

SOLUTIONS

Colligative properties

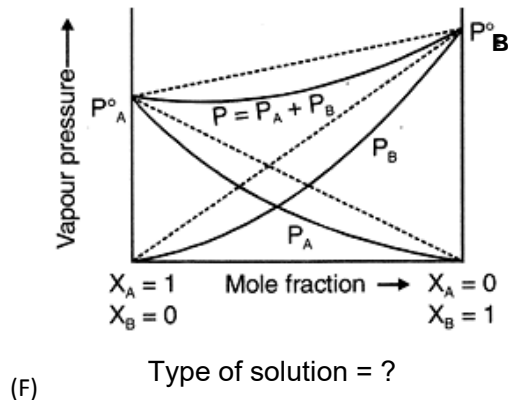
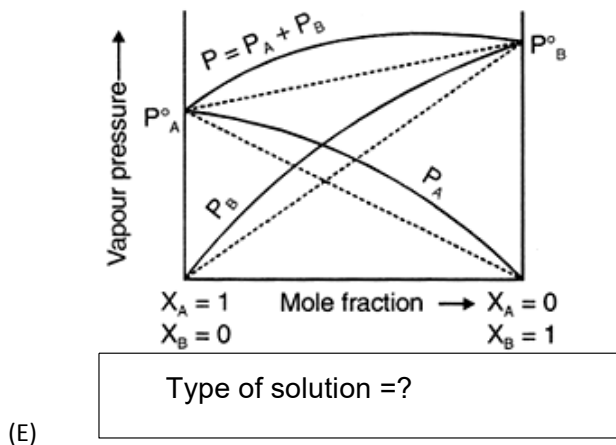
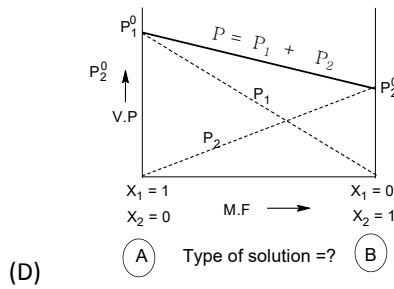
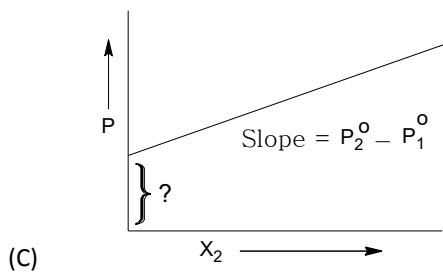
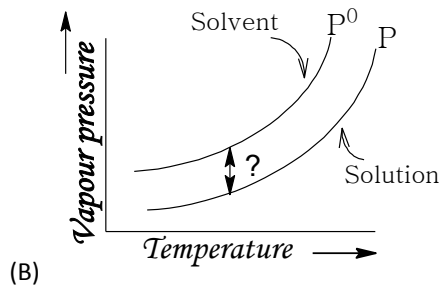
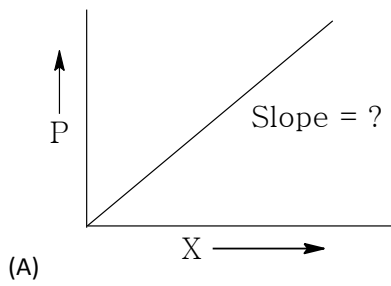
1. Why the boiling point of solution is higher than pure liquid ?
2. Fill the space of column -B by matching with Column -A by taking following values:
 $\Delta H_{\text{mix}} < 0$ and $\Delta V_{\text{mix}} < 0$; $\Delta H_{\text{mix}} = 0$ and $\Delta V_{\text{mix}} = 0$; $\Delta H_{\text{mix}} > 0$ and $\Delta V_{\text{mix}} > 0$

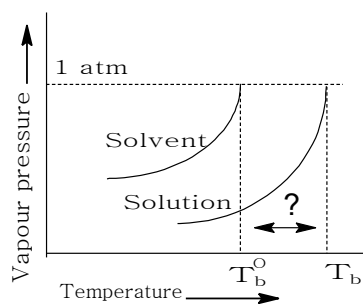
	Column -A	Column -B
A	Ethyl alcohol and water	
B	CCl_4 and Benzene or toluene	
C	Water- nitric acid	
D	Aniline -acetone	

E	Chloro benzene-Bromobenzene	
F	n-hexane and n-heptane	

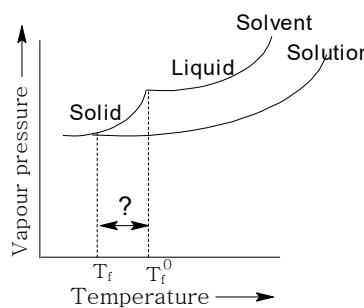
3. Ammonia dissolve in water and Fluorine dissolve in water will not obey Henry's law why?
4. Fill in the blanks.
 - a) Constant boiling mixtures are called -----?
 - b) The boiling point of one molal solution is known as -----?
 - c) Liquid having similar structure and polarity form -----type of solution?
 - d) Solution having same osmotic pressure have same concentration are known as -----?
 - e) The symptom observed by a person at high altitudes is -----?

5. Identify the portions from the following graphs:





(G)



(H)

Answers

1. Ans. Due to lowering in v.p
2. Ans A & B $\Rightarrow \Delta H_{mix} > 0$ and $\Delta V_{mix} > 0$
 C & D $\Rightarrow \Delta H_{mix} < 0$ and $\Delta V_{mix} < 0$
 E & F $\Rightarrow \Delta H_{mix} = 0$ and $\Delta V_{mix} = 0$
3. Ans. Because ammonia highly soluble and fluorine highly reactive with water.
4. Ans. a- Azeotrope; b- molal elevation constant/ Ebulliscopic constant ; c- Ideal solution; d- Isotonic solution ; e- Anaxia
5. Ans A- K_H ; B = ΔP ; C = p_1^0 ; D = ideal solution ; E= +ve deviation ; F= -ve deviation
 G. ΔT_b H. ΔT_f

Concentrations

1. Under what condition molarity and molality will be same?
2. 15ppm by mass = ----- (w/w) %
3. Out of 1M and 1m aqueous solution which is more concentrated
4. What is the molarity of water? (taking density of water = 1g/cc)
5. What will be the mole fraction of water in equimolar solution of ethanol?
6. Determine the correct order of the property mentioned against them :
 (a) 10% Glucose (p_1), 10% Urea (p_2) , 10% Sucrose(p_3) { Increasing osmotic pressure}
 (b) 0.1 M NaCl ; 0.1M Urea ; 0.1M $CaCl_2$ { Increasing order of boiling point}
 (c) 0.1 g NaCl; 0.1g KCl; 0.1 g LiCl { Increasing order of V.P}

Answers

1. Ans : Density of the solution is unit.
2. Ans 1.5×10^{-3}
3. Ans. 1M as density of water is 1gm/ml
4. Ans 55.55 moles
5. Ans 0.5
6. (a) Sucrose < Glucose < Urea
 (b) Urea < NaCl < $CaCl_2$
 (c) LiCl < NaCl < KCl

Concept: Van't Hoff's Factor

1. What is the Vant Hoff factor in $K_4[Fe(CN)_6]$?
2. What will be the van't Hoff factor for 0.1 M ideal solution?
3. Out of 1M $CaCl_2$ and 1 M $AlCl_3$ which having higher vapour pressure?
4. How the van't Hoff factor changes with decrease of molality of the solution?
5. Match the following

Column -A	Column -B
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A	100% Dissociation of NaCl	0.5
B	100% Dissociation of AlCl_3	1.5
C	100% Dissociation of Na_2SO_4	2
D	100% Dissociation of $\text{Al}_2(\text{SO}_4)_3$	5
E	50% Dissociation of AgCl	3
F	75% Dissociation of AgBr	1.75
G	100% dimerisation of benzoic acid	4

Answers

1. Ans. Five
2. Ans. Van't Hoff factor = 1, because ideal solution does not undergo dissociation or association
3. Ans. 1 M CaCl_2 , if we assume 100% dissociation, i for CaCl_2 is 3 and for AlCl_3 is 4 and relative lowering of V. P. is directly proportional to i .
4. Ans. Increases