## Ch-1 Solution. [Previous Years Questions]

CBSE 2025

**1. In case of association, abnormal molar mass of solute will:**

(A) increase

(B) decrease

(C) remain same

(D) first increase and then decrease

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

(A) it gains water due to osmosis

(B) it loses water due to reverse osmosis

(C) it gains water due to reverse osmosis

(D) it loses water due to osmosis

**3. (A) Give reasons:**

**(a) Cooking is faster in a pressure cooker than in an open pan.**

**(b) On mixing liquid X and liquid Y, volume of the resulting solution decreases. What type of deviation from Raoult's law is shown by the resulting solution? What change in temperature would you observe after mixing liquids X and Y?**

**OR**

**(B) Define Azeotrope. What type of Azeotrope is formed by negative deviation from Raoult's law? Give an example.**

**4. A solution of glucose (molar mass = 180 g mol$^{-1}$) in water has a boiling point of 100.20°C. Calculate the freezing point of the same solution. Molal constants for water $K_f$ and $K_b$ are 1.86 K kg mol$^{-1}$ and 0.512 K kg mol$^{-1}$ respectively.**

5. A solution containing 15 g urea (molar mass = 6 d mol$^{-1}$) per litre of solution in water has the same osmotic pressure(isotonic) as a solution of glucose (molar mass = 180g mol$^{-1}$) in water. Calculate the mass of glucose present in one litre of its solution.

6. (a) Define reverse osmosis. Name one SPM which can be used in the process of reverse osmosis.

(b) (i) What do you expect to happen when red blood corpuscles (RBC's) are placed in 0.5% NaCl solution ?

OR

(b) (ii) Which one of the following will have higher osmotic pressure in 1 M KCl or 1 M urea solution. Justify your answer.

(c) Why osmotic pressure is a colligative property ?

## CBSE 2024

1. **A 1% solution of solute 'X' is isotonic with a 6% solution of sucrose (molar mass = 342 g mol$^{-1}$). The molar mass of solute 'X' is :** CBSE-2024

(A) 34·2 g mol$^{-1}$

(B) 57 g mol$^{-1}$

(C) 114 g mol$^{-1}$

(D) 3·42 g mol$^{-1}$

2. *Assertion (A) :* Addition of ethylene glycol to water lowers its freezing point.

*Reason (R) :* Ethylene glycol is insoluble in water due to lack of its ability to form hydrogen bonds with water molecules.

3. (a) Define molal depression constant. How is it related to enthalpy of fusion ? 2

**OR**

(b) What type of deviation is shown by ethanol and acetone mixture ? Give reason. What type of azeotropic mixture is formed by that deviation ? 2

4. A solution is prepared by dissolving 5 g of a non-volatile solute in 200 g of water. It has a vapour pressure of 31·84 mm Hg at 300 K. Calculate the molar mass of the solute. *3*

(Vapour pressure of pure water at 300 K = 32 mm Hg)

5. Isotonic solutions have the same

(*a*) density (*b*) refractive index

(*c*) osmotic pressure (*d*) volume

6. Van't Hoff factor for $Na_2SO_4.10H_2O$ solution, assuming complete ionisation is

(*a*) 1 (*b*) 3

(*c*) 13 (*d*) 2

7. (*a*) (*i*) Ishan's automobile radiator is filled with 1.0 kg of water. How many grams of ethylene glycol (Molar mass = 62 g $mol^{-1}$) must Ishan add to get the freezing point of the solution lowered to –2.8 °C. $K_f$ for water is 1.86 K kg $mol^{-1}$. **3**

(*ii*) What type of deviation from Raoult's law is shown by ethanol and acetone mixture? Give reason. **2**

**OR**

(*b*) (*i*) Boiling point of water at 750 mm Hg pressure is 99.68 °C. How much sucrose (Molar mass = 342 g $mol^{-1}$) is to be added to 500 g of water such that it boils at 100 °C? ($K_b$ for water = 0.52 K kg $mol^{-1}$).

(*ii*) State Henry's law and write its any one application. **3+2**

Ch-1 solution PYQ

## 2022

(4) Which of the following pair will form an ideal solution
(a) Chloroform & Acetone (b) Ethanol & Acetone CBSE-2022
(c) n-Hexane & n-pentane (d) Phenol & Aniline.

(5) Which of the following formula represent Raoult's law for a solution containing non-volatile solute? CBSE 2022
(A) $P_{solute} = P^{\circ}_{solute} \cdot X_{solute}$
(B) $P = K_H \cdot X$
(C) $P_{Total} = P_{solvent}$
(D) $P_{solute} = P^{\circ}_{solvent} \cdot X_{solvent}$

(6) An Azeotropic solution of two Liquids has a boiling point lower than either of the two when it CBSE 2022
(A) Shows a positive deviation from Raoult's law
(B) Shows negative deviation from Raoult's law
(C) Shows no deviation from Raoult's law
(D) is saturated

(7) On Mixing 20 mL of acetone with 30 mL of Chloroform, the total volume of solution is CBSE 2022
(A) < 50 mL (B) = 50 mL (C) > 50 mL (d) = 10 mL

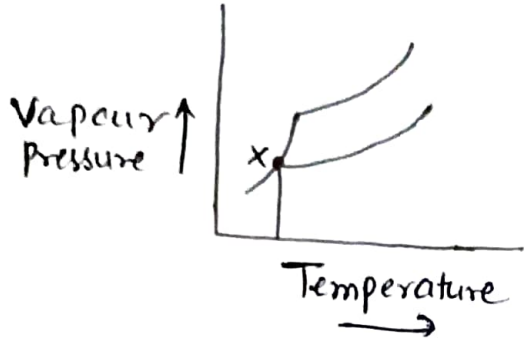
(8) Elevation in Boiling Point is inversely proportional to
(A) Molal elevation Constant (B) molality CBSE 2022
(C) Molar Mass of solute (D) weight of solute.

(9) An Unknown gas X is dissolved in water at 2.5 bar pressure and has mole fraction 0.04 in solution. The mole fraction of X gas when the pressure of gas is doubled at the same temperature is CBSE-2022
(A) 0.08 (B) 0.04 (C) 0.02 (D) 0.92

(10) The boiling point of 0.2 m solution of a non-electrolyte in water is ($K_b$ for water = 0.52 K Kg $mol^{-1}$) CBSE 2021

(A) 100°C (B) 100.52°C (C) 100.104°C (D) 100.26°C

(11) In the following diagram point X - represent CBSE 2022




(A) Boiling Point of Solution
(B) freezing Point of Solvent
(C) Boiling Point of Solvent
(D) freezing Point of Solution.

2021

(12) Vapour pressure of water at 293K is 17.536 mm Hg. Calculate the vapour pressure of aqueous solution when 20g of glucose (molar mass 180 g $mol^{-1}$) is dissolved in 500g of water. CBSE-2021

2023

(1) Which of the following solution will have highest boiling point. CBSE-2023

(a) 1M KCl (b) 1M $K_2SO_4$ (c) 2M KCl (d) 2M $K_2SO_4$

(2) (i) Why is boiling point of 1M NaCl solution more than that of 1M glucose?

(ii) A non volatile solute X (Molar mass 50 g $mol^{-1}$) when dissolved in 78g benzene reduced its vapour to 90%. Calculate the mass of X dissolved in solution. CBSE 2023

(iii) Calculate the boiling point elevation for the solution prepared by adding 10g $MgCl_2$ to 200g of water assuming $MgCl_2$ is completely dissociated

($K_b$ for $H_2O$ = 0.512 K Kg $mol^{-1}$, molar mass $MgCl_2$ = 95 g/mol)

CBSE 2023

(3) (i) Why is the value of Van't Hoff factor for ethanoic acid in benzene is 0.5? 2023

(ii) Determine the osmotic pressure of a solution prepared dissolving $2.32 \times 10^{-2}$ g of $K_2SO_4$ in 2L of solution at 25°C. assuming $K_2SO_4$ is completely dissociated. 2023

(R = 0.082 L atm $mol^{-1}$ $K^{-1}$, molar mass $K_2SO_4$ = 174 g/mol)

(iii) When 25.6 g of Sulphur was dissolved in 100g of benzene, the freezing point lowered by 0.512 K. Calculate the formula of Sulphur ($S_x$). 2023

$K_f$ for $H_2O$ / Benzene = 5.12 K Kg $mol^{-1}$

2024

Date :

(1) An equimolar solution of non volatile solute A & B shows depression in freezing Point in ratio of 2:1. If A remains in same state, the stat of B in solution

21 March ISC-2024

(a) Normal (b) Hydrolysed (c) Associate (d) Dissociate

(2) If 200 $cm^3$ of an aq. solution of a Protein Contains 1.26 g of Protein, the osmotic pressure of a solution at 300K is found to be $2.57 \times 10^{-3}$ atm Calculate Molar Mass of Protein - ISC 21-March-2024

(3) An aqueous solution Containing 12.50 g of Barium Chloride in 1000 g of water boils at 373.0834K. Calculate degree of dissociation of Barium Chloride Given $K_b$ for water = 0.52 K kg $mol^{-1}$, Molar Mass of $BaCl_2$ = 208.34 g $mol^{-1}$

ISC - 21 March-2024

(4) A 5% aqueous solution of glucose (M. Mass 180) is isotonic with 1.66% aq soln of Urea. Calculate Molar Mass of Urea - ISC 21 March-2024

(5) A 1% solution of solute x is isotonic with a 6% solution of Sucrose (Molar Mass = 342 g mol$^{-1}$) The molar Mass of solute x is -

(a) 34.2 g mol$^{-1}$ (b) 57 g mol$^{-1}$ (c) 114 g mol$^{-1}$ (d) 3.42 g mol$^{-1}$ CBSE-2024

(6) A = Addition ethylene glycol to water lowers its freezing Point
R = Ethylene glycol is insoluble in water due to lack of its ability to form hydrogen bond with $H_2O$ molecule
27 Feb- CBSE-2024

(7) Define molal depression Constant. How it is related to enthalpy of fusion?
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(8) What type of deviation is shown by ethanol & acetone mixture? Give reason. What type of azeotropic mixture is formed by that deviation?
27-Feb- CBSE-2024

(9) A solution is prepared by dissolving 5g of a non volatile solute in 200g of water. It has vapour pressure of 31.84 mm (Hg). Calculate the molar mass of solute. (Vapour pressure of Pure $H_2O$ = 32 mm Hg)
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