

- N.B. : (1) Attempt any **five** questions.  
(2) Draw a **neat diagram** wherever **necessary**.

1. (a) Name the methods to determine molecular weight of a non-volatile solute. 4  
Explain any one method in detail.
- (b) 0.6 gm. of a non-volatile compound (M. Wt. 60) was dissolved in 100 ml of water. Calculate the freezing point of the solution. 4  
**Given** : Cryoscopic constant for water  $K_f = 1.86$  deg. kg/mole.
2. (a) Explain the phenomenon of osmosis and explain the term "osmotic pressure." 4
- (b) What is an aerosol ? What is the principle of working of aerosols (pressurized packages) ? 4
3. (a) Give a short account of critical phenomenon. 4
- (b) State Raoult's Law and explain the negative deviation from Raoult's Law. 4
4. (a) Define entropy. 4  
Calculate the entropy change during melting of 2 gm. of ice at 0 °C to 2 gm. of water at 0 °C.  
Given Latent heat of fusion of ice = 80 cal/gm.
- (b) What is refractive index ? What is molar refraction. How is it useful in determining the structure or molecular formula of a compound ? 4
5. (a) What is dipole moment ? 4  
How could it be determined ?  
Give applications of dipole moment measurements.
- (b) Define equivalent conductance and explain how it could be determined. 4
6. Write short notes on any **two** :- 8
  - (a) Transport number
  - (b) Viscosity measurements.
  - (c) Hess's Law of constant heat summation.