

DPP-1: SOLUTIONS (Class 12 Chemistry – JAC Board)

◆ SECTION-A: MCQs ($20 \times 1 = 20$ marks)

- Colligative properties of solutions depend upon
 - Nature of solute
 - Nature of solvent
 - Number of solute particles
 - Chemical nature of solution
- Which of the following is a colligative property?
 - Viscosity
 - Surface tension
 - Relative lowering of vapour pressure
 - Refractive index
- Relative lowering of vapour pressure is equal to
 - Mole fraction of solute
 - Mole fraction of solvent
 - Molarity of solution
 - Molality of solution
- Which aqueous solution has the highest boiling point?
 - 1% glucose
 - 1% sucrose
 - 1% NaCl
 - 1% CaCl_2
- Van't Hoff factor is equal to
 - Moles of solute added
 - Moles of solvent
 - Actual number of particles / Expected number of particles
 - Mole fraction of solute
- Colligative properties increase when solute undergoes
 - Association
 - Dissociation
 - Both association and dissociation
 - None of these
- Depression in freezing point is directly proportional to
 - Molarity
 - Normality
 - Molality
 - Mole fraction of solvent
- Which of the following is NOT a solid solution?
 - Brass
 - Bronze
 - Hydrated salt
 - Aerated drinks

9. A molal solution contains one mole of solute in
(A) 1 litre of solution
(B) 1 litre of solvent
(C) 1000 g of solvent
(D) 22.4 litre of solution
10. Elevation in boiling point depends upon
(A) Nature of solute
(B) Nature of solvent
(C) Number of solute particles
(D) Pressure
11. Osmotic pressure of a solution depends on
(A) Nature of solute
(B) Temperature
(C) Concentration
(D) All of these
12. Which law explains vapour pressure of ideal solutions?
(A) Henry's law
(B) Raoult's law
(C) Boyle's law
(D) Dalton's law
13. A solution showing positive deviation from Raoult's law forms
(A) Maximum boiling azeotrope
(B) Minimum boiling azeotrope
(C) Ideal solution
(D) No azeotrope
14. The unit of molality is
(A) mol L^{-1}
(B) mol kg^{-1}
(C) g L^{-1}
(D) mol m^{-3}
15. Molarity changes with temperature because
(A) Mass changes
(B) Volume changes
(C) Moles change
(D) Density is constant
16. Which solution obeys Raoult's law?
(A) Benzene–Toluene
(B) Ethanol–Water
(C) Acetone–Chloroform
(D) HCl–Water
17. Osmotic pressure is preferred for molar mass determination because
(A) It is independent of temperature
(B) It is measurable at room temperature
(C) It is very high
(D) It is independent of concentration

18. Mole fraction is
(A) Temperature dependent
(B) Pressure dependent
(C) Dimensionless
(D) Expressed in %
19. Which solution shows negative deviation from Raoult's law?
(A) Benzene–Toluene
(B) Ethanol–Water
(C) Chloroform–Acetone
(D) n-Hexane–n-Heptane
20. PPM stands for
(A) Parts per mol
(B) Parts per mole
(C) Parts per million
(D) Pressure per mole
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◆ **SECTION–B : Short Answer Questions**

1. Define colligative properties.
 2. Define mole fraction.
 3. Distinguish between molarity and molality.
 4. Why CaCl_2 produces higher elevation in boiling point than NaCl ?
 5. What are azeotropes? Can they be separated by fractional distillation?
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◆ **SECTION–C : Long Answer Questions**

1. Derive the expression for **relative lowering of vapour pressure** of a solution.
2. Calculate the **molar mass of a non-volatile solute** if vapour pressure of pure benzene is 0.850 bar and that of solution is 0.845 bar.
(Given: mass of solute = 0.5 g, mass of benzene = 39 g)