



INDIAN SCHOOL MUSCAT
SENIOR SECTION
DEPARTMENT OF CHEMISTRY
CLASS XII
CHAPTER -SOLUTIONS
OBJECTIVE TYPE QUESTIONS



Multiple choice type questions

- Which is true about enthalpy of solution containing benzene and toluene?
 - $\Delta H_{\text{sol}} < 0$
 - $\Delta H_{\text{sol}} = 0$
 - $\Delta H_{\text{sol}} > 0$
 - ΔH_{sol} may be zero or greater than zero
- Which of the following is correct for a solution showing positive deviations from Raoult's law?
 - $\Delta V = +ve, \Delta H = +ve$
 - $\Delta V = -ve, \Delta H = +ve$
 - $\Delta V = +ve, \Delta H = -ve$
 - $\Delta V = -ve, \Delta H = -ve$
- A 5% solution of sugarcane (Mol wt = 342) is isotonic with 1% solution of X under similar conditions. The molar mass of X is:
 - 136.2
 - 68.4
 - 34.2
 - 171.2
- During depression in freezing point in a solution, the following are in equilibrium
 - liquid solvent, solid solvent
 - liquid solvent, solid solute
 - liquid solute, solid solute
 - liquid solute, solid solvent
- The number of moles of sodium hydroxide present in 2.5 L and 0.5 M aqueous solution will be
 - 1.25
 - 0.5
 - 12.5
 - 5

6. The azeotropic mixture of water and ethanol boils at 78.15°C . When this mixture is distilled, it is possible to obtain
- (a) pure H_2O
 - (b) pure $\text{C}_2\text{H}_5\text{OH}$
 - (c) pure H_2O as well as pure $\text{C}_2\text{H}_5\text{OH}$
 - (d) neither H_2O nor $\text{C}_2\text{H}_5\text{OH}$ in their pure state
7. The solubility of a gas in a liquid increases with
- (a) increase of temperature
 - (b) amount of liquid taken
 - (c) decrease in temperature
 - (d) reduction of gas pressure
8. During osmosis, flow of water through a semipermeable membrane is
- (a) from both sides of semi-permeable membrane with unequal flow rates
 - (b) from solution having lower concentration only
 - (c) from solution having higher concentration only
 - (d) from both sides of semi-permeable membrane with equal flow rates
9. According to Raoult's law, relative lowering of vapour pressure for a solution is equal to
- (a) mole fraction of the solute
 - (b) mole fraction of a solvent
 - (c) moles of a solute
 - (d) moles of a solvent
10. A solution of acetone in ethanol
- (a) behaves like a near ideal solution
 - (b) obeys Raoult's law
 - (c) shows a negative deviation from Raoult's law
 - (d) shows a positive deviation from Raoult's law
11. V litres of a solution contains m_2 g of non-volatile solute of molecular mass M_2 . Which of the following can be used to calculate the molecular mass of solute in terms of osmotic pressure?

$$(a) \frac{M_2}{V} = \frac{M_2}{\pi} VRT \quad (b) \frac{M_2}{V} = \frac{m_2}{\pi} RT$$

$$(c) M_2 = \frac{M_2}{V} \pi RT \quad (d) M_2 = \frac{m_2}{V} \frac{\pi}{RT}$$

12. The rise in the boiling point of a solution containing 1.8 g of glucose in 100 g of solvent is 0.1°C. The molal elevation constant of the liquid is
(a) 1 K/m (b) 0.1 K/m
(c) 0.01 K/m (d) 10 K/m
13. The mass of glucose that should be dissolved in 50 g of water in order to produce the same lowering of vapour pressure as is produced by dissolving 1 g of urea in the same quantity of water is
(a) 1 g (b) 3 g
(c) 6 g (d) 18 g
14. The vapour pressure of two liquids 'P' and 'Q' are 80 and 60 torr respectively. The total vapour pressure of solution obtained by mixing 3 mole of P and 2 mol of Q would be
(a) 20 torr (b) 72 torr
(c) 68 torr (d) 140 torr
15. 1.00 g of a non-electrolyte solute (molar mass 250 g mol⁻¹) was dissolved in 51.2 g of benzene. If the freezing point depression constant, K_f of benzene is 5.12 K kg mol⁻¹, the freezing point of benzene will be lowered by
(a) 0.5 K (b) 0.2 K
(c) 0.4 K (d) 0.3 K
16. Which of the following can form minimum boiling point azeotropic mixture?
(a) Methyl alcohol + water
(b) Carbon tetrachloride + chloroform
(c) Ethyl alcohol + water
(d) Acetone + chloroform
17. The amount of solute (molar mass 60 g/mol) that must be added to 180 g of water so that the vapour pressure of water is lowered by 10% is
(a) 30 g (b) 60 g
(c) 120 g (d) 12 g
18. An ideal solution is formed when its components
(a) have no volume change on mixing

- (b) have no enthalpy change on mixing
 - (c) Both (a) and (b) are correct
 - (d) Neither (a) nor (b) is correct
19. A mixture of ethyl alcohol and propyl alcohol has a vapour pressure of 290 mm Hg at 300 K. The vapour pressure of propyl alcohol is 200 mm Hg. If the mole fraction of ethyl alcohol is 0.6, its vapour pressure (in mm Hg) at the same temperature will be
- (a) 360 (b) 350
 - (c) 300 (d) 700
20. At equilibrium the rate of dissolution of a solid solute in a volatile liquid solvent is _____.
- (a) less than the rate of crystallisation.
 - (b) greater than the rate of crystallisation.
 - (c) equal to the rate of crystallisation.
 - (d) zero
21. The value of Henry's constant K_H is _____.
- (a) greater for gases with higher solubility.
 - (b) greater for gases with lower solubility.
 - (c) constant for all gases.
 - (d) not related to the solubility of gases.
22. Osmotic pressure of a solution at a given temperature
- (a) increases with concentration
 - (b) decreases with concentration
 - (c) remains same
 - (d) initially increases and then decreases
23. Blood cells retain their normal shape in solution which are
- (a) hypotonic to blood (b) isotonic to blood
 - (c) hypertonic to blood (d) equinormal to blood
24. When a gas is bubbled through water at 298 K, a very dilute solution of the gas is obtained. Henry's law constant for the gas at 298 K is 100 kbar. If the gas exerts a partial pressure of 1 bar, the number of millimoles of the gas dissolved in one litre of water is
- (a) 0.555 (b) 5.55
 - (c) 0.0555 (d) 55.5

25. K_H value for Ar(g), CO₂(g), HCHO (g) and CH₄(g) are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively. Arrange these gases in the order of their increasing solubility.
- (a) HCHO < CH₄ < CO₂ < Ar
 (b) HCHO < CO₂ < CH₄ < Ar
 (c) Ar < CO₂ < CH₄ < HCHO
 (d) Ar < CH₄ < CO₂ < HCHO
26. The ratio between lowering of vapour pressure of solution and mole fraction of solute is equal to
- (a) relative lowering of vapour pressure
 (b) vapour pressure of pure solvent
 (c) vapour pressure of solution
 (d) molar mass of solvent
27. Among the colligative properties of solution, which one is the best method for the determination of molecular masses of proteins and polymers?
- (a) osmotic pressure
 (b) lowering in vapour pressure
 (c) lowering in freezing point
 (d) elevation in boiling point

Fill in the Blanks

28. The vapour pressure of the solution containing non volatile solute at a given temperature is found to be than the vapour pressure of the pure solvent at the same temperature.
- (a) higher (b) lower
 (c) equal (d) can't calculate
29. At a given temperature, osmotic pressure of a concentrated solution of a substance _____.
- (a) is higher than that at a dilute solution.
 (b) is lower than that of a dilute solution.
 (c) is same as that of a dilute solution.
 (d) cannot be compared with osmotic pressure of dilute solution.
30. _____ a contemporary of Henry concluded independently that solubility of a gas in a liquid solution is a function of _____ of the gas
31. Raoult's law becomes a special case of Henry's law when _____.

32. Scuba divers may experience a condition called _____. To avoid this, the tanks used by scuba divers are filled with air diluted with _____
33. Low concentration of oxygen in the blood and tissues of people living at high altitudes is due to _____
34. Elevation in boiling point of 1 molal solution is called _____
35. The unit of ebullioscopic constant is _____.

A statement of assertion is followed by a statement of reason. Mark the correct choice from the options given below

- (a) Both assertion and reason are true and reason is the correct explanation of assertion.
- (b) Both assertion and reason are true but reason is not the correct explanation of assertion.
- (c) Assertion is true but reason is false.
- (d) Both assertion and reason are false
36. **Assertion:** Reverse osmosis is used to purify saline water.
Reason : Solvent molecules pass from concentrated to dilute solution through semipermeable membrane if high pressure is applied on solution.
37. **Assertion:** Gases always tend to be less soluble in liquids as the temperature is raised.
Reason : Vapour pressure of liquids increase with increase in temperature
38. **Assertion:** Isotonic solutions do not show the phenomenon of osmosis
Reason : Isotonic solutions have equal osmotic pressure.
39. **Assertion :** In an ideal solution, $\Delta_{\text{mix}}H$ is zero.
Reason : In an ideal solution, A - B interactions are lower than A-A and B-B interactions
40.

Column-I	Column-II
(A) Na-Hg Amalgam	(p) gas - solid
(B) H ₂ in Pd	(q) gas - liquid
(C) Camphor in nitrogen gas	(r) liquid - solid
(D) Oxygen dissolved in water	(s) solid - gas

(a) A - (q), B - (s), C - (r), D - (p)

(b) A - (t), B - (p), C - (q), D - (s)

(c) A - (r), B - (p), C - (s), D - (q)

(d) A - (s), B - (q), C - (p), D - (p)

