

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)

- What are limiting reactants and how is limiting reactant identified. (4)
 - Discuss manometric method for measurement of vapour pressure. (4)
- 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)
 - Describe eight (08) characteristics of cathode rays. (4)
- Define sp^3 hybridization. Explain the shape of methane molecule. (1+3)
 - 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)
- Explain how enthalpy of a reaction is determined by glass calorimeter. Also draw diagram. (3+1)
 - Explain construction and working of standard hydrogen electrode. (4)
- Define the following terms: (i) Molarity (ii) Molality (iii) Mole Fraction (iv) Parts per million (ppm) (1x4)
 - Define activation energy. How does the Arrhenius equation help us to calculate energy of activation of reaction. (4)