Liquid Solution

Question1

Among the following 0.1 m aqueous solutions, which one will exhibit the lowest boiling point elevation, assuming complete ionization of the compound in solution?

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Options:

A. Aluminium chloride

B. Aluminmium sulphate

C. Potassium sulphate

D. Sodium chloride

Answer: D

Solution:

To determine which 0.1 m aqueous solution will have the lowest boiling point elevation, we need to consider the Van't Hoff factor (i). This factor represents the number of particles the compound dissociates into in solution. The formula for boiling point elevation, $\Delta \mathrm{T_b} \propto \mathrm{i}$, indicates that a higher i value leads to a greater elevation in boiling point.

Here are the values of i for each compound, assuming complete ionization:

Aluminium chloride ($AlCl_3$): $i = 4$

Aluminium sulfate ($Al_2(SO_4)_3$): $i = 5$

Potassium sulfate (K_2SO_4): $i = 3$

Sodium chloride ($NaCl$): $i = 2$

The solution with the lowest i value will exhibit the smallest increase in boiling point. Therefore, sodium chloride, which has $i = 2$, will show the lowest boiling point elevation among the options.

Question2

Variation of solubility with temperature t for a gas in liquid is shown by the following graphs. The correct representation is

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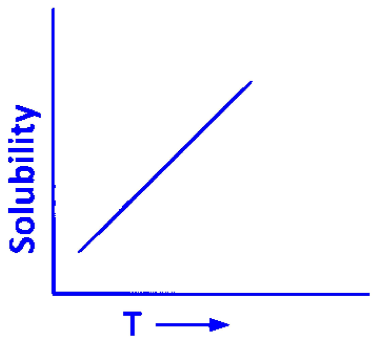
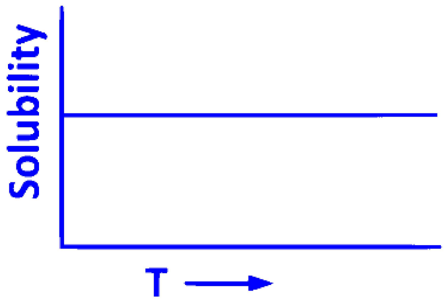
Options:

A.



B.



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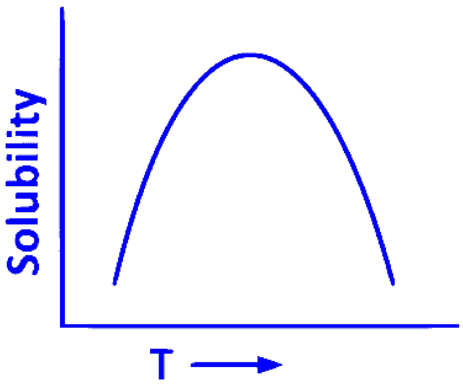
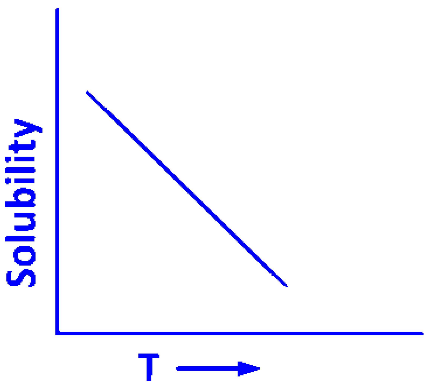


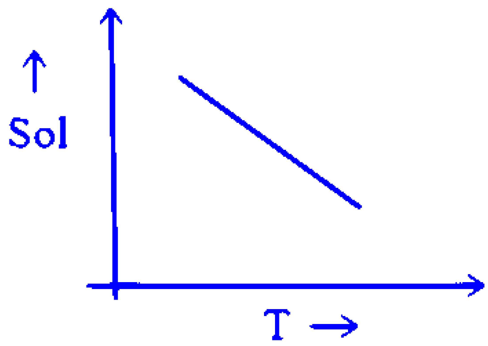
D.



Answer: A

Solution:

Henry law solubility $\propto \frac{1}{\text{Temp}}$



Question3

180 g of glucose, $C_6H_{12}O_6$, is dissolved in 1 kg of water in a vessel. The temperature at which water boils at 1.013 bar is __________ (given, K_b for water is $052 \text{ K kg mol}^{-1}$. Boiling point for pure water is 373.15 K)

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Options:

A. 373.67 K

B. 373015 K

C. 373.0 K

D. 373.202 K

Answer: A

Solution:

To find the boiling point of the water solution, we need to calculate the boiling point elevation using the formula:

$\Delta T_b = i \cdot K_b \cdot m$

where:

ΔT_b is the boiling point elevation,

i is the van 't Hoff factor, which is 1 for glucose as it does not dissociate in solution,

K_b is the ebullioscopic constant for water, given as $0.52\,K\,kg\,mol^{-1}$,

m is the molality of the solution.

To calculate the molality m, use:

$m = \frac{\text{moles of solute}}{\text{kilograms of solvent}}$

For glucose ($C_6H_{12}O_6$), with a mass of 180 g:

Moles of glucose $= \frac{180\text{ g}}{180\text{ g/mol}} = 1\,\text{mol}$

The solvent (water) is 1 kg:

$m = \frac{1\text{ mol}}{1\text{ kg}} = 1\,\text{mol/kg}$

Substituting into the formula for ΔT_b:

$\Delta T_b = 1 \times 0.52 \times 1 = 0.52\,K$

The normal boiling point of pure water is 373.15 K. Therefore, the boiling point of the solution is:

$T_b = 373.15 + 0.52 = 373.67\,K$

Question4

If N_2 gas is bubbled through water at 293 K , how many moles of N_2 gas would dissolve in 1 litre of water? Assume that N_2 exerts a partial pressure of 0.987 bar.

[Given K_H for N_2 at 293 K is 76.48 K bar]

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Options:

A. 0.716×10^{-3}

B. 7.16×10^{-5}

C. 7.16×10^{-4}

D. 7.16×10^{-3}

Answer: C

Solution:

To determine the number of moles of N_2 gas that would dissolve in 1 liter of water at 293 K, when N_2 exerts a partial pressure of 0.987 bar, we can use Henry's Law. Given that the Henry's Law constant (K_H) for N_2 at 293 K is 76.48 K bar, we apply the following:

Henry's Law

$P = K_H \cdot X$

Where:

P is the partial pressure of the gas (0.987 bar),

K_H is Henry's Law constant (76.48 K bar),

X is the mole fraction of the gas in the solvent.

Calculating Mole Fraction of N_2

The mole fraction X_{N_2} is given by:

$X_{N_2} = \frac{P_{N_2}}{K_H} = \frac{0.987}{76.48 \times 10^3} = 1.29 \times 10^{-5}$

Determining Moles of Water

The number of moles of water (n_{H_2O}) in 1 liter (1000 grams) is:

$n_{H_2O} = \frac{1000}{18} = 55.5$

Relating Mole Fraction and Moles of N_2

The mole fraction can also be expressed as:

$X_{N_2} = \frac{n_{N_2}}{n_{N_2} + n_{H_2O}} \approx \frac{n_{N_2}}{55.5}$

Setting this equal to the previously calculated mole fraction:

$1.29 \times 10^{-5} = \frac{n}{55.5}$

Solving for n (the moles of N_2):

$n_{N_2} = 1.29 \times 10^{-5} \times 55.5 = 7.16 \times 10^{-4}$

Thus, the number of moles of N_2 gas dissolved in 1 liter of water is 7.16×10^{-4}.

Question5

Vapour pressure of a solution containing 18 g of glucose and 178.2 g of water at $100^{\circ}\mathrm{C}$ is(Vapour pressure of pure water at $100^{\circ}\mathrm{C} = 760$ torr)

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Options:

A. 76.0 torr

B. 752.0 torr

C. 7.6 torr

D. 3207.6 torr

Answer: B

Solution:

Relative lowering of vapour pressure is equal to mole fraction of glucose.

$\frac{p_0 - p_S}{p_0} = \chi_{\text{Glucose}}$ ..... (i)

Now, number of moles of glucose $= \frac{18}{180} = 0.1$

number of moles of water $= \frac{178.2}{18} = 9.9$

Mole fraction of glucose

$= \frac{\text{Number of moles of glucose}}{\text{Number of moles of water} + \text{Number of moles of glucose}}$

$= \frac{0.1}{0.1+9.9} = 0.01$

Substituting the value of mole fraction in Eq. (i)

$$\frac{760 - p}{760} = 0.01$$
$$p = 752.4 \text{ torr}$$
$$\approx 752.0 \text{ torr}$$

Question6

A mixture of phenol and aniline shows negative deviation from Raoult's law. This is due to the formation of

KCET 2024

Options:

A. polar covalent bond

B. non-polar covalent bond

C. intermolecular hydrogen bond

D. intramolecular hydrogen bond

Answer: C

Solution:

Mixture of phenol and aniline shows negative deviation from Raoult's law due to the formation of intermolecular hydrogen bonding.

Question7

Which one of the following pairs will show positive deviation from Raoult's law?

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Options:

A. Water -HCl

B. Benzene - Methanol

C. Water $-HNO_3$

D. Acetone - Chloroform

Answer: B

Solution:

Among the given options benzene-methanol shows positive deviation from Raoult's law. The vapour pressure of such solutions are higher than that predicated by Raoult's law.

Question8

For which one of the following mixtures is composition uniform throughout?

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Options:

A. Sand and water.

B. Grains and pulses with stone.

C. Mixture of oil and water.

D. Dilute aqueous solution of sugar.

Answer: D

Solution:

Homogeneous mixtures have uniform composition through out. Thus, among the given options, dilute aqueous solution of sugar has uniform composition.

Question9

The swelling in feet and ankles of an aged person due to sitting continuously for long hours during travel, is reduced by soaking the feet in warm salt water. This is because of

KCET 2023

Options:

A. reverse osmosis

B. osmosis

C. edema

D. diffusion

Answer: B

Solution:

Soaking feet in warm water promotes the osmosis of molectles, including fluids, by increasing their kinetic energy. It also facilitates the movement of molecules from an area of higher concentration (swollen tissues) to an area of lower concentration (the bloodstream). This helps in reducing swelling by removing excess fluid and promoting proper circulation.

Question10

A sample of water is found to contain $5.85\% \left(\frac{w}{w}\right)$ of AB (molecular mass 58.5) and $9.50\% \left(\frac{w}{w}\right) XY_2$ (molecular mass 95). Assuming 80% ionisation of AB and 60% ionisation of XY_2, the freezing point of water sample is [Given, K_f for water $1.86 \mathrm{~K} \mathrm{~kg} \mathrm{~mol}^{-1}$, Freezing point of pure water is $273 \mathrm{~K}$ and A, B and Y are monovalent ions.]

KCET 2023

Options:

A. $264.25 \mathrm{~K}$

B. $265.56 \mathrm{~K}$

C. $280.44 \mathrm{~K}$

D. 281.75 K

Answer: A

Solution:

AB
5.85%
$$m = \frac{5.85}{58.5} \times \frac{1000}{84.65}$$
$=1.181$

XY_2
9.5%
$$m = \frac{9.5}{95} \times \frac{1000}{84.65}$$
$= 1.181$

$\alpha = 0.8$ (for 80% ionisation)

$\alpha = 0.6$ (for 60% ionisation)

$$i = 1 + (2-1)0.8 = 1.8 \qquad i = 1 + (3-1)0.6 = 2.2$$

$$\begin{aligned} \text{Now,} \quad \Delta T_f &= K_f\left[i_1 m_1 + i_2 m_2\right] \\ &= 1.86[1.8(1.181) + 2.2(1.181)] \\ &= 1.86[4.72] = 8.78 \\ \therefore \quad T_f &= 264.25 \text{ K} \end{aligned}$$

Question11

Solubility of a gas in a liquid increases with

KCET 2022

Options:

A. decrease of p and increase of T

B. increase of p and decrease of T

C. decrease of p and decrease of T

D. increase of p and increase of T

Answer: B

Solution:

Solubility of a gas in a liquid increases with increase of p and decrease of T.

Question12

The rise in boiling point of a solution containing 1.8 g of glucose in 100 g of solvent is $0.1^{\circ}C$. The molal elevation constant of the liquid is

KCET 2022

Options:

A. 1 K kg/mol

B. 2 K kg/mol

C. 10 K kg/mol

D. 0.1 K kg/mol

Answer: A

Solution:

Given, amount of glucose $(w) = 1.8 \text{ g}$

$$\begin{aligned} \text{Amount of solvent } (W) &= 100 \text{ g} \\ \Delta T_b &= 0.1^{\circ}\text{C} \end{aligned}$$

Molecular mass of glucose $= 180$

Molal elevation constant of the liquid, $\Delta T_b = 0.1^{\circ}\text{C}$

We know that,

$$\begin{aligned} K_b &= \frac{\Delta T_b \times m \times W}{1000 \times w} \\ &= \frac{0.1 \times 180 \times 100}{1000 \times 1.8} = 1 \text{ K kg/mol} \end{aligned}$$

Question13

If 3 g of glucose (molar mass = 180 g) is dissolved in 60 g of water at 15°C, the osmotic pressure of the solution will be

KCET 2022

Options:

A. 0.65 atm

B. 6.57 atm

C. 5.57 atm

D. 0.34 atm

Answer: B

Solution:

Given, molar mass of glucose $M_B = 180$ g

Mass of glucose, $W_B = 3$ g

Mass of water, $W_A = 60$ g

Temperature $= 15°\text{C} \Rightarrow 273 + 15 = 288$ K

Osmotic pressure, $\pi = ?$

$C = \frac{W_B \times 1000}{W_A \times M_B} = \frac{3 \times 1000}{60 \times 180} = 0.277 \text{ mol L}^{-1}$

We know that,

$$\pi = CRT = 0.277 \times 0.0821 \times 288$$
$$= 6.549 \simeq 6.57 \text{ atm}$$

Question14

Which of the following colligative properties can provide molar mass of proteins, polymers and colloids with greater precision?

KCET 2022

Options:

A. Elevation in boiling point

B. Depression in freezing point

C. Osmotic pressure

D. Relative lowering of vapour pressure

Answer: C

Solution:

Among the given colligative properties, osmotic pressure can provide molar mass of proteins, polymers and colloids with greater precision. Because for these substances, the value of other given colligative properties are too small to be measured. Secondly, this method has the advantage i.e., this use molarities instead of molalities.

Question15

Henry's law constant for the solubility of N_2 gas in water at $298\ \mathrm{K}$ is $1.0 \times 10^5\ \mathrm{atm}$. The mole fraction of N_2 in air is 0.8 . The number of moles of N_2 from air dissolved in 10 moles of water at $298\ \mathrm{K}$ and $5\ \mathrm{atm}$ pressure is

KCET 2021

Options:

A. 4.0×10^{-4}

B. 4.0×10^{-5}

C. 5.0×10^{-4}

D. 4.0×10^{-6}

Answer: A

Solution:

Given, Henry's law constant (K_H) for the solubility of N_2 gas in water at 298 K $= 1 \times 10^5$ atm.

Mole fraction of N_2 $(\chi_{N_2}) = 0.8$

Hence, partial pressure of nitrogen,

$$\begin{aligned} p_{N_2} &= p_{\text{total}} \cdot \chi_{N_2} \\ &= 0.8 \times 5 \text{ atm} \\ &= 4 \text{ atm} \end{aligned}$$

According to Henry's law,

$$\begin{aligned} p_{N_2} &= K_H \chi_{N_2} \\ 4 &= 10^5 \cdot \chi_{N_2} \\ \chi_{N_2} &= 4 \times 10^{-5} \end{aligned}$$

We know that,

$$\begin{aligned} \chi_{N_2} &= \frac{n_{N_2}}{n_{N_2} + n_{H_2O}} \\ 4 \times 10^{-5} &= \frac{n_{N_2}}{10} \quad (\because n_{N_2} << n_{H_2O}) \\ \Rightarrow \quad n_{N_2} &= 4 \times 10^{-4} \text{ moles} \end{aligned}$$

Thus, the number of moles of N_2 from air dissolved in 10 moles of water at 295 K and 5 atm pressure is 4×10^{-4}.

Question16

Choose the correct statement.

KCET 2021

Options:

A. K_H value is same for a gas in any solution.

B. Higher the K_H value more the solubility of gas.

C. K_H value increases on increasing the temperature of the solution.

D. Easily liquefiable gases usually has lesser K_H values.

Answer: C

Solution:

Among the given statements only (c) statement is correct about the Henry's law constant. Other statement are incorrect because

(a) K_H is a function of the nature of the gas and solvent used, thus K_{H} value is not same for a gas in any solution.

(b) Higher the K_{H} value, less the solubility of the gas.

(d) Easily liquefiable gases usually have higher K_{H} values.

Question17

The K_{H} value (K bar) of argon (I), carbondioxide (II), formaldehyde (III) and methane (IV) are respectively $40.3, 167, 1.83 \times 0^{-5}$ and 0.413 at $298 \mathrm{~K}$. The increasing order of solubility of gas in liquid is

KCET 2021

Options:

A. I < II < IV < III

B. III < IV < II < I

C. I < III < II < IV

D. I < IV < II < III

Answer: A

Solution:

Higher is the K_{H} value, less is the solubility of the gas.

Given compound	K_H **value at** $298 \mathrm{~K}$
Argon (I)	40.3
Carbon dioxide (II)	1.67

Given compound	K_H value at $298 \mathrm{~K}$
Formaldehyde (III)	1.83×10^{-5}
Methane (IV)	0.413

Thus, the increasing order of solubility of gas in liquid is I < II < IV < III.

Question18

The vapour pressure of pure liquids A and B are 450 and $700 \mathrm{~mm}$ of Hg at $350 \mathrm{~K}$ respectively. If the total vapour pressure of the mixture is $600 \mathrm{~mm}$ of Hg, the composition of the mixture in the solution is

KCET 2021

Options:

A. $\chi_A=0.4, \chi_B=0.6$

B. $\chi_A=0.6, \chi_B=0.4$

C. $\chi_A=0.3, \chi_B=0.7$

D. $\chi_A=0.7, \chi_B=0.3$

Answer: A

Solution:

Given, vapour pressure of pure liquid $A, p_A=450 \mathrm{~mm}$ of Hg

vapour pressure of pure liquid B,

$p_B^{\circ}=700 \mathrm{~mm}$ of Hg

Total vapour pressure, $p_{\text{Total}} \quad=600 \mathrm{~mm}$ of Hg

From Raoult's law, $p_{\text{Total}} \quad=p_A^{\circ} \chi_A+p_B \chi_B$

$$
\begin{aligned}
&= p_A^0 \chi_A + p_B^0 (1 - \chi_A) \\
\Rightarrow \quad 600 &= 450\chi_A = 700 (1 - \chi_A) \\
&= 450\chi_A + 700 - 700\chi_A \\
&= 700 - 250\chi_A \\
250\chi_A &= 700 - 600 \Rightarrow \chi_A = \frac{100}{250} \\
\chi_A &= 0.4 \\
\therefore \quad \chi_B &= 1 - 0.4 = 0.6
\end{aligned}
$$

Question19

Which of the following pair of solutions is isotonic?

KCET 2020

Options:

A. 0.01 M $BaCl_2$ and 0.015 M NaCl

B. 0.001 M $Al_2(SO_4)_3$ and 0.001 M $BaCl_2$

C. 0.001 M $CaCl_2$ and 0.001 M $Al_2(SO_4)_3$

D. 0.01 M $BaCl_2$ and 0.001 M $CaCl_2$

Answer: A

Solution:

To solutions are isotonic, if their osmotic pressure are same.

Here, 0.01 M $BaCl_2$ and 0.015 M NaCl will have same value of osmotic pressure.

We know, $\pi = CRT$

Here, R and T are constant and their value is same for both the solutions.

$\pi = C_{\text{effective}} \quad RT$

If $C_{\text{effective}}$ of two solutions are equal then their osmotic pressures will also be equal.

$$\textbf{BaCl}_2 \qquad\qquad \textbf{NaCl}$$

(a) $C_{\text{effective}} = 0.01 \times 3 = 0.03$ and $0.015 \times 2 = 0.03$

$$\textbf{Al}_2\textbf{(SO}_4\textbf{)}_3 \qquad\qquad \textbf{BaCl}_2$$

(b) $C_{\text{effective}} = 0.001 \times 5 = 0.005$ and $0.01 \times 3 = 0.03$

$$\textbf{CaCl}_2 \qquad\qquad \textbf{Al}_2\textbf{(SO}_4\textbf{)}_3$$

(c) $C_{\text{effective}} = 0.001 \times 3 = 0.003$ and $0.001 \times 5 = 0.005$

$$\textbf{BaCl}_2 \qquad\qquad \textbf{CaCl}_2$$

(d) $C_{\text{effective}} = 0.01 \times 3 = 0.03$ and $0.001 \times 3 = 0.003$

So, option (a) has equal value of $C_{\text{effective}}$ and hence, this pair will be isotonic.

Question20

Solute 'X' dimerises in water to the extent of 80%. 2.5g of 'X' in 100 g of water increases the boiling point by $0.3^{\circ}\mathrm{C}$. The molar mass of 'X' is $\left[K_b = 0.52 \text{ K kg mol}^{-1}\right]$

KCET 2020

Options:

A. 13

B. 52

C. 65

D. 26

Answer: D

Solution:

Here, 2.5 gX in 100 g water is increasing boiling point by $0.3^{\circ}\mathrm{C}$ and X is getting dimerise to the extent of 80%.

Molar mass of $X = ?$.

$K_b = 0.52$

Here,

$$2X \rightleftharpoons X_2$$

$$\begin{array}{cc} 1 & 0 \\ 1-\alpha & \dfrac{\alpha}{2} \end{array}$$

$i = \frac{1-\alpha+\frac{\alpha}{2}}{1} = 1 - 0.8 + \frac{0.8}{2}$ (Due to 80% dimerisation)

$$i = 0.6$$

$$\text{Now, } M = K_b \left(\frac{w_B \times 1000}{w_A \times \Delta T_b}\right) \times i$$

$$= 0.52 \left(\frac{2.5 \times 1000}{100 \times 0.3}\right) = \frac{52}{100} \times \frac{25}{3} \times 10 \times 0.6$$

$$= 26$$

Question21

A non-volatile solute, 'A' tetramerises in water to the extent of 80%. 2.5 g of 'A' in 100 g of water, lower the freezing point by 0.3°C. The molar mass of 'A' in g is $(K_f$ for water $= 1.86 \text{ K kg mol}^{-1})$

KCET 2019

Options:

A. 62

B. 221

C. 155

D. 354

Answer: A

Solution:

'A' solute tetramerises in water to the extent of 80%. So, $\alpha = 0.8$ and $n = 4$

As we know that, in case of association

$$\alpha = \frac{i-1}{\frac{1}{n}-1}$$

$$\therefore \quad 0.8 = \frac{i-1}{\frac{1}{4}-1} \Rightarrow i = 0.4$$

Calculating molar mass of solute 'A'

Given,

$$\begin{aligned} \Delta T_f &= 0.3^{\circ}\mathrm{C} = 0.3\ \mathrm{K} \\ w_1 &= 100\ \mathrm{g}, w_2 = 2.5\ \mathrm{g} \\ K_f &= 1.86\ \mathrm{K\ kg\ mol^{-1}} \\ M_2 &= \frac{i \times K_f \times w_2 \times 1000}{\Delta T_f \times w_1} \\ &= \frac{0.4 \times 1.86 \times 2.5 \times 1000}{0.3 \times 100} \\ M &= 62\ \mathrm{g.} \end{aligned}$$

Question22

Solution 'A' contains acetone dissolved in chloroform and solution 'B' contains acetone dissolved in carbon disulphide. The type of deviations from Raoult's law shown by solutions A and B, respectively are

KCET 2019

Options:

A. positive and positive

B. positive and negative

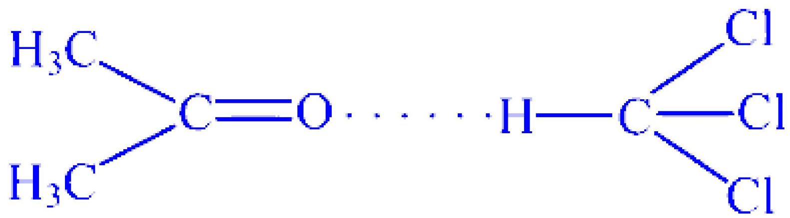
C. negative and negative

D. negative and positive

Answer: D

Solution:

Solution (A) containing acetone dissolved is chloroform shows negative deviation from Raoult's law. The intermolecular forces between acetone- acetone and chloroform-chloroform are weaker than those between acetone-chloroform that leads to decrease in vapour pressure resulting in negative deviations.



Solution (B) containing acetone dissolved in carbon disulphide shows positive deviation from Raoult's law. Here acetone-carbon disulphide interactions are weaker than those between acetone-acetone or carbon disulphide-carbon disulphide. As a result, molecules of acetone (or carbon disulphide) will escape easily.

Question23

Relative lowering of vapour pressure of a dilute solution of glucose dissolved in 1 kg of water is 0.002 . The molality of the solution is

KCET 2019

Options:

A. 0.004

B. 0.222

C. 0.111

D. 0.021

Answer: C

Solution:

Relative lowering of vapor pressure is defined as:

$\frac{p^0 - p}{p^0}$

For dilute solutions, this can be approximated by Raoult's law:

$\frac{p^0 - p}{p^0} = \frac{n_{\text{solute}}}{n_{\text{solvent}}}$

Given that the relative lowering of vapor pressure is 0.002:

$0.002 = \frac{n_{\text{solute}}}{n_{\text{solvent}}}$

Since the solvent is water, with 1 kg of water:

$n_{\text{solvent}} = \frac{1000}{18} \approx 55.56\,\text{mol}$

Let n_{solute} be the moles of glucose. Then:

$0.002 = \frac{n_{\text{solute}}}{55.56}$

Solving for n_{solute}:

$n_{\text{solute}} = 0.002 \times 55.56 \approx 0.111\,\text{mol}$

The molality (m) is defined as moles of solute per kilogram of solvent:

$\text{Molality} = \frac{0.111\text{ mol}}{1\text{ kg}} = 0.111\,\text{m}$

Therefore, the correct answer is:

Option C: 0.111

Question24

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

KCET 2018

Options:

A. 1.0 M NaOH

B. $1.0 \mathrm{M} Na_2SO_4$

C. $1.0 \mathrm{M} NH_2NO_3$

D. $1.0 \mathrm{M} KNO_3$

Answer: B

Solution:

All given species are electrolytes. Assuming that all may go for complete dissociation, more be the number of particles $\rightarrow$ more be the-boiling point.

(a) $1.0 M NaOH \rightarrow$ give 2 mol of particles.

(b) $1.0 M Na_2SO_4 \rightarrow$ give 3 mol of particles.

(c) $1.0 M NH_2 \cdot NO_3 \rightarrow$ give 2 mol of particles.

(d) $1.0 M KNO_3 \rightarrow$ give 2 mol of particles.

Hence, (b) is the correct answer.

Question25

Isotonic solutions are solutions having the same

KCET 2018

Options:

A. surface tension

B. vapour pressure

C. osmotic pressure

D. viscosity

Answer: C

Solution:

Isotonic solutions are defined as having the same osmotic pressure. Here's a brief explanation:

When two solutions are isotonic, they have the same solute concentration.

This equal concentration leads to equal osmotic pressures on both sides of a semipermeable membrane.

Because of the balanced osmotic pressure, there is no net movement of water between the solutions.

Thus, the correct answer is:

Option C: osmotic pressure

Question26

The, vant Hoff's factor ' i ' accounts for

KCET 2017

Options:

A. extent of solubility of solute

B. extent of mobility of solute

C. extent of dissolution of solute

D. extent of dissociation of solute

Answer: D

Solution:

The van't Hoff factor i measures the number of particles a solute produces when it dissolves. It indicates how many particles are in solution compared to the number of formula units initially added. For example:

When sodium chloride (NaCl) dissolves in water, it dissociates into Na^+ and Cl^- ions, so ideally, $i = 2$.

For substances that do not dissociate (non-electrolytes), $i \approx 1$.

Given this, the correct answer is:

Option D: extent of dissociation of solute.

Question27

When the pure solvent diffuses out of the solution through the semi-permeable membrane then the process is called

KCET 2017

Options:

A. sorption

B. dialysis

C. reverse osmosis

D. osmosis

Answer: C

Solution:

When pressure greater than the osmotic pressure is applied to a solution, the flow of solvent is forced to move **from the solution side to the pure-solvent side** through a semipermeable membrane. This process—pure solvent diffusing out of the solution—is called **reverse osmosis**.

Correct option : C. reverse osmosis

Question28

Which of the following aqueous solution has highest freezing point?

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Options:

A. 0.1 molal $Al_2(SO_4)_3$

B. 0.1 molal $BaCl_2$

C. 0.1 molal $AlCl_3$

D. 0.1 molal NH_4Cl

Answer: D

Solution:

Colligative property α number of particles after dissociation or association means less be the number of particles, more lower be the freezing point and more be the number of particle more lower be the freezing point.

Hence for $NH_4Cl, n = i = 2$

which is gives least number of particle hence show highest freezing point.
