रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD

सी ई एन नं. - 03/2024 / CEN No. - 03/2024

Test Date	22/04/2025
Test Time	9:00 AM - 11:00 AM
Subject	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 **Which of the following CANNOT be considered as a measure to control global warming?**

Ans
✗ 1. Efficiently using energy
✗ 2. Cutting down use of fossil fuel
✗ 3. Reduction in emission of greenhouse gases
✓ 4. Causing deforestation

Q.2 **What is the maximum number of Ministers allowed in the Council of Ministers, including the Prime Minister, as per the 91st Amendment Act?**

Ans
✗ 1. 12% of Lok Sabha strength
✗ 2. 10% of Lok Sabha strength
✓ 3. 15% of Lok Sabha strength
✗ 4. 20% of Lok Sabha strength

Q.3 **What is the net force acting on an object if balanced forces are applied?**

Ans
✗ 1. Equal to the mass of the object
✓ 2. Zero
✗ 3. Equal to acceleration
✗ 4. Infinite

Q.4 **Which of the following is NOT a source of release of smokestacks?**

Ans
✓ 1. Rivers
✗ 2. Smelters
✗ 3. Thermal power plants
✗ 4. Industries

Q.5 **What is the primary purpose of using a firewall on a Personal Computer?**

Ans
✗ 1. To increase storage space
✓ 2. To block unauthorised access and protect the computer
✗ 3. To clean up temporary files
✗ 4. To speed up internet connectivity

Q.6 The energy that is derived from the use of radioactive isotopes is termed as _____.

Ans
- ✗ 1. thermal energy
- ✗ 2. solar energy
- ✗ 3. geothermal energy
- ✓ 4. nuclear energy

Q.7 The fine powder that is obtained from the modified and recycled form of plastic is called _____.

Ans
- ✓ 1. polyblend
- ✗ 2. polystyrene
- ✗ 3. polyethylene
- ✗ 4. polythene

Q.8 Which of the following is NOT toxic to non-target organisms in the soil?

Ans
- ✓ 1. Organic fertilisers
- ✗ 2. Pesticides
- ✗ 3. Herbicides
- ✗ 4. Fungicides

Q.9 What does PCB stand for?

Ans
- ✗ 1. Processing Circuit Board
- ✗ 2. Peripheral Connection Bus
- ✗ 3. Primary Control Board
- ✓ 4. Printed Circuit Board

Q.10 Which of the following is NOT a component of a CPU?

Ans
- ✗ 1. Arithmetic Logic Unit (ALU)
- ✓ 2. Hard Disk
- ✗ 3. Cache Memory
- ✗ 4. Control Unit (CU)

Q.11 In which of the following regions the Himalayas has the greatest width?

Ans
- ✗ 1. Sikkim
- ✓ 2. Kashmir
- ✗ 3. Himachal Pradesh
- ✗ 4. Arunachal Pradesh

Q.12 Which official in the Gupta administration was responsible for peace and war matters?

Ans
- ✗ 1. Vishayapati
- ✓ 2. Sandhi-Vigrahika
- ✗ 3. Mahapratihara
- ✗ 4. Mahadandanayaka

Q.13 Which of the following is a characteristic difference between colloids and true solutions?

Ans
- ✗ 1. True solutions have visible solute particles, whereas colloids have invisible dispersed particles.
- ✓ 2. True solutions have a single-phase system, whereas colloids have a two-phase system.
- ✗ 3. True solutions exhibit Brownian motion, but colloids do not.
- ✗ 4. True solutions show the Tyndall effect, but colloids do not.

Q.14 Which of the following cities hosted the inaugural Kho Kho World Cup in January 2025?

Ans
- ✗ 1. Chennai
- ✓ 2. New Delhi
- ✗ 3. Mumbai
- ✗ 4. Kolkata

Q.15 The primary agent that helps in the decomposition of biodegradable matter in domestic sewage is _____.

Ans
- ✗ 1. chloride
- ✗ 2. nitrate
- ✓ 3. bacterium
- ✗ 4. phosphate

Q.16 What is the first step to securing ones smartphone or tablet?

Ans
- ✓ 1. Setting a password/PIN-protected lock screen
- ✗ 2. Turning off mobile data
- ✗ 3. Using only free Wi-Fi networks
- ✗ 4. Installing more apps

Q.17 What is the approximate pH of a neutral salt solution?

Ans
- ✗ 1. Less than 7
- ✗ 2. Depends on the temperature
- ✗ 3. More than 7
- ✓ 4. Equal to 7

Q.18 Why does a bee sting cause pain and irritation?

Ans
- ✗ 1. The sting releases carbon dioxide gas.
- ✗ 2. The sting injects a mild sugar solution.
- ✓ 3. The sting injects methanoic acid.
- ✗ 4. The sting contains a strong base.

Q.19 If you want the primary recipient to see that others have received a copy of an email, you should enter their email addresses in the _____ field.

Ans
- ✗ 1. Bcc
- ✓ 2. Cc
- ✗ 3. Subject
- ✗ 4. To

Q.20 What is the purpose of the Collation option in the Print settings?

Ans
- ✓ 1. To print all the pages of a document as a set
- ✗ 2. To select a custom print range
- ✗ 3. To adjust the page orientation
- ✗ 4. To change the printer selection

Q.21 The Rudra Veena is predominantly associated with which genre of Hindustani music?

Ans
- ✗ 1. Thumri
- ✓ 2. Dhrupad
- ✗ 3. Khayal
- ✗ 4. Ghazal

Q.22 Which of the following correctly represents the chemical formula of a compound formed by aluminium and sulphate ions?

Ans
✗ 1. $Al(SO_4)_3$
✗ 2. Al_2SO_4
✓ 3. $Al_2(SO_4)_3$
✗ 4. $Al_3(SO_4)_2$

Q.23 Which of the following states is NOT covered under the Atal Bhujal Yojana?

Ans
✗ 1. Maharashtra
✗ 2. Rajasthan
✓ 3. Jharkhand
✗ 4. Uttar Pradesh

Q.24 The phenomenon of multiple echoes due to repeated reflections is called _____.

Ans
✗ 1. resonance
✗ 2. refraction
✗ 3. diffraction
✓ 4. reverberation

Q.25 If the absolute refractive index of a medium is less than 1, it means _____.

Ans
✓ 1. light travels faster in that medium than in vacuum
✗ 2. the medium is a perfect reflector
✗ 3. the medium absorbs all light
✗ 4. light travels slower in that medium than in vacuum

Q.26 The Millennium Development Goals (MDGs) aimed to reduce extreme poverty by which year?

Ans
✗ 1. 2008
✓ 2. 2015
✗ 3. 2005
✗ 4. 2014

Q.27 Which defect of vision occurs due to the weakening of ciliary muscles with age?

Ans
✗ 1. Astigmatism
✗ 2. Hypermetropia
✗ 3. Myopia
✓ 4. Presbyopia

Q.28 Which state of matter shows the highest expansion when temperature is increased?

Ans
✗ 1. Solids
✓ 2. Gases
✗ 3. Liquids
✗ 4. Plasma

Q.29 What is the primary function of the F4 key in MS Excel when editing a cell reference in a formula?

Ans
✗ 1. Opens the Find and Replace dialog
✓ 2. Toggles between absolute and relative references
✗ 3. Repeats the last action
✗ 4. Refreshes the worksheet

Q.30 The main use of chlorofluorocarbons is in _____.

Ans
- ✗ 1. smog
- ✗ 2. chimneys
- ✓ 3. refrigerants
- ✗ 4. vehicles

Q.31 Which of the following is the correct way to insert a new column in a spreadsheet?

Ans
- ✓ 1. Go to Home > Insert > Insert Sheet Columns.
- ✗ 2. Go to File > New > Column.
- ✗ 3. Use Ctrl + Z to insert a column.
- ✗ 4. Press Ctrl + X and then Insert.

Q.32 What is the shortcut key to start a slideshow from the beginning?

Ans
- ✓ 1. F5
- ✗ 2. Alt + Tab
- ✗ 3. Shift + F5
- ✗ 4. Ctrl + P

Q.33 Which of the following companies announced plans in February 2025 to construct the world's longest undersea cable, aiming to enhance internet connectivity across five continents, with landing points in India?

Ans
- ✗ 1. Amazon
- ✓ 2. Meta
- ✗ 3. Microsoft
- ✗ 4. Google

Q.34 What is India's global military ranking in the 2025 Global Firepower (GFP) index?

Ans
- ✗ 1. 5^{th}
- ✗ 2. 2^{nd}
- ✓ 3. 4^{th}
- ✗ 4. 3^{rd}

Q.35 What happens when an acid reacts with a metal oxide?

Ans
- ✗ 1. Only salt is formed.
- ✗ 2. A salt and hydrogen gas are formed.
- ✓ 3. A salt and water are formed.
- ✗ 4. Only water is formed.

Q.36 Dr. BR Ambedkar described which part of the Indian Constitution as its 'novel features', while Granville Austin referred to it as the 'Conscience of the Constitution'?

Ans
- ✓ 1. Directive Principles of State Policy
- ✗ 2. Fundamental Rights
- ✗ 3. Preamble
- ✗ 4. Fundamental Duties

Q.37 If an object is dropped from rest, what will be its velocity after 15 seconds? (g = 9.8 m/s^2)

Ans
- ✗ 1. 143 m/s
- ✗ 2. 149 m/s
- ✗ 3. 145 m/s
- ✓ 4. 147 m/s

Q.38 What happens when a computer is put into Sleep mode?

Ans

✗ 1. It shuts down completely.

✗ 2. It stores data on the hard drive and powers off.

✗ 3. It restarts automatically after a few minutes.

✓ 4. It keeps the session active in RAM while using minimal power.

Q.39 The glass panel used in greenhouses is known to retain _____.

Ans

✗ 1. humidity

✓ 2. heat

✗ 3. pH

✗ 4. rainfall

Q.40 Inertia depends on which property of an object?

Ans

✗ 1. Shape

✗ 2. Acceleration

✗ 3. Velocity

✓ 4. Mass

Q.41 The practice of Jhum cultivation is prevalent in the _____.

Ans

✗ 1. South west

✗ 2. North west

✓ 3. North east

✗ 4. South east

Q.42 Which of the following correctly explains why clothes dry faster on a windy day?

Ans

✗ 1. Wind decreases the temperature of the water molecules.

✓ 2. Wind removes the water vapour from the clothes' surroundings.

✗ 3. Wind increases the humidity around the clothes.

✗ 4. Wind reduces the surface area of the clothes.

Q.43 The maximum sound is generated _____.

Ans

✗ 1. from vehicular emissions

✗ 2. from house chimneys

✗ 3. from industrial smoke

✓ 4. by the take off of a jet plane

Q.44 Identify the correct formula for the compound formed between Mg^{2+} and PO_4^{3-} ions.

Ans

✗ 1. $Mg(PO_4)_3$

✓ 2. $Mg_3(PO_4)_2$

✗ 3. $Mg_2(PO_4)_3$

✗ 4. $MgPO_4$

Q.45 What was the main objective of the Extremists during the Indian National Movement?

Ans

✓ 1. To attain complete independence (Swaraj)

✗ 2. To promote British goods in India

✗ 3. To expand the legislative councils

✗ 4. To bring social reforms

Q.46 According to the Tendulkar methodology, what was the estimated percentage of people below the poverty line in rural areas in 2011-12?

Ans
- ✗ 1. 27.5%
- ✗ 2. 20%
- ✓ 3. 25.7%
- ✗ 4. 15.5%

Q.47 The Industrial Policy Resolution of 1956 categorised industries into how many groups?

Ans
- ✗ 1. Five
- ✓ 2. Three
- ✗ 3. Nine
- ✗ 4. Seven

Q.48 Which Article provides Ministers the right to participate in parliamentary proceedings but without voting rights?

Ans
- ✓ 1. Article 88
- ✗ 2. Article 78
- ✗ 3. Article 53
- ✗ 4. Article 77

Q.49 In an electric circuit, what is the correct way to connect an ammeter?

Ans
- ✗ 1. In either series or parallel
- ✗ 2. In parallel with the component
- ✓ 3. In series with the component
- ✗ 4. In parallel with the source

Q.50 Who among the following inaugurated the 38th National Games held in Dehradun in January 2025?

Ans
- ✓ 1. Narendra Modi
- ✗ 2. Pushkar Singh Dhami
- ✗ 3. Anurag Thakur
- ✗ 4. Droupadi Murmu

Section : **Technical Abilities**

Q.1 Which of the following is NOT a mechanical finishing process?

Ans
- ✗ 1. Burnishing
- ✓ 2. Pickling
- ✗ 3. Shot peening
- ✗ 4. Buffing

Q.2 Which of the following is used in organic coating as catalysts that speed up the cure reaction?

Ans
- ✗ 1. Colloidal stabilisers
- ✗ 2. UV stabilisers
- ✗ 3. Plasticisers
- ✓ 4. Cure additives

Q.3 **In a two-stroke petrol engine, which of the following best describes the sequence of events during an exhaust stroke?**

Ans
- ✔ 1. The exhaust port opens first, followed by the transfer port.
- ✘ 2. Both ports open simultaneously.
- ✘ 3. The transfer port opens first, followed by the exhaust port.
- ✘ 4. The exhaust port opens and closes before the transfer port opens.

Q.4 **Pressure head in a fluid system is best described as:**

Ans
- ✘ 1. the kinetic energy per unit weight of the fluid
- ✘ 2. the difference between absolute and gauge pressure
- ✔ 3. the height of a fluid column equivalent to the pressure exerted by the fluid
- ✘ 4. the rate of fluid flow per unit cross-sectional area

Q.5 **If torsional rigidity increases in the torsion equation, then the:**

Ans
- ✘ 1. angle of twist first increases then decreases
- ✔ 2. angle of twist decreases
- ✘ 3. angle of twist increases
- ✘ 4. angle of twist remains constant

Q.6 **Class ___ items are those that are 30-40% of all inventory items, and account for 30-40% of the total rupee consumption volume of the inventory. These are important, but not critical, and do NOT pose sourcing difficulties.**

Ans
- ✔ 1. B
- ✘ 2. C
- ✘ 3. X
- ✘ 4. A

Q.7 **Which of the following is the function of hose pipes in the gas welding process?**

Ans
- ✘ 1. Protects the eyes from harmful heat and ultraviolet rays
- ✔ 2. Supplies the gases from the pressure regulators
- ✘ 3. Mixes oxygen and acetylene in the correct proportion
- ✘ 4. Removes the oxide film and maintains a clean surface

Q.8 **What is the function of shielding gas in Gas Tungsten Arc Welding (GTAW)?**

Ans
- ✘ 1. Protects the consumable coated electrode and the molten metal weld pool from the atmospheric contamination
- ✔ 2. Protects the tungsten electrode and the molten metal weld pool from the atmospheric contamination
- ✘ 3. Removes the slag by striking and conducts current to pass through it
- ✘ 4. Protects the consumable bare electrode and the molten metal weld pool from the atmospheric contamination

Q.9 **In four-stroke diesel engine, which valves are closed during the expansion stroke?**

Ans
- ✘ 1. Only the exhaust valve
- ✘ 2. Neither inlet valve nor exhaust valve
- ✘ 3. Only the inlet valve
- ✔ 4. Both inlet and exhaust valves

Q.10 **What is the basic essential condition for coating material in hot dipping?**

Ans
- ✘ 1. It should have a higher melting point than the base metal.
- ✔ 2. It should form an alloy at the interface with the base metal.
- ✘ 3. It should completely evaporate during the process.
- ✘ 4. It should have lower wettability.

Q.11 Which of the following assumptions is essential for applying Bernoulli's theorem?

Ans

✔ 1. The flow is steady, incompressible and frictionless.

✘ 2. The fluid is viscous and incompressible.

✘ 3. The fluid has high compressibility.

✘ 4. The flow is turbulent and rotational.

Q.12 Identify the class A items as per the ABC analysis in inventory.

Ans

✘ 1. The next 15-25% account for 10-20% of the consumption

✘ 2. The balance 65-75% account for 70-80% of the consumption

✘ 3. The balance 65-75% account for 5-10% of the consumption

✔ 4. 10-20% of the items account for 70-80% of the consumption

Q.13 What is the number of divisions on the vernier scale of a Universal Bevel Protractor?

Ans

✘ 1. 46

✘ 2. 70

✘ 3. 60

✔ 4. 24

Q.14 A symmetrical T-section has its flange horizontal on top. Its dimensions are: Flange: Width = 100 mm, thickness = 24 mm; Web: Height = 84 mm, thickness = 20 mm. Its moment of inertia about a vertical axis through its centroid parallel to the web is (in mm^4):

Ans

✔ 1. 2056×10^3

✘ 2. 431×10^4

✘ 3. 451×10^4

✘ 4. 384,0000

Q.15 A symmetrical planar built-up section consists of two channel sections joined together at the tips of their flanges to form a closed rectangular area. The total width of each flange is 'B'. Each web is 'w' units deep inside, 'D' units deep at its outside (longer) face, and 'b' units thick. The moment of inertia of the composite section about its centroidal axis perpendicular to the webs is given by:

Ans

✘ 1. $\frac{BD^3}{12} - \frac{(B-b)w^3}{12}$

✘ 2. $\frac{BD^3}{12} - \frac{Bw^3}{3}$

✘ 3. $\frac{BD^3}{12} + \frac{(B-b)w^3}{3}$

✔ 4. $\frac{BD^3}{6} - \frac{(B-b)w^3}{6}$

Q.16 In an air standard cycle, heat addition is assumed to occur _____.

Ans

✔ 1. from an external constant high-temperature source

✘ 2. through internal combustion of fuel

✘ 3. by direct contact with a flame

✘ 4. from a combination of chemical reactions and external sources

Q.17 Which of the following movements of the grinding wheel is possible in a chucking-type internal grinder?

Ans

✘ 1. Only rotational movement

✘ 2. Only vibrational movement

✔ 3. Both rotational and reciprocating movement

✘ 4. Only reciprocating movement

Q.18 In which type of welding flame is oxygen proportion more compared to acetylene proportion?

Ans

✗ 1. Reducing welding flame

✗ 2. Carburising welding flame

✓ 3. Oxidising welding flame

✗ 4. Neutral welding flame

Q.19 What is the impact of effective preplanning on the economic efficiency of a manufacturing operation?

Ans

✓ 1. Prevention of the production of large uneconomic output

✗ 2. Increase in the complexity of the production process

✗ 3. Elimination of the need for any forecasting

✗ 4. Focus on the design of jigs and tools

Q.20 Given an annual usage value of 400 units, the procurement cost is ₹20 per order, cost per piece is ₹100 and cost of carrying inventory is 10%. Calculate the EOQ.

Ans

✗ 1. 60

✓ 2. 40

✗ 3. 30

✗ 4. 50

Q.21 According to the Principle of Resolution, the algebraic sum of the resolved parts of multiple forces in a given direction is equal to:

Ans

✗ 1. the difference between the largest and smallest force

✗ 2. the sum of all forces acting in that direction

✗ 3. the total magnitude of all forces combined

✓ 4. the resolved part of their resultant in the same direction

Q.22 The vaned diffuser in a centrifugal pump serves to:

Ans

✗ 1. accelerate the fluid

✗ 2. reduce cavitation by increasing turbulence

✗ 3. control the pump's rotational speed

✓ 4. convert kinetic energy into pressure energy

Q.23 What is the complete form of 'LVDT', one of the most popular electromechanical comparators?

Ans

✗ 1. Longitudinal variable differential transformer

✗ 2. Linear variable dimensional transformer

✓ 3. Linear variable differential transformer

✗ 4. Linear versatile differential transformer

Q.24 Despite having the highest possible efficiency for Carnot cycle, it is not suitable for a practical engine using a gaseous working fluid as:

Ans

✗ 1. the cycle requires very high pressures that are hard to manage

✗ 2. it is easy to maintain isothermal processes in practice

✓ 3. it is impossible to achieve perfectly reversible processes

✗ 4. the work output from the cycle is quite low

Q.25 Which of the following hardness scales uses a diamond cone indenter?

Ans

✗ 1. Mohs scale

✗ 2. Brinell scale

✗ 3. Vickers scale

✓ 4. Rockwell C scale

Q.26 The creep rate in a material increases when:

Ans
- ✔ 1. stress is increased
- ✘ 2. the temperature is decreased
- ✘ 3. the material is stretched
- ✘ 4. alloying elements are removed

Q.27 The work done by the load in stretching the bar is known as:

Ans
- ✔ 1. Strain Energy
- ✘ 2. Potential Energy
- ✘ 3. Kinetic Energy
- ✘ 4. Dislocation Energy

Q.28 In a dry sump lubrication system, how is oil returned to the storage tank?

Ans
- ✘ 1. Centrifugal force separates oil from air.
- ✔ 2. A scavenge pump actively pumps oil back.
- ✘ 3. Oil remains in the engine block indefinitely.
- ✘ 4. Gravity drains oil directly to the crankcase.

Q.29 What is meant by the resolution of a force?

Ans
- ✘ 1. Changing the direction of a force without altering magnitude
- ✘ 2. Combining multiple forces to form a single resultant
- ✔ 3. Splitting a force into components without changing its effect
- ✘ 4. Reducing the magnitude of a force in a given direction

Q.30 Atmospheric pressure is:

Ans
- ✔ 1. the pressure exerted by the Earth's atmosphere at any given point
- ✘ 2. the pressure difference between two fluids
- ✘ 3. the pressure inside a fluid container
- ✘ 4. the pressure of a vacuum

Q.31 Shielded Metal Arc Welding (SMAW) is also called _____.

Ans
- ✘ 1. Gas Tungsten Arc Welding
- ✘ 2. Tungsten Inert Gas Welding
- ✘ 3. Metal Inert Gas Welding
- ✔ 4. Manual Metal Arc Welding

Q.32 The main objective of the sequencing problem in production is to:

Ans
- ✘ 1. ignore the order of job processing
- ✘ 2. maximise the number of jobs processed
- ✘ 3. increase the processing time of jobs
- ✔ 4. minimise the idle time of machines

Q.33 A simply supported beam with a span length of 4 m carries a uniform load of intensity 5 N/m throughout its length. What will the value of the maximum bending moment (in N-m) in the beam be?

Ans
- ✔ 1. 10
- ✘ 2. 0
- ✘ 3. 20
- ✘ 4. 4

Q.34 What does the process of Principle of Arc welding involve?

Ans

✔ 1. Creating flow of electric current in the air gap between the electrode and the workpiece to melt the metal

✘ 2. Supplying oxygen and acetylene between the electrodes to melt the metal

✘ 3. Creating a chemical reaction between the electrode and the workpiece to melt the metal

✘ 4. Creating friction between the electrode and the workpiece to melt the metal

Q.35 For machining yellow metals and free-cutting steels, _____ is/are used as cutting fluids.

Ans

✔ 1. water soluble oils

✘ 2. germicides and water

✘ 3. water

✘ 4. insoluble oils

Q.36 Which of the following is NOT an angular measurement device?

Ans

✘ 1. Spirit Level

✘ 2. Autocollimator

✔ 3. Digital Micrometer

✘ 4. Sine Bar

Q.37 What distinguishes a semi-open impeller from an open impeller?

Ans

✘ 1. A semi-open impeller lacks any vanes.

✘ 2. A semi-open impeller has vanes on both sides.

✔ 3. A semi-open impeller has a partial shroud on one side.

✘ 4. A semi-open impeller is completely enclosed by a casing.

Q.38 Relative efficiency of an engine is defined as the ratio of:

Ans

✘ 1. mechanical efficiency to volumetric efficiency

✔ 2. actual thermal efficiency to air-standard efficiency

✘ 3. brake thermal efficiency to indicated thermal efficiency

✘ 4. actual thermal efficiency to Carnot efficiency

Q.39 Identify the milling cutter used for parting off operations or cutting thin slots.

Ans

✘ 1. Angle milling cutter

✘ 2. Plain milling cutter

✘ 3. Fly milling cutter

✔ 4. Metal slitting cutter

Q.40 What defines a black body in the context of thermal radiation?

Ans

✔ 1. An idealised object that absorbs all incident radiation and emits the maximum possible radiation at a given temperature

✘ 2. An object with perfect thermal insulation

✘ 3. A surface that reflects all incident radiation without absorption

✘ 4. A material that only emits visible light

Q.41 How is thermal efficiency defined in the context of internal combustion engines?

Ans

✘ 1. The ratio of indicated power to frictional power losses

✘ 2. The ratio of the engine displacement to the fuel mass used

✘ 3. The ratio of exhaust gas temperature to the intake air temperature

✔ 4. The ratio of useful work output to the total chemical energy input from fuel

Q.42 In drilling operations, a coolant is used to _____.

Ans

✗ 1. clean the drill bit

✓ 2. cool down the drill bit

✗ 3. reduce durability of drill bit

✗ 4. heat the drill bit

Q.43 A built-up section is made by joining two equal I-sections at the flanges at their outer faces so that the composite consists of one I-section above the other. The moment of inertia of each section through a centroidal axis parallel to the web is I_{yy}.
The moment of inertia of the composite built-up section about a similar axis is:

Ans

✗ 1. $\frac{I_{yy}}{2}$

✓ 2. $2I_{yy}$

✗ 3. $4I_{yy}$

✗ 4. I_{yy}

Q.44 _____ is/are the most widely used material for the broaches in a broaching operation.

Ans

✗ 1. Silver-copper combination

✗ 2. Copper

✗ 3. Metal matrix composites

✓ 4. High speed steel

Q.45 Why does cast iron have high compressive strength but low tensile strength?

Ans

✗ 1. Due to its elastic properties

✗ 2. Due to its high malleability

✗ 3. Due to its ductile nature

✓ 4. Due to the presence of graphite flakes

Q.46 Why is the concept of transmissibility of forces valid for a rigid body?

Ans

✓ 1. Because a rigid body does not deform under applied forces

✗ 2. Because a rigid body always has an infinite number of forces acting on it

✗ 3. Because forces always act in the direction of motion

✗ 4. Because internal forces in a rigid body do not exist

Q.47 Brazing is a process of _____ metals without melting the base metal.

Ans

✗ 1. cutting

✗ 2. melting

✗ 3. drilling

✓ 4. joining

Q.48 Specific volume of a fluid is the reciprocal of its _____.

Ans

✗ 1. surface tension

✗ 2. viscosity

✓ 3. mass density

✗ 4. dynamic viscosity

Q.49 In torch brazing, heat is produced by burning a mixture of _____.

Ans

✓ 1. oxy-acetylene gas

✗ 2. oxy-neon gas

✗ 3. oxy-nitrogen gas

✗ 4. oxy-hydrogen gas

Q.50 While measuring surface texture, the part of the profilometer that makes contact with the workpiece surface is _____.

Ans

✗ 1. a motorised mechanism

✓ 2. a finely pointed stylus

✗ 3. an electrical pickup

✗ 4. a recording unit

Q.51 Soldering is a _____ similar or dissimilar metals by heating them to a required temperature.

Ans

✗ 1. method of cooling

✓ 2. method of joining

✗ 3. method of boring

✗ 4. method of cutting

Q.52 Inventory control begins with _____ analysis, a fundamental supply chain activity frequently performed by inventory controllers and materials managers.

Ans

✗ 1. XYZ

✗ 2. VED

✓ 3. ABC

✗ 4. FSN

Q.53 In a battery or coil ignition system, what is the role of the ignition coil?

Ans

✗ 1. To compress the air entering the combustion chamber

✗ 2. To regulate the fuel injection timing

✗ 3. To control the engine's exhaust temperature

✓ 4. To transform the low battery voltage into a high voltage required for spark generation

Q.54 In a 'spirit-level device', to which point of the glass vial does the bubble always move?

Ans

✗ 1. Random point

✓ 2. Highest point

✗ 3. Middle point

✗ 4. Lowest point

Q.55 A bench mounted drilling machine is of the same type as a _____.

Ans

✓ 1. sensitive drilling machine

✗ 2. deep hole drilling machine

✗ 3. radial drilling machine

✗ 4. gang drilling machine

Q.56 Impact strength is usually measured in units of:

Ans

✓ 1. Joules

✗ 2. Newtons

✗ 3. Watts

✗ 4. Pascals

Q.57 Which of the following expressions can determine the longitudinal feed rate in "Through Feed Centreless Grinding"?
(If the diameter of the regulating wheel = D, r.p.m. of the regulating wheel = N, angle of inclination of the regulating wheel = θ)

Ans

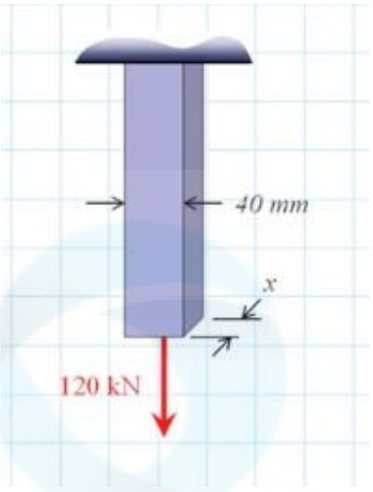
✓ 1. Longitudinal feed rate = Π x D x N x Sin (θ)

✗ 2. Longitudinal feed rate = [Π x D x N] / Sin (θ)

✗ 3. Longitudinal feed rate = Π x D x N x Cos (θ)

✗ 4. Longitudinal feed rate = [Π x D x N] / Cos (θ)

Q.58 **Determine the minimum thickness of the rectangular axial bar shown against yielding. Given Factor of Safety (FOS) = 2 and Yield stress = 310 MPa.**



Ans

✗ 1. 155 mm

✓ 2. 19.4 mm

✗ 3. 60 mm

✗ 4. 25 mm

Q.59 **What should be the included angle of the cutting tool used for machining metric threads in a thread-cutting operation?**

Ans

✗ 1. 45 degrees

✓ 2. 60 degrees

✗ 3. 75 degrees

✗ 4. 55 degrees

Q.60 **Which of the following wheels supports the workpiece in internal centreless grinding operation?**

Ans

✓ 1. Pressure roller, supporting roller and regulating wheel

✗ 2. Only pressure roller

✗ 3. Only supporting roller

✗ 4. Only regulating wheel

Q.61 **Among the following, which beam can be classified as a statically indeterminate beam?**

Ans

✓ 1. Fixed beam

✗ 2. Simply supported beam

✗ 3. Overhanging beam

✗ 4. Cantilever beam

Q.62 **What is the function of a shank in a broaching machine?**

Ans

✗ 1. Removes chips and coolant from the cutting area

✗ 2. Breaks up the chips generated during the broaching process

✗ 3. Holds the broach in place and gives it a rotary motion

✓ 4. Guides the broach through the material and maintains tool alignment

Q.63 **One design advantage of a single volute casing is that:**

Ans

✗ 1. it allows for multiple impeller stages

✗ 2. it provides balanced radial forces

✗ 3. it minimises hydraulic losses by equalising pressure distribution

✓ 4. it simplifies the manufacturing process

Q.64 What does the Polygon Law of Forces describe?

Ans

✗ 1. The equilibrium condition of multiple forces

✓ 2. The method to find the resultant of multiple forces

✗ 3. The interaction between two perpendicular forces

✗ 4. The force required to balance a single force

Q.65 The structured list of components and sub-assemblies needed to manufacture a final product is represented by the:

Ans

✗ 1. lead time

✗ 2. master file

✓ 3. bill of materials

✗ 4. components directory

Q.66 The overall efficiency of a pump is calculated by comparing:

Ans

✓ 1. the hydraulic power output to the mechanical power input

✗ 2. the volumetric flow rate to the pump casing size

✗ 3. the manometric head to the fluid velocity

✗ 4. the pump speed to the impeller diameter

Q.67 If two forces act at a right angle (90°), what will be the magnitude of their resultant force?

Ans

✓ 1. $R = \sqrt{F_1^2 + F_2^2}$

✗ 2. $R = F_1 - F_2$

✗ 3. $R = 2F_1F_2\cos\theta$

✗ 4. $R = F_1 + F_2$

Q.68 Two shafts, A and B, are of the same material. If the diameter of A is thrice the diameter of B, then the torque that can be transmitted by A will be:

Ans

✗ 1. 9 times that of B

✓ 2. 27 times that of B

✗ 3. 16 times that of B

✗ 4. 64 times that of B

Q.69 The power required to drive a pump is calculated by considering:

Ans

✗ 1. only the mechanical friction in the pump

✗ 2. the pump's weight

✓ 3. the work done in overcoming hydraulic losses and delivering the desired head

✗ 4. only the hydraulic power output

Q.70 Which of the following is an example of forced convection?

Ans

✗ 1. Heat transfer through a stationary fluid layer

✗ 2. Thermal energy transmitted by electromagnetic waves

✗ 3. Warm air naturally rising from a hot surface

✓ 4. Air blown over a car radiator by a fan

Q.71 Which of the following is a key advantage of CNC lathes in turning operations?

Ans

✓ 1. They provide higher automation and complex machining cycles.

✗ 2. They are limited to simple machining operations.

✗ 3. They are less accurate than conventional chucking machines.

✗ 4. They rely mainly on mechanical devices for control.

Q.72 Which area under the stress-strain curve represents the toughness of a material?

Ans
- ✔ 1. Total area under the curve
- ✘ 2. Area of plastic region
- ✘ 3. Area of elastic region
- ✘ 4. Slope of the elastic region

Q.73 In Submerged Arc Welding, _____ electrode is used in combination with a flux feeder tube.

Ans
- ✘ 1. non-consumable baked carbon
- ✘ 2. non-consumable tungsten
- ✘ 3. non-consumable graphite
- ✔ 4. consumable bare

Q.74 Which type of steel would be best suited for applications requiring both high strength and good corrosion resistance?

Ans
- ✘ 1. High-carbon steel
- ✘ 2. Low-alloy steel
- ✘ 3. Mild steel
- ✔ 4. Stainless steel

Q.75 What will be the value of the maximum absolute shear stress produced in a thin cylinder if hoop stress = 40 MPa and longitudinal stress = 20 MPa?

Ans
- ✘ 1. 10 MPa
- ✘ 2. 60 MPa
- ✘ 3. 30 MPa
- ✔ 4. 20 MPa

Q.76 What is a primary advantage of using an open impeller design?

Ans
- ✔ 1. Easier inspection and cleaning compared to closed impellers
- ✘ 2. Improved efficiency due to reduced flow separation
- ✘ 3. Higher pressure generation compared to radial flow pumps
- ✘ 4. Complete elimination of cavitation risks

Q.77 The Vickers hardness number (VHN) for a material with a 20 kg load and an average indentation diagonal of 0.3 mm is:

Ans
- ✘ 1. 78
- ✘ 2. 324
- ✘ 3. 115
- ✔ 4. 412

Q.78 Which of the following best describes the strength of mild steel compared to alloy steel?

Ans
- ✔ 1. Alloy steel generally has higher strength than mild steel.
- ✘ 2. Mild steel generally has higher strength than alloy steel.
- ✘ 3. Both mild steel and alloy steel have the same strength.
- ✘ 4. Mild steel is stronger in compression but weaker in tension than alloy steel.

Q.79 What is the typical behaviour of creep deformation in materials at very high temperatures (above 0.5 times the melting temperature)?

Ans
- ✔ 1. Material exhibits significant plastic deformation
- ✘ 2. Rapid deformation and fractures
- ✘ 3. Material becomes more brittle and fails instantly
- ✘ 4. Deformation in material is negligible

Q.80 **Which of the following is the correct sequence for the IS specification of any Grinding wheel?**

Ans

✗ 1. Abrasive used - Structure - Grade - Grit number - Bond Type

✗ 2. Abrasive used - Grit number - Structure - Grade - Bond Type

✓ 3. Abrasive used - Grit number - Grade - Structure - Bond Type

✗ 4. Abrasive used - Grade - Structure - Grit number - Bond Type

Q.81 **In a four-stroke cycle diesel engine, the intake valve starts to open at _____.**

Ans

✗ 1. 25° - 40° after BDC

✗ 2. 10° - 25° before TDC

✓ 3. 25° - 40° before BDC

✗ 4. 10° - 15° after TDC

Q.82 **In a profile projector, the magnified image of the workpiece is created by:**

Ans

✗ 1. mirrors

✗ 2. a Vernier micrometer

✓ 3. projection lens

✗ 4. condenser lens

Q.83 **A cantilever beam with a span length of L m carries a uniform moment of intensity 'M' N-m/m. Which of the following statements is correct?**

Ans

✗ 1. Shear force throughout the length will be M/L.

✗ 2. Shear force throughout the length will be ML.

✓ 3. Shear force throughout the length will be zero.

✗ 4. Shear force throughout the length will be ML/2.

Q.84 **The key step in making a dimensional measurement using a tool maker's microscope is _____.**

Ans

✓ 1. adjusting the focus on the workpiece

✗ 2. changing the objective lens power

✗ 3. aligning the cross-wires with the measurement points

✗ 4. viewing the magnified image

Q.85 **For a closed system undergoing a thermodynamic cycle, the first law states which of the following?**

Ans

✓ 1. Net work done equals net heat transfer.

✗ 2. Entropy always increases.

✗ 3. Pressure and temperature are inversely related.

✗ 4. Internal energy remains constant.

Q.86 **It is important for the piston to fit 'snugly' into the cylinder to:**

Ans

✗ 1. neither allow for easy movement nor provide a gas-tight space

✗ 2. provide a gas-tight space alone

✓ 3. both, allow for easy movement and provide a gas-tight space

✗ 4. allow for easy movement alone

Q.87 **What is the primary function of the headstock in a lathe machine?**

Ans

✗ 1. To provide support for cutting tools during operation

✗ 2. To adjust the feed mechanism for thread-cutting

✗ 3. To control the movement of the carriage and tailstock

✓ 4. To hold and rotate the workpiece at different speeds

Q.88 Which of the following is the correct rule when selecting a Grinding Wheel?

Ans

✗ 1. Close structure for ductile and soft material

✓ 2. Soft wheel for hard metal and hard wheel for soft metal

✗ 3. Hard wheel for hard metal and soft wheel for soft metal

✗ 4. Fine finish needs open structure

Q.89 Which of the following does NOT belong to assumptions in calculating EOQ in the basic inventory model?

Ans

✓ 1. Material cannot be supplied in variable quantities

✗ 2. Demand is continuous

✗ 3. Delivery of all items are instantaneous

✗ 4. Lead time is constant

Q.90 Which of the following is the primary element that supports the workpiece in centreless grinding?

Ans

✓ 1. Work rest blade

✗ 2. Stationary table

✗ 3. Work test blade

✗ 4. Pressure roller blade

Q.91 Which of the following does a cascade refrigeration system use?

Ans

✓ 1. Two or more refrigerants with different boiling points

✗ 2. A single refrigerant in both cycles

✗ 3. Only ammonia as a refrigerant

✗ 4. Only air as a working fluid

Q.92 For a thin planar ring of radius ‘r’ mm and thickness ‘t’ mm, its radius of gyration about the polar axis in mm is:

Ans

✓ 1. r

✗ 2. 2r

✗ 3. r/2

✗ 4. r/t

Q.93 In gas welding process, gas pressure regulators are employed for _____.

Ans

✓ 1. reducing the pressure of acetylene and oxygen gas from the cylinders to working pressure

✗ 2. igniting the welding torch

✗ 3. increasing the oxygen and acetylene mixture pressure

✗ 4. mixing oxygen and acetylene thoroughly

Q.94 Which welding process is NOT classified under arc welding processes?

Ans

✓ 1. Atomic Hydrogen Welding

✗ 2. Tungsten Inert Gas Welding

✗ 3. Stud Arc Welding

✗ 4. Electroslag Welding

Q.95 If a pump’s theoretical manometric head is 30 metres and its measured head is 27 metres, what is its manometric efficiency?

Ans

✗ 1. 75%

✗ 2. 85%

✓ 3. 90%

✗ 4. 80%

Q.96 **Intensity of radiation varies with the:**

Ans
- ✔ 1. inverse square of the distance
- ✘ 2. cube of the distance
- ✘ 3. fourth power of the distance
- ✘ 4. square of the distance

Q.97 **Which cooling method is used in full annealing?**

Ans
- ✘ 1. Quenching in water
- ✔ 2. Slow cooling inside a furnace
- ✘ 3. Cooling in an oil bath
- ✘ 4. Air cooling

Q.98 **In a modern optical measuring microscope, the 'cross-wires' are:**

Ans
- ✘ 1. located on the XY stage
- ✘ 2. located on the surface of the workpiece
- ✘ 3. located on the objective lens
- ✔ 4. etched on glass within the eyepiece

Q.99 **The sensing element in the Tomlinson Surface Meter is _____.**

Ans
- ✘ 1. the shoe
- ✔ 2. the stylus
- ✘ 3. rollers
- ✘ 4. springs

Q.100 **Which of the following is considered a primary output report from Material Requirements Planning?**

Ans
- ✘ 1. Exception reports
- ✘ 2. Performance control reports
- ✘ 3. Planning reports
- ✔ 4. Planned order schedule