रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD

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

Test Date	22/04/2025
Test Time	2:30 PM - 4:30 PM
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	**Why do covalent compounds generally have low melting and boiling points?**
Ans	✔ 1. They have weak intermolecular forces.
	✘ 2. They have strong electrostatic forces.
	✘ 3. They contain metallic bonds.
	✘ 4. They have a rigid lattice structure.

Q.2	**Which of the following was NOT an artisan guild during the Mauryan period?**
Ans	✘ 1. Bankers and Merchants
	✘ 2. Carpenters
	✔ 3. Astrologers
	✘ 4. Potters

Q.3	**Which operating system is known for its open-source nature and community-driven development for desktops and laptops?**
Ans	✘ 1. iOS
	✔ 2. Linux
	✘ 3. macOS
	✘ 4. Windows

Q.4	**An alloy is considered a homogeneous mixture because:**
Ans	✔ 1. it exhibits uniform composition throughout
	✘ 2. it contains two or more phases
	✘ 3. its components are chemically combined in fixed proportions
	✘ 4. its components can be separated by filtration

Q.5	**An object is placed 15 cm in front of a convex lens of focal length 25 cm. The image distance will be _____.**
Ans	✘ 1. 17.5 cm
	✔ 2. −37.5 cm
	✘ 3. −10.0 cm
	✘ 4. −9.37 cm

Q.6	Which of the following options is NOT a greenhouse gas?
Ans	✗ 1. Nitrous oxide
	✗ 2. Carbon dioxide
	✓ 3. Carbon tetrachloride
	✗ 4. Methane

Q.7	Who among the following referred to the Directive Principles as the 'life-giving provisions' of the Constitution of India?
Ans	✗ 1. Ivor Jennings
	✗ 2. BR Ambedkar
	✓ 3. LM Singhvi
	✗ 4. HM Seervai

Q.8	In January 2025, India launched the NVS-02 satellite to strengthen which of the following navigation systems?
Ans	✗ 1. Global Positioning System (GPS)
	✓ 2. Navigation with Indian Constellation (NavIC)
	✗ 3. Galileo
	✗ 4. Global Navigation Satellite System (GLONASS)

Q.9	Electricity production is categorised under which of the following economic sectors?
Ans	✓ 1. Secondary sector
	✗ 2. Tertiary sector
	✗ 3. Quaternary sector
	✗ 4. Primary sector

Q.10	Due to global warming, the temperature of the earth has increased by _____
Ans	✓ 1. 0.6°C
	✗ 2. 0.8°C
	✗ 3. 0.5°C
	✗ 4. 0.7°C

Q.11	The power to issue an ordinance when Parliament is NOT in session is given to the President under which Article?
Ans	✗ 1. Article 72
	✓ 2. Article 123
	✗ 3. Article 356
	✗ 4. Article 110

Q.12	In which of the following events did Deepthi Jeevanji set a world record at the 2024 World Para Athletics Championships?
Ans	✗ 1. 600 metres T20
	✓ 2. 400 metres T20
	✗ 3. 200 metres T20
	✗ 4. 100 metres T20

Q.13	In an aquatic ecosystem, the phenomenon of biomagnification can best be studied in the case of _____.
Ans	✔ 1. DDT
	✘ 2. chlorine
	✘ 3. phosphates
	✘ 4. organochlorine

Q.14	Radiations that are emitted from nuclear wastes are known to cause _____ at a high rate.
Ans	✘ 1. emotional defects
	✘ 2. diseases
	✔ 3. mutations
	✘ 4. syndromes

Q.15	Which type of RAM is faster and DOES NOT require refreshing?
Ans	✘ 1. DRAM
	✘ 2. ROM
	✘ 3. Flash Memory
	✔ 4. SRAM

Q.16	Which function key is used to move text or graphics in a document?
Ans	✘ 1. F5
	✔ 2. F2
	✘ 3. F12
	✘ 4. F1

Q.17	Where can one find the option to change a PowerPoint template?
Ans	✔ 1. Design → Themes
	✘ 2. Insert → Themes
	✘ 3. Home → Layout
	✘ 4. View → Slide Master

Q.18	The kinetic energy of an object is derived using which of the following equations of motion?
Ans	✘ 1. $s = ut + ½ at^2$
	✔ 2. $v^2 – u^2 = 2as$
	✘ 3. $a = (v – u) / t$
	✘ 4. $v = u + at$

Q.19	The people of _____ were famously involved in execution of the Chipko movement.
Ans	✔ 1. Garhwal Himalayas
	✘ 2. Gujarat
	✘ 3. Delhi
	✘ 4. Assam

Q.20	Which of the following will increase the heat produced by a heating element?
Ans	✔ 1. Increasing the current flowing through the wire
	✘ 2. Using a wire of lower resistance
	✘ 3. Using a material with high conductivity
	✘ 4. Decreasing the applied voltage

Q.21	The wavelength of ultraviolet radiations which is most powerful and causes damage to the DNA is _____.
Ans	✗ 1. UV-A
	✗ 2. UV-C
	✓ 3. UV-B
	✗ 4. UV-D

Q.22	Which of the following elements has an atomic number of 8?
Ans	✗ 1. Nitrogen
	✓ 2. Oxygen
	✗ 3. Carbon
	✗ 4. Hydrogen

Q.23	Which of the following bridges is constructed over the Brahmaputra River in India?
Ans	✗ 1. Mahatma Gandhi Setu
	✗ 2. Pamban Bridge
	✓ 3. Dhola-Sadiya Bridge
	✗ 4. Howrah Bridge

Q.24	The President has the power to dissolve which house of Parliament?
Ans	✓ 1. Lok Sabha only
	✗ 2. Both Rajya Sabha and Lok Sabha
	✗ 3. Legislative Assembly
	✗ 4. Rajya Sabha only

Q.25	Who among the following established the Bengal Chemical Swadeshi Stores?
Ans	✓ 1. Acharya PC Ray
	✗ 2. BG Tilak
	✗ 3. Dadabhai Naoroji
	✗ 4. Surendranath Banerjee

Q.26	A solution is prepared by dissolving 40 g of NaCl in 200 g of water. What is the mass per cent of NaCl in the solution?
Ans	✗ 1. 25%
	✓ 2. 16.67%
	✗ 3. 45%
	✗ 4. 20%

Q.27	Which country proposed the idea of holding a United Nations conference on human interactions with the environment in 1968?
Ans	✗ 1. United States
	✗ 2. France
	✓ 3. Sweden
	✗ 4. Canada

Q.28	A ball of mass 50 grams is moving with a velocity of 15 m/s. What is its kinetic energy?
Ans	✗ 1. 3.750 J
	✓ 2. 5.625 J
	✗ 3. 1.875 J
	✗ 4. 7.500 J

Q.29	What is the primary function of a computer firewall?
Ans	✗ 1. To store user passwords securely
	✗ 2. To speed up internet connectivity
	✓ 3. To prevent unauthorised access to a private network
	✗ 4. To detect and remove computer viruses

Q.30	A car moving at a constant speed of 123 km/hr along a straight road is an example of _____.
Ans	✓ 1. uniform motion
	✗ 2. random motion
	✗ 3. non-uniform motion
	✗ 4. rotational motion

Q.31	The main reason for which we are dependent on air is our _____.
Ans	✗ 1. excretion
	✓ 2. respiration
	✗ 3. digestion
	✗ 4. osmoregulation

Q.32	Which of the following MS Excel functions is used to convert a numeric value into a text with a specific format?
Ans	✗ 1. NUMBERTOTEXT()
	✓ 2. TEXT()
	✗ 3. VALUE()
	✗ 4. FORMAT()

Q.33	What does LAN stand for?
Ans	✓ 1. Local Area Network
	✗ 2. Limited Access Node
	✗ 3. Large Area Network
	✗ 4. Linked Access Network

Q.34	For the protection and improvement of the environmental quality, the Environment Protection Act came into force in the year _____.
Ans	✗ 1. 1984
	✓ 2. 1986
	✗ 3. 1972
	✗ 4. 1992

Q.35	Which German optical technology firm inaugurated its first Global Capability Centre in Bengaluru in November 2024, with plans to double its workforce within three years?
Ans	✗ 1. Schneider Kreuznach
	✗ 2. Leica
	✓ 3. Carl Zeiss AG
	✗ 4. Jenoptik

Q.36	A concave lens has a focal length of −2 cm. What is its power?
Ans	✗ 1. −0.5 D
	✗ 2. 25 D
	✓ 3. −50 D
	✗ 4. 0.5 D

Q.37	Who among the following developed the notation system for Hindustani classical music?	
Ans	✗ 1. Pandit Ravi Shankar	
	✗ 2. Ustad Amjad Ali Khan	
	✗ 3. Ustad Bismillah Khan	
	✓ 4. Pandit Vishnu Narayan Bhatkhande	

Q.38	What is the primary function of a firewall tool in a computer network?	
Ans	✗ 1. To store data securely	
	✗ 2. To detect and remove viruses	
	✓ 3. To monitor and control incoming and outgoing network traffic	
	✗ 4. To speed up internet connections	

Q.39	Who among the following Indian female cricketers won the Best International Cricketer Award (Women) at the BCCI Naman Awards 2025?	
Ans	✗ 1. Mithali Raj	
	✓ 2. Smriti Mandhana	
	✗ 3. Jhulan Goswami	
	✗ 4. Harmanpreet Kaur	

Q.40	A metal wire is stretched, but it does not break easily. This property is known as:	
Ans	✗ 1. brittleness	
	✓ 2. ductility	
	✗ 3. malleability	
	✗ 4. hardness	

Q.41	What is the general orientation of the Himalayan ranges in the northwestern part of India?	
Ans	✗ 1. South-North	
	✗ 2. East-South	
	✓ 3. Northwest to Southeast	
	✗ 4. Northeast to Southwest	

Q.42	The atomic mass of sulphur is 32 u, and sulphur exists as S_8 molecules. What is the molecular mass of sulphur?	
Ans	✗ 1. 128 u	
	✗ 2. 32 u	
	✗ 3. 64 u	
	✓ 4. 256 u	

Q.43	Which of the following is NOT a source of collection of municipal solid waste?	
Ans	✓ 1. Radioactive waste	
	✗ 2. Waste from schools	
	✗ 3. Waste from hospitals	
	✗ 4. Waste from homes	

Q.44	Who is known as the leader of the Green Revolution in India?	
Ans	✗ 1. Tribhuvandas Kishibhai Patel	
	✗ 2. C Subramaniam	
	✗ 3. Dr. Rajendra Prasad	
	✓ 4. Prof. MS Swaminathan	

Q.45	**Which formula should be entered in cell C2 to multiply the values of cells A2 and B2 in Excel?**
Ans	✗ 1. =MULTIPLY(A2,B2)
	✓ 2. =A2*B2
	✗ 3. =A2+B2
	✗ 4. =A2-B2

Q.46	**What happens to the pH of pure water when a few drops of lemon juice are added?**
Ans	✗ 1. The pH becomes neutral
	✓ 2. The pH decreases
	✗ 3. The pH remains the same
	✗ 4. The pH increases

Q.47	**A sound wave with a low frequency will have _____.**
Ans	✓ 1. a low pitch
	✗ 2. a low amplitude
	✗ 3. a short wavelength
	✗ 4. a high pitch

Q.48	**Which of the following is NOT toxic to non-target organisms in the soil?**
Ans	✗ 1. Herbicides
	✗ 2. Fungicides
	✓ 3. Organic fertilisers
	✗ 4. Pesticides

Q.49	**Which of the following correctly differentiates mixtures and compounds?**

Feature	Mixture	Compound
A) Separation	Can be separated by physical methods	Requires chemical me
B) Composition	Fixed ratio	Variable ratio
C) Properties	Always the same as constituents	Different from consti
D) Formation	By chemical reaction	By simple mixing

Ans	✗ 1. Option B (Composition) is correct
	✗ 2. Option D (Formation) is correct
	✓ 3. Option A (Separation) is correct
	✗ 4. Option C (Properties) is correct

Q.50	**What happens when you click on the 'Forward' button in an email?**
Ans	✗ 1. The email is permanently deleted.
	✗ 2. A blank email opens.
	✗ 3. The email is automatically sent to all contacts.
	✓ 4. The original message is copied into a new email draft.

Section : **Technical Abilities**

Q.1	**Which of the following materials is likely to have the highest thermal conductivity?**
Ans	✗ 1. Rubber
	✗ 2. Air
	✓ 3. Aluminium
	✗ 4. Wood

Q.2	**Which characteristic best describes an axial flow pump?**
Ans	✔ 1. The fluid flows parallel to the pump shaft.
	✘ 2. The fluid flows radially outward from the shaft.
	✘ 3. The fluid flows perpendicular to the pump shaft.
	✘ 4. The fluid flow is converted to heat energy.

Q.3	**Which of the following are used to improve pigment dispersion and the stability of coatings during organic coating?**
Ans	✔ 1. Colloidal stabilisers
	✘ 2. Pigment analyser
	✘ 3. Curing stabilisers
	✘ 4. Plasticisers

Q.4	**What is the primary function of the tool post in a lathe machine?**
Ans	✘ 1. To secure the workpiece firmly on the machine bed
	✘ 2. To control the feed rate and depth of cut during machining
	✔ 3. To hold and adjust the tool for a suitable working position
	✘ 4. To support the compound rest and provide rotational movement

Q.5	**The S-N curve in fatigue testing shows the relationship between:**
Ans	✘ 1. the number of cycles and strain amplitude
	✔ 2. the number of cycles and stress amplitude
	✘ 3. stress and strain
	✘ 4. stress and displacement

Q.6	**Slag inclusion is the welding defect caused by _____.**
Ans	✘ 1. gas being trapped, due to moisture
	✔ 2. insufficient cleaning and preparation of the base metal before welding commences
	✘ 3. contamination of either the filler or parent metals
	✘ 4. incorrect edge penetration

Q.7	**Tungsten Inert Gas Welding (TIG) is also called _____.**
Ans	✘ 1. Metal Inert Gas Welding
	✔ 2. Gas Tungsten Arc Welding
	✘ 3. Gas Metal Arc Welding
	✘ 4. Thermo-compression Welding

Q.8	**Which of the following centre-less grinding can be preferred for headed, stepped, or taper-shaped workpieces?**
Ans	✔ 1. Plunge cut grinding
	✘ 2. Taper out grinding
	✘ 3. Rotation feed center-less grinding
	✘ 4. Out feed grinding

Q.9	**Which statement best compares battery and magneto ignition systems in internal combustion engines?**
Ans	✘ 1. Magneto systems require more frequent maintenance than battery systems.
	✘ 2. Battery ignition systems are independent of engine speed, unlike magneto systems.
	✔ 3. Battery ignition systems rely on stored electrical energy, whereas magneto systems generate power on-demand via electromagnetic induction.
	✘ 4. Both systems depend on an external battery for operation.

Q.10	In brazing, the filler metal is drawn into the joint by means of _____.
Ans	✗ 1. friction
	✗ 2. damping action
	✓ 3. capillary action
	✗ 4. surface tension

Q.11	In Arc Welding Processes, GMAW stands for _____.
Ans	✓ 1. Gas Metal Arc Welding
	✗ 2. Gas Molten Arbour Welding
	✗ 3. Gas Molten Arc Welding
	✗ 4. Gang Metal Arc Welding

Q.12	Which type of light is generally used in the photo etching process?
Ans	✗ 1. Infrared (IR) light
	✗ 2. X-ray
	✗ 3. Visible light
	✓ 4. Ultraviolet (UV) light

Q.13	How is the resultant force calculated if two forces act along the same straight line but in opposite directions?
Ans	✗ 1. $R = F_1 + F_2$
	✗ 2. $R = \sqrt{F_1^2 + F_2^2}$
	✗ 3. $R = 2F_1F_2\cos\theta$
	✓ 4. $R = F_1 - F_2$

Q.14	The radius of gyration about the polar axis of a circular lamina of radius 0.2 m is:
Ans	✗ 1. 4.1 cm
	✓ 2. 0.14 m
	✗ 3. 0.1 m
	✗ 4. π cm

Q.15	The intake valve closes at _____ for a low-speed engine and at _____ for high-speed four-stroke petrol engines.
Ans	✗ 1. 60 deg after BDC; 10 deg after BDC
	✗ 2. 10 deg before BDC; 60 deg before BDC
	✗ 3. 60 deg before BDC; 10 deg before BDC
	✓ 4. 10 deg after BDC; 60 deg after BDC

Q.16	If the external diameter of a hollow shaft is three times greater than its internal diameter, what is the ratio of its torque-carrying capacity compared to that of a solid shaft of identical material and the same outer diameter?
Ans	✗ 1. 65/81
	✓ 2. 80/81
	✗ 3. 26/27
	✗ 4. 81/80

Q.17	**In which type of engine is a mist lubricating system most commonly used?**
Ans	✗ 1. Gas turbine engines
	✗ 2. Rotary engines
	✗ 3. Four-stroke diesel engines
	✓ 4. Two-stroke petrol engines

Q.18	**Which of the following is a common metrological application of interferometry?**
Ans	✗ 1. Determining surface hardness
	✗ 2. Analysing chemical composition
	✗ 3. Measuring temperature
	✓ 4. Inspecting machine parts for straightness

Q.19	**What does specific fuel consumption (SFC) measure in an internal combustion engine?**
Ans	✗ 1. The efficiency of the engine's exhaust system
	✗ 2. The total mass of the fuel used during engine operation
	✓ 3. The fuel efficiency expressed as the amount of fuel consumed per unit of power produced
	✗ 4. The ratio of air intake to fuel delivered per combustion cycle

Q.20	**The Zeroth Law of Thermodynamics establishes the basis for which of the following?**
Ans	✗ 1. Entropy increase in isolated systems
	✗ 2. Heat transfer through conduction
	✗ 3. Conservation of energy
	✓ 4. Measurement of temperature

Q.21	**A pump discharges water with a manometric head of 20 m. If the density of water is 1000 kg/m^3 and gravity is 9.81 m/s^2, what is the approximate pressure increase provided by the pump?**
Ans	✗ 1. 20 kPa
	✗ 2. 2 kPa
	✓ 3. 196 kPa
	✗ 4. 9.81 kPa

Q.22	**Broaching of outside surfaces is called _____.**
Ans	✗ 1. internal broaching
	✗ 2. hallow broaching
	✓ 3. surface broaching
	✗ 4. hole broaching

Q.23	**How many mirrors are used for magnification in the Zeiss Ultra-Optimeter?**
Ans	✗ 1. One
	✓ 2. Two
	✗ 3. Three
	✗ 4. Four

Q.24	**In most of the SI engines, the intake valve opens a few degrees before the TDC on the exhaust stroke to:**
Ans	✓ 1. allow for better scavenging of exhaust gases
	✗ 2. ensure that the intake valve is fully open when the piston reaches the TDC
	✗ 3. ensure complete combustion of the fuel-air mixture
	✗ 4. increase the engine's compression ratio

Q.25	**Which of the following is NOT a function of the spirit level measuring instrument?**
Ans	✔ 1. For measuring surface roughness
	✘ 2. For determining flatness and straightness
	✘ 3. For measuring angles
	✘ 4. For measuring alignment of machine parts

Q.26	**Electroplating is the opposite of which of the following?**
Ans	✘ 1. Electrolysis
	✘ 2. Battery charging
	✔ 3. Galvanic cell
	✘ 4. Fuel cell

Q.27	**The primary purpose of job rating or evaluation is to:**
Ans	✘ 1. provide benefits like leave and housing
	✘ 2. assess an employee's performance
	✘ 3. motivate employees for higher production
	✔ 4. determine the relative worth of different jobs

Q.28	**What is the primary function of the tailstock in a lathe?**
Ans	✘ 1. To change the direction of the spindle movement
	✔ 2. To provide support and bearing for the rotating job
	✘ 3. To hold the cutting tool for machining operations
	✘ 4. To control the speed of the spindle rotation

Q.29	**A pitot tube is primarily used to measure:**
Ans	✘ 1. dynamic pressure
	✘ 2. static pressure
	✘ 3. atmospheric pressure
	✔ 4. flow velocity

Q.30	**In rack and pinion gear, the rack is a _____ and the pinion is a _____.**
Ans	✘ 1. straight line gear; straight line gear
	✔ 2. straight line gear; circular wheel
	✘ 3. circular wheel; straight line gear
	✘ 4. circular wheel; circular wheel

Q.31	**Which of the following is a special case of a spirit-level device?**
Ans	✘ 1. Micrometer
	✔ 2. Clinometer
	✘ 3. Autocollimator
	✘ 4. Kelvinometer

Q.32	**Angle gauges are generally made from which material?**
Ans	✘ 1. Carbon fibre
	✔ 2. Hardened steel
	✘ 3. Wood
	✘ 4. Plastic

Q.33	**In which type of oxy-acetylene welding flames are both acetylene and oxygen in equal proportions?**
Ans	✔ 1. Neutral welding flame
	✘ 2. Oxidising welding flame
	✘ 3. Reducing welding flame
	✘ 4. Carburising welding flame

Q.34	**Which of the following types of steel would NOT typically undergo the normalising process?**
Ans	✘ 1. High-carbon steel
	✘ 2. Alloy steel
	✘ 3. Medium-carbon steel
	✔ 4. Stainless steel

Q.35	**Which of the following beams is classified as a statically determinate beam?**
Ans	✘ 1. Propped cantilever beam
	✘ 2. Continuous beam
	✔ 3. Overhanging beam
	✘ 4. Fixed beam

Q.36	**A gray body is defined as a body that:**
Ans	✘ 1. absorbs all radiation incident upon its surface
	✘ 2. reflects all radiation incident upon its surface
	✔ 3. has emissivity less than 1 but constant for all wavelengths
	✘ 4. has an emissivity that varies with wavelength of radiation

Q.37	**Fluid pressure is defined as:**
Ans	✔ 1. the force per unit area exerted by a fluid at rest
	✘ 2. the force acting parallel to a surface
	✘ 3. the weight of a fluid per unit volume
	✘ 4. the rate of the flow of fluid through a given area

Q.38	**What is the function of coolants in metal cutting or machining operation?**
Ans	✔ 1. Decreases adhesion between chip and tool
	✘ 2. Provides higher friction and wear between tool and workpiece
	✘ 3. Increases wear and tear of tools and decrease tool life
	✘ 4. Reduces machinability and machining forces

Q.39	**If elastic strength increases 3 times, then Proof Resilience:**
Ans	✘ 1. increases 3 times
	✘ 2. decreases 9 times
	✘ 3. decreases 3 times
	✔ 4. increases 9 times

Q.40	**In a two-stroke petrol engine, the primary function of the crankcase is to:**
Ans	✘ 1. house the transfer port
	✘ 2. store lubricating oil
	✘ 3. cool the engine
	✔ 4. act as a primary pumping chamber for the air-fuel mixture

Q.41	If a component has a Factor of Safety (FoS) of 1.0, what does it indicate?
Ans	✗ 1. The design is highly conservative.
	✗ 2. The component will never fail irrespective of any load.
	✗ 3. The design is unsafe and should not be designed.
	✓ 4. The material will fail exactly at the expected load.

Q.42	What will be the shape of the bending moment diagram for a cantilever beam carrying a uniformly distributed load throughout its length?
Ans	✗ 1. Cubical
	✗ 2. A straight line
	✓ 3. A parabola
	✗ 4. A hyperbola

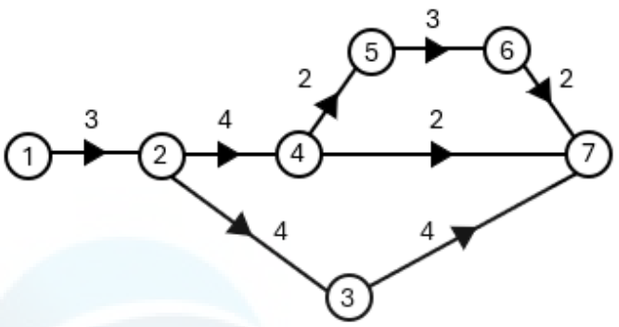
Q.43	The primary reason for diesel engines having more efficiency than gasoline engines is they _____.
Ans	✗ 1. have a longer stroke
	✓ 2. have a higher compression ratio
	✗ 3. use a different fuel
	✗ 4. operate at higher temperatures

Q.44	Which type of fracture is most likely to occur in a material with high tensile strength but low ductility?
Ans	✗ 1. Fatigue failure
	✗ 2. Ductile fracture
	✗ 3. Creep failure
	✓ 4. Brittle fracture

Q.45	In the _____ welding technique, the welding rod is applied before the welding torch in the direction of motion.
Ans	✓ 1. forehand
	✗ 2. backhand
	✗ 3. laser
	✗ 4. electric arc

Q.46	In climb milling, metal is removed by the cutter rotating in the _____.
Ans	✗ 1. opposite direction of the feed of the workpiece
	✗ 2. perpendicular direction of the feed of the workpiece
	✓ 3. same direction of the feed of the workpiece
	✗ 4. diagonal direction of the feed of the workpiece

Q.47	Identify the critical path from the given diagram.



Ans	✗ 1. 1-2-3-7
	✓ 2. 1-2-4-5-6-7
	✗ 3. 1-2-4-5-6
	✗ 4. 1-2-4-7

Q.48	Which of the following elements provides the necessary horizontal force to the workpiece in centerless grinding?
Ans	✓ 1. Regulating wheel
	✗ 2. Stationary wheel
	✗ 3. Work test blade
	✗ 4. Revolving wheel

Q.49	In the CPM technique, the critical path slack is:
Ans	✓ 1. zero
	✗ 2. negative
	✗ 3. either negative or zero
	✗ 4. positive

Q.50	If the temperature of a black body doubles, how many times will its emissive power increase?
Ans	✗ 1. 8 times
	✗ 2. 4 times
	✓ 3. 16 times
	✗ 4. 2 times

Q.51	Frictional power in an engine is calculated as:
Ans	✓ 1. Indicated power − Brake power
	✗ 2. Brake power / Mechanical efficiency
	✗ 3. Indicated power + Brake power
	✗ 4. Indicated power × Mechanical efficiency

Q.52	In carburising welding flame, there is a supply of _____ in the combustible mixture.
Ans	✗ 1. limited acetylene proportion and more oxygen proportion
	✗ 2. acetylene and oxygen in equal proportion
	✓ 3. more acetylene proportion and limited oxygen proportion
	✗ 4. only oxygen

Q.53	_____ type of electrode is used in Gas Tungsten Arc Welding (GTAW).
Ans	✔ 1. Non-consumable tungsten
	✘ 2. Consumable bare
	✘ 3. Consumable coated
	✘ 4. Non-consumable carbon

Q.54	Which alloying element in alloy steel is primarily responsible for enhancing corrosion resistance?
Ans	✔ 1. Chromium
	✘ 2. Manganese
	✘ 3. Silicon
	✘ 4. Carbon

Q.55	The type of lasers commonly used in laser interferometers for metrology applications are _____.
Ans	✘ 1. solid-state lasers
	✘ 2. dye lasers
	✔ 3. gas lasers
	✘ 4. excimer lasers

Q.56	In Carbon Arc Welding, DCSP stands for _____.
Ans	✘ 1. Direct current straight porosity
	✘ 2. Direct current straight pressure
	✔ 3. Direct current straight polarity
	✘ 4. Dual current straight polarity

Q.57	In Arc Welding process, chipping hammer is used to _____.
Ans	✘ 1. clean the surface to be welded
	✔ 2. remove the slag by striking
	✘ 3. protect the eyes
	✘ 4. hold the electrode manually and conducting current to it

Q.58	How does atmospheric pressure influence gauge pressure measurements?
Ans	✘ 1. Gauge pressure is independent of atmospheric pressure.
	✘ 2. Gauge pressure equals atmospheric pressure minus absolute pressure.
	✔ 3. Gauge pressure is the difference between absolute pressure and atmospheric pressure.
	✘ 4. Gauge pressure is the sum of absolute and atmospheric pressure.

Q.59	What is the full form of 'CBN', which is used as an abrasive in grinding processes?
Ans	✘ 1. Calcium bi nitrous
	✘ 2. Carbon boron nitrate
	✘ 3. Copper boron nitride
	✔ 4. Cubic boron nitride

Q.60	Drill chuck is the major part of drilling machines, which _____.
Ans	✘ 1. transmits rotary motion to the drill spindle at a number of speeds
	✘ 2. rests on the base and supports the head and the table
	✔ 3. holds the drill bit
	✘ 4. holds electric motor, V-pulleys and V-belt

Q.61	**While measuring surface texture, the part of the profilometer that makes contact with the workpiece surface is:**
Ans	✗ 1. an electrical pickup
	✓ 2. a finely pointed stylus
	✗ 3. a motorised mechanism
	✗ 4. a recording unit

Q.62	**What is a characteristic of a coplanar parallel force system?**
Ans	✗ 1. Forces act in different planes and are parallel.
	✗ 2. Forces act in the same plane but are not parallel.
	✗ 3. Forces act in different planes and are not parallel.
	✓ 4. Forces act in the same plane and are parallel.

Q.63	**Which of the following factors generally increases the brittleness of a material?**
Ans	✗ 1. High alloy content
	✓ 2. Low temperature
	✗ 3. High temperature
	✗ 4. High strain rate

Q.64	**A simply supported beam with a span length of 5 m carries a moment of 20 N-m (counterclockwise direction) at the middle of the beam. What will the value of reactions be at both the ends of the beam?**
Ans	✓ 1. 4 N, −4 N
	✗ 2. 8 N, −8 N
	✗ 3. 5 N, −5 N
	✗ 4. 2 N, −2 N

Q.65	**Why does stainless steel resist rusting, while regular carbon steel does not?**
Ans	✗ 1. Stainless steel has a thicker iron content.
	✓ 2. Stainless steel has a protective chromium oxide layer that prevents rusting.
	✗ 3. Stainless steel has higher carbon content which makes it corrosion resistant.
	✗ 4. Stainless steel is coated with a special anti-rust chemical.

Q.66	**A beam with a symmetrical T section has a top flange 50 mm wide and 20 mm thick, and a web 40 mm high and 10 mm thick. An additional plate, 10 mm thick and 60 mm wide, is welded above the flange. The moment of inertia of this symmetrical planar cross-section about an axis in its plane normal to the web and in line with the upper face of the 10 mm thick plate works out to 1506,666.66 mm^4. The centroidal axis of the combined area is 21.5 mm below this axis, normal to the web. The moment of inertia of this built-up area about the centroidal axis is (in mm^4):**
Ans	✗ 1. 2,17,833.34
	✗ 2. 70,077.52
	✓ 3. 5,82,166.66
	✗ 4. 1.33×10^5

Q.67	**In which of the following situations would brittleness be most UNDESIRABLE?**
Ans	✗ 1. In materials used in high-speed applications
	✓ 2. In tools that need to withstand heavy impact
	✗ 3. In structural beams under static load
	✗ 4. In materials exposed to high temperatures

Q.68	When two equal forces F act at an angle θ, the resultant force is given by which of the following expressions?
Ans	✗ 1. $R = 2F\sin\left(\frac{\theta}{2}\right)$
	✗ 2. $R = F_1 + F_2$
	✗ 3. $R = F_1 - F_2$
	✓ 4. $R = 2F\cos\left(\frac{\theta}{2}\right)$

Q.69	A symmetrical I-section has a moment of inertia about the centroidal axis in its plane perpendicular to the web, of 22.34 × 10^4 mm^4. The moment of inertia of the full rectangular area occupied by the I-beam cross section about this axis is 65 × 10^4 mm^4. The two empty spaces on either side of the web are square. What is the height of the web?
Ans	✗ 1. 50 mm
	✗ 2. 30 mm
	✗ 3. 55 mm
	✓ 4. 40 mm

Q.70	_____ is a welding defect caused by trapping of gas during the welding process.
Ans	✗ 1. Undercut
	✗ 2. Burn through
	✗ 3. Cracking
	✓ 4. Porosity

Q.71	Which of the following is a benefit of using Material Requirements Planning (MRP)?
Ans	✗ 1. Reduced customer service and satisfaction
	✗ 2. Increased raw material costs
	✓ 3. Better inventory planning and scheduling
	✗ 4. Slower response to market changes

Q.72	According to Maslow's Hierarchy of Needs, the basic requirements of the human body such as food, water, sleep, etc. are categorised into:
Ans	✓ 1. physiological needs
	✗ 2. esteem needs
	✗ 3. self-actualisation needs
	✗ 4. social needs

Q.73	Compared to axial flow pumps, radial flow pumps typically:
Ans	✓ 1. generate higher pressures with lower flow rates
	✗ 2. are used exclusively for pumping gases
	✗ 3. have lower efficiency in all applications
	✗ 4. produce higher flow rates at lower pressures

Q.74	An engine is assumed to be working on ideal Otto cycle with the temperatures at the beginning and end of compression as 27 °C and 327 °C. The air-standard efficiency of the engine is:
Ans	✗ 1. 87%
	✗ 2. 78%
	✗ 3. 60%
	✓ 4. 50%

Q.75	**Manometric head is defined as:**
Ans	✔ 1. the height of a fluid column corresponding to the pump's output pressure
	✘ 2. the weight of the pump
	✘ 3. the temperature difference across the pump
	✘ 4. the fluid velocity within the pump

Q.76	**Which of the following material has the highest compressive strength?**
Ans	✘ 1. Copper
	✘ 2. Mild Steel
	✘ 3. Rubber
	✔ 4. Cast Iron

Q.77	**Which of the following represents the polar modulus of the hollow shaft? [If Do = External diameter and Di = Internal diameter]**
Ans	✘ 1. [16Π/Do] [Do4 - Di4]
	✘ 2. [Π/16Do] [Do3 - Di3]
	✔ 3. [Π/16Do] [Do4 - Di4]
	✘ 4. [16/ΠDo] [Do4 - Di4]

Q.78	**While scheduling decisions, the most influencing parameter is:**
Ans	✘ 1. market research
	✔ 2. sales forecasting
	✘ 3. competitor pricing
	✘ 4. availability of skilled personnel

Q.79	**In an ideal four-stroke petrol engine, the assumption made about the burning process during the power stroke i.e. after compression is:**
Ans	✔ 1. It occurs instantaneously when the piston is at the top dead centre.
	✘ 2. It starts at the bottom dead centre and continues as the piston moves up.
	✘ 3. It is a gradual process that starts before the piston reaches top dead centre.
	✘ 4. It takes a significant amount of time.

Q.80	**In the Charpy impact test, the specimen is typically:**
Ans	✘ 1. a cylindrical rod with no defects
	✔ 2. a rectangular bar with a notch in the middle
	✘ 3. a sheet of material placed under compression
	✘ 4. subjected to a gradual tensile load

Q.81	**A steel bar (E = 200E = 200, α = 12 × 10 − 6/°C) expands by 0.3 mm due to a temperature increase. If the original length of the bar was 15 cm, what was the temperature rise?**
Ans	✔ 1. 166.6°C
	✘ 2. 100°C
	✘ 3. 180°C
	✘ 4. 120.6°C

Q.82	**What is the capability of a profilometer instrument?**
Ans	✘ 1. Measure surface waviness only
	✘ 2. Measure surface roughness only
	✘ 3. Measure surface flaws only
	✔ 4. Measure roughness together with waviness and any other surface flaws

Q.83	What will be the nature of longitudinal stress in a thin closed cylinder containing hydrostatic fluid pressure?
Ans	✗ 1. Bending
	✗ 2. Shear
	✗ 3. Compressive
	✓ 4. Tensile

Q.84	Which of the following happens when two equal and opposite forces are applied at a point on a rigid body?
Ans	✗ 1. They produce an additional force on the body.
	✗ 2. They create rotational motion in the body.
	✓ 3. They cancel each other and have no effect.
	✗ 4. They change the magnitude of the original force.

Q.85	One challenge associated with double volute casings is:
Ans	✓ 1. increased complexity in manufacturing and alignment
	✗ 2. higher risk of leakage due to multiple seams
	✗ 3. decreased efficiency in converting kinetic to pressure energy
	✗ 4. reduced flow rates

Q.86	To machine an internal hole in a broaching operation, the broach is gripped by the _____.
Ans	✓ 1. puller at the pilot
	✗ 2. puller at the face of the teeth
	✗ 3. puller at the flute
	✗ 4. puller at the shank end

Q.87	Which of the following is the surface coating process?
Ans	✗ 1. Tumbling
	✗ 2. Hot doping
	✓ 3. Hot dipping
	✗ 4. Pickling

Q.88	Which of the following is a limitation of taper turning by swiveling the compound rest?
Ans	✗ 1. It ensures the best surface finish.
	✓ 2. It is suitable only for short tapers.
	✗ 3. It provides high production efficiency.
	✗ 4. It cannot turn any type of taper.

Q.89	What is the designated function of a 'planetary internal grinder machine'?
Ans	✓ 1. For a work piece of irregular shape
	✗ 2. For a very small work piece
	✗ 3. For a work piece of regular shape
	✗ 4. For low precision surface finishes

Q.90	Which of the following processes produces the minimum surface roughness on workpieces?
Ans	✗ 1. Honing
	✓ 2. Superfinishing
	✗ 3. Grinding
	✗ 4. Lapping

Q.91	How does the volute shape in a single volute pump casing affect performance?
Ans	✔ 1. It helps maintain a uniform flow distribution.
	✘ 2. It increases turbulence within the pump.
	✘ 3. It restricts the pump's operating range.
	✘ 4. It serves only an aesthetic purpose.

Q.92	The factor considered for wage determination in the flat day rate basic wage incentive plan is:
Ans	✘ 1. individual performance
	✘ 2. number of pieces produced
	✘ 3. company profit
	✔ 4. hours worked

Q.93	Which of the following is an operational function that comes under pre-planning?
Ans	✘ 1. Dispatching
	✘ 2. Material planning and control
	✘ 3. Loading
	✔ 4. Forecasting

Q.94	The master production schedule represents the:
Ans	✘ 1. starting time of component manufacturing
	✘ 2. financial requirements for the production
	✔ 3. starting and finishing time of different products
	✘ 4. finishing time of component manufacturing

Q.95	Priming of a pump refers to:
Ans	✔ 1. removing air from the pump casing and suction line
	✘ 2. lubricating the pump bearings
	✘ 3. increasing the rotational speed of the pump
	✘ 4. adjusting the impeller clearance

Q.96	The primary purpose of a shadow projector is to _____.
Ans	✘ 1. detect internal flaws in a material
	✘ 2. analyse material composition
	✔ 3. produce an undistorted magnified reflected image of an object
	✘ 4. measure surface roughness

Q.97	The Bell-Coleman cycle is also known as:
Ans	✔ 1. Reversed Brayton cycle
	✘ 2. Brayton cycle
	✘ 3. Rankine cycle
	✘ 4. Carnot cycle

Q.98	**For a symmetrical T-section, the moment of inertia through centroidal axes in its plane parallel to the flange $I_{xx} = 2 \times 10^7$ mm^4, and perpendicular to the flange is $I_{yy} = 1.5 \times 10^7$ mm^4. The moment of inertia about the centroidal axis normal to the planar area works out to (in mm^4):**
Ans	✗ 1. 1.33×10^7
	✗ 2. 2.5×10^7
	✓ 3. 3.5×10^7
	✗ 4. 0.5×10^7

Q.99	**Which of the following best defines vapour pressure in a liquid?**
Ans	✓ 1. The pressure exerted by the vapour in equilibrium with its liquid at a given temperature
	✗ 2. The pressure exerted by the liquid molecules
	✗ 3. The pressure required to force the liquid into a capillary tube
	✗ 4. The difference between atmospheric pressure and absolute pressure

Q.100	**Which of the following options best describes non-coplanar concurrent forces?**
Ans	✓ 1. Forces that meet at one point but their lines of action do not lie on the same plane
	✗ 2. Forces that do not meet at one point and their lines of action lie on the same plane
	✗ 3. Forces that meet at one point and their lines of action lie on the same plane
	✗ 4. Forces that do not meet at one point but their lines of action lie on different planes