

* Marked Questions are having more than one correct option.

DPP No. # 21

- 1.* 1 M of glucose ($C_6H_{12}O_6$) solution (density = 1.18 g/ml) is equivalent to which of the following solution
 (A) % w/w = 18% (solution) (B) 180 g solute per litre solution
 (C) % w/v = 18% (solution) (D) 1 molal solution
- 2.* Which of the following molarity values of ions in a aqueous solution of 5.85 % w/v NaCl, 5.55% w/v $CaCl_2$ and 6% w/v NaOH are correct [Na = 23, Cl = 35.5, Ca = 40, O = 16]
 (A) $[Cl^-] = 2M$ (B) $[Na^+] = 1M$ (C) $[Ca^{2+}] = 0.5 M$ (D) $[OH^-] = 1.5 M$
3. If 20 ml of 0.5 M Na_2SO_4 is mixed with 50 ml of 0.2 M H_2SO_4 & 30 ml of 0.4 M $Al_2(SO_4)_3$ solution, calculate. $[Na^+]$, $[H^+]$, $[SO_4^{2-}]$, $[Al^{3+}]$. Assuming 100% dissociation.
4. Calculate the osmotic pressure of a decimolar solution of cane sugar at 27°C.
5. An aqueous solution contains 18 g of glucose (mol wt. = 180) per 0.5 L. Assuming the solution to be ideal, calculate osmotic pressure at 27°C.
6. A solution of 1.73 g of 'A' in 100 cc of water is found to be isotonic with a 3.42% (weight/volume) solution of sucrose ($C_{12}H_{22}O_{11}$). Calculate molecular weight of A (given molecular weight of $C_{12}H_{22}O_{11} = 342$)
7. At 12°C the osmotic pressure of a urea solution is 500 mm. The solution is diluted and the temperature is raised to 27°C, when the osmotic pressure is found to be 100 mm. Determine the extent of dilution.
8. A membrane permeable only to water separates a 0.01 M solution of sucrose from a 0.001 M solution. On which solution must pressure be applied to bring the system into equilibrium? Find this pressure if the T = 300 K.
9.

Column (I) (A) 50 ml of 3M HCl + 150 ml of 1M $FeCl_3$ (B) mole fraction of NaCl in aqueous solution of NaCl is 0.1 then molality of the solution is (C) 10%(w/w) propanol (C_3H_7OH) solution has molality (D) 10.95% (w/v) HCl	Column (II) (p) 1.85 m (q) $[Cl^-] = 3 M$ (r) $[H^+] = 0.75 M$ (s) 6.1 m
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DPP No. # 22

1. What weight of glucose, dissolved in 100 grams of water, will produce the same lowering of vapour pressure as one gram of urea dissolved in 50 grams of water, at the same temperature?
 (A) 3 gms (B) 5 gms (C) 6 gms (D) 4 gms
2. In which case van't Hoff factor is maximum ?
 (A) KCl, 50% ionised (B) K_2SO_4 , 40% ionised (C) $SnCl_4$, 20% ionised (D) $FeCl_3$, 30% ionised
3. Solution having osmotic pressure nearer to that of an equimolar solution of $K_4[Fe(CN)_6]$ is:
 (A) Na_2SO_4 (B) $BaCl_2$ (C) $Al_2(SO_4)_3$ (D) $C_{12}H_{22}O_{11}$

4. Osmotic pressure [atm] of a 0.1 M solution of $K_4[Fe(CN)_6]$, which undergoes 50% dissociation, will be _____ atm at $27^\circ C$.
 (A) 7.38 (B) 3.69 (C) 405.9 (D) none of these
5. Two aqueous solutions, one of the NaCl in water (A) and the other of $C_8H_{15}O_2Na$ in water (B) are isotonic. If w_A and w_B are weight fractions of NaCl and $C_8H_{15}O_2Na$ in solution A and B respectively, then (assuming that both the salts dissociate completely) :
 (A) $w_A > w_B$ (B) $w_A = w_B$ (C) $w_A < w_B$ (D) none of these
6. Assuming the salts to be completely ionized in solution, which of the following has highest osmotic pressure at same temperature.
 (A) 1% CsCl w/w (B) 1% RbCl w/w (C) 1% KCl w/w (D) 1% NaCl w/w
- 7.* In which of the following pairs of solutions will the values of the van't Hoff factor be the same?
 (A) 0.05 M $K_4[Fe(CN)_6]$ and 0.10 M $FeSO_4$.
 (B) 0.10 M $K_4[Fe(CN)_6]$ and 0.05 M $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$.
 (C) 0.20 M NaCl and 0.10 M $BaCl_2$
 (D) 0.05 M $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$ and 0.02 M $KCl \cdot MgCl_2 \cdot 6H_2O$
- 8.* Consider the following solution in water
 (I) 1 M Sucrose (II) 1 M KCl (III) 1M Benzoic acid (IV) 1 M $(NH_4)_3PO_4$
 Which of the following is/are true :
 (A) All solutions are isotonic (B) III is hypertonic of II, IV
 (C) I, II and III are hypotonic of IV (D) IV is hypertonic of I, II and III
9.

Column-I (Solute)	Column-II (van't Hoff factor, i)
(A) $AlCl_3$ if $\alpha = 0.8$.	(p) $i = 2.8$.
(B) $BaCl_2$ if $\alpha = 0.9$.	(q) $i = 3.4$.
(C) Na_3PO_4 if $\alpha = 0.9$.	(r) $i = 3.8$.
(D) $K_4[Fe(CN)_6]$ if $\alpha = 0.7$.	(s) $i = 3.7$.
10.

Column-I	Column-II
(A) $\pi_1 : 0.1M$ glucose ; $\pi_2 : 0.1 M$ urea.	(p) π_1 and π_2 are isotonic.
(B) $\pi_1 : 0.1M$ NaCl ; $\pi_2 : 0.1M$ Na_2SO_4 .	(q) No net migration of solvent across the membrane.
(C) $\pi_1 : 0.1M$ NaCl ; $\pi_2 : 0.1 M$ KCl	(r) π_1 is hypertonic to π_2 .
(D) $\pi_1 : 0.1 M$ $CuSO_4$; $\pi_2 : 0.1 M$ sucrose	(s) π_1 is hypotonic to π_2

ANSWER KEY

DPP No. # 21

- 1.* (BCD) 2.* (ACD) 3. 0.56 M 4. 2.46 atm 5. 4.92 atm.
 6. 173. 7. 5.3. 8. 0.22 atm. 9. $[A - q, r] ; [B - s] ; [C - p] ; [D - q]$.

DPP No. # 22

1. (C) 2. (D) 3. (C) 4. (A) 5. (C) 6. (D)
 7.* (BD) 8.* (CD) 9. $[A - q] ; [B - p] ; [C - s] ; [D - r]$
 10. $[A - p, q] ; [B - s] ; [C - p, q] ; [D - r]$

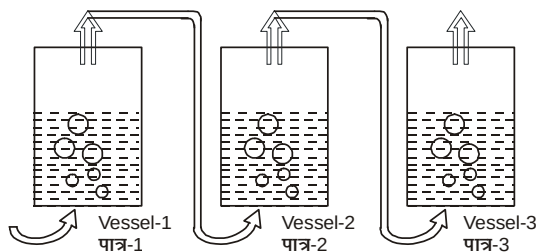
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DPP No. # 23

- 1.* Which is the correct relation between osmotic pressure of 0.1 M NaCl solution & 0.1 M Na_2SO_4 solution :
 (A) the osmotic pressure of Na_2SO_4 is less than NaCl solution
 (B) the osmotic pressure of Na_2SO_4 is more than NaCl solution
 (C) the osmotic pressure of Na_2SO_4 is 1.5 times that of NaCl solution
 (D) the osmotic pressure of NaCl is 1.5 times that of Na_2SO_4 solution

2. Three solutions are prepared by adding 'w' gm of 'A' into 1kg of water, 'w' gm of 'B' into another 1 kg of water and 'w' gm of 'C' in another 1 kg of water (A, B, C are non electrolytic). Dry air is passed from these solutions in sequence (A $\longrightarrow$ B $\longrightarrow$ C). The loss in weight of solution A was found to be 2 gm while solution B gained 0.5 gm and solution C lost 1 gm. Then the relation between molar masses of A, B and C is :
 (A) $M_A : M_B : M_C = 4 : 3 : 5$
 (B) $M_A : M_B : M_C = \frac{1}{4} : \frac{1}{3} : \frac{1}{5}$
 (C) $M_C > M_A > M_B$
 (D) $M_B > M_A > M_C$

- 3.* Dry air is slowly passed through three solutions of different concentrations, c_1 , c_2 and c_3 ; each containing (non volatile) NaCl as solute and water as solvent, as shown in the Fig. If the vessel 2 gains weight and the vessel 3 loses weight, then



- (A) $c_1 > c_2$ (B) $c_1 < c_2$ (C) $c_1 < c_3$ (D) $c_2 > c_3$
4. A solution is prepared by dissolving 10 g of nonvolatile solute in 180 g of H_2O . If the relative lowering of vapour pressure is 0.005, find the mol. wt of the solute.

 5. 1M of glucose solution has a freezing point of -1.86°C . If 10 ml of 1M glucose is mixed with 30ml of 3M glucose, then the resultant solution will have a freezing point of
 (A) -2.79°C (B) -4.65°C (C) -5.58°C (D) -7.44°C

 6. 20g of a binary electrolyte (molecular weight = 100) are dissolved in 500 g of water. The freezing point of the solution is -0.74°C ; $K_f = 1.86 \text{ K molality}^{-1}$. The degree of dissociation of electrolyte is
 (A) 50% (B) 75% (C) 100% (D) Zero

 7. 2.56g of sulfur in 100g of CS_2 has depression in freezing point of 0.01°C . $K_f = 0.1^\circ\text{C molal}^{-1}$. Hence, the atomicity of sulfur in CS_2 is
 (A) 2 (B) 4 (C) 6 (D) 8

 8. A solute 'S' undergoes a reversible trimerization when dissolved in a certain solvent. The boiling point elevation of its 0.1 molal solution was found to be identical to the boiling point elevation in case of a 0.08 molal solution of a solute which neither undergoes association nor dissociation. To what percent had the solute 'S' undergone trimerization?
 (A) 30% (B) 40% (C) 50% (D) 60%

9. 1g of arsenic dissolved in 86 g of benzene brings down the freezing point to 5.31 °C from 5.50 °C. If K_f of benzene is $4.9 \frac{^\circ\text{C}}{\text{m}}$, the atomicity of the molecule is : (As – 75)
 (A) 8 (B) 2 (C) 3 (D) 4
10. **Statement-1** : The freezing point of water is depressed by the addition of glucose.
Statement-2 : Entropy of solution is less than entropy of pure solvent.
 (A) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1.
 (B) Statement-1 is True, Statement-2 is True; Statement-2 is NOT a correct explanation for Statement-1.
 (C) Statement-1 is True, Statement-2 is False
 (D) Statement-1 is False, Statement-2 is True

DPP No. # 24

1. Liquids A and B form an ideal solution. At a certain temperature, the total vapour pressure of a mixture of A and B is 400 mm. The mole fraction of A in the liquid mixture, in equilibrium with the vapour phase, is 0.4. If the vapour pressure ratio (P_A^0/P_B^0) for the pure liquids at this temperature is 1/6, what is the partial pressure of A in the vapour phase?
 (A) 50mm (B) 60mm (C) 70mm (D) 40mm
2. Mixture of volatile components A and B has total vapour pressure (in Torr) $p = 254 - 119 x_A$, where x_A is mole fraction of A in mixture. Hence p_A^0 and p_B^0 are (in Torr)
 (A) 254, 119 (B) 119, 254 (C) 135, 254 (D) 119, 373
3. Which represents correct difference when non-volatile solute is present in an ideal solution ?
- (I)

(II)
- (III)
- (A) I, II, III (B) I, III (C) II, III (D) I, III
- 4.* Which of the following are true for ideal solutions :
 (A) $\Delta V_{\text{mix}} = 0$ (B) $\Delta H_{\text{mix}} = 0$ (C) $\Delta S_{\text{mix}} = 0$ (D) $\Delta G_{\text{mix}} = 0$
 (E) Raoult's law is obeyed for entire concentration range and temperatures.

Comprehension

Read the following comprehension carefully and answer the questions (5 to 9).

A system of greater disorder of molecules is more probable. The disorder of molecules is reflected by the entropy of the system. A liquid vaporises to form a more disordered gas. When a solute is present, there is additional contribution to the entropy of the liquid due to increased randomness. As the entropy of solution is higher than that of pure liquid, there is weaker tendency to form the gas. Thus, a solute (non volatile) lowers the vapour pressure of a liquid, and hence a higher boiling point of the solution.

Similarly, the greater randomness of the solution opposes the tendency to freeze. In consequence, a lower the temperature must be reached for achieving the equilibrium between the solid (frozen solvent) and the solution. Elevation of B.Pt. (ΔT_b) and depression of F.Pt. (ΔT_f) of a solution are the colligative properties which depend only on the concentration of particles of the solute, not their identity. For dilute solutions, ΔT_b and ΔT_f are proportional to the molality of the solute in the solution.

$$\Delta T_b = K_b m \quad K_b = \text{Ebullioscopic constant} = \frac{RT_b^2 M}{1000 \Delta H_{\text{vap}}}$$

And $\Delta T_f = K_f m$ K_f = Cryoscopic constant = $\frac{RT_f^{\circ 2} M}{1000 \Delta H_{fus}}$ (M = molecular mass of the solvent)

The values of K_b and K_f do depend on the properties of the solvent. For liquids, $\frac{\Delta H_{vap}}{T_b^{\circ}}$ is almost

constant. [Troutan's Rule, this constant for most of the **unassociated liquids** (not having any strong bonding like Hydrogen bonding in the liquid state) is equal to 90 J/mol.]

For solutes undergoing change of molecular state is solution (ionization or association), the observed ΔT values differ from the calculated ones using the above relations. In such situations, the relationships are modified as $\Delta T_b = i K_b m$; $\Delta T_f = i K_f m$

where i = Van't-Hoff factor, greater than unity for ionization and smaller than unity for association of the solute molecules.

5. Depression of freezing point of which of the following solutions does represent the cryoscopic constant of water?
 (A) 6% by mass of urea is aqueous solution
 (B) 100g of aqueous solution containing 18 g of glucose
 (C) 59 g of aqueous solution containing 9 g of glucose
 (D) 1 M KCl solution in water.
6. Dissolution of a non-volatile solute into a liquid leads to the -
 (A) decrease of entropy (B) increase in tendency of the liquid to freeze
 (C) increases in tendency to pass into the vapour phase. (D) decrease in tendency of the liquid to freeze
7. To aqueous solution of NaI, increasing amounts of solid HgI_2 is added. The vapor pressure of the solution
 (A) decreases to a constant value
 (B) increases to a constant value
 (C) increases first and then decreases
 (D) remains constant because HgI_2 is sparingly soluble in water.
8. A liquid possessing which of the following characteristics will be most suitable for determining the molecular mass of a compound by cryoscopic measurements?
 (A) That having low freezing point and small enthalpy of freezing
 (B) That having high freezing point and small enthalpy of freezing
 (C) That having high freezing point and small enthalpy of vaporisation
 (D) That having large surface tension
9. A mixture of two immiscible liquids at a constant pressure of 1 atm boils at a temperature
 (A) equal to the normal boiling point of more volatile liquid
 (B) equal to the mean of the normal boiling points of the two liquids
 (C) greater than the normal boiling point of either of the liquid
 (D) smaller than the normal boiling point of either of the liquid.

ANSWER KEY

DPP No. # 23

- | | | | | | | | | | | | |
|-----|------|----|-----|-----|------|-----|----------|----|-----|----|-----|
| 1.* | (BC) | 2. | (C) | 3.* | (BD) | 4. | M = 199. | 5. | (B) | 6. | (D) |
| 7. | (D) | 8. | (A) | 9. | (D) | 10. | (C) | | | | |

DPP No. # 24

- | | | | | | | | | | | | | | |
|----|-----|----|-----|----|-----|-----|-------|----|-----|----|-----|----|-----|
| 1. | (D) | 2. | (C) | 3. | (A) | 4.* | (ABE) | 5. | (C) | 6. | (D) | 7. | (B) |
| 8. | (B) | 9. | (D) | | | | | | | | | | |

	TARGET JEE (ADVANCED) : 2015	PHYSICAL CHEMISTRY <small>DAILY PRACTICE PROBLEMS</small> D P P
COURSE NAME : URJAA (UR)	DATE : 09.09.2013 to 14.09.2013	DPP No. 25 & 26

* Marked Questions are having more than one correct option.

DPP No. # 25

- How many grams of NaCl must be dissolved in 225 g of water to yield a solution having the same boiling point as that containing 20 g glucose (M = 180) and 30 g sucrose (M = 342) in 225 g of water? (Na = 23, Cl = 35.5)
 (A) 5.8 (B) 11.6 (C) 12.3 (D) None of these
- A solution of 0.2 mole KI ($\alpha = 100\%$) in 1000 g water freezes at T_1 °C. Now to this solution 0.1 mole HgI_2 is added and the resulting solution freezes at T_2 °C. Which of the following is correct :
 (A) $T_1 = T_2$ (B) $T_1 > T_2$ (C) $T_1 < T_2$ (D) Cannot be predicted.
- 0.1 mole of which of the following when added to 1 L water, the aqueous solution obtained will have the lowest freezing point?
 (A) $\text{C}_6\text{H}_5\text{NH}_3\text{Cl}$ (B) $\text{K}_3[\text{Fe}(\text{CN})_6]$ (C) $\text{K}_4[\text{Fe}(\text{CN})_6]$ (D) $\text{Al}(\text{NO}_3)_3$.
- An electrolyte A gives 3 ions and B is a non-electrolyte. If 0.1 M solution of B produces an osmotic pressure P, then 0.05 M solution of A will produce an osmotic pressure, assuming that the electrolyte is completely ionised -
 (A) 1.5 P (B) P (C) 0.5 P (D) 0.75 P
- How many mmoles of sucrose should be dissolved in 500 gms of water so as to get a solution which has a difference of 103.57°C between boiling point and freezing point.
 ($K_f = 1.86 \text{ K Kg mol}^{-1}$, $K_b = 0.52 \text{ K Kg mol}^{-1}$)
 (A) 500 mmoles (B) 900 mmoles (C) 750 mmoles (D) 650 mmoles
- In an ideal mixture of liquids A and B the mole fraction of A is 0.25. If the ratio of P_A^0 to P_B^0 is 7/3, how many repeated distillations would be required as a "minimum" to obtain a small quantity of distillate which has a mole fraction of A, better than 0.80?
 (A) 4 (B) 2 (C) 3 (D) 5
- Two liquids A and B form an ideal solution. The solution has a vapor pressure of 700 Torr at 80°C. It is distilled till $2/3^{\text{rd}}$ of the solution is collected as condensate. The composition of the condensate is $x'_A = 0.75$ and that of the residue is $x''_A = 0.30$. If the vapor pressure of the residue at 80°C is 600 Torr, which of the following is/are true?
 (A) The composition of the original liquid was $x_A = 0.6$. (B) $P_A^0 = \frac{2500}{3}$ Torr.
 (C) The composition of the original liquid was $x_A = 0.4$. (D) $P_B^0 = 500$ Torr.
- To 100g of water some ethylene glycol ($\begin{smallmatrix} \text{CH}_2\text{OH} \\ | \\ \text{CH}_2\text{OH} \end{smallmatrix}$) was added and the solution was cooled to -10°C when 20g of ice was separated. What was the amount of ethylene glycol added to water? What will be its boiling point? (K_f for water is 1.86 and K_b is 0.513).
- What is the degree of dissociation of trichloroacetic acid, if its 1.0 m solution has a freezing point of -2.53 °C? $K_f = 1.86 \frac{\text{K}}{\text{molal}}$

10.	Column-I	Column-II
(A)	0.1 M $\text{Al}_2(\text{SO}_4)_3$	(p) Solution with highest boiling point.
(B)	0.1 M AlPO_4	(q) Van't Hoff factor is greater than 1.
(C)	0.1 M urea.	(r) Solution with lowest osmotic pressure.
(D)	0.1 M MgCl_2	(s) Solution with lowest freezing point.

DPP No. # 26

- The osmotic pressure of equimolar solutions of BaCl_2 , NaCl and glucose will be in the order
 (A) glucose > NaCl > BaCl_2 (B) BaCl_2 > NaCl > glucose
 (C) NaCl > BaCl_2 > glucose (D) NaCl > glucose > BaCl_2
- A 0.004 M solution of Na_2SO_4 is isotonic with 0.010 M solution of glucose at same temperature. The apparent percentage dissociation of Na_2SO_4 is -
 (A) 25% (B) 50% (C) 75% (D) 85%
- Two liquids 'A' and 'B' are mixed in the molar ratio of 1 : 2 and the vapour pressure of the solution is 24 torr. When the two liquids are mixed in the reverse ratio, the vapour pressure of the solution increases by a fraction of $\frac{1}{4}$. The vapour pressures of pure 'A' and 'B' are respectively.
 (A) 20 torr, 40 torr (B) 40 torr, 20 torr (C) 36 torr, 18 torr (D) 18 torr, 36 torr
- Two liquids X and Y are perfectly immiscible. If X and Y have molecular masses in ratio 1:2, the total vapour pressure of a mixture of X and Y prepared in weight ratio 2:3 should be ($P_X^0 = 400$ torr, $P_Y^0 = 200$ torr)
 (A) 300 torr (B) 466.7 torr (C) 600 torr (D) 700 torr

Comprehension # (Q.4 to Q.6)

Properties, whose values depend only on the concentration of solute particles in solution and not on the identity of the solute are called colligative properties. There may be change in number of moles of solute due to ionisation or association hence these properties are also affected. Number of moles of the product is related to degree of ionisation or association by vant Hoff factor 'i'

given by $i = [1 + (n - 1) \alpha]$ for dissociation

where n is the number of products (ions or molecules) obtained per mole of the reactant.

$$\& i = \left[1 + \left(\frac{1}{n} - 1 \right) \alpha \right] \text{ for association}$$

where n is number of reactant particles associated to give 1 mole product.

A dilute solution contains 't' moles of solute X in 1 Kg of solvent with molal elevation constant K_b . The solute dimerises in the solution according to the following equation. The degree of association is α .



- The vant Hoff factor will be [if we start with one mole of X]
 (A) $i = 1 - 2\alpha$ (B) $i = 1 - \alpha/2$ (C) $i = 1 + \alpha/2$ (D) $i = 1 + \alpha$
- The colligative properties observed will be
 (A) $\Delta P_{\text{theo}} > \Delta P_{\text{actual}}$
 $\Delta T_{b(\text{theo})} > \Delta T_{b(\text{actual})}$
 $\Delta T_{f(\text{theo})} > \Delta T_{f(\text{actual})}$
 (C) $\Delta T_{b(\text{theo})} < \Delta T_{b(\text{actual})}$
 $\Delta T_{f(\text{theo})} < \Delta T_{f(\text{actual})}$
 $\Delta P_{\text{theo}} < \Delta P_{\text{actual}}$
 (B) $\Delta P_{\text{theo}} = \Delta P_{\text{actual}}$
 $\Delta T_{b(\text{theo})} = \Delta T_{b(\text{actual})}$
 $\Delta T_{f(\text{theo})} = \Delta T_{f(\text{actual})}$
 (D) $\Delta P_{\text{theo}} \geq \Delta P_{\text{actual}}$
 $\Delta T_{b(\text{theo})} = \Delta T_{b(\text{actual})}$
 $\Delta T_{f(\text{theo})} < \Delta T_{f(\text{actual})}$

6. The equilibrium constant for the process can be expressed as
- (A) $K = \frac{K_b \frac{t}{\Delta T_b}}{1 - \frac{K_b t}{\Delta T_f}}$ (B) $K = \frac{K_b (K_b t - \Delta T_b)}{[2\Delta T_b - K_b t]^2}$ (C) $K = \frac{2(K_{bt} - \Delta T_b) / \Delta T_b}{2t \left[1 - \frac{2(K_b t - \Delta T_b)^2}{\Delta T_b} \right]}$ (D) $K = \frac{\Delta T_{bobs}}{\Delta T_{fobs}}$
7. A 0.01 m solution of NH_4Cl ($M = 53.5$) solidifies at -0.0358°C . Determine the degree of dissociation in this solution and the apparent molar mass of the salt if $K_f = 1.86 \frac{\text{K}}{\text{kg-mol}}$ for water?
8. Calculate the molecular weight of cellulose acetate if its 0.2% (wt./vol.) solution in acetone (sp. gr. 0.8) shows an osmotic rise of 2.58 cm against pure acetone at 27°C .
9. If cost per gram were not a concern, which of the following substances would be the most efficient per unit mass for melting snow from side walks and roads : glucose, LiCl , NaCl , CaCl_2 ?
[C – 12, O – 16, Li – 7, Cl – 35.5, Na – 23, Ca – 40]
10. Match the following :
- | Column-I | Column-II |
|--------------------------------------|--|
| (A) n-hexane + n-heptane. | (p) Can be separated by fractional distillation. |
| (B) Acetone + chloroform | (q) Maximum boiling azeotrope. |
| (C) Chloro-benzene and bromo-benzene | (r) Cannot be separated by fractional distillation completely. |
| (D) Ethanol + water. | (s) Minimum boiling azeotrope. |

ANSWER KEY

DPP No. # 25

1. (A) 2. (C) 3. (C) 4. (A) 5. (C) 6. (C)
7.* (ABD) 8. 102.76°C 9. $a = 0.36$ 10. (A) p,q,s ; (B) q ; (C) r ; (D) q.

DPP No. # 26

1. (B) 2. (C) 3. (C) 4. (B) 5. (A)
6. (B) 7. $0.9247, 27.796 \text{ g/mole.}$ 8. $M = 24,600$ 9. LiCl
10. (A) p ; (B) q,r ; (C) p ; (D) r,s