

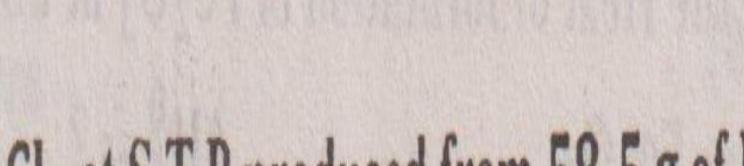
SECTION 'B' (Short-Answer Questions) (36)

NOTE: Answer any NINE part questions. All questions carry equal marks.

2. i) Define any four of the following:

- * Stoichiometry * Exponential notation * Unit Cell
- * Latent Heat of Fusion * Energy of Activation

ii) Chlorine gas is produced on an industrial scale by electrolysis of a aqueous solution of NaCl

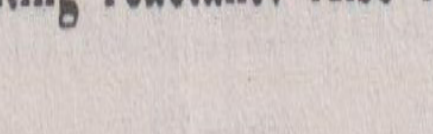


Calculate:

* The volume of Cl_2 at S.T.P produced from 58.5 g of NaCl.

* The total number of molecules of Cl_2 produced.

iii) 53.5g of Aluminium is burnt with 22.4g of oxygen to given brilliant white flame of Al_2O_3 .



Which reactant is limiting reactant? Also find the mass of Al_2O_3 produced.

iv) State 'Hund's rule'. Write electronic configuration of the following:

- * $\text{Cr}(Z = 24)$ * $\text{Sr}^{++}(Z = 38)$ * $\text{S}^{--}(Z = 16)$

v) Give any four scientific reasons for the following:

- * Evaporation is a cooling process.
- * Graphite conduct electricity but diamond does not.
- * Boiling point of H_2O is higher than HF .
- * Pressure cooker is used for rapid cooking.
- * Milk sour more rapidly in summer than in winter.

vi) A 100cm^3 sample of hydrogen effuse four times as rapidly as 100cm^3 of an unknown gas. Calculate the molecular mass of the unknown gas.

vii) Drive Van der Waal's equation for real gases by correcting volume and pressure.

viii) The solubility of $\text{Mg}(\text{OH})_2$ at 25°C is $4.6 \times 10^{-3}\text{g}/100\text{cm}^3$, calculate the solubility product of the $\text{Mg}(\text{OH})_2$.

ix) Explain Bronsted Lowry Theory of acids and bases. Also explain conjugate acid-base pair.

x) The reaction $2\text{NO} + \text{Cl}_2 \rightarrow 2\text{NOCl}$ was studied at 25°C the following results were obtained:

Exp. No	Initial Concentration mol/dm^3		Initial rate $\text{mol}/\text{dm}^3.\text{sec}$
	$[\text{NO}]$	$[\text{Cl}_2]$	
1	0.1	0.1	2.52×10^{-3}
2	0.1	0.2	5.04×10^{-3}
3	0.2	0.1	10.05×10^{-3}

On the basis of above information illustrate the Rate law and find the order of reaction.

xi) Define Colligative properties. Explain elevation of boiling point and depression of freezing point.

xii) Calculate the Heat of formation of Fe_2O_3 at 25°C :

- * $2\text{Fe} + \frac{3}{2}\text{O}_2 \rightarrow \text{Fe}_2\text{O}_3$ $\Delta H_f^\circ = ?$
- * $\text{H}_2 + \frac{1}{2}\text{O}_2 \rightarrow \text{H}_2\text{O}$ $\Delta H = -286 \text{ KJ/mole}$
- * $\text{Fe}_2\text{O}_3 + 3\text{H}_2\text{O} \rightarrow 2\text{Fe}(\text{OH})_3$ $\Delta H = +289 \text{ KJ/mole}$
- * $\text{Fe} + 3\text{H}_2\text{O} \rightarrow \text{Fe}(\text{OH})_2 + \frac{3}{2}\text{H}_2$ $\Delta H = +161 \text{ KJ/mole}$

xiii) Differentiate any two of the following:

- * VBT and MOT.
- * Line Spectrum and Continuous Spectrum
- * Ideal Solution and Non-ideal Solution

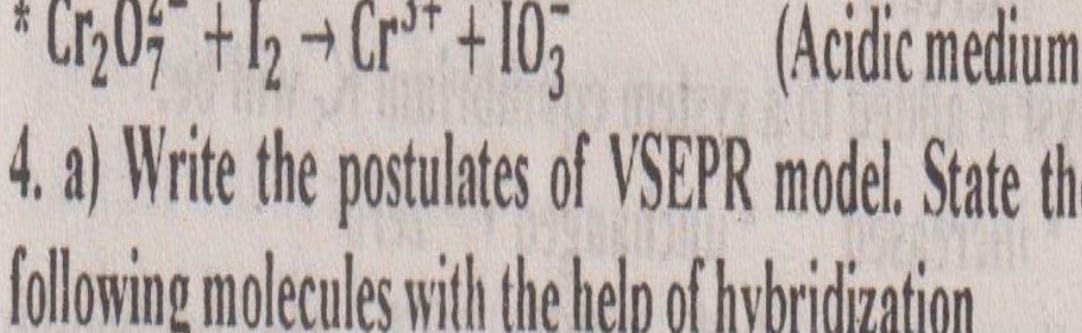
xiv) At 30°C the vapour pressure of water is 31.6 torr. If 30g of urea (molecular weight = 60) are dissolved in 180g of water. Calculate the lowering of vapour pressure.

SECTION 'C' (Detailed Answer Questions)(32)

NOTE: Attempt any Two questions from this section. All questions carry equal marks.

3. a) Write the postulates of Bohr's atomic model. Starting from $\Delta E = E_2 - E_1$ derive an expression for the wave number of radiations emitted by an electron.

b) Define Corrosion. Balance the following equations by ion-electron method:



4. a) Write the postulates of VSEPR model. State the shapes of the following molecules with the help of hybridization

- * H_2C * BF_3

b) State law of mass action. Derive the expression of K_c for the general reversible reaction $a\text{A} + b\text{B} \rightleftharpoons c\text{C} + d\text{D}$ and also give the relationship between K_p , K_c and K_A .

5. a) Define battery. Explain the working of lead storage battery and determined electrode potential of copper or zinc.

b) Give the characteristics of ionic and covalent solids. K_c for reaction is 55 at 700°C . Calculate the equilibrium concentration of reactants and products when the concentration of each reactant is $2.55 \text{ mole}/\text{dm}^3$.

