

## Colligative Properties

- 1 Which colligative property is preferred for the molecular mass determination of macromolecules and why? What is osmotic pressure?
- 2 Modify the equation  $\Delta T = K_b m$  by using Vant Hoff factor Define Vant Hoff factor. State Raoult's Law. What are ideal solutions?
- 3 What is the mole fraction of Methanol in a solution containing 3.2 grams of methanol in 18 grams of water.
- 4 What is the mole fraction of water in a solution containing 4.6 grams of ethanol in 18.0 ml of water? Take the density of water to be 1Kg/L.
- 5 Define vapour pressure of a solution.
- 6 Why vapour pressure of a solution is lowered when a non volatile solute is dissolved in it ?
- 7 Write vapour pressure expression for Raoult's law for a non volatile solute in a volatile solvent.
- 8 Under what conditions do non ideal solutions show negative deviation?
- 9 What happens to the osmosis if pressure more than the osmotic pressure is applied on the solution.
- 10 Define Molal elevation or Ebullioscopic constant.
- 11 Define Molal depression or Cryoscopic constant.
- 12 How is the molecular mass of a solute related to the elevation in boiling point of the solution.
- 13 How is the molecular mass of a solute related to the depression in freezing point of the solution.
- 14 Give one important application of the phenomenon of depression in freezing point in every day life.
- 15 How is the colligative property of solution changed when a solute in a solution undergoes a) Association b) dissociation
- 16 Why water from the soil rises to the top of a tall tree ?
- 17 Solution A contains 1 mole of sugar per kg of water and B contains 1 mole of urea in 1 kg of water. Which solution has a greater elevation in boiling point?
- 18 Solution A contains 0.1mole of sugar per Kg and solution B 0.5 mole of sugar per Kg of water. Which solution has a higher boiling point at 25 °C and 1 atm. Pressure?
- 19 Which will show higher depression in freezing point, 0.5molar solution of urea or 0.25molar sugar?
- 20 Why does doctors recommend gargles with salt water to a patient suffering from bad throat?
- 21 What is the molality of the solution when one mole of urea is dissolved in 1000 gms of water?
- 22 Of the following which is independent of temperature. a) molality b) molarity c) molefraction.
- 23 What is the effect of temperature on vapour pressure?
- 24 What is an azeotrope?
- 25 What is a minimum boiling azeotrope?
- 26 What is a maximum boiling azeotrope?
- 27 Why does a mixture of ethanol and cyclohexane show positive deviation from Raoult's law?
- 28 Why does a mixture of chloroform and acetone show negative deviation from Raoult's law?
- 29 Why is the boiling point of solution higher than that of the pure solvent?
- 30 What causes association of molecules in a solution? Give two examples.
- 31 In the preparation of an ideal solution no thermal change is observed. Why?
- 32 What is the unit of molal freezing point depression constant  $K_f$  or Cryoscopic constant.
- 33 What are the units of Osmotic Pressure?(Cm Hg, mm Hg, Nm<sup>-2</sup>, Pa)
- 34 What is the effect of temperature on Osmotic Pressure?
- 35 What is the effect of molality of a solution on Osmotic Pressure?
- 36 Glucose is mixed with saline before being injected into patients veins? Give reasons.
- 37 Sodium Chloride freezes at a lower temperature than water but boils at a higher temperature than water. Explain.
- 38 Why is the Osmotic pressure of 1M solution of NaCl approximately double that of 1M solution Sugar?
- 39 The normal boiling point of two pure liquids A and B are 80°C and 100°C respectively. Which one of these has a higher vapour pressure at 80°C?
- 40 Which of the following has a higher vapour pressure at the same temperature? CH<sub>3</sub>OH (B.P.=64.5° C) and C<sub>2</sub>H<sub>5</sub>OH(B.P.=78.3° C) (one mark)
- 41 If a sample of water boil's at 100°C on the top of a mountain what conclusion can you draw?