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 CMA

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

1. Options shown in green color with a tick icon are correct.
2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : **General Abilities**

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

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

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

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

Q.5	**Who among the following Indian female cricketers won the Best International Cricketer Award (Women) at the BCCI Naman Awards 2025?**
Ans	✘ 1. Jhulan Goswami
	✘ 2. Mithali Raj
	✘ 3. Harmanpreet Kaur
	✔ 4. Smriti Mandhana

Q.6	Which of the following elements has an atomic number of 8?
Ans	✔ 1. Oxygen
	✘ 2. Nitrogen
	✘ 3. Carbon
	✘ 4. Hydrogen

Q.7	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.8	Who among the following referred to the Directive Principles as the 'life-giving provisions' of the Constitution of India?
Ans	✘ 1. BR Ambedkar
	✔ 2. LM Singhvi
	✘ 3. Ivor Jennings
	✘ 4. HM Seervai

Q.9	Who among the following established the Bengal Chemical Swadeshi Stores?
Ans	✘ 1. Surendranath Banerjee
	✘ 2. Dadabhai Naoroji
	✔ 3. Acharya PC Ray
	✘ 4. BG Tilak

Q.10	The main reason for which we are dependent on air is our _____.
Ans	✘ 1. digestion
	✘ 2. osmoregulation
	✔ 3. respiration
	✘ 4. excretion

Q.11	A concave lens has a focal length of −2 cm. What is its power?
Ans	✘ 1. 0.5 D
	✔ 2. −50 D
	✘ 3. 25 D
	✘ 4. −0.5 D

Q.12	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.13	Due to global warming, the temperature of the earth has increased by _____
Ans	✘ 1. 0.8°C
	✘ 2. 0.5°C
	✘ 3. 0.7°C
	✔ 4. 0.6°C

Q.14	What does LAN stand for?
Ans	✗ 1. Large Area Network
	✗ 2. Limited Access Node
	✗ 3. Linked Access Network
	✓ 4. Local Area Network

Q.15	What happens when you click on the 'Forward' button in an email?
Ans	✗ 1. A blank email opens.
	✓ 2. The original message is copied into a new email draft.
	✗ 3. The email is automatically sent to all contacts.
	✗ 4. The email is permanently deleted.

Q.16	Radiations that are emitted from nuclear wastes are known to cause _____ at a high rate.
Ans	✓ 1. mutations
	✗ 2. diseases
	✗ 3. syndromes
	✗ 4. emotional defects

Q.17	Why do covalent compounds generally have low melting and boiling points?
Ans	✗ 1. They have a rigid lattice structure.
	✗ 2. They contain metallic bonds.
	✗ 3. They have strong electrostatic forces.
	✓ 4. They have weak intermolecular forces.

Q.18	For the protection and improvement of the environmental quality, the Environment Protection Act came into force in the year _____.
Ans	✗ 1. 1984
	✗ 2. 1972
	✗ 3. 1992
	✓ 4. 1986

Q.19	Which of the following bridges is constructed over the Brahmaputra River in India?
Ans	✗ 1. Pamban Bridge
	✗ 2. Howrah Bridge
	✗ 3. Mahatma Gandhi Setu
	✓ 4. Dhola-Sadiya Bridge

Q.20	Which of the following is NOT a source of collection of municipal solid waste?
Ans	✗ 1. Waste from hospitals
	✗ 2. Waste from schools
	✗ 3. Waste from homes
	✓ 4. Radioactive waste

Q.21	Who is known as the leader of the Green Revolution in India?
Ans	✗ 1. Tribhuvandas Kishibhai Patel
	✗ 2. Dr. Rajendra Prasad
	✗ 3. C Subramaniam
	✓ 4. Prof. MS Swaminathan

Q.22	The atomic mass of sulphur is 32 u, and sulphur exists as S_8 molecules. What is the molecular mass of sulphur?
Ans	✗ 1. 64 u
	✗ 2. 32 u
	✓ 3. 256 u
	✗ 4. 128 u

Q.23	Which of the following will increase the heat produced by a heating element?
Ans	✗ 1. Using a wire of lower resistance
	✗ 2. Using a material with high conductivity
	✗ 3. Decreasing the applied voltage
	✓ 4. Increasing the current flowing through the wire

Q.24	In an aquatic ecosystem, the phenomenon of biomagnification can best be studied in the case of _____.
Ans	✗ 1. phosphates
	✗ 2. organochlorine
	✓ 3. DDT
	✗ 4. chlorine

Q.25	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.26	A sound wave with a low frequency will have _____.
Ans	✗ 1. a low amplitude
	✓ 2. a low pitch
	✗ 3. a high pitch
	✗ 4. a short wavelength

Q.27	The kinetic energy of an object is derived using which of the following equations of motion?
Ans	✗ 1. $s = ut + \frac{1}{2} at^2$
	✗ 2. $v = u + at$
	✗ 3. $a = (v - u) / t$
	✓ 4. $v^2 - u^2 = 2as$

Q.28	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.29	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. Carl Zeiss AG
	✘ 2. Leica
	✘ 3. Jenoptik
	✘ 4. Schneider Kreuznach

Q.30	Which of the following was NOT an artisan guild during the Mauryan period?
Ans	✔ 1. Astrologers
	✘ 2. Bankers and Merchants
	✘ 3. Potters
	✘ 4. Carpenters

Q.31	Which type of RAM is faster and DOES NOT require refreshing?
Ans	✘ 1. ROM
	✘ 2. Flash Memory
	✘ 3. DRAM
	✔ 4. SRAM

Q.32	Electricity production is categorised under which of the following economic sectors?
Ans	✘ 1. Primary sector
	✘ 2. Tertiary sector
	✘ 3. Quaternary sector
	✔ 4. Secondary sector

Q.33	Which operating system is known for its open-source nature and community-driven development for desktops and laptops?
Ans	✔ 1. Linux
	✘ 2. Windows
	✘ 3. iOS
	✘ 4. macOS

Q.34	Which of the following MS Excel functions is used to convert a numeric value into a text with a specific format?
Ans	✔ 1. TEXT()
	✘ 2. FORMAT()
	✘ 3. NUMBERTOTEXT()
	✘ 4. VALUE()

Q.35	In which of the following events did Deepthi Jeevanji set a world record at the 2024 World Para Athletics Championships?
Ans	✘ 1. 200 metres T20
	✔ 2. 400 metres T20
	✘ 3. 100 metres T20
	✘ 4. 600 metres T20

Q.36	What is the primary function of a firewall tool in a computer network?
Ans	✘ 1. To speed up internet connections
	✔ 2. To monitor and control incoming and outgoing network traffic
	✘ 3. To store data securely
	✘ 4. To detect and remove viruses

Q.37	A ball of mass 50 grams is moving with a velocity of 15 m/s. What is its kinetic energy?
Ans	✔ 1. 5.625 J
	✘ 2. 7.500 J
	✘ 3. 1.875 J
	✘ 4. 3.750 J

Q.38	Which function key is used to move text or graphics in a document?
Ans	✘ 1. F1
	✘ 2. F12
	✘ 3. F5
	✔ 4. F2

Q.39	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.40	Which of the following is NOT toxic to non-target organisms in the soil?
Ans	✘ 1. Fungicides
	✘ 2. Herbicides
	✔ 3. Organic fertilisers
	✘ 4. Pesticides

Q.41	The power to issue an ordinance when Parliament is NOT in session is given to the President under which Article?
Ans	✔ 1. Article 123
	✘ 2. Article 356
	✘ 3. Article 72
	✘ 4. Article 110

Q.42	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. 20%
	✔ 2. 16.67%
	✘ 3. 45%
	✘ 4. 25%

Q.43	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-D
	✔ 4. UV-B

Q.44	The people of _____ were famously involved in execution of the Chipko movement.
Ans	✘ 1. Delhi
	✘ 2. Gujarat
	✘ 3. Assam
	✔ 4. Garhwal Himalayas

Q.45	An object is placed 15 cm in front of a convex lens of focal length 25 cm. The image distance will be _____.
Ans	✗ 1. −9.37 cm
	✗ 2. −10.0 cm
	✓ 3. −37.5 cm
	✗ 4. 17.5 cm

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

Q.47	Who among the following developed the notation system for Hindustani classical music?
Ans	✗ 1. Pandit Ravi Shankar
	✗ 2. Ustad Amjad Ali Khan
	✓ 3. Pandit Vishnu Narayan Bhatkhande
	✗ 4. Ustad Bismillah Khan

Q.48	The President has the power to dissolve which house of Parliament?
Ans	✗ 1. Rajya Sabha only
	✗ 2. Legislative Assembly
	✓ 3. Lok Sabha only
	✗ 4. Both Rajya Sabha and Lok Sabha

Q.49	A metal wire is stretched, but it does not break easily. This property is known as:
Ans	✗ 1. hardness
	✗ 2. malleability
	✓ 3. ductility
	✗ 4. brittleness

Q.50 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 C (Properties) is correct
✗ 2. Option B (Composition) is correct
✗ 3. Option D (Formation) is correct
✓ 4. Option A (Separation) is correct

Section : **Technical Abilities**

Q.1	Why are s-block elements highly reactive?
Ans	✗ 1. They have completely filled orbitals.
	✗ 2. They have low atomic size.
	✓ 3. They have low ionisation enthalpy.
	✗ 4. They have high ionisation enthalpy.

Q.2	Which of the following is a fundamental unit?
Ans	✔ 1. Kilogram (kg)
	✘ 2. Pascal (Pa)
	✘ 3. Joule (J)
	✘ 4. Newton (N)

Q.3	What does the Lewis symbol for an element represent?
Ans	✘ 1. The number of protons in an atom
	✘ 2. The total number of electrons in an atom
	✘ 3. The atomic mass of an element
	✔ 4. The valence electrons of an atom

Q.4	Three resistors of resistances 2, 4 and 8 ohms are connected in parallel. What is the equivalent resistance?
Ans	✘ 1. 3.1 ohms
	✔ 2. 1.1 ohms
	✘ 3. 0.4 ohms
	✘ 4. 2.3 ohms

Q.5	Which of the following is the correct unit of coefficient of thermal conductivity in terms of Watt (W), metre (m) and Kelvin (K)?
Ans	✘ 1. W^{-1} m K
	✘ 2. W m K
	✔ 3. W m^{-1} K^{-1}
	✘ 4. W m^{-1} K

Q.6	Which of the following correctly represents the relation between the number of free electrons n_e and number of holes n_h for an intrinsic semiconductors?
Ans	✘ 1. $n_e > n_h$
	✘ 2. $n_e < n_h$
	✔ 3. $n_e = n_h$
	✘ 4. $n_e = n_h^2$

Q.7	During electrolytic refining, which of the following occurs at the anode?
Ans	✔ 1. Oxidation of metal
	✘ 2. Reduction of metal
	✘ 3. Metal deposition
	✘ 4. Hydrogen gas formation

Q.8	In the chemical reaction ZnO + C → Zn + CO, ZnO is getting _____ and carbon is getting _____.
Ans	✘ 1. oxidised, oxidised
	✘ 2. reduced; reduced
	✘ 3. reduced; decomposed
	✔ 4. reduced; oxidised

Q.9	When a beam of 5.5 MeV α-particles emitted from a $^{214}_{83}Bi$ radioactive source is allowed to fall on a thin foil of gold of thickness 2.1×10^{-7} m, then what percentage of an incident α-particles scatter by more than 1°.
Ans	✗ 1. 0.014%
	✗ 2. 14.0%
	✗ 3. 1.4%
	✓ 4. 0.14%

Q.10	Which of the following is a major cause of eutrophication in water bodies?
Ans	✗ 1. Excessive use of pesticides in agriculture
	✓ 2. High concentration of phosphates and nitrates
	✗ 3. Presence of dissolved oxygen in water
	✗ 4. Dumping of heavy metals into rivers

Q.11	In longitudinal waves, which of the following options describes the direction of motion of the particles of the medium through which the wave is propagating?
Ans	✗ 1. No motion of the particle
	✓ 2. Move in a direction parallel to the direction of propagation
	✗ 3. Move in random directions
	✗ 4. Up and down about their mean position

Q.12	Which natural indicator turns dark pink in an acidic solution and green in a basic solution?
Ans	✗ 1. Turmeric
	✗ 2. Litmus
	✓ 3. China rose (Hibiscus)
	✗ 4. Methyl orange

Q.13	A nucleus $^{A}_{Z}X$ undergoes beta minus (β^-) decay. What will happen to the atomic number of $^{A}_{Z}X$?
Ans	✗ 1. It will increase by 2.
	✗ 2. It will decrease by 2.
	✗ 3. It will remain unchanged.
	✓ 4. It will increase by 1.

Q.14	Newton per coulomb is the SI unit of _____.
Ans	✗ 1. magnetic field
	✗ 2. magnetic potential
	✗ 3. electric potential
	✓ 4. electric field

Q.15	Which of the following laws explains the relationship between the pressure and solubility of a gas in a liquid?
Ans	✗ 1. Charles' Law
	✗ 2. Raoult's Law
	✗ 3. Avogadro's Law
	✓ 4. Henry's Law

Q.16	As per the Bohr's second postulate, the electrons can revolve around a nucleus in only those orbits for which the angular momentum is an integral multiple of _____.
Ans	✗ 1. $\frac{2h}{\pi}$
	✗ 2. $\frac{2\pi}{h}$
	✗ 3. $2\pi h$
	✓ 4. $\frac{h}{2\pi}$

Q.17	A solution turns blue litmus paper red. What does this indicate about the ions present in the solution?
Ans	✗ 1. The solution contains no ions at all.
	✗ 2. The solution contains equal amounts of H^+ and OH^- ions.
	✓ 3. The solution contains more H^+ ions than OH^- ions.
	✗ 4. The solution contains more OH^- ions than H^+ ions.

Q.18	Which method is used to separate iron-rich minerals like magnetite from unwanted materials?
Ans	✓ 1. Using a magnet to attract the mineral
	✗ 2. Using water to wash away lighter materials
	✗ 3. Using bubbles to lift the mineral
	✗ 4. Dissolving the mineral in a liquid

Q.19	Which of the following statements is NOT true regarding infrared waves?
Ans	✗ 1. They are used in physical therapy.
	✗ 2. These rays are also referred as heat waves.
	✗ 3. They are help in maintaining the average temperature of the Earth.
	✓ 4. They have wavelength much less than 700 nm.

Q.20	Identify whether the given statements are true or false. Statement-I: The word 'stoichiometry' is derived from two Greek words — stoicheion (meaning, element) and metron (meaning, measure). Statement-II: Stoichiometry, thus, deals with the calculation of masses (sometimes volumes also) of the reactants and the products involved in a chemical reaction.
Ans	✗ 1. Statement-I is false but Statement-II is true.
	✗ 2. Both the statements are false.
	✗ 3. Statement-I is true but Statement-II is false.
	✓ 4. Both the statements are true.

Q.21	Select the molecules where all bonds are single covalent bonds from the given list. O_2, N_2, CH_4, CO_2, NH_3
Ans	✓ 1. NH_3 and CH_4
	✗ 2. O_2 and CH_4
	✗ 3. CO_2, CH_4 and NH_3
	✗ 4. N_2 and NH_3

Q.22	What will be the energy gained by an electron when it has been accelerated by a potential difference of 1 volt?
Ans	✗ 1. 1.602×10^{-16} J
	✓ 2. 1.602×10^{-19} J
	✗ 3. 1.602×10^{16} J
	✗ 4. 1.602×10^{19} J

Q.23	Which of the following is a major source of pathogenic water pollution?
Ans	✗ 1. Industrial waste
	✗ 2. Heavy metals from factories
	✗ 3. Agricultural runoff
	✓ 4. Domestic sewage and animal excreta

Q.24	Which of the following reactions is used for the industrial preparation of sodium hydroxide?
Ans	✗ 1. Heating sodium carbonate with calcium hydroxide
	✗ 2. Reaction of sodium with water
	✓ 3. Electrolysis of sodium chloride solution
	✗ 4. Decomposition of sodium bicarbonate

Q.25	Which of the following relations is correct for the actual frequency v_0 and the apparent frequency v of a sound wave as observed by a stationary observer when the source of sound wave is moving towards the observer with velocity v_S? Take the actual velocity of the sound wave in the medium as v.
Ans	✗ 1. $\upsilon = \upsilon_0\left(1+\frac{v}{v_s}\right)$
	✗ 2. $\upsilon = \upsilon_0\left(1+\frac{v_s}{v}\right)$
	✗ 3. $\upsilon_0 = \upsilon\left(1+\frac{v_s}{v}\right)$
	✓ 4. $\upsilon_0 = \upsilon\left(1-\frac{v_s}{v}\right)$

Q.26	Which of the following statements about washing soda (Na2CO3·10H2O) are correct? Statement 1: Washing soda is obtained from sodium hydroxide. Statement 2: It is used to remove permanent hardness of water. Statement 3: Washing soda is a hydrated salt.
Ans	✗ 1. All statements are correct.
	✗ 2. Only Statements 1 and 3 are correct.
	✗ 3. Only Statements 1 and 2 are correct.
	✓ 4. Only Statements 2 and 3 are correct.

Q.27	Identify the INCORRECT pair from the following options.
Ans	✗ 1. Cyclopropane - homocyclic
	✗ 2. Tetrahydrofuran - heterocyclic
	✗ 3. Aniline - aromatic
	✓ 4. Thiophene - homocyclic

Q.28	A paper weight is kept on a tabletop. The mass of paper weight is 0.5 kg and its dimensions are 10 cm × 4 cm × 2 cm. Find the pressure exerted by the paper weight on the table top if it is made to lie on the table top with its sides of dimensions 10 cm × 2 cm. (Take g = 9.8 m/s^2)
Ans	✗ 1. 612.5 Nm^{-2}
	✗ 2. 2420 Nm^{-2}
	✓ 3. 2450 Nm^{-2}
	✗ 4. 49 Nm^{-2}

Q.29	A body is projected with a velocity $\vec{u} = 3\hat{i} + 4\hat{j}$ with respect to ground. At the highest point of motion of the body, what will be the magnitude of the vertical component of the velocity.
Ans	✗ 1. 4 m/s
	✓ 2. 0 m/s
	✗ 3. 5 m/s
	✗ 4. 3 m/s

Q.30	Identify the correct option in which the heat required to warm a given substance does not depend.
Ans	✗ 1. Change in temperature
	✓ 2. Atmospheric pressure
	✗ 3. Nature of the substance
	✗ 4. Mass of the substance

Q.31	What is the nature of the magnetic field at the centre of a current-carrying circular loop?
Ans	✓ 1. Straight lines
	✗ 2. Concentric circles
	✗ 3. Zig-zag pattern
	✗ 4. Radial lines

Q.32	What will be the energy gained by an electron with charge q = 1.6×10^{-19} C, when accelerated through a potential difference (ΔV) = 1 volt?
Ans	✗ 1. 1.6×10^{19} J
	✓ 2. 1.6×10^{-19} J
	✗ 3. 10^{-19} J
	✗ 4. 10^{19} J

Q.33	Which of the following is the correct pair of a physical quantity and its SI unit?
Ans	✗ 1. Force - dyne
	✗ 2. Power - kilowatt
	✓ 3. Pressure - Pascal
	✗ 4. Energy - ergs

Q.34	The mass of a body is 'X' kg on the surface of the Earth. What will be the weight of this body (in newton) on the surface of the Earth? (Take the value of g on Earth as 10 m/s^2)
Ans	✗ 1. X/10
	✗ 2. X
	✗ 3. X/5
	✓ 4. 10X

Q.35	The relation between displacement (X) of a particle and time (t) is given by the following equation: $X = At + Bt^2$. What will be the dimensions of A/B, if the equation is dimensionally correct?
Ans	✔ 1. [T]
	✘ 2. $[T^3]$
	✘ 3. $[T^{-3}]$
	✘ 4. $[T^{-1}]$

Q.36	Beyond the breakdown voltage, the current in a Zener diode _____.
Ans	✔ 1. changes by a large amount for a small change in voltage
	✘ 2. increases linearly with voltage
	✘ 3. is completely independent of voltage
	✘ 4. remains constant with voltage

Q.37	What determines the shape of a molecule like CH_4?
Ans	✘ 1. The number of atoms in the molecule
	✔ 2. The overlap of atomic orbitals
	✘ 3. The temperature at which the molecule is formed
	✘ 4. The ionisation energy of atoms

Q.38	Which property is common to both mixtures and compounds?
Ans	✔ 1. Made of two or more substances
	✘ 2. Fixed composition
	✘ 3. Physically separated into components
	✘ 4. Homogeneous nature

Q.39	Why is it difficult to determine the exact position and velocity of an electron simultaneously?
Ans	✘ 1. Electrons move at extremely high speeds in all directions.
	✔ 2. Measuring one property affects the accuracy of the other.
	✘ 3. Electrons do not follow the basic laws of physics.
	✘ 4. Electrons are very small and cannot be detected easily.

Q.40	Which of the following is a real-life example of a neutralisation reaction?
Ans	✘ 1. Mixing salt in water to make a saline solution
	✔ 2. Adding baking soda to vinegar in a volcano experiment
	✘ 3. Dissolving sugar in tea
	✘ 4. Heating lemon juice to concentrate its acidity

Q.41	Which of the following equations correctly represents the Ampere's circuital law?
Ans	✘ 1. $\oint \vec{B} \cdot \vec{dl} = \frac{\mu_0}{I}$
	✘ 2. $\oint \vec{B} \cdot \vec{dl} = \mu_0 I^2$
	✔ 3. $\oint \vec{B} \cdot \vec{dl} = \mu_0 I$
	✘ 4. $\oint \vec{B} \cdot \vec{dl} = 2\mu_0 I$

Q.42	According to Planck's quantum theory, energy is emitted or absorbed in:
Ans	✗ 1. random energy bursts
	✓ 2. discrete packets called quanta
	✗ 3. infinite energy levels
	✗ 4. continuous waves

Q.43	Which of the following statement(s) is/are true regarding the boiling point of a liquid? (i) The temperature at which the liquid and the vapour states of the substance coexist is called its boiling point. (ii) The temperature at which the liquid and the solid states of the substance coexist is called its boiling point. (iii) The boiling point for water is 273 K.
Ans	✗ 1. Both (ii) and (iii)
	✗ 2. Both (i) and (iii)
	✓ 3. Only (i)
	✗ 4. Only (ii)

Q.44	What is the principal quantum number (n) of the ground state of a hydrogen atom?
Ans	✓ 1. n = 1
	✗ 2. n = 2
	✗ 3. n = 3
	✗ 4. n = 0

Q.45	For all angles of incidence greater than the critical angle, the wave will undergo what is known as total internal reflection. Which of the following is the correct formula for the critical angle? (where $n_1 = \frac{\text{Speed of light in vacuum}}{\text{Speed of light in first medium}}$ and $n_2 = \frac{\text{Speed of light in vacuum}}{\text{Speed of light in second medium}}$ and n_1 is greater than n_2)
Ans	✓ 1. $\sin i_c = \frac{n_2}{n_1}$
	✗ 2. $\tan i_c = \frac{n_2}{n_1}$
	✗ 3. $\tan i_c = \frac{n_1}{n_2}$
	✗ 4. $\sin i_c = \frac{n_1}{n_2}$

Q.46	Which of following statement(s) is/are true? i. A mixture contains particles of two or more pure substances, which may be present in it in any ratio. ii. Sugar solution and air are the examples of homogeneous mixtures. iii. Mixtures of salt and sugar, grains and pulses along with some dirt (often stones), are heterogeneous mixtures.
Ans	✓ 1. i, ii and iii
	✗ 2. ii and iii only
	✗ 3. i and iii only
	✗ 4. i and ii only

Q.47	What is the ratio of the total energy of the second excited state to that of the third excited state in a hydrogen atom?
Ans	✗ 1. 9/16
	✗ 2. 9/4
	✓ 3. 16/9
	✗ 4. 4/9

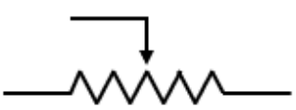
Q.48	The corrosion of silver, copper and iron articles will produce _____, respectively.
Ans	✗ 1. silver sulphide, copper sulphide and iron oxide
	✗ 2. silver carbonate, copper carbonate and iron oxide
	✗ 3. silver oxide, copper carbonate and iron carbonate
	✓ 4. silver sulphide, copper carbonate and iron oxide

Q.49	A packet of potato chips contains nitrogen gas. Why is nitrogen gas used instead of oxygen?
Ans	✗ 1. Nitrogen enhances the taste of chips.
	✓ 2. Nitrogen prevents oxidation and rancidity.
	✗ 3. Oxygen is toxic for packaged food.
	✗ 4. Nitrogen is lighter than oxygen.

Q.50	Which of the following statements is INCORRECT regarding the structure of benzene?
Ans	✗ 1. It has six carbon-hydrogen single bonds.
	✓ 2. It has six carbon-carbon single bonds.
	✗ 3. It has six carbon atoms in a ring, each bonded to one hydrogen atom.
	✗ 4. It is an unsaturated cyclic hydrocarbon.

Q.51	Zinc is extracted from zinc sulphide (ZnS) by first converting it into zinc oxide (ZnO). This is done by:
Ans	✗ 1. dissolving ZnS in acid
	✗ 2. direct electrolysis of ZnS
	✗ 3. heating ZnS in the absence of air
	✓ 4. heating ZnS in the presence of air

Q.52	A _____ pitch sound corresponds to more number of compressions and rarefactions passing a fixed point per unit time.
Ans	✗ 1. low
	✗ 2. high and low
	✓ 3. high
	✗ 4. zero

Q.53	What is the correct name and function of the device represented by the given symbol? 
Ans	✗ 1. Ammeter; used for measuring current flowing through a circuit.
	✓ 2. Rheostat; used for varying the current flowing through a circuit.
	✗ 3. Switch; used for connecting and disconnecting the circuit.
	✗ 4. Battery; used for providing potential difference.

Q.54	The earth's crust has only _____ carbon in the form of minerals (like carbonates, hydrogen carbonates, coal and petroleum).
Ans	✗ 1. 2%
	✗ 2. 0.2%
	✗ 3. 20%
	✓ 4. 0.02%

Q.55	Which of the following statements is/are true? i. In elements, in the free or the uncombined state, each atom bears an oxidation number of zero. ii. For ions composed of only one atom, the oxidation number is equal to the charge on the ion. iii. In all its compounds, fluorine has an oxidation number of −1. iv. The algebraic sum of the oxidation number of all the atoms in a compound must be zero.
Ans	✗ 1. Only i and ii
	✗ 2. Only i, iii and iv
	✓ 3. i, ii, iii and iv
	✗ 4. Only i, ii and iii

Q.56	What will be the conventional direction of electric current flowing through an electric circuit?
Ans	✗ 1. Does not depend on the direction of the flow of electrons
	✗ 2. Perpendicular to the direction of the flow of electrons
	✗ 3. In the direction of the flow of electrons
	✓ 4. Opposite to the direction of the flow of electrons

Q.57	Which property of nylon makes it suitable for making ropes and fibres?
Ans	✓ 1. High tensile strength
	✗ 2. Low melting point
	✗ 3. High water absorption
	✗ 4. Brittle nature

Q.58	Identify whether the given statements are true or false. Statement-I: An H-bond in case of HF molecule, alcohol or water molecules is an intermolecular hydrogen bond. Statement-II: There is an intramolecular hydrogen bonding in an o-nitrophenol molecule.
Ans	✗ 1. Statement-I is true but Statement-II is false.
	✓ 2. Both the statements are true.
	✗ 3. Statement-I is false but Statement-II is true.
	✗ 4. Both the statements are false.

Q.59	Given below are two statements. Read the statements carefully and select the correct option. Statement I: Many metals, such as copper, zinc, tin, nickel, silver and gold, are refined electrolytically. Statement II: In Electrolytic Refining, the impure metal is made the anode and a thin strip of pure metal is made the cathode.
Ans	✓ 1. Both Statements I and II are true.
	✗ 2. Statement I is true but Statement II is false.
	✗ 3. Statement I is false but Statement II is true.
	✗ 4. Both Statements I and II are false.

Q.60	A car is moving in a straight line from city A to city B then city C. Let the distance between city A to B is 240 km and between city A and C is 320 km. The car moves from A to C in 6 hrs and back to B from C in 2 hrs. What will be the average velocity of the car?
Ans	✔ 1. 30 km/hr
	✘ 2. 40 km/hr
	✘ 3. 53.66 km/hr
	✘ 4. 50 km/hr

Q.61	What does the pattern formed by iron filings around a magnet demonstrate?
Ans	✘ 1. The presence of an electric field around the magnet
	✘ 2. The effect of friction on iron filings
	✘ 3. The presence of gravitational force
	✔ 4. The presence of a magnetic field around the magnet

Q.62	Which of the following equations correctly defines the input resistance of the common emitter junction transistor?
Ans	✘ 1. $r_i = \frac{\Delta V_{CE}}{\Delta I_E}$ at constant V_{BE}
	✘ 2. $r_i = \frac{\Delta V_{CE}}{\Delta I_B}$ at constant V_{BE}
	✔ 3. $r_i = \frac{\Delta V_{BE}}{\Delta I_B}$ at constant V_{CE}
	✘ 4. $r_i = \frac{\Delta V_{BE}}{\Delta I_E}$ at constant V_{CE}

Q.63	Which of the following properties are usually shown by metals? i. They have a lustre (shine). ii. They conduct heat and electricity. iii. They are malleable (can be hammered into thin sheets).
Ans	✘ 1. i and iii only
	✘ 2. i and ii only
	✘ 3. ii and iii only
	✔ 4. i, ii and iii

Q.64	Rahul stirs a spoonful of salt into a glass of water. After a while, he notices that the salt is no longer visible. What type of mixture has he created?
Ans	✔ 1. Homogeneous mixture
	✘ 2. Suspension
	✘ 3. Colloid
	✘ 4. Heterogeneous mixture

Q.65	Two isotopes, A and B, are present in a chlorine sample with 75% and 25% abundances, respectively. Their average atomic mass is 35.5 u, and the sum of their nucleons is 72. What are the number of nucleons in A and B, respectively?
Ans	✘ 1. 38 and 34
	✘ 2. 34 and 38
	✔ 3. 35 and 37
	✘ 4. 37 and 35

Q.66	The metals high up in the reactivity series are very reactive. These metals are obtained by _____.
Ans	✔ 1. electrolytic reduction
	✘ 2. heating with carbon
	✘ 3. heating in air
	✘ 4. heating in absence of air

Q.67	20 g of ice cubes at 0°C are put in 60 g of water in a tumbler. If the initial temperature of water is 40°C, then what will be the final temperature of water, assuming that no heat is lost to the surroundings? (Take: Latent heat of ice = 80 cal/g; Specific heat capacity of water = 1 cal/g°C)
Ans	✔ 1. 10°C
	✘ 2. 50°C
	✘ 3. 100°C
	✘ 4. 20°C

Q.68	Which of the following is a physical intensive property?
Ans	✘ 1. Volume
	✘ 2. Energy
	✔ 3. Density
	✘ 4. Mass

Q.69	What happens to the impurities during the electrolytic refining of copper?
Ans	✘ 1. They dissolve in the electrolyte.
	✔ 2. They settle as anode mud.
	✘ 3. They evaporate as gas.
	✘ 4. They deposit on the cathode.

Q.70	Which of the following is the simplest ketose?
Ans	✔ 1. Dihydroxyacetone
	✘ 2. Glyceraldehyde
	✘ 3. Xylose
	✘ 4. Erythrose

Q.71	In the chlor-alkali process, _____ is given off at the anode, and _____ at the cathode.
Ans	✘ 1. chlorine gas, oxygen gas
	✔ 2. chlorine gas, hydrogen gas
	✘ 3. oxygen gas, hydrogen gas
	✘ 4. chlorine gas, water vapour

Q.72	How does electronegativity generally vary in the periodic table?
Ans	✘ 1. It increases down a group and increases across a period.
	✔ 2. It decreases down a group and increases across a period.
	✘ 3. It increases down a group and decreases across a period.
	✘ 4. It decreases down a group and decreases across a period.

Q.73	**When an electric current is passed through a metallic conductor, a nearby compass needle gets deflected. What is the reason for this deflection?**
Ans	✗ 1. The electric current creates an electric field that repels the needle.
	✗ 2. The conductor gains magnetic properties due to heating.
	✓ 3. The electric current generates a magnetic field around the conductor, influencing the needle.
	✗ 4. The electric current produces heat in the conductor, affecting the needle.

Q.74	**Which of the following metals does NOT occur in nature in a free state?**
Ans	✗ 1. Silver
	✗ 2. Platinum
	✗ 3. Gold
	✓ 4. Aluminium

Q.75	**Which of the following statement(s) is/are true regarding the production and propagation of sound waves?** **(i) Sound is produced by vibrating objects.** **(ii) Sound waves do not require a material medium for their propagation.** **(iii) Sound waves fall in the category of non-mechanical waves.**
Ans	✗ 1. Both (ii) and (iii)
	✗ 2. Only (ii)
	✓ 3. Only (i)
	✗ 4. Both (i) and (iii)

Q.76	**Which of the following are physical properties?** **i. Melting point** **ii. Hardness** **iii. Density** **iv. Fluidity**
Ans	✗ 1. i and ii only
	✗ 2. i, ii and iii only
	✗ 3. i, iii and iv only
	✓ 4. i, ii, iii and iv

Q.77	**The binding energy of a nucleus gives a _____ contribution to the mass of the nucleus.**
Ans	✗ 1. negligible
	✗ 2. zero
	✓ 3. negative
	✗ 4. positive

Q.78	Which of the following sets of quantum numbers (n, l, m_l, m_s) is NOT allowed for an electron in an atom?
Ans	✗ 1. (2, 1, −1, −1/2)
	✓ 2. (4, 3, −4, +1/2)
	✗ 3. (5, 2, 0, −1/2)
	✗ 4. (3, 2, 1, +1/2)

Q.79	Which of the following is/are the use(s) of washing soda? i. Sodium carbonate (washing soda) is used in glass, soap, and paper industries. ii. It is used in the manufacture of sodium compounds such as borax.
Ans	✗ 1. Neither i nor ii
	✗ 2. ii only
	✓ 3. Both i and ii
	✗ 4. i only

Q.80	In which of the following materials is the energy gap (E_g) between the top of the valence band and bottom of the conduction band is between greater than 0.5 eV and less than 3 eV?
Ans	✗ 1. Insulators
	✓ 2. Semiconductors
	✗ 3. Conductors
	✗ 4. Superconductors

Q.81	If a liquid of density ρ and coefficient of viscosity η flow with a velocity v through a pipe of diameter D, then the Reynold's number is X. If the velocity of the liquid flowing through the pipe increases to 2v and the diameter of the pipe is reduced to D/4 (keeping all the other parameters the same), the new Reynold's number is Y. What will be the value of X : Y?
Ans	✗ 1. 1 : 4
	✗ 2. 4 : 1
	✗ 3. 1 : 2
	✓ 4. 2 : 1

Q.82	Identify the INCORRECT pair from the given options.
Ans	✗ 1. Three-carbon chain with a ketone group - Propanone
	✗ 2. Alkane having three carbon atoms - Propane
	✗ 3. Alcohol - Propanol
	✓ 4. Aldehyde - Propanone

Q.83	The melting point of a substance at standard atmospheric pressure is called it's _____.
Ans	✗ 1. thermal equilibrium point
	✗ 2. standard freezing point
	✓ 3. normal melting point
	✗ 4. absolute melting point

Q.84	Why is metal refining important?
Ans	✗ 1. To make metals heavier
	✓ 2. To remove unwanted impurities and obtain pure metal
	✗ 3. To convert metal oxides into metals
	✗ 4. To increase impurities in metals

Q.85	What happens to the pH when a strong acid reacts with a strong base?
Ans	✓ 1. It becomes 7.
	✗ 2. It becomes 1.
	✗ 3. It becomes 14.
	✗ 4. It remains unchanged.

Q.86	If the pressure of an ideal gas is doubled and its volume is halved at constant temperature, what happens to the number of moles (n)?
Ans	✗ 1. It doubles.
	✗ 2. It becomes zero.
	✗ 3. It becomes half.
	✓ 4. It remains the same.

Q.87	Which of the following represents the correct electronic configuration of Chromium (Z = 24)?
Ans	✗ 1. [Ar] $3d^3\ 4s^3$
	✗ 2. [Ar] $3d^4\ 4s^2$
	✗ 3. [Ar] $3d^6\ 4s^0$
	✓ 4. [Ar] $3d^5\ 4s^1$

Q.88	Select the option that is correct regarding the following two statements labelled Assertion (A) and Reason (R). Assertion: The magnetic field lines do not form closed loops. Reason: Magnetic field lines can never intersect.
Ans	✗ 1. Assertion is true but reason is false.
	✗ 2. Both assertion and reason are true and reason is the correct explanation of assertion.
	✗ 3. Both assertion and reason are false.
	✓ 4. Assertion is false but reason is true.

Q.89	A potential difference (V) is applied for time (t) across the heating element of an electric geyser having a resistance (R). Which of the following is the correct relation between heat produced (H) in the geyser coil in terms of V, t, and R?
Ans	✓ 1. $H = \left(\frac{V^2}{R}\right)t$
	✗ 2. H = VRt
	✗ 3. $H = \frac{VR}{t}$
	✗ 4. $H = \left(\frac{V^2R}{t}\right)$

Q.90	The mass number of a nucleus is X, while its atomic number is Y. What will be the number of neutrons and protons, respectively, in the nucleus?
Ans	✗ 1. (X + Y) and X
	✗ 2. Y and (X − Y)
	✗ 3. X and (X + Y)
	✓ 4. (X − Y) and Y

Q.91	Which of the following is NOT an example of forced convection?
Ans	✗ 1. Forced-air heating systems
	✗ 2. Human circulatory system
	✗ 3. Cooling system of an automobile engine
	✓ 4. Heating up of ground more quickly than large bodies of water

Q.92	**Which of the following statements is/are true?** **i. The covalent bond may be classified into two types depending upon the types of overlapping: (i) Sigma(σ) bond and (ii) pi(π) bond** **ii. Basically, the strength of a bond depends upon the extent of overlapping.** **iii. In case of sigma bond, the overlapping of orbitals takes place to a larger extent. Hence, it is stronger compared to the pi bond where the extent of overlapping occurs to a smaller extent.**
Ans	✗ 1. Only ii and iii
	✗ 2. Only i and iii
	✗ 3. Only i and ii
	✓ 4. i, ii and iii

Q.93	**Why was DDT widely used after World War II?**
Ans	✗ 1. It acted as a natural fertiliser.
	✓ 2. It helped control malaria and insect-borne diseases.
	✗ 3. It increased soil fertility.
	✗ 4. It was biodegradable and eco-friendly.

Q.94	**A medium has an absolute refractive index of √3. What will be the polarising angle for this medium?**
Ans	✓ 1. 60°
	✗ 2. 0°
	✗ 3. 45°
	✗ 4. 30°

Q.95	**What did Rutherford's experiment prove about the structure of the atom?**
Ans	✗ 1. Atoms do not contain any empty space.
	✓ 2. Atoms have a dense, positively charged nucleus.
	✗ 3. Atoms are made only of electrons.
	✗ 4. Atoms are solid throughout.

Q.96	**What does BJT stand for?**
Ans	✗ 1. Base Junction Transistor
	✗ 2. Binary Junction Transistor
	✓ 3. Bipolar Junction Transistor
	✗ 4. Bi-layer Junction Transistor

Q.97	**Which of the following statements is true about the reactivity series of metals?**
Ans	✗ 1. It is a list of metals arranged in order of their decreasing atomic numbers.
	✓ 2. It is a list of metals arranged in order of their decreasing reactivity.
	✗ 3. It is a list of metals arranged in order of their increasing reactivity.
	✗ 4. It is a list of metals arranged in order of their increasing atomic masses.

Q.98	**Identify the INCORRECT pair from the given options.**
Ans	✗ 1. Alkenes - Contain one or more double bonds
	✗ 2. Hydrocarbon - Carbon and hydrogen
	✓ 3. Alkanes - Unsaturated hydrocarbons
	✗ 4. Alkynes - Contain one or more triple bonds

Q.99	**On heating gypsum at 373 K, it loses water molecules and becomes _____, called Plaster of Paris.**
Ans	✔ 1. calcium sulphate hemihydrate
	✘ 2. calcium sulphate dihydrate
	✘ 3. calcium sulphate
	✘ 4. calcium sulphate trihydrate

Q.100	**Given below are two statements. Read the statements carefully and select the correct option.** **Statement I: p-Block Elements comprise those belonging to Group 13 to 18 of the modern periodic table.** **Statement II: p-Block Elements, together with the s-Block Elements, are called the Representative Elements or Main Group Elements.**
Ans	✘ 1. Both Statements I and II are false.
	✘ 2. Statement I is true but Statement II is false.
	✘ 3. Statement I is false but Statement II is true.
	✔ 4. Both Statements I and II are true.