Unit

2

SOLUTIONS

I. Multiple Choice Questions (Type-I)

1. Which of the following units is useful in relating concentration of solution with its vapour pressure?

(i) mole fraction

(ii) parts per million

(iii) mass percentage

(iv) molality

2. On dissolving sugar in water at room temperature solution feels cool to touch. Under which of the following cases dissolution of sugar will be most rapid?

(i) Sugar crystals in cold water.

(ii) Sugar crystals in hot water.

(iii) Powdered sugar in cold water.

(iv) Powdered sugar in hot water.

3. At equilibrium the rate of dissolution of a solid solute in a volatile liquid solvent is _____.

(i) less than the rate of crystallisation

(ii) greater than the rate of crystallisation

(iii) equal to the rate of crystallisation

(iv) zero

4. A beaker contains a solution of substance 'A'. Precipitation of substance 'A' takes place when small amount of 'A' is added to the solution. The solution is _____.

(i) saturated

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(ii) supersaturated

(iii) unsaturated

(iv) concentrated

5. Maximum amount of a solid solute that can be dissolved in a specified amount of a given liquid solvent does **not** depend upon _____.

(i) Temperature

(ii) Nature of solute

(iii) Pressure

(iv) Nature of solvent

6. Low concentration of oxygen in the blood and tissues of people living at high altitude is due to _____.

(i) low temperature

(ii) low atmospheric pressure

(iii) high atmospheric pressure

(iv) both low temperature and high atmospheric pressure

7. Considering the formation, breaking and strength of hydrogen bond, predict which of the following mixtures will show a positive deviation from Raoult's law?

(i) Methanol and acetone.

(ii) Chloroform and acetone.

(iii) Nitric acid and water.

(iv) Phenol and aniline.

8. Colligative properties depend on _____.

(i) the nature of the solute particles dissolved in solution.

(ii) the number of solute particles in solution.

(iii) the physical properties of the solute particles dissolved in solution.

(iv) the nature of solvent particles.

9. Which of the following aqueous solutions should have the highest boiling point?

(i) 1.0 M NaOH

(ii) 1.0 M Na_2SO_4

(iii) 1.0 M NH_4NO_3

(iv) 1.0 M KNO_3

10. The unit of ebullioscopic constant is _____.

(i) K kg mol^{-1} or K (molality)$^{-1}$

(ii) mol kg K^{-1} or K^{-1}(molality)

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(iii) kg mol^{-1} K^{-1} or $K^{-1}(molality)^{-1}$

(iv) K mol kg^{-1} or K (molality)

11. In comparison to a 0.01 M solution of glucose, the depression in freezing point of a 0.01 M $MgCl_2$ solution is _____.

(i) the same

(ii) about twice

(iii) about three times

(iv) about six times

12. An unripe mango placed in a concentrated salt solution to prepare pickle, shrivels because _____.

(i) it gains water due to osmosis.

(ii) it loses water due to reverse osmosis.

(iii) it gains water due to reverse osmosis.

(iv) it loses water due to osmosis.

13. At a given temperature, osmotic pressure of a concentrated solution of a substance _____.

(i) is higher than that at a dilute solution.

(ii) is lower than that of a dilute solution.

(iii) is same as that of a dilute solution.

(iv) cannot be compared with osmotic pressure of dilute solution.

14. Which of the following statements is false?

(i) Two different solutions of sucrose of same molality prepared in different solvents will have the same depression in freezing point.

(ii) The osmotic pressure of a solution is given by the equation $\Pi = CRT$ (where C is the molarity of the solution).

(iii) Decreasing order of osmotic pressure for 0.01 M aqueous solutions of barium chloride, potassium chloride, acetic acid and sucrose is

$BaCl_2 > KCl > CH_3COOH >$ sucrose.

(iv) According to Raoult's law, the vapour pressure exerted by a volatile component of a solution is directly proportional to its mole fraction in the solution.

15. The values of Van't Hoff factors for KCl, NaCl and K_2SO_4, respectively, are _____.

(i) 2, 2 and 2

(ii) 2, 2 and 3

(iii) 1, 1 and 2

(iv) 1, 1 and 1

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