

Answer any 4 questions from 1 to 5. Each carries 1 score.

(4 × 1 = 4)

- The number of moles of solute in one litre of the solution is _____.
(a) Molarity (b) Molality
(c) Normality (d) Mole fraction
- The element with outer electronic configuration $3s^23p^3$ belong to which block of the periodic table ?
- The hybridisation of carbon in Ethyne molecule is _____.
- Which among the following is a Lewis acid ?
(a) CH_4 (b) BF_3
(c) PCl_5 (d) NH_3
- Which among the following is a group showing + R effect ?
(a) $-CN$ (b) $-OH$
(c) $-NO_2$ (d) $-COOH$

Answer any 8 questions from 6 to 15. Each carries 2 scores.

(8 × 2 = 16)

- Hydrogen combines with oxygen to form two different compounds, H_2O and H_2O_2 .
 - Which law is obeyed by this combination ? (1)
 - State the law mentioned above. (1)
- Dual nature of matter was proposed by Louis de Broglie. Calculate the de Broglie wavelength associated with an electron with velocity 1.6×10^6 m/s. (2)

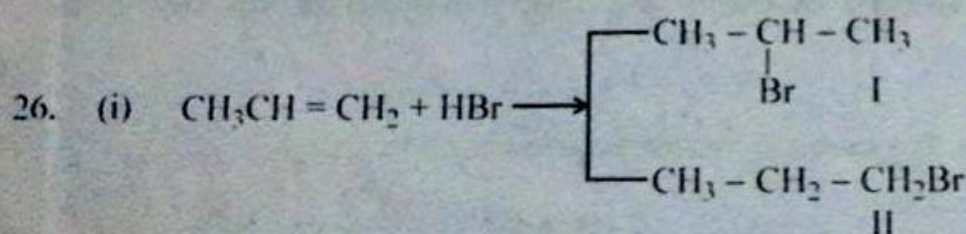
8. Heisenberg's uncertainty principle rules out the existence of definite path for electrons. State Heisenberg's uncertainty principle with equation. (2)
9. NF_3 and NH_3 are polar molecules. The Dipole moment of NF_3 is less than that of NH_3 . Why? (2)
10. The spontaneity of a process is expressed in terms of Gibb's energy.
- (i) Define Gibb's energy. (1)
 - (ii) Write Gibb's equation. (1)
11. (i) Le-chatelier principle helps to maximise the conversion of reactants to products. State Le-chatelier's principle. (1)
- (ii) Explain common ion effect. (1)
12. (i) Find the oxidation number of chlorine in HClO_4 . (1)
- (ii) Explain oxidation and reduction in terms of oxidation number. (1)
13. Give the structures of the following compounds :
- (i) 3-Ethyl-2, 2-dimethyl pentane (1)
 - (ii) Pent-4-en-2-ol (1)
14. Draw the cis and trans isomers of But-2-ene. (2)
15. Complete the following :
- (i) $3\text{CH} \equiv \text{CH} \xrightarrow[873 \text{ k}]{\text{Red Hot Iron Tube}} \text{_____}$ (1)
 - (ii) How alkanes are prepared by Wurtz reaction? (1)

Answer any 8 questions from 16 to 26. Each carries 3 scores.

(8 × 3 = 24)

16. (i) Classify the following as homogeneous mixture, heterogeneous mixture, element and compound:
(a) Silver (b) Air (c) Muddy water (d) Water
- (ii) Define Limiting Reagent of a reaction.
17. (i) Write the names of four quantum numbers.
- (ii) State Pauli's exclusion principle.
18. (i) Write the IUPAC name of the element with atomic number 105.
- (ii) Define electronegativity.
- (iii) Chlorine atom has high electron gain enthalpy than fluorine atom.
19. (i) Write the general outer electronic configuration of transition metals.
- (ii) Mention two properties of transition metals.
20. Give three salient features of molecular orbital theory.
21. (i) State first law of thermodynamics. Write its mathematical expression.
- (ii) Which of the following is a process taking place with increase in entropy?
- (a) Freezing of water
- (b) Condensation of steam
- (c) Evaporation of water

22. (i) Define pH scale. (1)
- (ii) The pK_a of acetic acid and pK_b of ammonium hydroxide are 4.76 and 4.75 respectively. Calculate the pH of ammonium acetate solution. (2)
23. (i) Describe disproportionation reaction with an example. (2)
- (ii) Write the stock notation of the compound CuO . (1)
24. (i) What is Heterolytic fission? (1)
- (ii) Write any one type of adsorption chromatography. (1)
- (iii) Name the purification method used to separate the components of crude petroleum. (1)
25. (i) Draw the Newman's projections for the staggered and eclipsed conformation of ethane. (2)
- (ii) Which conformation of ethane is more stable? (1)



Classify I and II as major and minor product. (2)

(ii) Name the rule that decides the formation of major product. (1)

Answer any 4 questions from 27 to 31. Each carries 4 scores. (4 × 4 = 16)

27. (i) Explain Bohr model of Hydrogen atom. (2)
- (ii) Write any two drawbacks of Rutherford model of atom. (1)
- (iii) What is photoelectric effect? (1)

28. (i) Match the molecules in Column-I with their shape in Column-II.

	Column-I		Column-II
(1)	PCl_5	(A)	Trigonal Pyramidal
(2)	SF_6	(B)	Trigonal bipyramidal
(3)	CH_4	(C)	Octahedral
(4)	NH_3	(D)	Tetrahedral

- (ii) Define Bond order of a molecule. (2)
- (iii) Mention the two types of Hydrogen Bonding. (1)
29. (i) Define Lattice enthalpy. (1)
- (ii) Construct an enthalpy diagram for the determination of lattice enthalpy of sodium chloride. (3)
30. (i) What are Buffer Solutions? Give an example for Buffer solution. (2)
- (ii) Explain Bronsted-Lowry concept of acids and bases. (1)
- (iii) Write the relation between K_p and K_c ? (1)
31. (i) Differentiate Electrophile and Nucleophile. Give one example for each. (2)
- (ii) Explain the following : (2)
- (a) Functional group isomerism
- (b) Metamerism