

SECTION – I

2. Write short answers to any EIGHT (8) questions :

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- (i) Define stoichiometry. Give two assumptions for stoichiometric calculations. Justify it.
- (ii) How percentage yield is calculated?
- (iii) Define Avogadro's number. Give one example.
- (iv) Differentiate between stationary phase and mobile phase in chromatographic technique?
- (v) What is ether extraction?
- (vi) Derive Avogadro's law from KMT.
- (vii) Why the graph plotted between pressure and volume moves away from pressure axis at higher temperature?
- (viii) Calculate SI unit of ' R ' gas constant.
- (ix) Why does pilots feel uncomfortable breathing at high altitude?
- (x) State Raoult's law. Give one mathematical expression.
- (xi) Relative lowering of vapour pressure is independent of temperature. Justify this statement.
- (xii) Give two applications of colligative properties.

3. Write short answers to any EIGHT (8) questions :

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- (i) What are dipole dipole forces? Give one example.
- (ii) Name the factors which affect the London forces.
- (iii) Cleavage of the crystals is itself anisotropic behaviour, explain.
- (iv) Define transition temperature with two examples.
- (v) Why cathode rays are also called as electron?
- (vi) Write down any four properties of positive rays.
- (vii) Define spectrum and name any two types of spectrum.
- (viii) For Azimuthal quantum number, $\ell = 2$ and $\ell = 3$, calculate the total values of magnetic quantum number (m).
- (ix) How equilibrium constant (K_c) predicts direction of a reaction?
- (x) Define pH and write how it is helpful to know nature of solutions.
- (xi) What do you mean by order of reaction? Give two examples.
- (xii) What is the effect of temperature on rate of chemical reaction? Also write Arrhenius equation.

4. Write short answers to any SIX (6) questions :

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- (i) Bond distance is the compromise distance between two atoms. Justify.
- (ii) Write down the two postulates of VSEPR theory.
- (iii) Differentiate between covalent and co-ordinate covalent bond.
- (iv) Draw the hypothetical orbital picture of He_2 molecule according to M.O.T.
- (v) Define enthalpy of formation with an example.
- (vi) Prove $q_v = \Delta E$.
- (vii) Calculate the oxidation numbers of the elements underlined : (a) $Na_2\underline{P}O_4$ (b) $H\underline{N}O_3$
- (viii) How salt bridge maintains the electrical neutrality in the cell? Justify.
- (ix) What is standard hydrogen electrode (SHE)?

(Turn Over)

SECTION – II

Note : Attempt any **THREE** questions.

5. (a) Calculate the number of grams of K_2SO_4 and H_2O produced when 14 gram of KOH reacts with excess of H_2SO_4 under the following equation :

$$2KOH + H_2SO_4 \rightarrow K_2SO_4 + 2H_2O$$

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- (b) Explain the structure of ice on the basis of hydrogen bonding. 4
6. (a) State Charles's law. Explain its experimental verification. 4
- (b) Write down experiment that how neutrons were discovered? 4
7. (a) Define ionization energy, write factors affecting ionization energy and explain its trend along group. 4
- (b) Prove that $\Delta H = q_p$ 4
8. (a) A buffer solution is prepared by mixing 0.2 M CH_3COONa and 0.5 M CH_3COOH in $1 dm^3$ of solution. Calculate pH of solution. pK_a of acid is 4.74. 4
- (b) Explain energy of activation. 4
9. (a) Define solubility curve. Explain different types of solubility curves with the help of graphs. 4
- (b) Describe electrochemical series. Give its three applications. 4

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