

Time: 2:40 Hours

SUBJECTIVE

Marks: 68

Note: Section I is compulsory. Attempt any THREE (3) questions from Section II.**(SECTION – I)****2. Write short answers to any EIGHT questions.****(2 x 8 = 16)**

- i - What is mass spectrum?
- ii - One mole of H_2SO_4 should completely react with two moles of NaOH .
How does Avogadro's number help to explain it?
- iii - Define limiting reactant. Give an example.
- iv - Write down the names of any four major steps involved in crystallization.
- v - What is ether extraction?
- vi - What is paper chromatography? Name its two types.
- vii - What is mean square velocity?
- viii - Where is plasma found?
- ix - Derive Charles's law from kinetic molecular theory of gases.
- x - What is common ion effect? Give an example.
- xi - Write down the Henderson's equation to determine the pH of a buffer solution.
- xii - Define solubility product. Give an example.

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3. Write short answers to any EIGHT questions.**(2 x 8 = 16)**

- i - Ionic crystals are highly brittle. Justify it.
- ii - Cleavage of the crystals is itself anisotropic behaviour. Justify it.
- iii - Diamond is hard and an electrical insulator. Justify it.
- iv - Boiling needs a constant supply of heat. Justify it.
- v - How the $^{65}_{29}\text{Cu}$ can be converted into $^{66}_{30}\text{Zn}$.
- vi - What is Zeeman effect?
- vii - Define Moseley's law and give its relationship/equation.
- viii - Define Pauli's exclusion principle.
- ix - Define parts per million (PPM) and give its expression.
- x - Define critical solution temperature and give an example.
- xi - What is catalytic poisoning? Give an example.
- xii - Define catalysis and give two examples of catalysed reactions.

4. Write short answers to any SIX questions.**(2 x 6 = 12)**

- i - Why the molecules of BF_3 are triangular planar?
- ii - Define covalent radius. Give one example.
- iii - Define shielding effect. How it varies across the period?
- iv - Define coordinate covalent bond. Give one example.
- v - Differentiate between endothermic and exothermic reaction.
- vi - What is lattice energy? Give one example.
- vii - Enthalpy of neutralization of a strong acid and a base is always $-57.5 \text{ Kcal mole}^{-1}$. Why?
- viii - Calculate the oxidation number of chromium in the following compounds:
a) CrO_3 b) Cr_2O_3
- ix - Define oxidation state. Give example.

(Turn Over)

(SECTION – II)

Note: Attempt any THREE (3) questions from Section II..

5. (a) Explain the concept of limiting reactant with a suitable example. 1+1+2 (4)
Also write down steps to identify a limiting reactant.
- (b) Define quantum numbers and explain in detail azimuthal quantum number. 1+3 (4)
6. (a) 250 cm^3 of the sample of hydrogen effuses four times as rapidly as 250 cm^3 of an unknown gas. Calculate the molar mass of unknown gas. (4)
- (b) Discuss any two industrial importance of electrolytic process. (4)
7. (a) Explain the geometry of NH_3 using hybridization. 3+1 (4)
- (b) State and explain Hess's law of constant heat summation with an example. 1+3 (4)
8. (a) Brief about structure of ice. (4)
- (b) Calculate the pH of buffer solution in which $0.11\text{ M CH}_3\text{COONa}$ and $0.09\text{ M CH}_3\text{COOH}$ solutions are present while K_a for CH_3COOH is 1.85×10^{-5} . (4)
9. (a) What is solubility curve? Discuss its types with examples. (4)
- (b) What is catalysis? Give any three characteristics of catalyst with examples. (4)

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