# TOPIC : SOLUTION

## DPP-01 : Concentration terms

**1.** 8 g NaOH is dissolved in one litre of solution, its molarity is :
(1) 0.8 M (2) 0.4 M (3) 0.2 M (4) 0.1 M

**2.** A 500 g tooth paste sample has 0.02 g fluoride concentration. What is the concentration of fluorine in terms of ppm level ?
(1) 250 (2) 40 (3) 400 (4) 1000

**3.** A mixture has 18 g water and 414 g ethanol. The mole fraction of water in mixture is (assume ideal behaviour of the mixture) :
(1) 0.1 (2) 0.4 (3) 0.7 (4) 0.9

**4.** 25 mL of 3.0 M $HNO_3$ are mixed with 75 mL of 4.0M $HNO_3$. If the volumes are additive, the molarity of the final mixture would be-
(1) 3.25 M (2) 4.0 M (3) 3.75 M (4) 3.50 M

**5.** 15 gram of methyl alcohol is dissolved in 35 gram of water. What is the mass percentage of methyl alcohol in solution ?
(1) 30% (2) 50% (3) 70% (4) 75%

**6.** An X molal solution of a compound in benzene has mole fraction of solute equal to 0.2. The value of X is :
(1) 14 (2) 3.2 (3) 1.4 (4) 2

**7.** Mole fraction of ethanol in ethanol water mixture is 0.25. Hence precentage concentration of ethanol by weight of mixture is :
(1) 25% (2) 75% (3) 46% (4) 54%

**8.** Density of a 2.05 M solution of acetic acid in water is 1.02 g/mL. The molality of the solution is
(1) 3.28 mol $Kg^{-1}$ (2) 2.28 mol $Kg^{-1}$ (3) 0.44 mol $Kg^{-1}$ (4) 1.14 mol $Kg^{-1}$

**9.** What is the molarity of HCl in a solution prepared by dissolving 5.5g HCl in 200g ethanol if the density of the solution is 0.79 g $mL^{-1}$ ?
(1) 21 M (2) 0.93 M (3) $6\times10^{-4}$ (4) 0.58 M

**10.** A 5.2 molal aqueous solution of $CH_3OH$ is supplied. What is the mole fraction of methyl alcohol in the solution ?
(1) 0.050 (2) 0.100 (3) 0.190 (4) 0.086

**11.** The density of a solution containing 13% by mass of sulphuric acid is 1.09 g/mL. Calculate the molarity of the solution-
(1) 1.445 M (2) 14.45 M (3) 144.5 M (4) 0.1445 M

## DPP-02 : Vapour Pressure

**1.** A liquid is kept in a closed vessel. If a glass plate (negligible mass) with a small hole is kept on top of the liquid surface, then the vapour pressure of the liquid in the vessel is :
(1) More than what would be if the glass plate were removed
(2) Same as what would be if the glass plate were removed
(3) Less than what would be if the glass plate were removed
(4) Cannot be predicted

**2.** The vapour pressure of water depends upon :
(1) Surface area of container (2) Volume of container
(3) Temperature (4) All

**3.** Among the following substances, the lowest vapour pressure is exerted by :
(1) Water (2) Mercury (3) Acetone (4) Ethanol

**4.** At higher altitudes, water boils at temperature < 100ºC because
(1) temperature of higher altitudes is low (2) atmospheric pressure is low
(3) the proportion of heavy water increases (4) atmospheric pressure becomes more.

## DPP-03 : Colligative properties, Van't Hoff factor and its applications

**1.** Colligative properties of the solution depend upon
(1) Nature of the solution (2) Nature of the solvent
(3) Concentration of solute particles (4) Both (2) and (3)

**2.** Van't Hoff factor is :
(1) Less than one in case of dissociation (2) More than one in case of association
(3) Always less than one (4) Less than one in case of association

**3.** For the given electrolyte $A_xB_y$, the degree of dissociation '$\alpha$' can be given as
(1) $\alpha = \frac{i-1}{x+y-1}$ (2) $i = (1-\alpha) + x\alpha + y\alpha$ (3) $\alpha = \frac{1-i}{1-x-y}$ (4) All of these

**4.** The experimental molecular weight of an electrolyte will always be less than its calculated value because the value of vant Hoff factor, 'i' is :
(1) Less than 1 (2) Greater than 1 (3) One (4) Zero

**5.** The substance A when dissolved in solvent B shows the molecular mass corresponding to $A_3$. The vant Hoff's factor will be -
(1) 1 (2) 2 (3) 3 (4) 1/3

**6.** The value of observed and calculated molecular weight of silver nitrate are 92.64 and 170 respectively. The degree of dissociation of silver nitrate is :
(1) 60 % (2) 83.5% (3) 46.7% (4) 60.23%

**7.** One mole of a solute A is dissolved in a given volume of solvent. The association of the solute take place as follows:
$nA \rightleftharpoons A_n$
If $\alpha$ is the degree of association of A, the van't Hoff factor i is expressed as:
(1) $i = 1-\alpha$ (2) $i = 1+\frac{\alpha}{n}$ (3) $i = \frac{1-\alpha+\frac{\alpha}{n}}{1}$ (4) i = 1

**8.** The Vant Hoff factor (i) for a dilute solution of $K_3[Fe(CN)_6]$ is :
(1) 10 (2) 4 (3) 5 (4) 0.25

**9.** Which of the following salt has the same value of Vont Hoff's factor as that of $K_3[Fe(CN)_6]$
(1) $Al_2(SO_4)_3$ (2) NaCl (3) $Al(NO_3)_3$ (4) $Na_2SO_4$

**10.** The van't Hoff factor i for an infinitely dilute solution of $NaHSO_4$ is :
(1) 1/ 2 (2) 1/ 3 (3) 3 (4) 2

**11.** The experimental molecular weight of $CH_3COOH$ dissolved in benzene will always be more than its calculated value because the value of vant Hoff factor, 'i' is -
(1) Less than 1 (2) Greater than 1 (3) One (4) Zero

## DPP-04 : Raoult's law

**1.** If Raoult's law is obeyed, the vapour pressure of the solvent in a solution is directly proportional to
(1) Mole fraction of the solvent (2) Mole fraction of the solute
(3) Mole fraction of the solvent and solute (4) The volume of the solution

**2.** For a binary ideal liquid solution, the total pressure of the solution is given as :
(1) $P_{total} = P^o_A + (P^o_A - P^o_B) X_B$ (2) $P_{total} = P^o_B + (P^o_A - P^o_B) X_A$
(3) $P_{total} = P^o_B + (P^o_B - P^o_A) X_A$ (4) $P_{total} = P^o_B + (P^o_B - P^o_A) X_B$

**3.** At 323 K, the vapour pressure in millimeters of mercury of a methanol-ethanol solution is represented by the equation $p = 120 X_A + 140$, where $X_A$ is the mole fraction of methanol. Then the value of $\lim_{x_A \to 1} \frac{p_A}{X_A}$ is
(1) 250 mm (2) 140 mm (3) 260 mm (4) 20 mm

**4.** 1 mole of heptane (V.P. = 92 mm of Hg) was mixed with 4 moles of octane (V.P. = 31 mm of Hg) The vapour pressure of resulting ideal solution is :
(1) 46.2 mm of Hg (2) 40.0 mm of Hg (3) 43.2 mm of Hg (4) 38.4 mm of Hg

**5.** The vapour pressure of a pure liquid 'A' is 70 torr at 27°C. It forms an ideal solution with another liquid 'B'. The mole fraction of 'B' is 0.2 and total vapour pressure of the solution is 84 torr at 27°C. The vapour pressure of pure liquid 'B' at 27°C is
(1) 14 (2) 56 (3) 140 (4) 70

**6.** 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 :

(1) 68 torr (2) 140 torr (3) 72 torr (4) 20 torr

**7.** Which statement about the composition of vapour over an ideal 1 : 1 molar mixture of benzene and toluene is correct ? Assume the temperature is constant at 25°C.

**Vapour pressure date (25°C) :**

Benzene 75 mm Hg

Toluene 22 mm Hg

(1) The vapour will contain higher percentage of benzene

(2) The vapour will contain higher percentage of toluene

(3) The vapour will contain equal amount of benzene and toluene

(4) Not enough information is given to make a prediction

**8.** The vapour pressure of pure liquid 'A' at 310ºC is 120 torr. The vapour pressure of this liquid in solution with liquid B is 72 torr. Calculate the mole fraction of 'A' in solution if the mixture obeys Raoult's law.

(1) 0.06 (2) 0.9 (3) 0.3 (4) 0.6

**9.** The vapour pressure of pure benzene and toluene are 160 and 60 torr respectively. The mole fraction of toluene in vapour phase in contact with equimolar solution of benzene and toluene is :

(1) 0.50 (2) 0.6 (3) 0.27 (4) 0.73

## DPP-05 : Relative lowering of vapour pressure

**1.** If $P_0$ and P are the vapour pressures of a solvent and its solution with non-volatile solute respectively and $N_1$ and $N_2$ are the mole fractions of the solvent and solute respectively, then correct relation is :

(1) $P = P_0N_2$ (2) $P = P_0N_1$ (3) $P_0 = PN_1$ (4) $P = P_0(N_1/N_2)$

**2.** Which one of the following is the incorrect form of Raoult's law

(1) $\frac{P_s}{P^\circ} = \frac{N}{n+N}$ (2) $\frac{P^\circ}{P^\circ - P_s} = 1 + \frac{N}{n}$ (3) $\frac{P^\circ - P_s}{P_s} = \frac{n}{n+N}$ (4) $\frac{P_s}{P^\circ - P_s} = \frac{N}{n}$

**3.** The vapour pressure of a dilute aqueous solution of Glucose is 750 mm of mercury at 373 K. The mole fraction of solute is -

(1) $\frac{1}{10}$ (2) $\frac{1}{7.6}$ (3) $\frac{1}{35}$ (4) $\frac{1}{76}$

**4.** The vapour pressure of water at room temperature is 23.8 mm of Hg. The vapour pressure of an aqueous solution of sucrose with mole fraction 0.1 is equal to -

(1) 23.9 mm Hg (2) 24.2 mm Hg (3) 21.42 mm Hg (4) 31.44 mm Hg

**5.** Relative lowering in vapour pressure of a solution containing 1 mole $K_2SO_4$ in 54 g $H_2O$ is : ($K_2SO_4$ is 100% ionised)

(1) $\frac{1}{55}$ (2) $\frac{3}{55}$ (3) $\frac{3}{4}$ (4) $\frac{1}{2}$

**6.** What weight of solute (molecular weight = 60) is required to dissolve in 180 g of water to reduce the vapour pressure to $\frac{4}{5}$ th of pure water ?

(1) 48 g (2) 96 g (3) 150 g (4) 175 g

**7.** 18 g of glucose ($C_6H_{12}O_6$) is added to 178.2 g of water. The vapour pressure of water for this aqueous solution at $100^0$C is

(1) 7.60 torr (2) 76.00 torr (3) 752.40 torr (4) 759.00 torr

**8.** The mass of glucose that should be dissolved in 100 g of water in order to produce same lowering of vapour pressure as is produced by dissolving 1 g of urea (mol. mass =60) in 50 g of water is :

(1)1 g (2) 2 g (3) 6 g (4) 12 g

**9.** Relative decrease in vapour pressure of an aqueous NaCl is 0.167. Number of moles of NaCl present in 180g of $H_2O$ is :

(1) 2 mol (2) 1 mol (3) 3 mol (4) 4 mol

**10.** An aqueous solution is 1.00 molal in KI. Which change will cause the vapour pressure of the solution to increase ?

(1) Addition of NaCl (2) Addition of $Na_2SO_4$

(3) Addition of 1.00 molal KI (4) Addition of water

**11.** The vapour pressure of pure benzene, $C_6H_6$ at 50°C is 268 Torr. How many moles of non-volatile solute per mol of benzene is required to prepare a solution of benzene having a vapour pressure of 167 Torr at 50°C?

(1) 0.377 (2) 0.605 (3) 0.623 (4) 0.395

**12.** The vapour pressure of pure A is 10 torr and at the same temperature when 1 g of B is dissolved in 20 gm of A, its vapour pressure is reduced to 9.0 torr. If the molecular mass of A is 200 amu, then the molecular mass of B is :

(1) 100 amu (2) 90 amu (3) 75 amu (4) 120 amu

**13.** The vapour pressure of a solution of a non-volatile solute B in a solvent A is 95% of the vapour pressure of the solvent at the same temperature. If the molecular weight of the solvent is 0.3 times the molecular weight of the solute, what is the ratio of weight of solvent to solute.

(1) 0.15 (2) 5.7 (3) 0.2 (4) none of these

**14.** The lowering of vapour pressure of 0.1 M aqueous solution of NaCl, $CuSO_4$ and $K_2SO_4$ are :

(1) All equal (2) In the ratio of 1 : 1 : 1.5

(3) In the ratio of 3 : 2 : 1 (4) In the ratio of 1.5 : 1 : 2.5

**15.** The vapour pressure of water at room temperature is lowered by 5% by dissolving a solute in it, then the approximate molality of solution is :

(1) 2 (2) 1 (3) 4 (4) 3

**16.** The boiling point of $C_6H_6$, $CH_3OH$, $C_6H_5NH_2$ and $C_6H_5NO_2$ are 80°C, 65°C, 184°C and 212°C respectively which will show highest vapour pressure at room temperature :

(1) $C_6H_6$ (2) $CH_3OH$ (3) $C_6H_5NH_2$ (4) $C_6H_5NO_2$

**17.** The vapour pressure of an ideal solution having 0.2 mole non-volatile solute & 0.8 mole solvent is 60 mm. The vapour pressure of pure solvent at this temperature will be
(1) 120 mm (2) 150 mm (3) 60 mm (4) 75 mm

**18.** The vapour pressure of pure water at 26°C is 25.21 torr. What is the vapour pressure of a solution which contains 20.0 g glucose, $C_6H_{12}O_6$, in 70 g water ?
(1) 22.5 torr (2) 23.4 torr (3) 24.4 torr (4) 24.5 torr

## DPP-06 : Osmosis and osmotic pressure

**1.** Osmotic pressure of aqueous solution is determine by :
(1) haber's method (2) solvay method
(3) Berkeley and Hartley mothod (4) Ostwalds method

**2.** The compound whose 0.1 M solution has maximum osmotic pressure at 25°C will be
(1) $CaCl_2$ (2) KCl (3) Glucose (4) Urea

**3.** A solution containing 500 g of a protein per litre is isotonic with a solution containing 3.42 g of sucrose per litre. The molecular mass of protein is :
(1) 5 (2) 146 (3) 34200 (4) 50000

**4.** The best colligative property used for the determination of molecular masses of polymers is :
(1) Relative lowering in vapour pressure (2) Osmotic pressure
(3) Elevation in boiling point (4) depression in freezing point

**5.** If 0.1 M solution of glucose and 0.1 M urea solution are placed on two sides of a semipermeable membrane to equal heights, then it will be correct to say that :
(1) There will be no net movement across the membrane
(2) Glucose will flow towards urea solution
(3) Urea will flow towards glucose solution
(4) Water will flow from urea solution towards glucose solution.

**6.** Osmotic pressure of a sugar solution at 24°C is 2.5 atmosphere. The concentration of the solution in mole per litre is :
(1) 10.25 (2) 1.025 (3) 1025 (4) 0.1025

**7.** A solution containing 4g of polyvinyl chloride in 1 litre of dioxane was found to have an osmotic pressure of $6\times10^{-4}$ atm at 300K . The molecular mass of polymer is :
(1) $3\times10^3$ (2) $1.6\times10^5$ (3) $5\times10^4$ (4) $6.4\times10^2$

**8.** Equal volumes of 0.1 M urea and 0.1 M glucose solution are mixed. The mixture will have
(1) Lower osmotic pressure (2) Higher osmotic pressure
(3) Same osmotic pressure (4) None of these

**9.** Which has maximum osmotic pressure at temperature T :
(1) 100 mL of 1 M urea solution
(2) 300 mL of 1 M glucose solution
(3) mixture of 100 mL of 1 M urea solution and 300 mL of 1 M glucose solution
(4) all are isotonic

**10.** 1 mol each of following solutes are taken in 9 mol water

A. NaCl B. $K_2SO_4$ C. $Na_3PO_4$ D. glucose

Osmotic pressure will be in order

(1) A < B < C < D (2) D < C < B < A (3) D < A < B < C (4) equal

**11.** A solution containing 4 g of a non volatile organic solute per 100 ml was found to have an osmotic pressure equal to 500 cm of mercury at 27°C. The molecular weight of solute is :

(1) 14.97 (2) 149.7 (3) 1697 (4) 1.497

**12.** Osmotic pressure of 30% solution of glucose is 1.20 atm and that of 3.42% solution of cane sugar is 2.5 atm. The osmotic pressure of the mixture containing equal volumes of the two solutions will be

(1) 2.5 atm (2) 3.7 atm (3) 1.85 atm (4) 1.3 atm.

**13.** A solution of a substance containing 1.05 g per 100 mL was found to be isotonic with 3%(w/v) glucose solution. The molecular mass of the substance is :

(1) 31.5 (2) 6.3 (3) 630 (4) 63

## DPP-07: Elevation in boiling point

**1.** The molal elevation constant of water is 0.51K-kg/mol. The boiling point of 0.1 molal aqueous NaCl solution is nearly -

(1) 100.05 °C (2) 100.1 °C (3) 100.2 °C (4) 101.0 °C

**2.** An aqueous solution containing 1g of urea boils at 100.25 °C. The aqueous solution containing 3g of glucose in the same volume will boil at -

(1) 100.75 °C (2) 100.5 °C (3) 100 °C (4) 100.25 °C

**3.** Elevation in boiling point was 0.52 °C when 6 g of a compound x was dissolved in 100 g of water. Molecular weight of x is : ($K = 0.52$ kg $mol^{-1}$)

(1) 120 (2) 60 (3) 100 (4) 342

**4.** Aluminium phosphate is 100% ionised in 0.01 molal aqueous solution. Hence, $\Delta T_b / K_b$ is :

(1) 0.01 (2) 0.015 (3) 0.0175 (4) 0.02

**5.** The correct relationship between the boiling points of very dilute solution of $AlCl_3(t_1)$ and $CaCl_2$ $(t_2)$, having the same molar concentration is :

(1) $t_1 = t_2$ (2) $t_1 > t_2$ (3) $t_2 < t_1$ (4) $t_2 \leq t_1$

**6.** Which has the highest boiling point ?

(1) 0.1 M $Na_2SO_4$ (2) 0.1 M $C_6H_{12}O_6$ (glucose)

(3) 0.1 M $MgCl_2$ (4) 0.1 M Al $(NO_3)_3$

**7.** Consider equimolal aqueous solutions of $NaHSO_4$ and NaCl with $\Delta T_b$ and $\Delta T'_b$ as their respective boiling point elevations. The value of $\frac{\Delta T_b}{\Delta T'_b}$ will be :

(1) 1 (2) 1.5 (3) 3.5 (4) 2 / 3

**8.** 1.0 molal aqueous solution of an electrolyte $X_3Y_2$ is 25% ionized. The boiling point of the solution is ($K_b$ for $H_2O$ = 0.52 K kg/mol)
(1) 375.5 K (2) 374.04 K (3) 377.12 K (4) 373.25 K

**9.** A solution containing 28 g of phosphorus in 315 g $CS_2$ (b.p. 46.3ºC) boils at 47.98ºC. If $K_b$ for $CS_2$ is 2.38 K kg $mol^{-1}$. The formula of phosphorus is (at. mass of P = 31).
(1) $P_6$ (2) $P_4$ (3) $P_3$ (4) $P_2$.

**10.** A complex of iron and cyanide ions is 100% ionised at 1m (molal). If its elevation in boiling point is 2.08K. ($K_b$ = 0.52K $mol^{-1}$ kg), then the complex is :
(1) $K_3[Fe(CN)_6]$ (2) $Fe(CN)_2$ (3) $K_4[Fe(CN)_6]$ (4) $Fe(CN)_4$

## DPP-08 : Depression in freezing point

**1.** What is the effect of the addition of sugar on the boiling and freezing point of water
(1) Both boiling point and freezing point increases
(2) Both boiling point and freezing point decreases
(3) Boiling point increases and freezing point decreases
(4) Boiling point decreases and freezing point increases

**2.** Which of the following aqueous molal solution have highest freezing point
(1) Urea (2) Barium chloride (3) Potassium bromide (4) Aluminium sulphate

**3.** Glucose is added to 1 litre water to such an extent that $\frac{\Delta T_f}{K_f}$ becomes equal to $\frac{1}{1000}$, the weight of glucose added is :
(1) 180 g (2) 18 g (3) 1.8 g (4) 0.18 g

**4.** What should be the freezing point of aqueous solution containing 17 g of $C_2H_5OH$ in 1000 g of water (water $K_f$ = 1.86 deg – kg $mol^{-1}$)
(1) – 0.69°C (2) – 0.34°C (3) 0.0°C (4) 0.34°C

**5.** 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 :
(1) 0.4 K (2) 0.3 K (3) 0.5 K (4) 0.2 K

**6.** What is the freezing point of a solution containing 8.1 g. of HBr in 100 g. water assuming the acid to be 90% ionised ($K_f$ for water = 1.86 K $molality^{-1}$)
(1) 0.85 °C (2) – 3.53°C (3) 0°C (4) – 0.35°

**7.** The boiling point of an aqueous solution of a non volatile solute is 100.15°C. What is the freezing point of an aqueous solution obtained by diluting the above solution with an equal volume of water? The values of $K_b$ and $K_f$ for water are 0.512 and 1.86 K $molality^{-1}$ :
(1) – 0.544°C (2) – 0.512°C (3) – 0.272°C (4) – 1.86°C

**8.** Which of the following has been arranged in order of decreasing freezing point?
(1) 0.05 M $KNO_3$ > 0.04 M $CaCl_2$ > 0.140 M sugar > 0.075 M $CuSO_4$
(2) 0.04 M $BaCl_2$ > 0.140 M sucrose > 0.075 M $CuSO_4$ > 0.05 M $KNO_3$
(3) 0.075 M $CuSO_4$ > 0.140 M sucrose > 0.04 M $BaCl_2$ > 0.05 M $KNO_3$
(4) 0.075 M $CuSO_4$ > 0.05 M $NaNO_3$ > 0.140 M sucrose > 0.04 M $BaCl_2$

**9.** 50 g of antifreeze (ethylene glycol) is added to 200 g water. What amount of ice will separate out at –9.3°C ? ($K_f$ =1.86K kg $mol^{-1}$)

(1) 45 mg (2) 42 g (3) 38.71 g (4) 38.71 mg

## DPP-09: Ideal & nonideal solution

**1.** Which of the following will form an ideal solution?

(1) $C_2H_5OH$ and water (2) $HNO_3$ and water

(3) $CHCl_3$ and $CH_3COCH_3$ (4) $C_6H_6$ and $C_6H_5CH_3$

**2.** Which of the following shows negative deviation from Raoult's law?

(1) $CHCl_3$ and acetone (2) $CHCl_3$ and $C_2H_5OH$ (3) $C_6H_5CH_3$ and $C_6H_6$ (4) $C_6H_6$ and $CCl_4$

**3.** A solution of sulphuric acid in water exhibits :

(1) Negative deviations from Raoult's law (2) Positive deviations from Raoult's law

(3) Ideal properties (4) The applicability of Henry's law

**4.** Which of the following solution containing components A and B follows Raoult's law :

(1) A – B attraction force is greater than A – A and B – B

(2) A – B attraction force is less than A – A and B – B

(3) A – B attraction force remains same as A – A and B – B

(4) Volume of solution is different from sum of volume of solute and solvent

**5.** The vapour pressure of the solution of two liquids A($p^o$ = 80 mm) and B($p^o$ = 120 mm) is found to be 100 mm when $x_A$ = 0.4. The result shows that

(1) solution exhibits ideal behaviour

(2) solution shows positive deviations

(3) solution shows negative deviations

(4) solution will show positive deviations for lower concentration and negative deviations for higher concentrations.

**6.** Consider a binary mixture of volatile liquids. If at $X_A$ = 0.4 the vapour pressure of solution is 580 torr then the mixture could be ($p_A^o$ = 300 torr, $p_B^\circ$ = 800 torr) :

(1) $CHCl_3 – CH_3COCH_3$ (2) $C_6H_5Cl – C_6H_5Br$ (3) $C_6H_6 – C_6H_5CH_3$ (4) $nC_6H_{14} – nC_7H_{16}$

**7.** A maxima or minima obtained in the temperature composition curve of a mixture of two liquids indicates

(1) an azeotropic mixture

(2) an eutectic formation

(3) that the liquids are immiscible with one another

(4) that the liquids are partially miscible at the maximum or minimum

**8.** When KCl dissolves in water (assume endothermic dissolution), then :

(1) $\Delta H$ = + ve, $\Delta S$ = + ve, $\Delta G$ = + ve (2) $\Delta H$ = + ve, $\Delta S$ = – ve, $\Delta G$ = – ve

(3) $\Delta H$ = + ve, $\Delta S$ = + ve, $\Delta G$ = – ve (4) $\Delta H$ = – ve, $\Delta S$ = – ve, $\Delta G$ = + ve

**9.** The dissolving process is exothermic when :
(1) The energy released in solvation exceeds the energy used in breaking up solute-solute and solvent-solvent interactions.
(2) The energy used in solvation exceeds the energy released in breaking up solute-solute and solvent-solvent interactions.
(3) The energy released in solvation is about the same as the energy used in breaking up solute-solute and solvent-solvent interactions.
(4) The energy used in solvation is about the same as the energy used in breaking up solute-solute and solvent-solvent interactions.

**10.** Azeotropic mixture are :
(1) Mixture of two solids (2) Those which boil at different temperature
(3) Those which can be fractionally distilled (4) Constant boiling mixtures

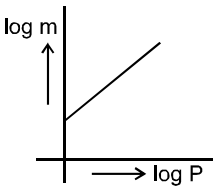
**11.** An azeotropic mixture of two liquids boil at a lower temperature than either of them when
(1) It is saturated
(2) It does not deviate from Raoult's law
(3) It shows negative deviation from Raoult's law
(4) It show positive deviation from Raoult's law

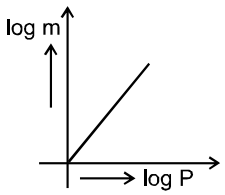
**12.** The azeotropic mixture of water (B.P 100°C) and HCl (B.P. 85°C) boils at 108.5°C. When this mixture is distilled, it is possible to obtain -
(1) Pure HCl (2) Pure water
(3) Pure water as well as HCl (4) Neither HCl nor $H_2O$ in their pure states

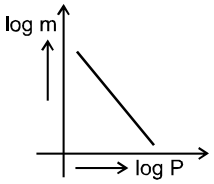
## DPP-10 : Solutions of Gases in Liquids

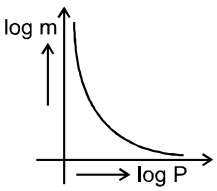
**1.** The solubility of gases in liquids :
(1) increases with increase in pressure and temperature
(2) decreases with increase in pressure and temperature
(3) Increases with increase in pressure and decrease in temperature
(4) decreases with increase in pressure and increase in temperature

**2.** Which of the following curves represents the Henry's law ?

(1) 

(2) 

(3) 

(4) 


**3.** According to Henry's law, the solubility of a gas in a given volume of liquid increases with increase
(1) Temperature (2) Pressure (3) Both (1) and (2) (4) None of these

**4.** Some of the following gases are soluble in water due to formation of their ions :
I : $CO_2$ ; II : $NH_3$ ; III : HCl ; IV : $CH_4$ ; V : $H_2$
Water insoluble gases can be :
(1) I, IV , V (2) I, V (3) I, II, III (4) IV, V

**5.** The solubility of $N_2(g)$ in water exposed to the atmosphere, when its partial pressure is 593 mm is $5.3 \times 10^{-4}$ M. Its solubility at 760 mm and at the same temperature is :
(1) $4.1 \times 10^{-4}$ M (2) $6.8 \times 10^{-4}$ M (3) 1500 M (4) 2400 M

# Answers

**DPP-01**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (2) | **3.** | (1) | **4.** | (3) | **5.** | (1) | **6.** | (2) | **7.** | (3) |
| **8.** | (2) | **9.** | (4) | **10.** | (4) | **11.** | (1) | | | | | | |

**DPP-02**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1.** | (2) | **2.** | (3) | **3.** | (2) | **4.** | (2) |

**DPP-03**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (4) | **3.** | (4) | **4.** | (2) | **5.** | (4) | **6.** | (2) | **7.** | (3) |
| **8.** | (2) | **9.** | (3) | **10.** | (3) | **11.** | (1) | | | | | | |

**DPP-04**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (1) | **2.** | (2) | **3.** | (3) | **4.** | (3) | **5.** | (3) | **6.** | (3) | **7.** | (1) |
| **8.** | (4) | **9.** | (3) | | | | | | | | | | |

**DPP-05**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (2) | **2.** | (3) | **3.** | (4) | **4.** | (3) | **5.** | (4) | **6.** | (3) | **7.** | (3) |
| **8.** | (3) | **9.** | (2) | **10.** | (4) | **11.** | (2) | **12.** | (2) | **13.** | (2) | **14.** | (2) |
| **15.** | (4) | **16.** | (2) | **17.** | (4) | **18.** | (4) | | | | | | |

**DPP-06**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (1) | **3.** | (4) | **4.** | (2) | **5.** | (1) | **6.** | (4) | **7.** | (2) |
| **8.** | (3) | **9.** | (4) | **10.** | (3) | **11.** | (2) | **12.** | (3) | **13.** | (4) | | |

**DPP-07**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (2) | **2.** | (4) | **3.** | (2) | **4.** | (4) | **5.** | (2) | **6.** | (4) | **7.** | (2) |
| **8.** | (2) | **9.** | (2) | **10.** | (1) | | | | | | | | |

**DPP-08**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (1) | **3.** | (4) | **4.** | (1) | **5.** | (1) | **6.** | (2) | **7.** | (3) |
| **8.** | (1) | **9.** | (3) | | | | | | | | | | |

**DPP-09**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1.** | (4) | **2.** | (1) | **3.** | (1) | **4.** | (3) | **5.** | (3) | **6.** | (1) | **7.** | (1) |
| **8.** | (3) | **9.** | (1) | **10.** | (4) | **11.** | (4) | **12.** | (4) | | | | |

**DPP-10**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (1) | **3.** | (2) | **4.** | (4) | **5.** | (2) |