decrease in distance
 - ☐ 4. Decrease in resistance

Q.61 Why are instrument transformers used with a wattmeter for high-power AC measurements?

- Ans**
- ☒ 1. To extend the current and voltage range of the wattmeter safely
 - ☐ 2. To eliminate the need for a pressure coil in the wattmeter
 - ☐ 3. To reduce the frequency of the measured circuit
 - ☐ 4. To convert AC power into DC power

Q.62 Which of the following sets of statements about the causes of errors in current transformers is correct?

- i) Leakage reactance in secondary winding contributes to ratio error
- ii) High magnetizing current increases phase angle error
- iii) Burden with low power factor increases phase angle error
- iv) Core saturation reduces both ratio and phase angle errors

- Ans**
- ☐ 1. (ii) and (iv) only
 - ☐ 2. (i) and (iv) only
 - ☒ 3. (i), (ii) and (iii) only
 - ☐ 4. (iii) and (iv) only

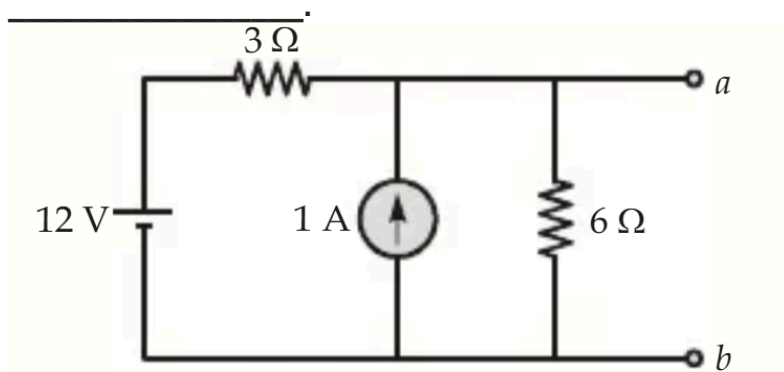
Q.63 In a single-phase RL circuit, the RMS voltage across the supply is 100 V, the RMS current is 5 A, and the current lags the voltage by 60° . Determine the apparent power of the circuit.

- Ans**
- ☒ 1. 500 VA
 - ☐ 2. 250 VA
 - ☐ 3. 400 VA
 - ☐ 4. 200 VA

Q.64 A 12 V battery is connected in series with two resistors $4\ \Omega$ and $6\ \Omega$, forming a closed circuit. What is the Thevenin equivalent resistance across the terminals of the $6\ \Omega$ resistor after it is removed?

- Ans**
- ☐ 1. $10\ \Omega$
 - ☐ 2. $2\ \Omega$
 - ☐ 3. $6\ \Omega$
 - ☒ 4. $4\ \Omega$

Q.65 The Thevenin equivalent voltage at terminals a-b is



- Ans
- ☐ 1. 12 V
 - ☒ 2. 10 V
 - ☐ 3. 9 V
 - ☐ 4. 6 V

Q.66 Which of the following is the main purpose of earth resistance measurement?

- Ans
- ☒ 1. Ensure safe dissipation of fault current
 - ☐ 2. Reduce frequency variation
 - ☐ 3. Increase power output
 - ☐ 4. Improve voltage level

Q.67 Megger is an instrument used to measure _____.

- Ans
- ☐ 1. Current carrier.
 - ☒ 2. High resistance.
 - ☐ 3. Source of e.m.f.
 - ☐ 4. Type of a null detector.

Q.68 Where is the shading coil placed in a shaded-pole motor?

- Ans
- ☒ 1. On a portion of the stator pole
 - ☐ 2. On the air-gap surface only
 - ☐ 3. On the rotor shaft
 - ☐ 4. On the motor bearings

Q.69 Retentivity in a B-H curve indicates:

- Ans
- ☐ 1. Reverse magnetic field required to reduce flux density to zero
 - ☐ 2. Maximum field strength
 - ☐ 3. Resistance to demagnetization
 - ☒ 4. Magnetic flux density left after removing the external magnetizing force

Q.70 Anderson's bridge belongs to which category of measuring circuits?

- Ans
- ☒ 1. AC bridge for inductance measurement
 - ☐ 2. DC potentiometer circuit
 - ☐ 3. Resonance circuit for frequency measurement
 - ☐ 4. DC bridge for resistance measurement

Q.71 The speed of a synchronous motor depends on:

- Ans
- ☒ 1. Supply frequency
 - ☐ 2. Field resistance
 - ☐ 3. Load only
 - ☐ 4. Armature current

Q.72 Which of the following points are **True** regarding the effect of short-time duty on the size and cost of electric motors?

- i) Short-time duty allows use of higher rated motors for short durations.
- ii) Motors used for short-time duty are generally smaller for the same load.
- iii) Short-time duty increases the need for oversized enclosures.
- iv) Cost per kW is lower for motors used in short-time duty.

Ans ☒ 1. (ii), (iii), and (iv) only
☒ 2. (i), (iii), and (iv) only
☒ 3. (i) and (iii) only
☒ 4. (i), (ii), and (iv) only

Q.73 A room requires an average illuminance of 200 lux over a 60 square meter area. If the total luminous flux emitted by the lamps is 15000 lumens and the utilization factor is 0.8, what is the actual illuminance achieved?

Ans ☒ 1. 125 lux
☒ 2. 100 lux
☒ 3. 160 lux
☒ 4. 200 lux

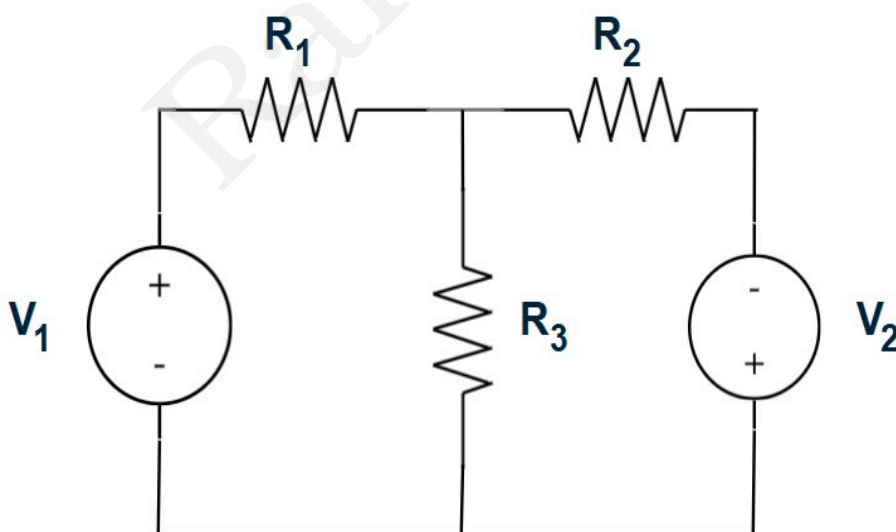
Q.74 At which voltage level are the maximum consumers connected?

Ans ☒ 1. primary distribution level
☒ 2. secondary transmission level
☒ 3. primary transmission level
☒ 4. secondary distribution level

Q.75 A single-phase preventer continuously monitors and protects preferably which motor against phase failure?

Ans ☒ 1. DC Motor
☒ 2. 3-phase induction motor
☒ 3. Reluctance motor
☒ 4. Single phase induction motor

Q.76 In the given circuit $R_1 = 6\Omega$, $R_2 = 4\Omega$ and $R_3 = 3\Omega$. The voltage sources are $V_1 = 21V$ and $V_2 = 5V$. Determine the currents flowing through R_1 and R_2 , respectively.



Ans ☒ 1. 3A and 2A
☒ 2. 2A and 3A
☒ 3. 4A and 6A
☒ 4. 2A and 6A

Q.77 Three identical capacitors are connected in parallel. If the total charge stored in the system is Q , what is the charge on each individual capacitor?

- Ans**
- ☐ 1. $Q/9$
 - ☐ 2. Q
 - ☐ 3. $3Q$
 - ☒ 4. $Q/3$

Q.78 Select the option that is correct regarding the following two statements labelled Assertion (A) and Reason (R).

Assertion (A): Three-phase auto-transformers are smaller and lighter than equivalent three-phase two-winding transformers.

Reason (R): Auto-transformers use fewer windings and a smaller core.

- Ans**
- ☐ 1. A is true, but R is false.
 - ☐ 2. A is false, but R is true.
 - ☐ 3. Both A and R are true, but R is not the correct explanation of A.
 - ☒ 4. Both A and R are true, and R is the correct explanation of A.

Q.79 The output of an alternator is taken from the:

- Ans**
- ☐ 1. Rotor winding
 - ☐ 2. Commutator
 - ☐ 3. Field winding
 - ☒ 4. Stator winding

Q.80 An underground cable used in power systems should possess which important requirement?

- Ans**
- ☐ 1. High magnetic saturation capability inside cable conductor arrangements only
 - ☐ 2. Low melting point of conductor material during fault conditions
 - ☐ 3. Variable conductor diameter during balanced load operating conditions
 - ☒ 4. High insulation resistance and adequate mechanical strength properties

Q.81 Two inductors of 8 H and 2 H connected in series opposing with mutual inductance of 1 H will have equivalent:

- Ans**
- ☒ 1. 8 H
 - ☐ 2. 9 H
 - ☐ 3. 5 H
 - ☐ 4. 11 H

Q.82 Concentrating solar technology is a type of solar power technology which:

- Ans**
- ☐ 1. uses sunlight energy to directly rotate turbines without a heat conversion stage
 - ☒ 2. uses mirrors to focus sunlight, generating heat that drives turbines to produce electricity
 - ☐ 3. directly converts sunlight into electricity using photovoltaic (PV) panels
 - ☐ 4. produces heat from sunlight without using mirrors or optical concentration

Q.83 What is the main objective of backup protection in a power system?

- Ans**
- ☐ 1. To detect minor disturbances in voltage
 - ☐ 2. To increase the complexity of the system
 - ☒ 3. To isolate faults if primary protection fails
 - ☐ 4. To operate faster than primary protection

Q.84 A PNP transistor is fabricated with an increased base doping concentration while keeping all other physical dimensions and doping levels constant. What is the effect on the transistor's performance?

- Ans**
- ☐ 1. The emitter injection efficiency increases
 - ☐ 2. The collector current becomes independent of emitter current
 - ☒ 3. The common-emitter current gain decreases
 - ☐ 4. The base transport factor increases.

Q.85 A limitation of Buchholz relay protection is:

- Ans**
- ☐ 1. Automatic detection of gas accumulation inside transformer oil systems
 - ☐ 2. Detection of incipient faults inside oil immersed transformers effectively
 - ☐ 3. Fast isolation of internal transformer faults during abnormal conditions
 - ☒ 4. Operation possible only in transformers provided with conservator tanks

Q.86 The fundamental operating principle of a transformer is based on:

- Ans**
- ☐ 1. direct electrical conduction between primary and secondary windings for energy transfer
 - ☒ 2. electromagnetic induction between two electrically isolated coils magnetically coupled through a low-reluctance magnetic circuit
 - ☐ 3. mechanical coupling of coils to facilitate energy transfer through physical motion
 - ☐ 4. conversion of alternating current (AC) into direct current (DC) via semiconductor devices

Q.87 The maximum fault current attained during a short circuit at the instant before the fuse completely interrupts the circuit is called:

- Ans**
- ☐ 1. Rated current
 - ☐ 2. Melting current
 - ☐ 3. Breaking capacity
 - ☒ 4. Cut-off current

Q.88 When an alternator operates at unity power factor, the armature current:

- Ans**
- ☐ 1. leads terminal voltage
 - ☐ 2. lags terminal voltage
 - ☐ 3. is opposite to terminal voltage
 - ☒ 4. is in phase with terminal voltage

Q.89 In a parallel RC circuit connected to a single-phase AC supply, the correct relationship between the supply voltage and the total circuit current is _____.

- Ans**
- ☐ 1. Current is in phase with the voltage
 - ☐ 2. Current lags the voltage
 - ☐ 3. Current and voltage are 180° out of phase
 - ☒ 4. Current leads the voltage

Q.90 Field failure protection in an alternator is provided to detect:

- Ans**
- ☐ 1. Variation in illumination intensity inside generator control panels
 - ☒ 2. Loss of excitation current in the synchronous generator field winding
 - ☐ 3. Reduction in paint thickness of alternator outer protective enclosure
 - ☐ 4. Change in colour of lubricating oil storage tank surface coating

Q.91 Which generator in wind turbines uses slip rings and a partially rated converter for variable-speed operation?

- Ans**
- ☐ 1. permanent magnet synchronous generator
 - ☐ 2. brushless DC generator
 - ☐ 3. squirrel cage induction generator
 - ☒ 4. doubly-fed induction generator

Q.92 In a buck-boost converter, how does the inductor contribute to the inversion of the input voltage polarity while regulating the output voltage?

- Ans**
- ☒ 1. The inductor stores energy from the input voltage and releases it in the opposite polarity during the 'off' phase of the switch.
 - ☐ 2. The inductor filters out high-frequency noise from the input supply.
 - ☐ 3. The inductor provides a low-impedance path for the return current.
 - ☐ 4. The inductor acts as a transformer to invert the voltage polarity.

Q.93 In a ring distribution system, what happens when there is a fault in one section?

- Ans**
- ☐ 1. The receiving end voltage becomes more than the sending end voltage.
 - ☒ 2. The power can be supplied through the alternate path.
 - ☐ 3. The entire system is shut down.
 - ☐ 4. The voltage drop increases significantly.

Q.94 In a properly biased PNP transistor operating in active region, the emitter terminal is _____.

- Ans**
- ☒ 1. more positive than the base
 - ☐ 2. more negative than the collector
 - ☐ 3. grounded permanently
 - ☐ 4. equal in potential to the base

Q.95 Which type of magnetic material loses its magnetism immediately after the removal of the magnetic field?

- Ans**
- ☐ 1. Ferromagnetic
 - ☒ 2. Paramagnetic
 - ☐ 3. Ferrimagnetic
 - ☐ 4. Diamagnetic

Q.96 The tapping in an auto transformer is used to:

- Ans**
- ☐ 1. reduce insulation
 - ☐ 2. increase magnetic losses
 - ☒ 3. regulate voltage output
 - ☐ 4. separate windings

Q.97 Which among the given statements correctly distinguishes Avalanche breakdown from Zener breakdown in a PN junction diode?

- Ans**
- ☐ 1. Zener breakdown occurs only under forward bias conditions.
 - ☐ 2. Avalanche breakdown does not result in a sharp increase in reverse current.
 - ☐ 3. Zener breakdown voltage is typically higher than the avalanche breakdown voltage.
 - ☒ 4. Avalanche breakdown is the predominant mechanism in lightly doped junctions.

Q.98 For supplying a large three-phase load with neutral connection requirement, which transformer connection is generally preferred?

- Ans**
- ☐ 1. Open delta connection for reduction of transformer copper losses
 - ☐ 2. Delta-delta connection for single-phase domestic lighting systems
 - ☐ 3. Scott connection for operation of balanced three-phase motor loads
 - ☒ 4. Star-star connection with neutral grounding arrangement on both sides

Q.99 Protection of transmission lines using differential pilot wire protection provides:

- Ans**
- ✓ 1. Fast and selective protection of short transmission feeder sections
 - ✗ 2. Reducing transmission line inductance under balanced operating conditions only
 - ✗ 3. Increasing transmission conductor diameter during overload conditions
 - ✗ 4. Improving illumination level inside substation control room sections

Q.100 Which crystal structure is specifically associated with ferrite iron (α -iron), a ferromagnetic material?

- Ans**
- ✗ 1. Diamond cubic
 - ✗ 2. Face-centered cubic (FCC)
 - ✓ 3. Body-centered cubic (BCC)
 - ✗ 4. Hexagonal close-packed (HCP)

Railway BABA



रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS
सीईएन - 05/25 - जेई, डीएमएस, सीएमए - CEN - 05/25 - JE, DMS, CMA



Test Date	02/07/2026
Test Time	9:00 AM - 11:00 AM
Subject / Exam Group	RRB JE Stage 2 CMA

* 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 : General Abilities

Q.1 Which of the following statements best describes how the power of accommodation enables the human eye to focus on both near and distant objects?

- Ans
- ☒ 1. The retina moves forward and backward to adjust the focus
 - ☒ 2. The iris controls the amount of light entering and helps to focus
 - ☒ 3. The cornea provides all the focusing power required for clear vision
 - ☒ 4. The eye lens changes its focal length by altering its shape through ciliary muscle action

Q.2 Which of the following options must be DISABLED before manually setting the date and time in Windows?

- Ans
- ☒ 1. Set time automatically
 - ☒ 2. Night Light
 - ☒ 3. Enable multiple clocks
 - ☒ 4. Set time zone globally

Q.3 The Mappila Uprisings of the 19th century occurred mainly in which region of India?

- Ans
- ☒ 1. Malabar region of Kerala
 - ☒ 2. Sunderbans region of West Bengal
 - ☒ 3. Konkan region of Maharashtra
 - ☒ 4. Coromandel Coast of Tamil Nadu

Q.4 मुंबई में स्थित कौन-सी ब्रिटिश औपनिवेशिक इमारत, जिसका निर्माण 1888 में पूरा हुआ था, विक्टोरियन गोथिक और भारतीय स्थापत्य तत्वों के मिश्रण को प्रदर्शित करती है?

- Ans
- ☒ 1. बॉम्बे टाउन हॉल
 - ☒ 2. छत्रपति शिवाजी महाराज टर्मिनस
 - ☒ 3. गेटवे ऑफ इंडिया
 - ☒ 4. राजाबाई क्लॉक टॉवर

Q.5 Which Quick Style type is applied only to selected words or individual characters within a paragraph in MS Word 2010?

- Ans
- ☒ 1. Paragraph styles
 - ☒ 2. Page styles
 - ☒ 3. Linked styles
 - ☒ 4. Character styles

Q.6 The Atal Bhujal Yojana 2020 focused on improving water resources management of how many states?

- Ans**
- ☐ 1. five
 - ☐ 2. ten
 - ☐ 3. eight
 - ☒ 4. seven

Q.7 Which of the following is a primary mission under India's National Action Plan on Climate Change (NAPCC)?

- Ans**
- ☐ 1. National Rural Livelihood Mission
 - ☒ 2. National Solar Mission
 - ☐ 3. National Highway Development Project
 - ☐ 4. National Nutrition Mission

Q.8 What is the main reason sulfur dioxide irritates the upper respiratory mucous membrane?

- Ans**
- ☐ 1. It oxidizes to sulphur trioxide and inhaled deep into lung
 - ☐ 2. It combines with haemoglobin and effect the oxygen transport
 - ☐ 3. It combines with other pollutants and polymerizes in the lungs
 - ☒ 4. It dissolves in moisture in upper respiratory tract and forms irritant

Q.9 The pollutant group commonly associated with oil spills in oceans is _____.

- Ans**
- ☐ 1. chemical fertilizers
 - ☐ 2. synthetic detergents
 - ☒ 3. petroleum products
 - ☐ 4. agricultural pesticides

Q.10 A student accidentally spills some hydrochloric acid on a table. Which substance should be used to neutralise the acid safely?

- Ans**
- ☐ 1. Lemon juice
 - ☒ 2. Baking soda solution
 - ☐ 3. Sugar solution
 - ☐ 4. Vinegar

Q.11 When was the 11th National Handloom Day celebrated across India under the coordination of the Ministry of Textiles?

- Ans**
- ☐ 1. October 7, 2025
 - ☒ 2. August 7, 2025
 - ☐ 3. November 7, 2025
 - ☐ 4. September 7, 2025

Q.12 The term 'smog' is a combination of _____.

- Ans**
- ☒ 1. Smoke and fog
 - ☐ 2. Smog and mist
 - ☐ 3. Fog and clouds
 - ☐ 4. Smoke and haze

Q.13 Who won the maximum number of medals at the 38th National Games of India?

- Ans**
- ☐ 1. Manu Bhaker
 - ☐ 2. Bajrang Punia
 - ☐ 3. Neeraj Chopra
 - ☒ 4. Dhinidhi Desinghu

Q.14 A construction worker needs to lift a heavy metal beam using a lever but has a limited length of plank. Which adjustment would allow the worker to lift the beam with the least effort if the position of the fulcrum can be changed but the plank length remains constant?

- Ans**
- ☐ 1. Keep the fulcrum fixed at any point
 - ☐ 2. Move the fulcrum closer to the worker
 - ☒ 3. Move the fulcrum closer to the beam
 - ☐ 4. Place the fulcrum at the center of the plank

Q.15 What file extension is used to save an MS PowerPoint 2021 presentation?

- Ans**
- ☒ 1. .pptx
 - ☐ 2. .pdf
 - ☐ 3. .docx
 - ☐ 4. .xlsx

Q.16 Which of the following statements best describes the behavior of magnetic field lines around a straight current-carrying conductor?

- Ans**
- ☐ 1. They radiate straight outward from the wire.
 - ☐ 2. They change direction randomly along the wire.
 - ☒ 3. They form concentric circles centered on the conductor.
 - ☐ 4. They are parallel straight lines along the wire.

Q.17 Which of the following satellites was launched on November 2, 2025, to enhance the Indian Navy's secure communication network and maritime surveillance capabilities?

- Ans**
- ☐ 1. Cartosat-3
 - ☒ 2. CMS-03 (GSAT-7R)
 - ☐ 3. GSAT-6A
 - ☐ 4. RISAT-2B

Q.18 Consider the following statements regarding chemical reactions and choose the correct option.

Statement I: Every reaction in which two or more reactants combine to form a single product is classified as a combination reaction regardless of heat change.

Statement II: The reaction $\text{CaO(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Ca(OH)}_2\text{(aq)} + \text{heat}$ is both a combination reaction and an exothermic reaction.

- Ans**
- ☐ 1. Only Statement I is correct
 - ☐ 2. Only Statement II is correct
 - ☒ 3. Both statements are correct
 - ☐ 4. Both statements are incorrect

Q.19 Which of the following is/are the primary reasons to fall in the trap of Email fraud or phishing?

- A) Paying attention to lucrative offers.
- B) Not checking on links or attachments from unknown senders
- C) Providing official information via email
- D) Paying attention to the company logo sent in the email

- Ans**
- ☐ 1. A, B, D Only
 - ☒ 2. A, B, C Only
 - ☐ 3. A only
 - ☐ 4. A, B Only

Q.20 Which of the following indicators is NOT typically used to measure sustainable development?

- Ans**
- ☒ 1. Ecological Footprint
 - ☐ 2. Gross Domestic Product (GDP) growth rate
 - ☒ 3. Human Development Index (HDI)
 - ☒ 4. Biocapacity

Q.21 Which condition is required for a displacement reaction between a metal and salt solution?

- Ans**
- ☒ 1. Salt must be insoluble in water
 - ☐ 2. Metal must be higher in reactivity series
 - ☒ 3. Metal must be same as salt constituent
 - ☒ 4. Reaction must be endothermic

Q.22 The primary goal of the Pradhan Mantri Gram Sadak Yojana (PMGSY) is to:

- Ans**
- ☐ 1. Provide rural connectivity through road construction
 - ☒ 2. Enhance telecommunication services in cities
 - ☒ 3. Promote renewable energy usage
 - ☒ 4. Develop urban infrastructure

Q.23 You want to automatically advance slides with narration and animations during a presentation. Which MS PowerPoint feature should you use to achieve this?

- Ans**
- ☒ 1. Presenter View
 - ☒ 2. Action Buttons
 - ☐ 3. Rehearse Timings
 - ☒ 4. Slide Sorter

Q.24 Which new warship was commissioned by the Indian Navy in November, 2025, to strengthen anti-submarine and coastal defence capabilities?

- Ans**
- ☐ 1. INS Mahe
 - ☒ 2. INS Vikrant
 - ☒ 3. INS Ikshak
 - ☒ 4. INS Arnala

Q.25 A student pushes a heavy box that is already moving across a rough floor. If the force applied by the student is exactly equal to the frictional force opposing the motion, what will happen to the box?

- Ans**
- ☒ 1. The box will move at increasing speed
 - ☐ 2. The box will move at a constant speed
 - ☒ 3. The box will accelerate forward
 - ☒ 4. The box will gradually come to rest

Q.26 The atmospheric component that remains largely unreactive is _____.

- Ans**
- ☒ 1. Methane
 - ☒ 2. Carbon dioxide
 - ☐ 3. Argon
 - ☒ 4. Oxygen

Q.27 Which of the following statements is true about the Outbox?

- Ans**
- ☒ 1. It holds emails that have been successfully sent.
 - ☒ 2. It contains emails that are currently being drafted.
 - ☒ 3. It is used to receive incoming emails.
 - ☐ 4. It temporarily stores emails that are queued for sending.

Q.28 Which pair of sectors is commonly addressed together in State Action Plan on Climate Change (SAPCC) adaptation planning?

- Ans**
- ☐ 1. Heavy industry and entertainment
 - ☒ 2. Water resources and health systems
 - ☐ 3. Textile design and fashion marketing
 - ☐ 4. Information technology and space research

Q.29 What is the general formula of alkenes?

- Ans**
- ☒ 1. C_nH_{2n}
 - ☐ 2. C_nH_{2n-2}
 - ☐ 3. C_nH_n
 - ☐ 4. C_nH_{2n+2}

Q.30 According to the Article 75 of the Indian Constitution, the total number of ministers (including the Prime Minister) in the Council of Ministers shall NOT exceed what percentage of the total members of the House of the People, i.e., Lok Sabha?

- Ans**
- ☐ 1. 10%
 - ☐ 2. 25%
 - ☐ 3. 20%
 - ☒ 4. 15%

Q.31 Which type of computer virus attaches itself to executable files and gets activated when the file is run?

- Ans**
- ☐ 1. Macro Virus
 - ☐ 2. Boot Sector Virus
 - ☒ 3. File Infector Virus
 - ☐ 4. Worm

Q.32 हम किसी बड़ी डायरेक्टरी में ज्ञात एक्सटेंशन वाली लेकिन अज्ञात नाम वाली फ़ाइल का पता कैसे लगा सकते हैं?

- Ans**
- ☐ 1. रीसायकल बिन (Recycle Bin) चेक करके
 - ☒ 2. फ़ाइल एक्सप्लोरर (File Explorer) के सर्च बॉक्स (Search box) में *.ext का उपयोग करके
 - ☐ 3. फ़ाइल एक्सप्लोरर (File Explorer) के माध्यम से
 - ☐ 4. dir कमांड का उपयोग करके

Q.33 Which of the following rivers forms a delta along the eastern coastal plains?

- Ans**
- ☐ 1. Narmada
 - ☐ 2. Tapi
 - ☐ 3. Ganga
 - ☒ 4. Godavari

Q.34 If 10 grams of salt are dissolved in 100 mL of water, which component is the solute?

- Ans**
- ☐ 1. Neither
 - ☐ 2. Water only
 - ☐ 3. Both salt and water
 - ☒ 4. Salt only

Q.35 अस्पताल में बायोमेडिकल अपशिष्ट संचालकों (handlers) को व्यावसायिक संकट का खतरा होता है। उन्हें संक्रामक पदार्थों के संपर्क में आने से बचाने के लिए सबसे प्रभावी तरीका निम्नलिखित में से कौन-सा है?

- Ans**
- ☐ 1. अपशिष्ट को वर्ण-कोडित डिब्बे में पृथक करना
 - ☐ 2. नियमित चिकित्सा जांच
 - ☐ 3. सामान्य संक्रमणों के विरुद्ध टीकाकरण
 - ☒ 4. सुरक्षात्मक उपस्कर और सुरक्षित हैंडलिंग का उपयोग

Q.36 Which of the following Articles states about the right of individual to form associations or unions or co-operative societies?

- Ans**
- ☐ 1. Article 19 (1) (a)
 - ☐ 2. Article 19 (1) (d)
 - ☐ 3. Article 19 (1) (b)
 - ☒ 4. Article 19 (1) (c)

Q.37 Which of the following best describes the velocity-time graph for an object moving with uniform velocity?

- Ans**
- ☐ 1. A curved line above the time axis
 - ☐ 2. A line starting from the origin and sloping upwards
 - ☐ 3. A straight line sloping upwards from the time axis
 - ☒ 4. A straight horizontal line parallel to the time axis

Q.38 The Kol Rebellion (1831–32) mainly affected which plateau region?

- Ans**
- ☐ 1. Meghalaya Plateau
 - ☒ 2. Chotanagpur Plateau
 - ☐ 3. Deccan Plateau
 - ☐ 4. Malwa Plateau

Q.39 A factory plans to install a powerful electromagnet for lifting metal scraps. To maximize the magnetic field strength around the coil, which of the following combinations would be most effective?

- Ans**
- ☐ 1. Using a copper core, increasing coil turns, and lowering current
 - ☒ 2. Using a soft iron core, increasing coil turns, and increasing current through the coil
 - ☐ 3. Using a steel core, decreasing coil turns, and lowering current
 - ☐ 4. Using an air core, decreasing coil turns, and keeping current constant

Q.40 Which function returns the smallest value?

- Ans**
- ☐ 1. AVERAGE
 - ☐ 2. COUNT()
 - ☒ 3. MIN()
 - ☐ 4. MAX()

Q.41 According to Thomson's model, how are electrons arranged in an atom?

- Ans**
- ☐ 1. Randomly placed inside the nucleus
 - ☒ 2. Embedded in a positively charged sphere like seeds in a watermelon
 - ☐ 3. Moving in fixed orbits around the nucleus
 - ☐ 4. Orbiting around neutrons in elliptical paths

Q.42 The primary method of managing biodegradable domestic waste after collection is _____.

- Ans**
- ☐ 1. burnt in open air
 - ☐ 2. sending for recycling
 - ☐ 3. throwing into sewers
 - ☒ 4. conversion into compost

Q.43 A farmer applies large amounts of chemical fertilizers over several years. Which consequence most likely results from this practice leading to soil pollution?

- Ans**
- ☒ 1. Accumulation of toxic substances in soil
 - ☐ 2. Erosion of surface soil layers
 - ☐ 3. Faster plant growth every season
 - ☐ 4. Increase in earthworm population

Q.44 Which experimental discovery contradicted Thomson's model of the atom and led to its rejection?

- Ans**
- ☐ 1. Observation of line spectra of hydrogen by Bohr
 - ☐ 2. Measurement of atomic radius using X-ray diffraction
 - ☒ 3. Alpha particle scattering showing deflection at large angles
 - ☐ 4. Discovery of the neutron by James Chadwick

Q.45 अत्यधिक पीड़कनाशी के उपयोग से खेत में केंचुओं की संख्या में तीव्र कमी देखी जाती है। परिणामस्वरूप मृदा पर क्या प्रभाव पड़ता है?

- Ans**
- ☒ 1. मृदा की उर्वरता (soil fertility) में कमी
 - ☐ 2. बेहतर वातन (Improved aeration)
 - ☐ 3. जल प्रतिधारण (water retention) में वृद्धि
 - ☐ 4. उन्नत अपघटन (Enhanced decomposition)

Q.46 निम्नलिखित कॉलमों का मिलान कीजिए।

क्षमादान अधिकार (Pardoning power)	प्रकार्य (Function)
1. लघूकरण (Commutation)	a. दंडादेश और दोषसिद्धि दोनों को रद्द करती है
2. प्रविलंबन (Reprieve)	b. विशेष मामलों में, मूल रूप से दिए गए दंडादेश को कम करती
3. विराम (Respite)	c. दंडादेश के स्वरूप को बदले बिना दंडादेश की अवधि को कम
4. परिहार (Remission)	d. किसी दंडादेश के कार्यान्वयन पर अस्थायी रोक लगाती है
5. क्षमा (Pardon)	e. दंड के एक रूप को उससे हल्के रूप में बदलती है

- Ans**
- ☐ 1. 1-d, 2-b, 3-e, 4-c, 5-a
 - ☐ 2. 1-a, 2-c, 3-d, 4-e, 5-b
 - ☒ 3. 1-e, 2-d, 3-b, 4-c, 5-a
 - ☐ 4. 1-c, 2-e, 3-b, 4-a, 5-d

Q.47 Which of the following best describes how sound travels through air?

- Ans**
- ☐ 1. The air particles vibrate up and down perpendicular to the direction of the wave
 - ☐ 2. The air particles move in circular paths as the wave passes
 - ☐ 3. The air particles remain stationary while the wave moves through
 - ☒ 4. The air particles vibrate back and forth parallel to the direction of the wave

Q.48 On which date is National Handloom Day observed in India?

- Ans**
- ☐ 1. 5 September
 - ☐ 2. 2 October
 - ☐ 3. 18 August
 - ☒ 4. 7 August

Q.49 If cell A1 = 10 and B1 = 20, what will `=A1+B1` return?

- Ans
- ☒ 1. 30
 - ☐ 2. Error
 - ☐ 3. 1020
 - ☐ 4. 200

Q.50 In a real-life scenario, a chemist discovers a compound with the formula $\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_2\text{OH}$. What is the correct IUPAC name for this compound?

- Ans
- ☐ 1. 4-methylpentanol
 - ☐ 2. 3-methylhexanol
 - ☒ 3. 3-methylpentan-1-ol
 - ☐ 4. 2-methylhexanol

Section : Technical Abilities

Q.1 Which of the following is most relevant when discussing health-based international standards for drinking water?

- Ans
- ☐ 1. Permissible limits for water storage used in households
 - ☐ 2. Permissible limits for minerals present in drinking water
 - ☒ 3. Permissible limits for contaminants in water
 - ☐ 4. Permissible limits for temperature in drinking water

Q.2 एक रसायन विज्ञान के विद्यार्थी से यह समझाने के लिए कहा जाता है कि एथेनोइक अम्ल को अक्सर कसकर सील की गई बोतलों में क्यों संग्रहीत किया जाता है। एथेनोइक अम्ल का कौन-सा गुणधर्म इस भंडारण अभ्यास को सर्वाधिक उचित ठहराता है?

- Ans
- ☒ 1. एथेनोइक अम्ल वाष्पशील है और कसकर सील न होने पर वाष्पित हो सकता है
 - ☐ 2. कक्ष ताप पर वायु के संपर्क में आने पर एथेनोइक अम्ल ठोस हो जाता है
 - ☐ 3. एथेनोइक अम्ल तीव्रता से जल और कार्बन डाइऑक्साइड में अपघटित हो जाता है
 - ☐ 4. एथेनोइक अम्ल प्लास्टिक के साथ अभिक्रिया करके विषाक्त गैसों का निर्माण करता है

Q.3 The amplified output signal in a common emitter transistor amplifier is usually taken from _____.

- Ans
- ☐ 1. Base-emitter circuit
 - ☒ 2. Collector-emitter circuit
 - ☐ 3. Base terminal only
 - ☐ 4. Emitter terminal only

Q.4 Which of the following observations confirm a double displacement reaction?

- Ans
- ☒ 1. Formation of a precipitate when two solutions are mixed
 - ☐ 2. Formation of a single product from two reactants
 - ☐ 3. Release of hydrogen gas when metal reacts with acid
 - ☐ 4. Colour change due to displacement of metal

Q.5 What determines the reactivity of elements in chemical reactions?

- Ans
- ☒ 1. Reactivity depends on ease of electron loss or gain
 - ☐ 2. Reactivity remains constant for all chemical elements
 - ☐ 3. Reactivity independent of electron transfer in reactions
 - ☐ 4. Reactivity depends only on nuclear properties of atoms

Q.6 A particle moves 8 m east, then 15 m north, and finally 8 m west. What is the ratio of the total distance travelled to the magnitude of the net displacement?

- Ans**
- ☐ 1. 16:15
 - ☒ 2. 31:15
 - ☐ 3. 31:8
 - ☐ 4. 15:31

Q.7 A student observes that diamond and graphite are both made of the same element but have different properties. What is the element that makes up both substances?

- Ans**
- ☐ 1. Hydrogen
 - ☐ 2. Oxygen
 - ☒ 3. Carbon
 - ☐ 4. Nitrogen

Q.8 A particle moves with uniform acceleration and has an initial velocity u . It covers distances s and $2s$ in two successive equal time intervals t . What is the acceleration of the particle?

- Ans**
- ☐ 1. $\frac{2s}{t^2}$
 - ☒ 2. $\frac{s}{t^2}$
 - ☐ 3. $\frac{3s}{4t^2}$
 - ☐ 4. $\frac{2s}{3t^2}$

Q.9 A student wants to compare the magnetic field patterns produced by a straight current-carrying wire and a current-carrying circular loop. Which experimental setup would best demonstrate the difference in their magnetic field lines?

- Ans**
- ☐ 1. Using a compass to detect direction of magnetic field at various points near the wire only
 - ☐ 2. Measuring the force between two parallel wires carrying current in the same direction
 - ☒ 3. Using iron filings around both the straight wire and the circular loop to visualize their magnetic field patterns
 - ☐ 4. Placing a bar magnet near both conductors to observe attraction or repulsion

Q.10 What does the Aufbau principle state about electron filling in orbitals?

- Ans**
- ☐ 1. Orbitals filled randomly without energy consideration
 - ☐ 2. Energy levels do not affect electron filling order
 - ☒ 3. Lower energy orbitals filled before higher energy orbitals
 - ☐ 4. Higher energy orbitals filled before lower energy orbitals

Q.11 If a hydrocarbon undergoes oxidation in the laboratory and a sweet-smelling liquid is produced, which class of compound is most likely formed?

- Ans**
- ☐ 1. A ketone is most likely formed during the reaction
 - ☐ 2. An amide is most likely formed during the reaction
 - ☐ 3. An alkene is most likely formed during the reaction
 - ☒ 4. An ester is most likely formed during the reaction

Q.12 Which process is mainly responsible for ozone layer depletion in the stratosphere?

- Ans**
- ☐ 1. Industrial dust particles in the air
 - ☐ 2. Urban heat island effect
 - ☐ 3. Acid rain due to sulfur emissions
 - ☒ 4. Reactions involving chlorofluorocarbons

Q.13 Which statement best explains how ionic radius varies with charge and electronic configuration of ions?

- Ans**
- ☒ 1. Higher positive charge leads to smaller ionic radius due to attraction
 - ☐ 2. Ionic radius remains constant regardless of ionic charge or structure
 - ☐ 3. Ionic charge has no influence on magnitude of ionic radius
 - ☐ 4. Electronic configuration plays no role in determining ionic size

Q.14 Which of the following statements is **INCORRECT** regarding combination reactions?

- Ans**
- ☒ 1. All combination reactions are endothermic in nature
 - ☐ 2. Burning of coal is an example of a combination reaction
 - ☐ 3. Combination reactions form a single product from two or more reactants
 - ☐ 4. CaO reacts with H₂O to form Ca(OH)₂ with release of heat

Q.15 Electric potential at a point is defined as the work done in bringing a unit positive charge from infinity to that point _____.

- Ans**
- ☒ 1. Without changing kinetic energy
 - ☐ 2. With infinite acceleration always
 - ☐ 3. Along a circular closed path
 - ☐ 4. Only in magnetic fields

Q.16 A vehicle manufacturer is designing engines compatible with both petrol and alcohol-based fuels. What challenge must be addressed to ensure efficient engine performance with alcohol blends?

- Ans**
- ☐ 1. Alcohol remains completely immiscible with petroleum-based fuels
 - ☒ 2. Alcohol tends to absorb water and corrode metallic engine parts
 - ☐ 3. Alcohol shows complete resistance to combustion inside engines
 - ☐ 4. Alcohol tends to freeze easily under normal room conditions

Q.17 Two circular current-carrying loops carry the same current but have different radii. Which loop produces the stronger magnetic field at its center?

- Ans**
- ☐ 1. Both loops produce the same magnetic field
 - ☒ 2. The loop with smaller radius produces a larger magnetic field
 - ☐ 3. The magnetic field at the center is zero
 - ☐ 4. The loop with smaller radius produces a smaller magnetic field

Q.18 If the frequency of a sound wave increases while its speed in the medium remains unchanged, what happens to its wavelength?

- Ans**
- ☐ 1. Its wavelength remains the same.
 - ☐ 2. Its wavelength becomes zero.
 - ☒ 3. Its wavelength decreases.
 - ☐ 4. Its wavelength increases.

Q.19 Two atoms having the same number of nucleons but different atomic numbers are called _____.

- Ans**
- ☐ 1. Isoelectronic particles only
 - ☐ 2. Isotopes only
 - ☒ 3. Isobars only
 - ☐ 4. Isotones only

Q.20 A metal rod is tightly fitted between two rigid walls at room temperature. If the temperature increases, which outcome is most likely due to thermal expansion of solids?

- Ans**
- ☐ 1. The rod will remain unaffected by the temperature change.
 - ☐ 2. The rod will freely increase in length without stress.
 - ☒ 3. The rod will experience compressive stress and may buckle.
 - ☐ 4. The rod will be under tensile stress and stretch.

Q.21 A mixture contains two non-reacting gases A and B. If the partial pressures of A and B are 3 bar and 5 bar, respectively, what is the total pressure of the mixture?

- Ans**
- ☐ 1. 5 bar
 - ☐ 2. 2 bar
 - ☒ 3. 8 bar
 - ☐ 4. 15 bar

Q.22 Which statement correctly explains the modern periodic law of elements?

- Ans**
- ☐ 1. Atomic number has no effect on chemical properties
 - ☒ 2. Properties repeat periodically with increasing atomic number values
 - ☐ 3. Properties depend only on atomic mass values of elements
 - ☐ 4. Properties vary randomly without any periodic trend observed

Q.23 Which combination of objective and eyepiece focal lengths will result in the highest magnifying power for a simple astronomical telescope?

- Ans**
- ☒ 1. Short focal length eyepiece and long focal length objective
 - ☐ 2. Short focal length eyepiece and short focal length objective
 - ☐ 3. Long focal length eyepiece and short focal length objective
 - ☐ 4. Long focal length eyepiece and long focal length objective

Q.24 A chemist is analyzing an unknown organic sample. If the compound contains a benzene ring directly attached to a methyl group, how should the compound be classified based on its structure?

- Ans**
- ☐ 1. Open-chain alkene
 - ☐ 2. Aliphatic alcohol
 - ☒ 3. Aromatic hydrocarbon
 - ☐ 4. Cyclic ether

Q.25 According to the Heisenberg uncertainty principle, what happens when the precision in measuring position increases?

- Ans**
- ☐ 1. Measurements remain unaffected by uncertainty principle limits
 - ☐ 2. Uncertainty decreases for both variables simultaneously
 - ☐ 3. Both variables can be measured accurately simultaneously always
 - ☒ 4. Greater precision in one variable leads to greater uncertainty in other

Q.26 A cylinder fitted with a frictionless movable piston contains 2 moles of an ideal gas at 27°C and a volume of 10 L. The gas is heated to 127°C while maintaining constant pressure. What will be the final volume of the gas?

- Ans**
- ☐ 1. 15.0 L
 - ☒ 2. 13.3 L
 - ☐ 3. 12.0 L
 - ☐ 4. 10.8 L

Q.27 Two objects, one made of copper and the other of aluminum, are placed in thermal contact. Both have equal masses and are initially at different temperatures. Considering their specific heat capacities, which statement best describes what happens as they approach thermal equilibrium?

- Ans**
- ☐ 1. Both interacting objects experience entirely identical magnitudes of temperature shifts.
 - ☒ 2. The object with lower specific heat experiences larger temperature shifts.
 - ☐ 3. The object with higher specific heat experiences larger temperature shifts.
 - ☐ 4. Neither interacting object experiences any measurable variation in absolute temperature.

Q.28 For an sp^3 molecule with one lone pair, how and why does the bond angle change compared to the ideal tetrahedral angle?

- Ans**
- ☒ 1. The bond angle will decrease due to lone pair-bond pair repulsion
 - ☐ 2. The bond angle will increase due to electron sharing
 - ☐ 3. The bond angle will remain unchanged due to stable geometry
 - ☐ 4. The bond angle will decrease due to increased nucleus attraction

Q.29 Which of the following correctly describes a homogeneous mixture?

- Ans**
- ☐ 1. It forms separate layers on standing
 - ☐ 2. It contains only solid components
 - ☒ 3. It has uniform composition throughout
 - ☐ 4. It has visible particles that settle on standing

Q.30 The magnetic field lines around an infinitely long straight current-carrying wire are _____.

- Ans**
- ☐ 1. Radially outward directed lines
 - ☒ 2. Concentric circular paths
 - ☐ 3. Straight parallel lines only
 - ☐ 4. Elliptical closed trajectories

Q.31 Which of the following equations is dimensionally consistent?

- Ans**
- ☐ 1. Velocity = mass $\times$ time
 - ☐ 2. Energy = mass $\times$ velocity
 - ☐ 3. Power = force $\times$ time
 - ☒ 4. Force = mass $\times$ acceleration

Q.32 When a hot metal block is placed in a cooler liquid inside a calorimeter, which property of the metal primarily determines how readily heat is conducted through the block to its surface?

- Ans**
- ☒ 1. The thermal conductivity of the metal block
 - ☐ 2. The specific heat capacity of the metal block
 - ☐ 3. The internal density profile of the metal block
 - ☐ 4. The absolute volume metrics of the metal block

Q.33 The charge of an electron is best described as:

- Ans**
- ☐ 1. Sometimes positive charge under certain environmental conditions
 - ☐ 2. Variable charge depending on speed and energy conditions
 - ☒ 3. Constant negative charge independent of external physical conditions
 - ☐ 4. Charge depending on surrounding magnetic field conditions

Q.34 A new physical quantity 'Y' is defined by the equation $Y = \text{Power} \times \text{Time} / \text{Area}$. Which one of the following expressions correctly represents the dimensions of 'Y'?

- Ans**
- ☐ 1. $M L^{-2} T$
 - ☒ 2. $M T^{-2}$
 - ☐ 3. $M L^2 T^{-2}$
 - ☐ 4. $M T^{-1}$

Q.35 In the parallelogram method of vector addition, two vectors are drawn from the same point as adjacent sides of a parallelogram. What does the diagonal passing through the common point represent?

- Ans**
- ☐ 1. The average of the two vectors
 - ☒ 2. The resultant vector in both magnitude and direction
 - ☐ 3. The scalar sum of the two vectors
 - ☐ 4. The difference between the two vectors

Q.36 A satellite is placed in a circular orbit around Earth at a fixed orbital radius. If the mass of the satellite is doubled while keeping the orbital radius unchanged, how does the gravitational force between Earth and the satellite change according to Newton's law of gravitation?

- Ans**
- ☐ 1. The gravitational force quadruples
 - ☐ 2. The gravitational force halves
 - ☒ 3. The gravitational force doubles
 - ☐ 4. The gravitational force remains the same

Q.37 Cathode rays observed in discharge tubes are best described as:

- Ans**
- ☐ 1. Streams of photons emitted from heated metal electrodes
 - ☐ 2. Streams of protons moving from anode toward cathode
 - ☐ 3. Streams of neutrons moving randomly inside the tube
 - ☒ 4. Streams of electrons moving from cathode toward anode

Q.38 Proton discovery is associated with which observation in discharge tube experiments?

- Ans**
- ☐ 1. Cathode rays contain negatively charged particles identified as protons
 - ☐ 2. Canal rays contain neutral particles identified as neutrons
 - ☐ 3. Cathode rays contain photons emitted from metal electrodes
 - ☒ 4. Canal rays contain positively charged particles identified as protons

Q.39 Radioactive decay cannot be predicted exactly for a single nucleus because the process is _____.

- Ans**
- ☐ 1. Controlled by temperature only
 - ☐ 2. Dependent on chemical state always
 - ☒ 3. Random in nature
 - ☐ 4. Completely deterministic

Q.40 A particle of mass m starts from rest and moves with constant acceleration ' a '. After travelling a distance ' s ', what is its kinetic energy?

- Ans**
- ☐ 1. $\frac{1}{2}ma^2$
 - ☒ 2. mas
 - ☐ 3. $2mas$
 - ☐ 4. $\frac{1}{2}mas$

Q.41 The stability of the nucleus is mainly due to the balance between _____.

- Ans**
- ☐ 1. Electron attraction and neutron decay
 - ☐ 2. Gravitational force and magnetic flux
 - ☐ 3. Atomic volume and electric current
 - ☒ 4. Nuclear attraction and proton repulsion

Q.42 Which of the following best explains how the thermal conductivity of a metal rod can be determined experimentally?

- Ans**
- ☐ 1. By enclosing the metallic structure inside a vacuum chamber and monitoring the resulting thermal radiation emissions over time.
 - ☒ 2. By measuring the steady rate of heat flow through the metal rod when its boundaries are maintained at two distinct temperatures.
 - ☐ 3. By evaluating the absolute volumetric mass density shifts of the metal rod samples before and after a prolonged thermal exposure.
 - ☐ 4. By tracking the localized color variations along the metal rod surface when it undergoes direct heating at one focal terminal.

Q.43 Which of the following best explains why radio waves are suitable for long-distance communication compared to other regions of the electromagnetic spectrum?

- Ans**
- ☐ 1. Radio waves are the exclusive electromagnetic signals generated by electronic circuits.
 - ☐ 2. Radio waves exhibit much higher energy per photon than optical frequency signals.
 - ☒ 3. Radio waves are less likely to be absorbed or scattered by Earth's atmosphere.
 - ☐ 4. Radio waves travel at significantly higher velocities through dense atmospheric layers.

Q.44 A company is designing a heating element and wants to reduce the resistance of a conductor. The material, temperature, and length of the conductor must remain unchanged. Which modification will most effectively decrease the resistance?

- Ans**
- ☐ 1. Raising the resistivity of the conductor
 - ☐ 2. Decreasing the cross-sectional area of the conductor
 - ☒ 3. Increasing the cross-sectional area of the conductor
 - ☐ 4. Decreasing the resistivity of the conductor.

Q.45 Which of the following correctly explains a precipitation reaction?

- Ans**
- ☒ 1. Formation of an insoluble solid when two solutions are mixed
 - ☐ 2. Formation of gas during a chemical reaction
 - ☐ 3. Formation of a single product from two reactants
 - ☐ 4. Breaking down of a compound into simpler substances

Q.46 According to the Kossel-Lewis approach, what is the main reason atoms form chemical bonds?

- Ans**
- ☐ 1. To maximize their energy states always
 - ☒ 2. To achieve stable octets in their outermost shells
 - ☐ 3. To increase their atomic mass significantly
 - ☐ 4. To share electrons regardless of stability

Q.47 Which of the following correctly identifies an acid using litmus paper?

- Ans**
- ☐ 1. Turns red litmus blue
 - ☐ 2. Turns blue litmus green
 - ☒ 3. Turns blue litmus red
 - ☐ 4. No change in red litmus

Q.48 Which combination of environmental factors would most likely accelerate the corrosion of an unprotected iron bridge?

- Ans**
- ☐ 1. Cold temperatures and low atmospheric pressure
 - ☐ 2. Continuous sunlight with dry air exposure
 - ☐ 3. Low humidity and absence of pollutants
 - ☒ 4. High humidity and presence of acidic pollutants

Q.49 Which of the following statements correctly describes electric circuit diagrams?

1. They help in analyzing paths of electric current.
2. They provide a simplified representation of a circuit.
3. The symbols used in them should be standardized.
4. They eliminate the need for actual electrical components.

- Ans**
- ☐ 1. 1, 2, 3 and 4
 - ☒ 2. 1, 2 and 3 only
 - ☐ 3. 2 and 4 only
 - ☐ 4. 1 and 4 only

Q.50 A body of mass m is dropped from a height h . When it has fallen through a distance of $2h/3$, the ratio of its kinetic energy to potential energy is _____.

- Ans**
- ☐ 1. 3:1
 - ☒ 2. 2:1
 - ☐ 3. 1:2
 - ☐ 4. 1:1

Q.51 Why are half-filled orbitals considered more stable?

- Ans**
- ☐ 1. Half-filled orbitals are always less stable
 - ☐ 2. Stability does not depend on electron arrangement
 - ☒ 3. Equal electron distribution reduces repulsion in orbitals
 - ☐ 4. Unequal electron distribution increases atomic instability

Q.52 Which scenario best demonstrates the cost-effective nature of green chemistry in industrial operations?

- Ans**
- ☐ 1. Lower raw material usage and increased waste generation during manufacturing
 - ☐ 2. Higher raw material usage and reduced waste generation during manufacturing
 - ☒ 3. Lower raw material usage and reduced waste generation during manufacturing
 - ☐ 4. Higher raw material usage and increased waste generation during manufacturing

Q.53 एक सील किए हुए पात्र में समान तापमान पर हाइड्रोजन और ऑक्सीजन का बराबर द्रव्यमान भरा हुआ है। तापमान की गतिज व्याख्या का उपयोग करते हुए, दोनों प्रकार के गैस अणुओं की औसत गतिज ऊर्जा और चाल के बारे में क्या निष्कर्ष निकाला जा सकता है?

- Ans**
- ☐ 1. हाइड्रोजन के अणुओं की माध्य गतिज ऊर्जा अधिक है और साथ ही उच्च औसत वेग बनाए रखते हैं।
 - ☐ 2. हाइड्रोजन के अणुओं की माध्य गतिज ऊर्जा अधिक हैं परंतु साथ ही समान औसत वेग बनाए रखते हैं।
 - ☐ 3. दोनों गैसों की माध्य गतिज ऊर्जाएं समान हैं, परंतु ऑक्सीजन के भारी अणु उच्च औसत वेग बनाए रखते हैं।
 - ☒ 4. दोनों गैसों की माध्य गतिज ऊर्जाएं समान हैं, परंतु हाइड्रोजन के हल्के अणु उच्च औसत वेग बनाए रखते हैं।

Q.54 Which functional group is commonly found in vinegar and gives it acidic properties?

- Ans**
- ☐ 1. Hydroxyl group
 - ☐ 2. Ester group
 - ☒ 3. Carboxyl group
 - ☐ 4. Amino group

Q.55 A scientist is designing a concert hall to optimize acoustics. She wants the audience to perceive louder sounds without increasing the energy input from the speakers. Which characteristic of sound should she focus on modifying within the hall's design?

- Ans**
- ☐ 1. Frequency of the sound waves
 - ☐ 2. Wavelength of the sound waves
 - ☐ 3. Speed of sound in air
 - ☒ 4. Amplitude of the sound waves

Q.56 Stoichiometry in chemistry is mainly concerned with calculation of which of the following?

- Ans**
- ☐ 1. Calculations ignoring mole concept in chemical reaction analysis
 - ☒ 2. Reactant and product amounts using balanced chemical equations
 - ☐ 3. Physical properties of substances without chemical reaction calculations
 - ☐ 4. Reactions without using balanced chemical equation relationships

Q.57 Which statement best defines electron gain enthalpy for an isolated gaseous atom?

- Ans**
- ☐ 1. Energy released when atoms combine to form stable molecules
 - ☒ 2. Energy released or absorbed when isolated gaseous atom gains electron
 - ☐ 3. Energy required to remove electron from isolated gaseous atom completely
 - ☐ 4. Energy required to break bonds present in chemical compounds

Q.58 A car is at rest with its horn continuously sounding. If a person walks toward the car, how does the frequency of the sound heard by the person change?

- Ans**
- ☒ 1. The frequency increases
 - ☐ 2. The frequency remains unchanged
 - ☐ 3. The frequency decreases
 - ☐ 4. The frequency fluctuates continuously

Q.59 Which statement correctly explains the relationship between pH and hydronium ion concentration?

- Ans**
- ☒ 1. Higher the hydronium ion concentration, lower is the pH
 - ☐ 2. pH is independent of ion concentration
 - ☐ 3. Lower the hydronium ion concentration, lower is the pH
 - ☐ 4. Higher the hydronium ion concentration, higher is the pH

Q.60 Which of the following options best describes the behaviour of a transistor in the transition regions?

- Ans**
- ☐ 1. The collector current remains constant.
 - ☒ 2. The transistor shows non-linear behaviour due to gradual switching.
 - ☐ 3. The transistor does not conduct at all.
 - ☐ 4. The transistor has a perfectly linear response.

Q.61 A compass needle placed in a uniform magnetic field oscillates about its equilibrium position. What is the main reason for this behavior?

- Ans**
- ☐ 1. It experiences a net force
 - ☐ 2. It gains energy from the field continuously
 - ☒ 3. It experiences a torque
 - ☐ 4. The magnetic field is non-uniform

Q.62 Isotopes of the same element possess different atomic masses because they contain different numbers of _____.

- Ans**
- ☐ 1. Electrons in outer shell
 - ☒ 2. Neutrons inside nucleus
 - ☐ 3. Protons inside nucleus
 - ☐ 4. Positive ions in orbit

Q.63 Three resistors of $2\ \Omega$, $3\ \Omega$, and $5\ \Omega$ are connected in series. What is their equivalent resistance?

- Ans**
- ☐ 1. $8\ \Omega$
 - ☐ 2. $9\ \Omega$
 - ☐ 3. $12\ \Omega$
 - ☒ 4. $10\ \Omega$

Q.64 Which of the following situations can represent non-uniform motion of a particle?

- Ans**
- ☐ 1. A horizontal line in a velocity–time graph
 - ☐ 2. Equal distances covered in equal intervals of time.
 - ☐ 3. A straight-line distance–time graph with constant slope
 - ☒ 4. A curved distance–time graph

Q.65 Which statement best explains origin of spectral lines from quantized electronic transitions in atoms?

- Ans**
- ☐ 1. Transitions occur between levels without any exchange of energy with surroundings
 - ☐ 2. Spectral lines are independent of electronic configuration of atoms
 - ☒ 3. Electrons jump between levels emitting or absorbing photons of specific energies
 - ☐ 4. Electrons move continuously between levels without defined quantized energy states

Q.66 A diamond ($n=2.42$) is immersed in a transparent liquid. A light ray inside the diamond is incident at the critical angle at the diamond-liquid interface. If the refractive index of the liquid increases, what happens to the critical angle?

- Ans**
- ☐ 1. The critical angle remains unchanged as the refractive index of the liquid increases
 - ☐ 2. The critical angle decreases as the refractive index of the liquid increases
 - ☒ 3. The critical angle increases as the refractive index of the liquid increases
 - ☐ 4. Total internal reflection occurs at all angles as the refractive index of the liquid increases

Q.67 Why does high-density polythene exhibit greater tensile strength than low-density polythene?

- Ans**
- ☐ 1. High-density polythene is manufactured at higher temperatures
 - ☐ 2. Low-density polythene contains extensive cross-linked structures
 - ☒ 3. High-density polythene contains linear and closely packed chains
 - ☐ 4. Low-density polythene contains more amorphous chain regions

Q.68 A community water supply contains fluoride at 3 ppm. Which health effect is most likely to appear first among long-term consumers of this water?

- Ans**
- ☒ 1. Brown mottling of teeth due to excess fluoride exposure
 - ☐ 2. Loss of tooth enamel due to complete fluoride absence
 - ☐ 3. Severe skeletal deformities due to chronic fluoride exposure
 - ☐ 4. Increased tooth decay due to inadequate fluoride exposure

Q.69 Plaster of Paris is prepared by heating which of the following substances?

- Ans**
- ☐ 1. Calcium hydroxide
 - ☒ 2. Gypsum
 - ☐ 3. Sodium chloride
 - ☐ 4. Calcium carbonate

Q.70 What do electron shells represent in atomic structure?

- Ans**
- ☐ 1. Electron shells do not exist in atoms
 - ☐ 2. All electrons have identical energy values
 - ☒ 3. Electrons occupy fixed energy level shells
 - ☐ 4. Electrons move randomly without defined shells

Q.71 Why is the net magnetic flux through any closed surface always zero?

- Ans**
- ☐ 1. Magnetic field lines are straight
 - ☐ 2. Electric charges cancel magnetic field
 - ☒ 3. Magnetic monopoles do not exist
 - ☐ 4. Magnetic field is weak

Q.72 According to the Aufbau principle, how are electrons distributed among atomic orbitals?

- Ans**
- ☐ 1. Electrons fill highest energy orbitals before lower ones
 - ☐ 2. Electrons occupy orbitals randomly without any energy order
 - ☐ 3. Orbital filling is independent of relative energy levels
 - ☒ 4. Filling occurs in order of increasing energy of orbitals

Q.73 Which statement correctly describes the strength of the bond in terms of orbital overlap?

- Ans**
- ☐ 1. Lesser orbital overlap forms a stronger covalent bond
 - ☒ 2. Greater orbital overlap forms a stronger covalent bond
 - ☐ 3. Partial orbital overlap forms an ionic bond
 - ☐ 4. Equal orbital overlap forms a weaker covalent bond

Q.74 Read the below Assertion and Reason and choose the correct option.

Assertion (A): Bleaching powder is used as an oxidising agent in chemical industries.

Reason (R): Bleaching powder is produced by the action of chlorine on dry slaked lime.

- Ans**
- ☐ 1. A is true, but R is false
 - ☒ 2. Both A and R are true, but R is not the correct explanation of A
 - ☐ 3. A is false, but R is true
 - ☐ 4. Both A and R are true, and R is the correct explanation of A

Q.75 Before breakdown, increasing reverse voltage causes reverse saturation current to _____.

- Ans**
- ☐ 1. Become exactly zero
 - ☐ 2. Increase rapidly from the beginning
 - ☒ 3. Remain approximately constant
 - ☐ 4. Change into forward current

Q.76 Which of the following statements correctly describe similarities between a bar magnet and a current-carrying solenoid?
1. Both have North and South poles.
2. Both produce a nearly uniform magnetic field inside.
3. Both require permanent magnetic material only.
4. Both follow the right-hand rule for determining the direction of the magnetic field.

- Ans**
- ☒ 1. 1, 2, 3 and 4
 - ☒ 2. 1 and 3 only
 - ☒ 3. 2 and 3 only
 - ☒ 4. 1 and 2 only

Q.77 A copper ore is heated in the presence of air during metal extraction. What property of copper makes this process effective?

- Ans**
- ☒ 1. Copper's low reactivity allows simple heating
 - ☒ 2. Copper readily combines with chlorine gas
 - ☒ 3. Copper requires strong reducing agents
 - ☒ 4. Copper forms soluble carbonates easily

Q.78 In the output characteristics of a transistor, the nearly horizontal curves indicate that collector current is _____.

- Ans**
- ☒ 1. Alternating continuously
 - ☒ 2. Zero for all voltages
 - ☒ 3. Highly dependent on V_{CE}
 - ☒ 4. Nearly constant for fixed base current

Q.79 A molecule containing a hydroxyl group attached to a saturated carbon atom is most appropriately classified under which category?

- Ans**
- ☒ 1. It is an aldehyde
 - ☒ 2. It is an ether
 - ☒ 3. It is an amide
 - ☒ 4. It is an alcohol

Q.80 एक खाद्य प्रसंस्करण कंपनी को अम्लीय खाद्य के भंडारण हेतु सामग्रियों का चयन करना है। संक्षारण को कम करने और दीर्घकालिक सुरक्षा सुनिश्चित करने के लिए कौन-सा तरीका सबसे उपयुक्त है?

- Ans**
- ☒ 1. टैंकों के निर्माण के लिए स्टेनलेस स्टील का उपयोग करना
 - ☒ 2. आंतरिक भाग को अधात्विक रंगों से पेंट करना
 - ☒ 3. टैंक की भित्तियों पर एल्यूमिनियम स्ट्रिप्स लगाना
 - ☒ 4. टैंकों के अंदर सिलिका जेल पैकेट रखना

Q.81 In the formation of sp hybrid orbitals, what is the geometry adopted by a molecule such as BeCl_2 ?

- Ans**
- ☒ 1. Linear
 - ☒ 2. Tetrahedral
 - ☒ 3. Trigonal planar
 - ☒ 4. Octahedral

Q.82 Which statement best explains why exchange energy stabilizes half-filled subshell configurations?

- Ans**
- ☒ 1. Opposite spins create stronger exchange interactions increasing stability
 - ☒ 2. Stability depends only on nuclear attraction to electrons
 - ☒ 3. Exchange energy has no role in determining electronic stability
 - ☒ 4. Parallel spins allow exchange interactions increasing configuration stability

Q.83 A copper plate and an aluminum plate of equal thickness and area are maintained at the same temperature difference. If the thermal conductivity of copper is twice that of aluminum, what will be the ratio of heat flow through copper to that through aluminum?

- Ans**
- ☐ 1. The ratio will be 4:1 for copper to aluminum.
 - ☐ 2. The ratio will be 1:1 for copper to aluminum.
 - ☒ 3. The ratio will be 2:1 for copper to aluminum.
 - ☐ 4. The ratio will be 1:2 for copper to aluminum.

Q.84 The electric field outside a uniformly charged spherical shell behaves as if the _____.

- Ans**
- ☒ 1. Entire charge was concentrated at the center
 - ☐ 2. Field lines became circular around shell
 - ☐ 3. Electric fields were always zero everywhere
 - ☐ 4. Charges were uniformly spread in surrounding space

Q.85 Two vectors have equal magnitudes. If the magnitude of their resultant is equal to the magnitude of either vector, what is the angle between the two vectors?

- Ans**
- ☐ 1. 60°
 - ☐ 2. 30°
 - ☒ 3. 120°
 - ☐ 4. 180°

Q.86 Which molecule contains a central atom that has an incomplete octet in its Lewis structure and completes the octet by accepting a lone pair through coordinate bonding?

- Ans**
- ☒ 1. In the formation of the tetrafluoroborate ion from Boron trifluoride
 - ☐ 2. In the formation of the hydronium ion from water
 - ☐ 3. In the formation of carbonate ion from carbon dioxide
 - ☐ 4. In the formation of the ammonium ion from ammonia

Q.87 Which of the following statements correctly describe magnetic field lines around a bar magnet?

1. Outside the magnet, field lines go from North to South.
2. Inside the magnet, field lines go from North to South.
3. Magnetic field lines always form closed loops.
4. Magnetic field lines are discontinuous at the poles.

- Ans**
- ☐ 1. 1, 2, 3 and 4
 - ☒ 2. 1 and 3 only
 - ☐ 3. 1, 2 and 4 only
 - ☐ 4. 2 and 3 only

Q.88 Which of the following statements best explains how the speed of sound changes when it travels from air into water?

- Ans**
- ☐ 1. Sound cannot travel through water at all because it is a liquid and not a gas.
 - ☐ 2. Sound travels at the same speed in both air and water because both are fluids with similar properties.
 - ☐ 3. Sound travels slower in water than in air because water particles are further apart, making transmission more difficult.
 - ☒ 4. Sound travels faster in water than in air because water particles are closer together, enabling quicker transmission of vibrations.

Q.89 Which observation confirms a displacement reaction when an iron nail is placed in copper sulphate solution?

- Ans**
- ☒ 1. Blue solution turns green and brown coating forms on iron
 - ☐ 2. A white precipitate is formed in the solution
 - ☐ 3. Blue solution turns colourless with no change in iron
 - ☐ 4. No colour change and no reaction occurs

Q.90 Which equation below is NOT dimensionally consistent?

- Ans
- ☐ 1. $s = (v^2 - u^2)/2a$
 - ☒ 2. $s = ut^2 + (1/2)at$
 - ☐ 3. $s = vt$
 - ☐ 4. $s = ut + (1/2)at^2$

Q.91 उच्चतर कक्षाओं में बोर त्रिज्या बढ़ जाती है क्योंकि इलेक्ट्रॉन _____।

- Ans
- ☐ 1. धनावेश प्राप्त कर लेता है
 - ☐ 2. अपनी संपूर्ण गतिज ऊर्जा खो देता है
 - ☐ 3. पूर्णतः परिक्रमा करना बंद कर देता है
 - ☒ 4. नाभिक से अधिक दूर गति करता है

Q.92 Read the following Assertion (A) and Reason (R) carefully and choose the correct option.

Assertion (A): Dry HCl gas does not show acidic behaviour.

Reason (R): HCl produces hydrogen ions only in the presence of water.

- Ans
- ☐ 1. Both A and R are true, but R is not the correct explanation of A
 - ☐ 2. A is false, but R is true
 - ☒ 3. Both A and R are true, and R is the correct explanation of A
 - ☐ 4. A is true, but R is false

Q.93 You have three test tubes: one with dilute HCl, one with NaOH solution, and one with distilled water. Using both red and blue litmus papers, which observation correctly identifies the test tube containing the acidic solution?

- Ans
- ☐ 1. No change in both red and blue litmus
 - ☒ 2. No change in red, turns blue litmus red
 - ☐ 3. Turns red litmus blue
 - ☐ 4. Turns both red and blue litmus blue

Q.94 The existence of cut-in voltage in a diode is mainly due to the presence of _____.

- Ans
- ☐ 1. Infinite conductivity
 - ☐ 2. Neutral atoms without charges
 - ☒ 3. Depletion barrier potential
 - ☐ 4. External magnetic field only

Q.95 Why is molality preferred over molarity in colligative property calculations under varying temperature conditions?

- Ans
- ☐ 1. Molality depends directly on solution volume changes with temperature
 - ☐ 2. Molarity remains unaffected by temperature changes unlike molality values
 - ☒ 3. Molality remains unaffected by temperature changes unlike molarity values
 - ☐ 4. Both molality and molarity remain unaffected by temperature variations

Q.96 The spectral lines in a hydrogen series become closer together because the energy levels at higher n values _____.

- Ans
- ☐ 1. Remain equally spaced
 - ☐ 2. Become farther apart
 - ☒ 3. Become closer together
 - ☐ 4. Disappear completely

Q.97 Which process uses oil and water to separate valuable minerals from impurities during ore concentration?

- Ans**
- ☐ 1. Electrolytic refining method
 - ☐ 2. Leaching process
 - ☐ 3. Magnetic separation method
 - ☒ 4. Froth flotation method

Q.98 Beta decay helps unstable nuclei achieve stability mainly by adjusting the _____.

- Ans**
- ☒ 1. Neutron-proton ratio
 - ☐ 2. Electron orbital speed only
 - ☐ 3. Atomic radius only
 - ☐ 4. Nuclear volume to infinity

Q.99 What happens to a plane wavefront after reflecting from a concave mirror whose principal axis is perpendicular to the incident wavefront?

- Ans**
- ☐ 1. It retains its structural orientation to emerge as a flat plane wavefront moving along the parallel axis.
 - ☐ 2. It breaks apart into irregular fragments to emerge as a highly scattered wave moving in random paths.
 - ☒ 3. It undergoes a shape transition to emerge as a spherical wavefront converging toward a focal point.
 - ☐ 4. It undergoes a shape transition to emerge as a spherical wavefront expanding outward toward infinity.

Q.100 Which of the following correctly describes the gaseous state of matter?

- Ans**
- ☐ 1. Particles are close but can move around
 - ☐ 2. Particles have definite shape and volume
 - ☒ 3. Particles are far apart and move freely
 - ☐ 4. Particles are very close and fixed in position