SONI TUTORIALS

Marks: 25 **Date: 08/08/2021**

Chapter: Solutions

Q1) Choose the most correct option. *(3M)*

(i) The colligative property of a solution is

(a) Vapour pressure b) Boiling point

(c) Osmotic pressure d) Freezing point

(ii) Cryoscopic constant depends on.

(a) Nature of solvent (b) Nature of solute

(c) Nature of solution (d) Number of solvent molecules

(iii) The osmotic pressure of blood is 7.65 atm at 310K. An aqueous solution of glucose isotonic with blood has the percentage (by volume).

(a) 5.41% (b)3.54% (c) 4.53% (d) 53.4%

Q2) Answer the following in one or two sentences - *(4M)*

(I) What is van't Hoff factor?

(ii) What is Henry's Law?

(iii) A solution concentration is expressed in molarity and not in molality while considering osmotic pressure. Why?

(iv) Define (i) Isotonic Solution (ii) Hypertonic Solution.

Q3) Answer the following *(18M)*

(i) Derive the relationship between degree of dissociation of an electrolyte and Van't Hoff factor.

(ii) Explain with diagram the boiling point elevation in terms of vapour pressure lowering.

(iii) The vapour pressure of water at 20°C is 17mm Hg. What is the vapour pressure of solution containing 2.8g urea in 50g of water?

(iv) At 25°C a 0.1 molal solution of acetic acid is 1.35% dissociated in an aqueous solution. Calculate freezing point and osmotic pressure of the solution assuming molality and molarity to be identical.

(v) Using Raoult's law, how will you show that $\Delta P = P_1^o x_2$? Where x_2 is the mole fraction of solute in the solution and P_1^o vapour pressure of pure solvent.

(vi) Obtain the relationship between freezing point depression of a solution containing non-volatile non-electrolyte and its molar mass. What is Osmotic pressure.