

Chemistry (Subjective)

(GROUP-II)

Time: 2:40 hours

SECTION-I

2. Write short answers of any eight parts from the following: (8x2=16)
- Molecular formula is multiple of empirical formula. Give an example.
 - Define gram formula. Give an example.
 - Many chemical reactions taking place in our surrounding involve the limiting reactants. Give the reason.
 - Give two methods for drying of the crystallized substance.
 - What is ether extraction? Give its importance.
 - How does a Gouch crucible increase the rate of filtration?
 - What is plasma? How is it formed?
 - Calculate the value of R in SI units.
 - Derive Boyle's law from kinetic molecular theory of gases.
 - How can we prepare basic buffers? Give an example.
 - Define solubility product. Give an example.
 - How does the equilibrium constant of a reaction tell us about the direction of a chemical reaction?
3. Write short answers of any eight parts from the following: (8x2=16)
- Why ionic crystals do not conduct electricity in solid state but their aqueous solutions are good conductors?
 - Why one feels sense of cooling under the fan after bath?
 - Why ethane (C_2H_6) has lower boiling point than hexane (C_6H_{14})?
 - Why lower alcohols are water soluble but hydrocarbons are water insoluble?
 - Calculate wave number for first spectral line of Lyman series.
 - Define Hund's rule, give an example.
 - Write electronic configuration of Cu_{29} and I_{53} .
 - Differentiate between orbit and orbitals.
 - Justify that sum of all mole fractions is equal to unity for any solution.
 - Freezing points of solvents are depressed due to presence of solutes in solutions.
 - Justify that radioactive decay is always a first order reaction.
 - A catalyst is specific in its function, prove it by chemical reactions.
4. Write short answers of any six parts from the following: (6x2=12)
- Na metal can displace hydrogen from acids but 'Pt' and 'Pd' cannot. Explain by giving reason.
 - Calculate the oxidation number of underlined elements: HNO_3 ; CrO_3
 - Define enthalpy of neutralization by giving one such example.
 - A reaction may be endothermic and spontaneous. Explain by giving example.
 - Prove that $\Delta E = q_v$
 - The distinction between coordinate covalent bond and a covalent bond vanishes after the bond formation in $CH_3N^+H_3$. Explain by giving reason.
 - The abnormality of bond length and bond strength in HI is less prominent than that of HCl. Explain with reason.
 - Calculate the bond energy of H-Br. The bond energy of H-H is 436 KJ mol^{-1} and that of Br-Br is 193 KJ mol^{-1}
 - Give any two limitations of Lewis concept of chemical bonding.

SECTION-II

- Note Attempt any three questions. Each question carries equal marks: (8x3=24)
- (a) What are limiting reactants and how is limiting reactant identified. (4)
 - (b) Discuss manometric method for measurement of vapour pressure. (4)
 - (a) Calculate the mass of 1 dm^3 of NH_3 gas at 30°C and 1000 torr pressure, considering that NH_3 is behaving ideally. (4)
 - (b) Describe eight (08) characteristics of cathode rays. (4)
 - (a) Define sp^3 hybridization. Explain the shape of methane molecule. (1+3)
 - (b) Calculate the P_H of buffer solution in which 0.11 molar CH_3COONa and 0.09 molar CH_3COOH solution are present. K_a for CH_3COOH is 1.85×10^{-5} (4)
 - (a) Explain how enthalpy of a reaction is determined by glass calorimeter. Also draw diagram. (3+1)
 - (b) Explain construction and working of standard hydrogen electrode. (4)
 - (a) Define the following terms: (i) Molarity (ii) Molality (iii) Mole Fraction (iv) Parts per million (ppm) (1x4)
 - (b) Define activation energy. How does the Arrhenius equation help us to calculate energy of activation of reaction. (4)