



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



RRB JE 2025 CBT-2

Mechanical Engineering | CEN 05/2025

ENGLISH ANSWER KEY

Official Answer Key

Complete Paper · 02-07-2026

Questions	150
Marking	+1 correct / -1/3 wrong
Duration	120 minutes
Sections	General Abilities 50 · Technical Abilities 100

Every paper is set out as the official RRB response sheet, typed from the saved paper, with the official answer key marked. No candidate details are included.

HOW TO USE THIS BOOK

- 1 Open the INDEX on the next page.
- 2 Click any row to jump straight to that date and shift.
- 3 The correct option is ticked in green; the other options are crossed in red.
- 4 Use the bookmarks panel of your PDF reader to move between shifts.

Blackbook

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Compiled 28 October 2026

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RRB JE 2025 CBT-2 Mechanical (English) · 1 shifts

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Test Date	02/07/2026
Test Time	9:00 AM - 11:00 AM
Subject	RRB JE CBT 2 - Mechanical 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.

Section : General Abilities

Q.1 Which of the following statements is true about the Outbox?

- Ans
- ☐ A. It is used to receive incoming emails.
 - ☐ B. It contains emails that are currently being drafted.
 - ☒ C. It temporarily stores emails that are queued for sending.
 - ☐ D. It holds emails that have been successfully sent.

Q.2 Which experimental discovery contradicted Thomson's model of the atom and led to its rejection?

- Ans
- ☐ A. Observation of line spectra of hydrogen by Bohr
 - ☒ B. Alpha particle scattering showing deflection at large angles
 - ☐ C. Measurement of atomic radius using X-ray diffraction
 - ☐ D. Discovery of the neutron by James Chadwick

Q.3 Which condition is required for a displacement reaction between a metal and salt solution?

- Ans
- ☐ A. Reaction must be endothermic
 - ☐ B. Salt must be insoluble in water
 - ☐ C. Metal must be same as salt constituent
 - ☒ D. Metal must be higher in reactivity series

Q.4 Which type of computer virus attaches itself to executable files and gets activated when the file is run?

- Ans
- ☐ A. Boot Sector Virus
 - ☒ B. File Infector Virus
 - ☐ C. Macro Virus
 - ☐ D. Worm

Q.5 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
- ☐ A. Move the fulcrum closer to the worker
 - ☐ B. Place the fulcrum at the center of the plank
 - ☐ C. Keep the fulcrum fixed at any point
 - ☒ D. Move the fulcrum closer to the beam

Q.6 The Atal Bhujal Yojana 2020 focused on improving water resources management of how many states?

- Ans**
- ☒ A. seven
 - ☐ B. eight
 - ☐ C. five
 - ☐ D. ten

Q.7 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**
- ☒ A. A, B, C Only
 - ☐ B. A only
 - ☐ C. A, B, D Only
 - ☐ D. A, B Only

Q.8 Which of the following indicators is NOT typically used to measure sustainable development?

- Ans**
- ☐ A. Ecological Footprint
 - ☒ B. Gross Domestic Product (GDP) growth rate
 - ☐ C. Human Development Index (HDI)
 - ☐ D. Biocapacity

Q.9 What is the general formula of alkenes?

- Ans**
- ☒ A. C_nH_{2n}
 - ☐ B. C_nH_n
 - ☐ C. C_nH_{2n-2}
 - ☐ D. C_nH_{2n+2}

Q.10 The primary method of managing biodegradable domestic waste after collection is _____.

- Ans**
- ☐ A. burnt in open air
 - ☐ B. sending for recycling
 - ☒ C. conversion into compost
 - ☐ D. throwing into sewers

Q.11 The Kol Rebellion (1831–32) mainly affected which plateau region?

- Ans**
- ☐ A. Deccan Plateau
 - ☐ B. Malwa Plateau
 - ☐ C. Meghalaya Plateau
 - ☒ D. Chotanagpur Plateau

Q.12 Which of the following rivers forms a delta along the eastern coastal plains?

- Ans**
- ☐ A. Narmada
 - ☐ B. Tapi
 - ☒ C. Godavari
 - ☐ D. Ganga

Q.13 According to Thomson's model, how are electrons arranged in an atom?

- Ans**
- ☐ A. Randomly placed inside the nucleus
 - ☒ B. Embedded in a positively charged sphere like seeds in a watermelon
 - ☐ C. Orbiting around neutrons in elliptical paths
 - ☐ D. Moving in fixed orbits around the nucleus

Q.14 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**
- ☐ A. The iris controls the amount of light entering and helps to focus
 - ☐ B. The retina moves forward and backward to adjust the focus
 - ☒ C. The eye lens changes its focal length by altering its shape through ciliary muscle action
 - ☐ D. The cornea provides all the focusing power required for clear vision

Q.15 The pollutant group commonly associated with oil spills in oceans is _____.

- Ans**
- ☒ A. petroleum products
 - ☐ B. agricultural pesticides
 - ☐ C. chemical fertilizers
 - ☐ D. synthetic detergents

Q.16 The primary goal of the Pradhan Mantri Gram Sadak Yojana (PMGSY) is to:

- Ans**
- ☐ A. Enhance telecommunication services in cities
 - ☐ B. Develop urban infrastructure
 - ☒ C. Provide rural connectivity through road construction
 - ☐ D. Promote renewable energy usage

Q.17 If cell A1 = 10 and B1 = 20, what will `=A1+B1` return?

- Ans**
- ☐ A. 1020
 - ☐ B. Error
 - ☒ C. 30
 - ☐ D. 200

Q.18 Which British colonial building in Mumbai, completed in 1888, showcases a blend of Victorian Gothic and Indian architectural elements?

- Ans**
- ☐ A. Bombay Town Hall
 - ☒ B. Chhatrapati Shivaji Maharaj Terminus
 - ☐ C. Rajabai Clock Tower
 - ☐ D. Gateway of India

Q.19 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**
- ☐ A. The box will accelerate forward
 - ☐ B. The box will move at increasing speed
 - ☐ C. The box will gradually come to rest
 - ☒ D. The box will move at a constant speed

Q.20 Which pair of sectors is commonly addressed together in State Action Plan on Climate Change (SAPCC) adaptation planning?

- Ans**
- ☒ A. Water resources and health systems
 - ☐ B. Information technology and space research
 - ☐ C. Heavy industry and entertainment
 - ☐ D. Textile design and fashion marketing

Q.21 What file extension is used to save an MS PowerPoint 2021 presentation?

- Ans
- ☐ A. .pdf
 - ☒ B. .pptx
 - ☐ C. .xlsx
 - ☐ D. .docx

Q.22 If 10 grams of salt are dissolved in 100 mL of water, which component is the solute?

- Ans
- ☐ A. Both salt and water
 - ☐ B. Water only
 - ☒ C. Salt only
 - ☐ D. Neither

Q.23 Who won the maximum number of medals at the 38th National Games of India?

- Ans
- ☐ A. Neeraj Chopra
 - ☒ B. Dhinidhi Desinghu
 - ☐ C. Bajrang Punia
 - ☐ D. Manu Bhaker

Q.24 Which function returns the smallest value?

- Ans
- ☐ A. AVERAGE
 - ☐ B. MAX()
 - ☒ C. MIN()
 - ☐ D. COUNT()

Q.25 Which Quick Style type is applied only to selected words or individual characters within a paragraph in MS Word 2010?

- Ans
- ☐ A. Linked styles
 - ☒ B. Character styles
 - ☐ C. Page styles
 - ☐ D. Paragraph styles

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
- ☐ A. Presenter View
 - ☐ B. Slide Sorter
 - ☐ C. Action Buttons
 - ☒ D. Rehearse Timings

Q.27 A student accidentally spills some hydrochloric acid on a table. Which substance should be used to neutralise the acid safely?

- Ans
- ☐ A. Sugar solution
 - ☒ B. Baking soda solution
 - ☐ C. Vinegar
 - ☐ D. Lemon juice

Q.28 A field exposed to excessive pesticide use shows a sharp decline in earthworm population. The resulting effect on soil is:

- Ans
- ☐ A. Enhanced decomposition
 - ☒ B. Reduced soil fertility
 - ☐ C. Increased water retention
 - ☐ D. Improved aeration

Q.29 When was the 11th National Handloom Day celebrated across India under the coordination of the Ministry of Textiles?

- Ans
- ☐ A. September 7, 2025
 - ☒ B. August 7, 2025
 - ☐ C. October 7, 2025
 - ☐ D. November 7, 2025

Q.30 The term 'smog' is a combination of _____.

- Ans
- ☐ A. Smog and mist
 - ☐ B. Fog and clouds
 - ☐ C. Smoke and haze
 - ☒ D. Smoke and fog

Q.31 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
- ☐ A. Both statements are incorrect
 - ☐ B. Only Statement I is correct
 - ☐ C. Only Statement II is correct
 - ☒ D. Both statements are correct

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

- Ans
- ☐ A. The air particles remain stationary while the wave moves through
 - ☒ B. The air particles vibrate back and forth parallel to the direction of the wave
 - ☐ C. The air particles move in circular paths as the wave passes
 - ☐ D. The air particles vibrate up and down perpendicular to the direction of the wave

Q.33 Which new warship was commissioned by the Indian Navy in November, 2025, to strengthen anti-submarine and coastal defence capabilities?

- Ans
- ☐ A. INS Ikshak
 - ☒ B. INS Mahe
 - ☐ C. INS Arnala
 - ☐ D. INS Vikrant

Q.34 Which of the following statements best describes the behavior of magnetic field lines around a straight current-carrying conductor?

- Ans
- ☒ A. They form concentric circles centered on the conductor.
 - ☐ B. They change direction randomly along the wire.
 - ☐ C. They radiate straight outward from the wire.
 - ☐ D. They are parallel straight lines along the wire.

Q.35 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
- ☐ A. RISAT-2B
 - ☐ B. Cartosat-3
 - ☐ C. GSAT-6A
 - ☒ D. CMS-03 (GSAT-7R)

Q.36 On which date is National Handloom Day observed in India?

- Ans**
- ✓ A. 7 August
 - ✗ B. 5 September
 - ✗ C. 2 October
 - ✗ D. 18 August

Q.37 The Mappila Uprisings of the 19th century occurred mainly in which region of India?

- Ans**
- ✗ A. Sunderbans region of West Bengal
 - ✗ B. Konkan region of Maharashtra
 - ✓ C. Malabar region of Kerala
 - ✗ D. Coromandel Coast of Tamil Nadu

Q.38 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**
- ✗ A. Using an air core, decreasing coil turns, and keeping current constant
 - ✓ B. Using a soft iron core, increasing coil turns, and increasing current through the coil
 - ✗ C. Using a copper core, increasing coil turns, and lowering current
 - ✗ D. Using a steel core, decreasing coil turns, and lowering current

Q.39 Which of the following is a primary mission under India's National Action Plan on Climate Change (NAPCC)?

- Ans**
- ✗ A. National Rural Livelihood Mission
 - ✗ B. National Highway Development Project
 - ✗ C. National Nutrition Mission
 - ✓ D. National Solar Mission

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**
- ✗ A. Regular medical check-ups
 - ✗ B. Vaccination against common infections
 - ✓ C. Use of protective equipment and safe handling
 - ✗ D. Segregation of waste into color-coded bins

Q.41 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 t 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 o

- Ans**
- ✗ A. 1-a, 2-c, 3-d, 4-e, 5-b
 - ✗ B. 1-c, 2-e, 3-b, 4-a, 5-d
 - ✗ C. 1-d, 2-b, 3-e, 4-c, 5-a
 - ✓ D. 1-e, 2-d, 3-b, 4-c, 5-a

Q.42 Which of the following options must be DISABLED before manually setting the date and time in Windows?

- Ans**
- ✗ A. Set time zone globally
 - ✗ B. Enable multiple clocks
 - ✗ C. Night Light
 - ✓ D. Set time automatically

Q.43 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**
- ☒ A. 3-methylpentan-1-ol
 - ☐ B. 3-methylhexanol
 - ☐ C. 4-methylpentanol
 - ☐ D. 2-methylhexanol

Q.44 What is the main reason sulfur dioxide irritates the upper respiratory mucous membrane?

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

Q.45 A farmer applies large amounts of chemical fertilizers over several years. Which consequence most likely results from this practice leading to soil pollution?

- Ans**
- ☐ A. Erosion of surface soil layers
 - ☐ B. Increase in earthworm population
 - ☒ C. Accumulation of toxic substances in soil
 - ☐ D. Faster plant growth every season

Q.46 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**
- ☐ A. 25%
 - ☐ B. 10%
 - ☒ C. 15%
 - ☐ D. 20%

Q.47 Which of the following best describes the velocity-time graph for an object moving with uniform velocity?

- Ans**
- ☐ A. A curved line above the time axis
 - ☒ B. A straight horizontal line parallel to the time axis
 - ☐ C. A line starting from the origin and sloping upwards
 - ☐ D. A straight line sloping upwards from the time axis

Q.48 Which of the following Articles states about the right of individual to form associations or unions or co-operative societies?

- Ans**
- ☒ A. Article 19 (1) (c)
 - ☐ B. Article 19 (1) (b)
 - ☐ C. Article 19 (1) (d)
 - ☐ D. Article 19 (1) (a)

Q.49 The atmospheric component that remains largely unreactive is _____.

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

Q.50 How can we locate a file with a known extension but an unknown name in a large directory?

- Ans**
- ☐ A. Using the dir command
 - ☐ B. Through File Explorer
 - ☒ C. Using the Search box in File Explorer with *.ext
 - ☐ D. Checking the Recycle Bin

Section : **Technical Abilities**

Q.51 Mild steel shows poor corrosion resistance mainly because it:

- Ans**
- ☐ A. Possesses a non-uniform and less stable microstructure
 - ☐ B. Forms a dense but non-protective oxide layer on the surface
 - ☐ C. Contains a relatively high amount of carbon
 - ☒ D. Does not contain protective elements like chromium or nickel

Q.52 A technician wants to improve flatness and surface quality of a gauge block using lapping. What is the most important factor to control?

- Ans**
- ☐ A. Applying excessive force to speed up lapping
 - ☒ B. Uniform pressure and movement across the surface
 - ☐ C. Using coarse abrasives for faster removal
 - ☐ D. High temperature and fast lap speed

Q.53 Which component in a cylindrical grinding machine provides longitudinal movement to the workpiece?

- Ans**
- ☒ A. Table with sliding mechanism
 - ☐ B. Spindle for work rotation
 - ☐ C. Wheel guard for safety
 - ☐ D. Coolant system with pump

Q.54 What is the main chemical change that occurs on the metal surface during anodizing?

- Ans**
- ☐ A. Deposition of metallic ions
 - ☒ B. Formation of a thick oxide layer
 - ☐ C. Dissolving the metal away
 - ☐ D. Removal of the oxide layer

Q.55 How do the gear mechanism and braking system in a hoist contribute to safe lifting operations?

- Ans**
- ☐ A. Both gear mechanism and brake system work only during lowering of load
 - ☐ B. The brake system increases speed and the gear mechanism holds the load steady
 - ☐ C. The gear mechanism increases speed and the brake system adds force to lifting
 - ☒ D. The gear mechanism reduces speed while the brake system holds the load steady

Q.56 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**
- ☒ A. Dye penetrant and ultrasonic testing
 - ☐ B. Radiographic and magnetic particle testing
 - ☐ C. Radiographic and ultrasonic testing
 - ☐ D. Visual and magnetic particle testing

Q.57 What is the typical least count of a bevel protractor with a vernier scale?

- Ans**
- ☐ A. 10 minutes
 - ☐ B. 1°
 - ☐ C. 0.1°
 - ☒ D. 5 minutes

Q.58 Corrosion resistance of alloy steels can be increased further by:

- Ans**
- ☐ A. Increasing the overall carbon content in the alloy
 - ☒ B. Using protective coatings or chemical passivation treatment
 - ☐ C. Adding a small percentage of copper to the composition
 - ☐ D. Improving surface finish through mechanical polishing

Q.59 The functioning of a comparator is based on:

- Ans**
- ☐ A. An optical measuring system
 - ☒ B. Comparison with a known standard, such as slip gauges
 - ☐ C. The use of an accurately calibrated scale
 - ☐ D. The use of limit gauges

Q.60 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**
- ☐ A. $P/V = \text{Constant}$.
 - ☒ B. $PV = \text{Constant}$.
 - ☐ C. $P = \text{constant}$.
 - ☐ D. $V = \text{constant}$.

Q.61 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**
- ☐ A. 250 MPa
 - ☐ B. 2500 MPa
 - ☐ C. 0.25 MPa
 - ☒ D. 2.5 MPa

Q.62 The type of surface produced by a taper turning operation performed on a lathe machine is:

- Ans**
- ☐ A. cylindrical
 - ☐ B. flat
 - ☒ C. conical
 - ☐ D. curved one

Q.63 Which material handling equipment would be most suitable for transferring bulk granular materials over a long horizontal distance within a factory?

- Ans**
- ☐ A. Overhead crane arrangement
 - ☒ B. Belt conveyor system
 - ☐ C. Forklift transportation
 - ☐ D. Pallet truck operation

Q.64 Which of the following best describes the principle of parkerising?

- Ans**
- ☐ A. A paint coating is applied to the surface
 - ☒ B. A phosphate layer forms by chemical reaction
 - ☐ C. Surface roughness is increased mechanically
 - ☐ D. A polymer coating is sprayed on the surface

Q.65 The area under load v/s elongation diagram for a ductile material upto fracture indicates _____.

- Ans**
- ☐ A. Modulus of resilience
 - ☐ B. Resilience
 - ☐ C. Modulus of toughness
 - ☒ D. Toughness

Q.66 The primary function of a sine bar is to:

- Ans**
- ☐ A. calibrate pressure gauges
 - ☒ B. measure angles with high accuracy
 - ☐ C. check thread pitches
 - ☐ D. measure linear dimensions

Q.67 The most effective method for applying cutting fluid during high-speed machining is:

- Ans**
- ☒ A. Flooding
 - ☐ B. Drip system
 - ☐ C. Atomized spray
 - ☐ D. Hand pouring

Q.68 Water as a cutting fluid does NOT spread well over a surface to wet it because of ____.

- Ans**
- ☐ A. high buoyancy force
 - ☒ B. high surface tension
 - ☐ C. high volatility
 - ☐ D. low surface tension

Q.69 Why is water mixed with oil often preferred as a grinding coolant over plain water?

- Ans**
- ☐ A. It decreases grinding time significantly
 - ☐ B. It increases corrosion of metals
 - ☐ C. It makes coolant less effective
 - ☒ D. It provides both cooling and lubrication

Q.70 With an increase in angle of the inclined surface, the maximum angle at which a body starts sliding down the plane is called _____.

- Ans**
- ☐ A. Static friction
 - ☐ B. limiting friction
 - ☒ C. angle of friction
 - ☐ D. cone angle

Q.71 Which of the following is a necessary modification in Newton's second law to derive D'Alembert's principle for a dynamic system?

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

Q.72 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**
- ☐ A. North-west
 - ☒ B. South-west
 - ☐ C. North-east
 - ☐ D. South-east

Q.73 Which of the following is NOT a type of water-based cutting fluid?

- Ans
- ☒ A. Dispersion
 - ☒ B. Grease
 - ☒ C. Emulsion
 - ☒ D. Solution

Q.74 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 ∠AOB?

- Ans
- ☒ A. $10 \sin 30^\circ$ N
 - ☒ B. 10 N
 - ☒ C. $10 \cos 30^\circ$ N
 - ☒ D. $10 \cos 60^\circ$ N

Q.75 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
- ☒ A. $p = \frac{2\sigma}{d}$
 - ☒ B. $p = \frac{\sigma}{d}$
 - ☒ C. $p = \frac{4\sigma}{d}$
 - ☒ D. $p = \frac{6\sigma}{d}$

Q.76 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
- ☒ A. The external equilibrium remains unchanged
 - ☒ B. The effect depends on the material
 - ☒ C. The force magnitude becomes zero
 - ☒ D. The external equilibrium changes

Q.77 Which of the following is a limitation of conventional oxy-fuel gas cutting?

- Ans
- ☒ A. Cannot cut mild steel plates
 - ☒ B. Cannot cut thick carbon steels
 - ☒ C. Requires electrical input for operation
 - ☒ D. Cannot cut stainless steel efficiently

Q.78 If the electrolyte does not contain metal ions of the plating metal, what is the most likely outcome?

- Ans
- ☒ A. The cathode will dissolve in the solution
 - ☒ B. No metal will deposit on the cathode
 - ☒ C. The anode will become coated with metal
 - ☒ D. The process will create a thick oxide layer

Q.79 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
- ☒ A. High brittleness with low ductility
 - ☒ B. High brittleness with high elasticity
 - ☒ C. Low brittleness with high toughness
 - ☒ D. Low brittleness with low stiffness

Q.80 The center of pressure for a submerged horizontal plane surface is:

- Ans
- ☐ A. The top edge of the submerged surface, taken as the uppermost boundary of fluid contact
 - ☒ B. The centroid of the plane surface, representing the geometric center of the submerged area
 - ☐ C. A position independent of the depth of immersion, unaffected by how far the surface is submerged
 - ☐ D. The point of total hydrostatic force, located below the centroid when the surface is inclined

Q.81 Which of the following is a limitation of mechanical comparators?

- Ans
- ☒ A. Mechanical wear can reduce accuracy over time
 - ☐ B. They cannot measure linear dimensions
 - ☐ C. They cannot measure small deviations
 - ☐ D. They require electricity

Q.82 During the 'Shaping' operation conducted on a workpiece of aluminum material, the type of coolant used is:

- Ans
- ☒ A. kerosene
 - ☐ B. dry kerosene turpentine
 - ☐ C. mineral hard oil
 - ☐ D. cutting compound

Q.83 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
- ☒ A. Mild steel with low carbon and minimal alloying elements
 - ☐ B. Mild steel with increased silicon and phosphorus content
 - ☐ C. Alloy steel with high manganese and vanadium content
 - ☐ D. Alloy steel with high chromium and nickel content

Q.84 Under which scenario is a body on an inclined plane most likely to slip when subjected to a parallel force?

- Ans
- ☐ A. Frictional force equals weight of the body
 - ☒ B. Coefficient of friction is less than tangent of inclination
 - ☐ C. Normal reaction is greater than weight
 - ☐ D. Parallel force is opposite to frictional force

Q.85 During oxy-acetylene gas welding, improper adjustment of the neutral flame can most likely result in which weld defect on stainless steel?

- Ans
- ☐ A. Development of porosity within the weld metal
 - ☐ B. Formation of significant undercut along the joint
 - ☒ C. Excessive oxidation at the weld bead surface
 - ☐ D. Occurrence of incomplete root fusion in the joint

Q.86 The saddle of a lathe carriage:

- Ans
- ☐ A. Rotates the workpiece against tool
 - ☐ B. Controls spindle speed automatically
 - ☒ C. Supports the cross-slide and tool post
 - ☐ D. Moves the lead screw mechanism

Q.87 Which characteristic is assessed in the bend test for welded joints?

- Ans
- ☐ A. Chemical composition check
 - ☐ B. Magnetic properties check
 - ☒ C. Ductility of the weld metal
 - ☐ D. Surface finish of the weld

Q.88 Trackless cranes are mainly used for:

- Ans**
- ☐ A. Handling liquid materials only
 - ☐ B. Operations limited to fixed tracks
 - ☐ C. Continuous material transport
 - ☒ D. Lifting loads in confined or uneven areas

Q.89 Which of the following best describes the function of a hoist in material handling systems?

- Ans**
- ☐ A. Moving loads horizontally between different workstations
 - ☐ B. Rotating loads for alignment during material handling
 - ☐ C. Sorting materials by size during material handling
 - ☒ D. Lifting and lowering loads vertically with controlled movement

Q.90 An LVDT (Linear Variable Differential Transformer) is primarily used in which type of comparator?

- Ans**
- ☐ A. Mechanical comparator
 - ☒ B. Electrical comparator
 - ☐ C. Pneumatic comparator
 - ☐ D. Optical comparator

Q.91 _____ is used to measure the pressure difference in a Venturi meter.

- Ans**
- ☐ A. Rotameter
 - ☐ B. Bourdon gauge
 - ☒ C. Manometer
 - ☐ D. Pitot tube

Q.92 When selecting a material for a component subjected to cyclic loading and impact, which mechanical property should be prioritized along with hardness?

- Ans**
- ☐ A. Plasticity must be considered to increase mass
 - ☐ B. Ductility must be considered to avoid oxidation
 - ☐ C. Elasticity must be considered for better insulation
 - ☒ D. Toughness must be considered to resist sudden failure

Q.93 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**
- ☐ A. 100 N and 0 N
 - ☐ B. 70 N and 70 N
 - ☐ C. 60 N and 80 N
 - ☒ D. 80 N and 60 N

Q.94 Which of the following plots is used for the classification of types of facilities and layouts used for different levels of the production?

- Ans**
- ☐ A. Production quantity vs. product cost plot
 - ☐ B. Product cost vs. product variety plot
 - ☒ C. Production quantity vs. product variety plot
 - ☐ D. Production mass vs. product variety plot

Q.95 Which defect results from improper shielding during the welding process and causes gas pockets in the weld?

- Ans**
- ☐ A. Slag inclusion
 - ☐ B. Undercut
 - ☒ C. Porosity
 - ☐ D. Lack of fusion

Q.96 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
- ☐ A. Low viscosity and low electrical insulation properties in the formulation.
 - ☐ B. Ability to dissolve in water and rapid drying at room temperature.
 - ☐ C. High chemical reactivity and low cohesion with steel to form a sacrificial layer.
 - ☒ D. Strong adhesion to substrate and high resistance to ultraviolet radiation.

Q.97 Which of the following is a primary application of interferometry in metrology?

- Ans
- ☐ A. Calculating torque in shafts using sensors
 - ☐ B. Analyzing thermal conductivity of metals
 - ☐ C. Determining chemical composition by spectroscopy
 - ☒ D. Measuring surface flatness with high precision

Q.98 Which characteristic best describes the arc in submerged arc welding?

- Ans
- ☐ A. The arc is exposed to the atmosphere during welding
 - ☐ B. The arc is shielded only by inert gas during welding
 - ☐ C. The arc is visible and produces bright light during welding
 - ☒ D. The arc is completely covered by a layer of flux

Q.99 Why is a steady rest sometimes used in cylindrical grinding?

- Ans
- ☐ A. To hold abrasive materials for grinding
 - ☒ B. To support long workpieces during rotation
 - ☐ C. To align the grinding wheel to the table
 - ☐ D. To cool the workpiece during grinding

Q.100 Intensity of pressure at a point in a fluid is:

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

Q.101 Which manufacturing method is primarily used to harden and set silicate-bonded grinding wheels?

- Ans
- ☐ A. Chemical polymerization at room temperature
 - ☐ B. Low-temperature drying without firing
 - ☒ C. Controlled firing at moderate temperature
 - ☐ D. High-pressure forging of abrasive particles

Q.102 Why is facing operation critical for assembly parts?

- Ans
- ☐ A. It reduces the hardness of the material at the surface region.
 - ☐ B. It improves the cutting tool life during machining operation.
 - ☐ C. It increases the overall strength of the workpiece material.
 - ☒ D. It ensures the end surface is flat and perpendicular to the axis.

Q.103 Which type of flux is most suitable for minimizing oxidation in high-temperature aluminum welding applications involving magnesium alloys?

- Ans
- ☐ A. Borax-based flux
 - ☒ B. Fluoride-based flux
 - ☐ C. Zinc chloride-based flux
 - ☐ D. Rosin-based flux

Q.104 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
- ☐ A. Outsource production to the supplier as it saves more money
 - ☐ B. Split production equally between manufacturing and outsourcing
 - ☒ C. Continue manufacturing the component in-house as it is more cost-effective
 - ☐ D. Reduce production and buy the remaining units from the supplier

Q.105 The maximum bending moment for a simply supported beam of span L with uniformly distributed load (UDL) w per unit length is ____.

- Ans
- ☒ A. $\frac{WL^2}{8}$
 - ☐ B. $\frac{WL^2}{2}$
 - ☐ C. $\frac{WL^2}{16}$
 - ☐ D. $\frac{WL^2}{12}$

Q.106 Which of the following best defines the specific weight of a fluid?

- Ans
- ☐ A. The weight of fluid per unit pressure
 - ☒ B. The weight of fluid per unit volume
 - ☐ C. The weight of fluid per unit force
 - ☐ D. The weight of fluid per unit mass

Q.107 Which property most significantly differentiates mild steel from alloy steel when exposed to high-temperature mechanical stress in industrial applications?

- Ans
- ☒ A. Alloy steel maintains higher mechanical strength at elevated temperatures compared to mild steel
 - ☐ B. Alloy steel demonstrates greater ductility at elevated temperatures than mild steel
 - ☐ C. Mild steel has enhanced corrosion resistance at high temperatures compared to alloy steel
 - ☐ D. Mild steel provides improved wear resistance under high temperatures compared to alloy steel

Q.108 Which component is essential in a profile projection method for accurately displaying the outline of a machine part?

- Ans
- ☐ A. Non-reflective surface with ambient room lighting
 - ☐ B. Curved screen with angled light projection
 - ☒ C. Collimated light source with precise screen alignment
 - ☐ D. Simple lamp with diffused translucent screen

Q.109 The lathe bed is designed with which type of guideways?

- Ans
- ☐ A. Rectangular
 - ☐ B. Triangular
 - ☒ C. Inverted V and flat combination
 - ☐ D. Circular

Q.110 What type of efficiency is most important for an axial flow compressor in high-speed applications?

- Ans
- ☐ A. Mechanical efficiency
 - ☐ B. Thermal efficiency
 - ☒ C. Isentropic efficiency
 - ☐ D. Volumetric efficiency

Q.111 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
- ☒ A. $\frac{13}{14}$
 - ☒ B. $\frac{5}{9}$
 - ☒ C. $\frac{2}{3}$
 - ☒ D. $\frac{15}{16}$

Q.112 Which two types of thermodynamic processes constitute the Carnot cycle in an ideal heat engine?

- Ans
- ☒ A. Isothermal and adiabatic
 - ☒ B. Adiabatic and isochoric
 - ☒ C. Isobaric and isochoric
 - ☒ D. Isothermal and isochoric

Q.113 Which of the following best describes the purpose of ABC analysis in inventory management?

- Ans
- ☒ A. To organize inventory items solely by their production shelf life in warehouse
 - ☒ B. To store inventory items according to their physical characteristics in the warehouse
 - ☒ C. To group inventory items based on supplier location and delivery schedule
 - ☒ D. To categorize inventory items based on significance in value and usage frequency

Q.114 Which of the following is an example of a positive displacement air compressor?

- Ans
- ☒ A. Radial dynamic compressor
 - ☒ B. Reciprocating piston compressor
 - ☒ C. Axial flow compressor
 - ☒ D. Centrifugal compressor

Q.115 If a block slides down a rough plane inclined at 30° with a coefficient of friction of 0.2, the net acceleration is:

- Ans
- ☒ A. Zero
 - ☒ B. 0.676 g
 - ☒ C. 0.326 g
 - ☒ D. 0.5 g

Q.116 In a workshop, why might a lever-operated hoist be preferred over an electric hoist for certain applications?

- Ans
- ☒ A. Portability and suitability for short, manual lifting operations
 - ☒ B. High lifting speed and remote control capabilities
 - ☒ C. Continuous operation and automatic overload protection
 - ☒ D. Lower initial cost and larger load lifting capacity

Q.117 In _____ process, heat is added during Otto cycle.

- Ans
- ☒ A. Constant volume
 - ☒ B. Constant pressure
 - ☒ C. Isentropic compression
 - ☒ D. Isothermal expansion

Q.118 For a simply supported beam with multiple point loads, maximum bending moment occurs where:

- Ans
- ☐ A. Deflection = 0
 - ☐ B. Reaction = 0
 - ☐ C. Load = 0
 - ☒ D. Shear force = 0

Q.119 What is the nature of strain as a physical quantity?

- Ans
- ☐ A. It has units of force per area.
 - ☐ B. It has units of volume.
 - ☒ C. It is dimensionless.
 - ☐ D. It has units of length.

Q.120 What is the role of the acute angle attachment in a Bevel Protractor?

- Ans
- ☐ A. To adjust the stock
 - ☒ B. To measure acute angles less than 90°
 - ☐ C. To lock the vernier scale
 - ☐ D. To measure linear distances

Q.121 Radial flow pumps are preferred when:

- Ans
- ☒ A. Low flow, high head is required
 - ☐ B. Only low suction head is available
 - ☐ C. Flow is very viscous
 - ☐ D. High flow, low head is required

Q.122 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
- ☐ A. $P_{atm} - \rho(g-a)h$
 - ☒ B. $P_{atm} + \rho(g+a)h$
 - ☐ C. $P_{atm} + \rho gh$
 - ☐ D. $P_{atm} - \rho gh$

Q.123 When a mild steel bar is loaded in tension within the elastic limit, the relation between stress and strain is:

- Ans
- ☐ A. Stress independent of strain
 - ☐ B. $\text{Stress} \propto \sqrt{(\text{Strain})}$
 - ☒ C. $\text{Stress} \propto \text{Strain}$
 - ☐ D. $\text{Stress} \propto (\text{Strain})^2$

Q.124 Which of the following is considered a common surface defect in welding processes?

- Ans
- ☐ A. Incomplete penetration at root
 - ☐ B. Excessive spatter deposits
 - ☒ C. Undercut along the weld bead
 - ☐ D. Lamellar tearing in plate

Q.125 Which type of friction occurs when surfaces are lubricated with a fluid?

- Ans
- ☐ A. Dry friction
 - ☒ B. Film friction
 - ☐ C. Static friction
 - ☐ D. Rolling friction

Q.126 In malleability, material is subjected to which of the following stresses?

- Ans**
- ☒ A. Compressive stress
 - ☐ B. Fatigue stress
 - ☐ C. Tensile stress
 - ☐ D. Shear stress

Q.127 Which of the following can be measured using interferometry?

- Ans**
- ☐ A. Frequency of vibration
 - ☐ B. Linear displacement
 - ☒ C. Surface roughness
 - ☐ D. Depth of micro-grooves

Q.128 After leaving the low-pressure cylinder in a two-stage air compressor, where does the air go next?

- Ans**
- ☐ A. Back to the atmosphere
 - ☐ B. To the high pressure cylinder directly
 - ☒ C. To the intercooler
 - ☐ D. To the air receiver tank

Q.129 For drilling a hole on a lathe, the drilling tool is placed in the ____.

- Ans**
- ☐ A. chuck
 - ☐ B. tool post
 - ☒ C. tailstock
 - ☐ D. carriage

Q.130 In a scenario where excessive spatter occurs during arc welding, which adjustment is most likely to mitigate the issue without compromising weld quality?

- Ans**
- ☐ A. Decreasing base metal thickness
 - ☒ B. Reducing arc length slightly
 - ☐ C. Switching to a larger electrode
 - ☐ D. Increasing travel speed marginally

Q.131 A center drill is used before drilling because it:

- Ans**
- ☐ A. Increases the temperature at the cutting zone
 - ☐ B. Removes burrs and debris from the drilled hole
 - ☒ C. Provides a pilot hole to guide the main drill
 - ☐ D. Reduces the spindle rotation of the lathe

Q.132 In high-performance applications such as turbine shafts and precision gears, alloy steels are favored over mild steels primarily because they:

- Ans**
- ☒ A. Retain mechanical integrity and hardness under conditions of elevated temperature and cyclic stress
 - ☐ B. Exhibit superior machinability due to refined ferritic microstructure
 - ☐ C. Possess lower density and improved dimensional stability
 - ☐ D. Require less alloying and heat treatment to achieve desired strength

Q.133 Determine the gauge pressure given an absolute pressure of 2 atm and atmospheric pressure of 1 atm.

- Ans**
- ☐ A. 0.5 atm
 - ☐ B. 2 atm
 - ☒ C. 1 atm
 - ☐ D. 3 atm

Q.134 Which of the following is not a type of friction?

- Ans ☒ A. Gravitational friction
☐ B. Rolling friction
☐ C. Static friction
☐ D. Kinetic friction

Q.135 What is the heat supplied to a Carnot engine that produces 100 kW of useful work at an efficiency of 35%?

- Ans ☒ A. 285.7 kW
☐ B. 150 kW
☐ C. 300 kW
☐ D. 200 kW

Q.136 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 ☐ A. Factor of Safety (Yield) = 3.58, Elongation = 0.8 mm
☐ B. Factor of Safety (Yield) = 2.25, Elongation = 0.5 mm
☐ C. Factor of Safety (Yield) = 2.25, Elongation = 0.318 mm
☒ D. Factor of Safety (Yield) = 3.58, Elongation = 0.318 mm

Q.137 The shape of the bending moment diagram for a cantilever beam subjected to a uniformly distributed load (UDL) over the whole length is ____.

- Ans ☐ A. Trapezoidal
☐ B. Triangular
☒ C. Parabolic
☐ D. Rectangular

Q.138 The point of contraflexure occurs where ____.

- Ans ☒ A. Bending moment changes sign
☐ B. Shear force is zero
☐ C. Load intensity is zero
☐ D. Bending moment is maximum

Q.139 In a two-stroke diesel engine, the exhaust gases are removed through:

- Ans ☐ A. Valves
☐ B. Spark plug
☐ C. Carburetor
☒ D. Ports

Q.140 Which of the following pair of processes in the Otto cycle are both isentropic?

- Ans ☐ A. Heat addition and heat rejection processes
☐ B. Expansion and heat addition processes
☐ C. Compression and heat rejection processes
☒ D. Compression and expansion processes

Q.141 In ABC analysis, the letter 'C' is designated to:

- Ans**
- ☒ A. low valued items, smaller in number
 - ☒ B. low valued items, larger in number
 - ☒ C. high valued items, larger in number
 - ☒ D. high valued items, smaller in number

Q.142 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**
- ☒ A. The EOQ is 1000 units
 - ☒ B. The EOQ is 2240 units
 - ☒ C. The EOQ is 5000 units
 - ☒ D. The EOQ is 4000 units

Q.143 Why is direct current (DC) commonly used in MIG (metal inert gas) welding?

- Ans**
- ☒ A. It offers a stable arc and consistent metal transfer
 - ☒ B. It reduces penetration for thick materials
 - ☒ C. It limits the types of metals that can be welded
 - ☒ D. It increases spatter for faster welding

Q.144 Which of the following properties is used as the basis for temperature measurement in constant volume thermometers?

- Ans**
- ☒ A. Enthalpy
 - ☒ B. Volume
 - ☒ C. Entropy
 - ☒ D. Pressure

Q.145 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**
- ☒ A. 24.5 kW
 - ☒ B. 58.1 kW
 - ☒ C. 32.7 kW
 - ☒ D. 43.6 kW

Q.146 Which defect is most likely to result from excessive carburizing time in steel heat treatment?

- Ans**
- ☒ A. Development of coarse pearlite across the section
 - ☒ B. Formation of excessive retained austenite at the surface
 - ☒ C. Increase in porosity throughout the component
 - ☒ D. Initiation of intergranular corrosion in the core

Q.147 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**
- ☒ A. Both shafts have equal torsional stiffness and equal weight.
 - ☒ B. The hollow shaft has a higher torsional stiffness and higher weight.
 - ☒ C. The hollow shaft has a lower torsional stiffness but lower weight.
 - ☒ D. The solid shaft has a higher torsional stiffness and lower weight.

Q.148 Which property of rubber-based coatings makes them suitable for protecting steel pipes in industrial environments?

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

Q.149 What type of measurement does a 'comparator' work on?

- Ans**
- ☐ A. Basic measurement
 - ☒ B. Relative measurement
 - ☐ C. Direct measurement
 - ☐ D. Absolute measurement

Q.150 Why does the vapor pressure of a liquid increase with an increase in temperature?

- Ans**
- ☐ A. Viscosity reduces exponentially
 - ☒ B. Molecules gain kinetic energy to escape into vapor
 - ☐ C. Density reduces in a straight-line manner
 - ☐ D. Surface tension remains constant