CHEMISTRY

BOOKS - NARENDER AVASTHI CHEMISTRY (HINGLISH)

DILUTE SOLUTION

Exercise

1. The vapour pressure of a give liquid will decrease if :

A. surface area of liquid decreased

B. the volume of liquid in the container is decreased

C. the volume of the vapour phase is increased

D. the temperature is dexreased

Answer: d

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2. The normal boiling point of water is 373 k. Vapour pressure of water at temperature T is 19 mm hg. If enthalpy of vapourization is 40.67 kJ/mol, then temperature T would be

(use : log 2 = 0.3, R : 8.3$Jk^{-1}mol^{-1}$):

A. 250 K

B. 291.4 K

C. 230 K

D. 290 K

Answer: B

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3. A simple of thliqid H_2O at 18.0 g is inlected into an evacuated 7.6 L flask maintained at $27.0^\circ C$. If vapour pressure of H_0O at $27.0^\circ C$ is 24.63

mm Hg, what wight percentage of the water will be vaproueied when the ssystem comes to equilibrium? Assume water vapours behaves as an ideal gas. The volume occupied by the liquid water is negligible compared to the volume of the container:

A. 0.01

B. 0.1

C. 0.18

D. 0.2

Answer: a

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4. Raoult's low is obeyed by each constituent of s binary liquid solution when :

A. the forces of attraction between like molecules are greater than those between unlike molecules

B. the forces of attraction between like molecules are smaller than those between unlike molecules

C. the forces of attraction between like molecules are identical with those between unlike molecules

D. the volume occupied by unlike molecules are different

Answer: c

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5. For a binary ideal liquid solution, the total vapour of the solution is given as:

A. $P_{\text{total}} = P_A^\circ + \left(P_A^\circ - P_B^\circ\right)X_B$

B. $P_{\text{total}} = P_B^\circ + \left(P_A^\circ - P_B^\circ\right)X_A$

C. $P_{\text{total}} = P_B^\circ + \left(P_B^\circ - P_A^\circ\right)X_A$

D. $P_{\text{total}} = P_B^\circ + \left(P_B^\circ - P_A^\circ\right)X_B$

Answer: b

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6. For an ideal liquid solution with $P_A^\circ > P_A^\circ$, which relation between X_A ((mole fraction of A in liquid phase) and Y_A(mole fraction of A in vapour phase) is correct ?

A. $Y_a < Y_b$

B. $X_A > X_B$

C. $\frac{Y_A}{Y_B} > \frac{X_A}{X_B}$

D. $\frac{Y_A}{Y_B} < \frac{X_A}{X_B}$

Answer: C

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7. X_A and X_B are the mole fraction of A and B respectively in liquid phase y_A and y_B are the mole fraction of A and B respective in vapour phase. Find out the slope of straight line if a graph is plotted $\frac{1}{y_A}$ along Y-axis against $\frac{1}{x_A}$ along X-axis gives straight line $[p_A^\circ$ and p_B° are vapour pressure of pure components A and B].

A. $\frac{P_B^\circ}{P_A^\circ}$

B. $\frac{P_A^\circ}{P_B^\circ}$

C. $P_B^\circ - P_A^\circ$

D. $P_A^\circ - P_B^\circ$

Answer: a

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8. For a dilute solution, Raoult's low srates that :

A. the lowering of vapour pressure is equal to the mole fraction solute

B. the relative lowering of varpour pressure is equal to the mole fraction of solute

C. the relative lowering of varpour pressure is proportional to the amount of solute in solution

D. the vapour pressure of the solution is equal to the mole fraction of solvent

Answer: b

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9. The solubility of a speific non-volatile salt is 4 g in 100 g of water at $25^{\circ}C$. $If 2.0g, 4.0g$ and 6.0 g of the salt added of 100 g of water at 25°, in system X, Y and Z. The vapour pressure would be in the order:

A. $X < Y < Z$

B. $X > Y > Z$

C. $Z > X = Y$

D. $X > Y = Z$

Answer: d

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10. The boiling point of $C_6H_6, CH_3OH, C_6H_5NH_2 \text{and} C_6H_5NO_2 \text{are} 80^\circ C, 65^\circ C, 184^\circ C \text{and} 212^\circ C$ respectively. Which will show highest vapour pressure at room temperature :

A. C_6H_6

B. CH_3OH

C. $C_6H_5NH_2$

D. $C_6H_5NO_2$

Answer: B

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11. 6.0 g of urea (molecules mass = 60)was dissolved in 9.9 moles of water. If the vspour presssure of pure water is P°, the vapour pressure of solution is :

A. 0.10 P°

B. 1.10 P°

C. 0.90 P°

D. 0.99 P°

Answer: d

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12. An ideal solution was found to have a vapour pressure of 80 torr when the mole fraction of a non-volatile solute was 0.2. What would be the vapour pressure of the pure solvent at the same temperature?

A. 64 torr

B. 80 torr

C. 100 torr

D. 400 torr

Answer: C

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13. If the vapor pressure of a dilute aqueous solution of glucose is $750mm$ of Hg at $373K$, then molality of solute is

A. 0.26

B. 0.73

C. 0.74

D. 0.039

Answer: c

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14. The lowering of vapour pressure due to a solute in a $1m$ aqueous solution at $100^\circ C$ is

A. 10 torr

B. 18 torr

C. 13.45 torr

D. 24 torr

Answer: c

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15. Calculate the weight of non $-$ volatile solute having molecular weight 40, which should be dissolvd in $57gm$ octane to reduce its vapour pressure to $80\ \%$:

A. 47.2 g

B. 5 g

C. 106.2 g

D. None of these

Answer: b

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16. Equal mass of a soute are dissolved in equal mass of two solvents A and B and formed very dilute solution. The relative lowering of vapour pressure for the solution B has twice the relative lowering of vapour pressure for the solution A. If $m_A \text{and} M_B$ are the molecules mass of solventds A and B respectively, then :

A. $M_A = M_B$

B. $M_B = 2 \times M_A$

C. $M_A = 4M_B$

D. $M_A = 2M_B$

Answer: b

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17. An ideal solution has two components A is more volatile than B, i.e. $P_A^\circ > P_B^\circ$ and also$p_A^\circ > P_{\text{total}}$. If X_A and Y_A are mole fraction of components A in liquid and vapour phases, than :

A. $X_A = Y_A$

B. $X_A > Y_A$

C. $X_A < Y_A$

D. Data insuffcient

Answer: c

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18. At $25^\circ C$, the vapour pressure of pure liquid A (mol. Mas = 40) is 100 torr, (mol. = 80). The vapour pressure at $25^\circ C$ of a solution containing 20 g of each A and B is :

A. 80 torr

B. 59.8 torr

C. 68 torr

D. 48 torr

Answer: a

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19. The lquid A and B from ideal solutions. At 300 K, the vapour pressure of solution containing 1 mole of A and 3 mole of B is 550 mm Hg. At the same tempreature, if one more mole of B is added to this solution, the vapour pressure of the solution increases by 10 mm Hg. determinethe vapour pressure of A and B in their pure states (in mm Hg):

A. 400600

B. 500 , 500

C. 600 , 400

D. none of these

Answer: a

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20. Two liquid A and B have vapour pressure in the ratio $P_A^\circ : P_B^\circ$ =1.3 at a certain temperature.Assume A and B from an ideal solution and the ratio

of mole fractions of A to B in the vapour phase is 4 : 3, then the mole fraction of B in the solution at the same tempreature is :

A. $\frac{1}{5}$

B. $\frac{2}{3}$

C. $\frac{4}{5}$

D. $\frac{1}{4}$

Answer: a

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21. Two liquids A and B have P_A° and P_B° in the ratio of 1 : 3 and the ratio of number of moles of A and B in liquid phese are 1 : 3 then mole fraction of 'A' in vapour phase in equilibrium with the solution is equal to :

A. 0.1

B. 0.2

C. 0.5

D. 1

Answer: a

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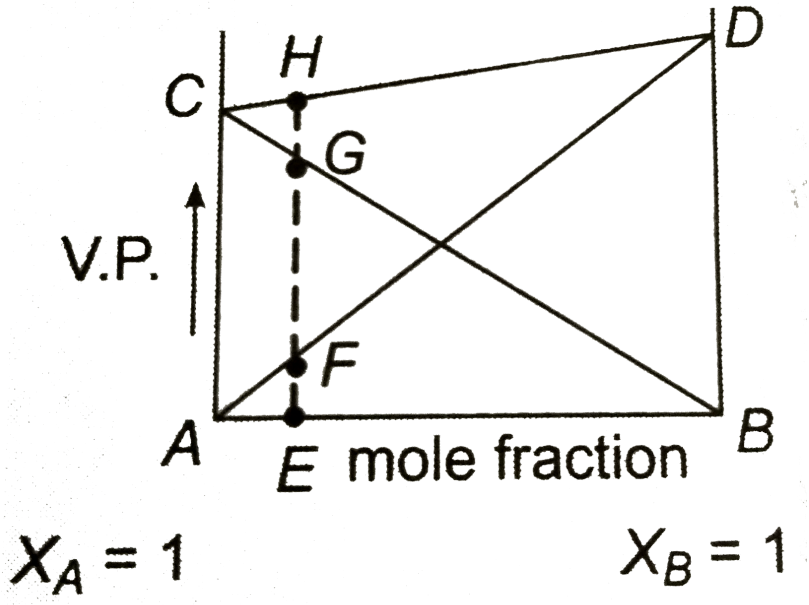
22. Based on the given diagram, which of the following statements regarding the homogenous solution of two volatile liquids are correct?



A. only 1

B. 2 and 3

C. 1 and 3

D. all

Answer: d

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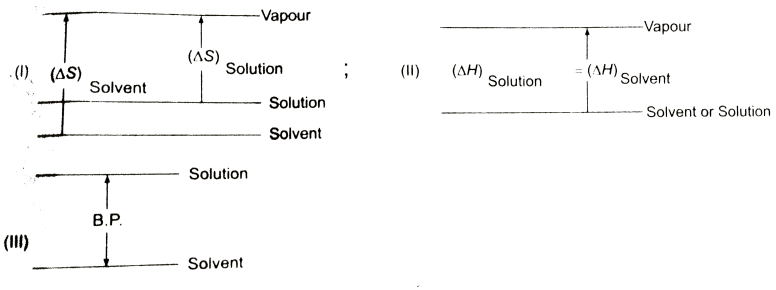
23. Which represents correct difference when non-volatile solute is present in an ideal solution?



A. I, II, III

B. I, III

C. II, III

D. I, II

Answer: a

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24. Select correct statement :

A. Solution has more molecules randomness than a pure solvent. The entropy change between solution and solid is lager than the entropy change between pure solvent and solid

B. Heat of fusion of solution are positive

C. Solution containing sugar freezes at a lower tempreature than pure water

D. All are correct statements

Answer: d

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25. Select correct statement :

A. Heats of vaporisation for a pure sovent and for a solution are similar because similar intermolecules forces between solvent molecules must be overcome in both cases

B. Entropy change between solution and vapour is smaller than the entropy change between pure solvent and vapour

C. Boiling point of the solution is larger than that of the pure solvent

D. All sre correct statements

Answer: d

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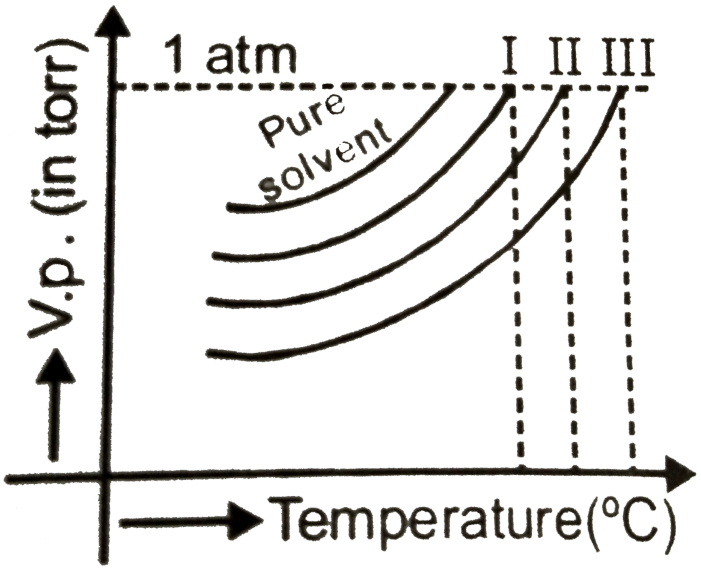
26. The vapour pressure curves of the same solute in the same solvent are shown below. The curves are parallel to each other and does not

intersect. The concentrations of solutions are in order of :



A. $I < II < III$

B. $I = II = III$

C. $I > II > III$

D. $I > III > II$

Answer: a

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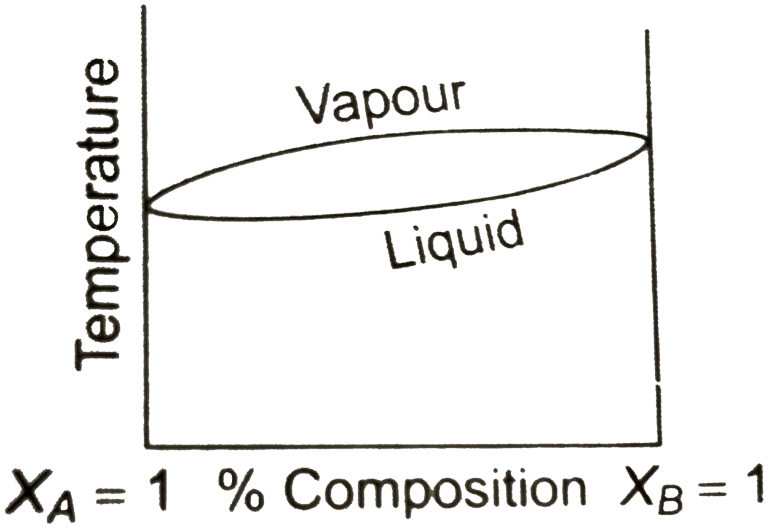
27. Boiling point composition diagram of the liqid-vapour equilibrium for A and B is shown in the figure. If a binary liquid mixture of A and B is distilled fractionally, which of the following would be correct observation ?



A. Composition of the still (residue) will approach pure liquid B only

B. composition of the distillate will approach pure A only

C. Composition of distillate and residue will approach pure A and B respectively

D. Neither of the component can be obtained in pure state

Answer: c

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28. The boiling point of an azeotropic mixture of water and ethyl alcohol is less than that of the theoretical value of water and alcohol mixture. Hence the mixture shows

A. the mixture will show negative deviation from Raoult's law

B. the mixture will show positive deviation from Raoult's law

C. the mixture can be considered as ture solution

D. this mixture can be considered as ture solution

Answer: b

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29. Formation of a solution from two componets can be considered as :

(i) pure solvent $\rightarrow$ separated solvent molecules, $\triangle H_1$

(ii) Pure solute $\rightarrow$ separated molecules, $\triangle H_2$

(iii) separated solvent and solute molecules $\rightarrow$ solution, $\triangle H_3$

solution so formed will be ideal if :

A. $\triangle H_{\text{soln}} = \triangle H_1 + \triangle H_2 + \triangle H_3$

B. $\triangle H_{\text{soln}} = \triangle H_1 + \triangle H_2 - \triangle H_3$

C. $\triangle H_{\text{soln}} = \triangle H_1 - \triangle H_2 - \triangle H_3$

D. $\triangle H_{\text{soln}} = \triangle H_3 - \triangle H_1 - \triangle H_2$

Answer: a

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30. Total vapour pressure of mixture of 1 mol X (P_X° = 150 torr) and 2 mol $Y\left(P_Y^\circ\right)$ = 300 torr is 240torr. In this case :

A. there is a negative deviation from Raoult's law

B. there is a positive deviation from Raoult's law

C. there is no deviation from Raoults law

D. can not be decided

Answer: a

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31. In a mixture of A and B, components show positive deviation when:

A. A-B interaction is stronger than A -A and B-B interaction

B. A-B interaction is weaker than A-A and B-B interaction

C. $\triangle V\text{mix} < 0, \ \triangle Smix > 0$

D. $\triangle V\text{mix} = 0, \ \triangle Smix > 0$

Answer: b

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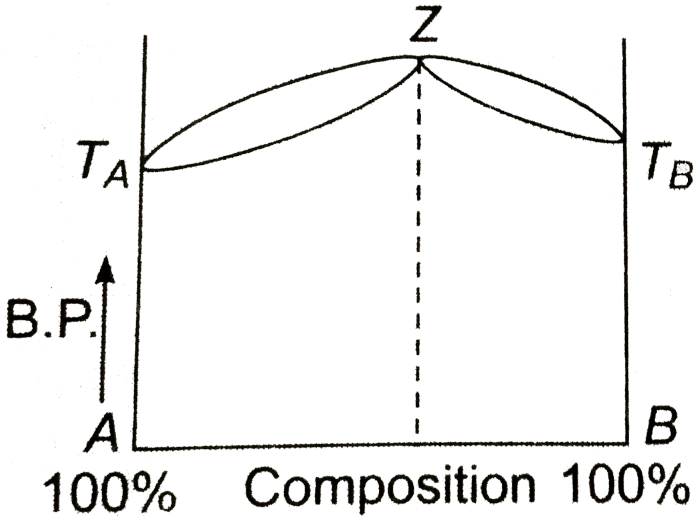
32. A liquid mixture ohaving composition corresponding to point Z in the figure shown is subjected to distillation at constant pressure. Which of the following statements is correct about the process?



A. The composition of distillate differs from the mixture

B. The boiling point goes on changing

C. The mixyure has highest vapour pressure than for any other composition

D. Composition of an azeotrope alters on changing the exernal pressure

Answer: d

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33. Which will from maximum boiling azeotrope ?

A. $C_6H_6 + C_6H_5CH_3$ solution

B. $HNO_3 + H_2O$ solution

C. $C_2H_5OH + H_2O$ solution

D. n- hexane and n-heptane

Answer: B

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34. Total vapour pressure of mixture of 1 mole of volaile components A ($P_{a\%}$)=100 mm Hg) and 3 mole of volatile component B($P_B^\circ = 80mmHg$) is 90 mm Hg. For such case:

A. There is positive deviation from Rsoult's law

B. boiling point has been lowered

C. force of attraction between A and B is weaker than that between A and A or betweenB and B

D. All the above statement are correct

Answer: d

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35. The azeotropic mixture of water ($B.P. = 100^\circ C$) and HCl($B.P. = 86^\circ C$)boils at about $120^\circ C$. During fractional distillation of this mixture it is possible to obtain :

A. pure HCl

B. pure H_2O

C. pure H_2O as well as pure HCl

D. Neither C_2H_5OH nor HCl

Answer: d

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36. Azeotropic mixture of water and C_2H_5OH boils at 351 K. By distilling the mixture it is possible to obtain

A. pure C_2H_5OH only

B. Pure water only

C. Neither C_2H_5OH nor water

D. Both water and C_2H_5OH in pure state

Answer: c

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37. Anazeotropic mixture of two liquid has a boiling point higher than either of them when it :

A. shows positive deviation from Raoult's law

B. shows negative deviation from Raoult's law

C. shows ideal behaviour

D. is saturated

Answer: b

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38. If two liquids A ($P_A^\circ = 100$torr) and (P_B° =200 torr) which are completely immiscible with each other (each one will behave indepenently of the othere)are present in a closed vessel, the total vapour pressure of the system will be :

A. less than 100 torr

B. greater than 200 torr

C. between 100 to 200 torr

D. 300 torr

Answer: d

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39. When a liquid that is immiscible with water was steam distilled at $952^\circ C$ at a total pressure of 748 torr, the distillate contained $1.25g$ of the liquid per gram of water. The vapour pressure of water is 648 torr at $95.2^\circ C$. What is the molar mass of liquid?

A. 7.975 g/mol

B. 166 g/ mol

C. 145.8 g/mol

D. None of these

Answer: c

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40. Water and chorobenzene are immiscible liquids. Their mixture boils at $89^{\circ} C$ is 7 x10^{4}pa. Mass per cent of chorobenzene in the distilate is :

A. 50

B. 60

C. 78.3

D. 38.46

Answer: d

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41. Which of the following is not a colligative property ?

A. Vapour pressure

B. Depression in f.pt.

C. Elevation in b.pt.

D. Osmotic pressure

Answer: a

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42. The degree of an electrolyte is a and its Van't Hoff factor is i. The number of ions obtained by complete dissociation of 1 molecules of electrolyte as :

A. $\frac{i+a-1}{a}$

B. i- a - 1

C. $\frac{i-1}{a}$

D. $i+1+\frac{a}{1-a}$

Answer: a

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43. One mole of a soulte A is dissolved in a given volume of a solvent. The association of the solute take place as folloes:

A. I = 1 - a

B. $i = 1 + \frac{a}{n}$

C. $i = \frac{1 - a + \frac{a}{n}}{1}$

D. I = 1

Answer: C

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44. The van't Hoff factor I for an electrolyte which undergoes dissociation and association in solvent place as follows

A. greater than one and less then one

B. less then one and greater than one

C. less then one and less than one

D. greater then one and greater than one

Answer: A

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45. Which solution has the highert vapour presssure ?

A. 0.02 M NaCl at 50° C

B. 0.03 M sucrose at 15° C

C. 0.005 m CaCl_(2) at $500^\circ C$

D. 0.005 M$CaCl_2$at$25^\circ C$

Answer: c

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46. An aqueous solution is 1.00 molal in KI. Which change will cause the vapor pressure of the solution to increase?

A. addition of water

B. addtion of NaCl

C. addtion of Na_2So_4

D. Addition of 1.0 molal KI

Answer: a

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47. Four solutions of K_2So_4 with the concentrations 0.1m ,0.001 m, and 0.0001 mare available . The maximum value of colligative property corresponds to :

A. 0.0001 msolution

B. 0.001 m solution

C. 0.01 m solution

D. 0.1 m solution

Answer: d

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48. Moles of K_2SO_4 to be dissolved in 12 moles of water of lower its vapour pressure by 10mm Hg at a temperature at which vapour pressure of pure water is 50mm Hg is

A. 1.5 mole

B. 2 mole

C. 1 mole

D. 3 mole

Answer: D

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49. A very diluted saturated solution of a sparingly soluble salt X_3Y_4 has a vapour pressure of 20 mm Hg temperature T, while pure water exerts a pressure of 20.0126 mm Hg at the same temperature . Calculate molality (m)at temperature T :

A. 6.3×10^{-4}

B. 3.5×10^{-2}

C. 5×10^{-3}

D. None of these

Answer: c

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50. When 1 mole of a solute is dissolved in 1 kg of H_2O, boiling point of solution was found to be 100.5°C. K_b for H_2O is :

A. 0.5

B. 100

C. 100.5

D. 95.5

Answer: a

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51. Choroform , $CHCl_3$, boils at 61.7°C. If the K_b for choroform is $3.63^\circ C/\text{molal}$, what is the boiling point of a solution of 15.0 kg ofCH_3 and 0.616 kg of acenaphthalene, $C_{12}H_{10}$?

A. 61.9

B. 62

C. 52.2

D. 62.67

Answer: d

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52. A compound has the empirical formula $C_{10}H_8Fe$. A solution of 0.26 g of the compound in 11.2 g of benzene (C_6H_6)boils at $80.26^\circ C$. The boiling point of benzene is $80.10^\circ C$, theK_b is $2.53^\circ C$/molal. What is the molecules formula of the compound?

A. $C_{30}H_{24}Fe_3$

B. $C_{10}H_8Fe$

C. C_5H_4Fe

D. $C_{20}H_{16}Fe_2$

Answer: d

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53. A solution of 0.640 g of azulene in 100.0 g of benzene is $80.23^\circ C$. The boilingpoint of benzeneis $80.10^\circ C$, andK_b is $2.53^\circ C$/molal What is the moleculer mass of azulene?

A. 108

B. 99

C. 125

D. 134

Answer: c

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54. One molal solution of a carboxylic acid in benzene shows the elevation of boiling point of 1.518 K. The degree of association for simerization of the acid in benzene is (K_b for beznene = $2.53 K kg mol^{-1}$):

A. 0.6

B. 0.7

C. 0.75

D. 0.8

Answer: d

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55. The normal boiling point of toluene is $110.7^{\circ}C$ and its boiling point elevation constant $3.32\ \mathrm{K\,kg\,mol^{-1}}$. The enthalpy of vaporization of toluene is nearly :

A. $17.0kjmol^{-1}$

B. $34.0kjmol^{-1}$

C. $51.0kjmol^{-1}$

D. $68.0kjmol^{-1}$

Answer: b

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56. Which one of the following aqueous solutions will exhibit highest boiling point?

A. 0.015 M urea

B. 0.01 M KNO_3

C. $0.10MNa_2SO_4$

D. 0.015 m glucose

Answer: c

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57. Calcuate the percentage degree of dissociation of an electrolyte XY_2 (Normal molar mass = 164) in water if the water if the observed molar

mass by measuring elevation in boiling point is 65.6

A. 0.75

B. 0.25

C. 0.65

D. None of these

Answer: a

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58. if the elevation in boiling point of a solution of non-volatile, non-electrolytic and non-associating solute in solvent ($K_b = xK.\ k > .\ \mathrm{mol}^{-1}$)is y K, then the depression in freezing point of solution of same concentration would be

(K_f)of the solvent = $zk.\ kg\mathrm{mol}^{-1}$)

A. $2x\frac{y}{y}$

B. $y\frac{z}{x}$

C. $x\frac{z}{y}$

D. $y\frac{z}{2x}$

Answer: b

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59. When a solution containing non- volatile solute freezes, which equilibrium would exist?

A. solid solvent $\Leftrightarrow$ liquid sovent

B. solid solute $\Leftrightarrow$ liquid solution

C. solid solute $\Leftrightarrow$ liquid sovent

D. solid solvent $\Leftrightarrow$ liquid solution

Answer: d

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60. Bromoform has a normal has freezing point of $7.734^\circ C$ and $K_f = 14.4^\circ C/m$.a solution of 2.60 g of an unknown substance in 100 g of freezes at $5.43^\circ C$. What is the molecules mass of the unknown substance ?

A. 16.25

B. 162.5

C. 100

D. none of these

Answer: b

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61. C_6H_6 freezes at $5.5^\circ C$. At what tempreature will a solution of 10.44 g of C_4H_{10} in 200 g of $C_6H_6 \text{freeze} K_f(C_6H_6) = 5.12^\circ C/m$

A. $4.608^\circ C$

B. $0.892^\circ C$

C. $5.5^\circ C$

D. none of these

Answer: b

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62. How much ethyl alcohol must be added to $1.00L$ of water so that the solution will not freeze at $-4^\circ F$?

A. lt 20 g

B. lt10.75 g

C. lt 494.5 g

D. gt494.5 g

Answer: d

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63. The freezing point of a solution of 2.40 g of biphenyl($C_{12}H_{10}$) in 75.0 g of benzene (C_6H_6) is $4.40^\circ C$. The normal freezing point of benzene is $5.50^\circ C$. What is the molal freezing point constant ($\hat{}$ ($\circ$)C/m) for benzene ?

A. 5.3

B. 5.1

C. 4.6

D. 4.8

Answer: a

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64. A solution containing 1.8 g of a compound (empirical formula CH_2O) in 40 g of water is observed to freeze at -0.465°C. The molecules formula of the compound is (K_f of water =1.86kg Kmol^{-1}):

A. $C_2H_4O_2$

B. C_3H_6

C. $C_4H_8O_4$

D. $C_6H_{12}O_6$

Answer: d

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65. Freezing point of the following equilibrium, liquid solvent $\Leftrightarrow$ solid solvent is :

A. $\frac{\triangle H - \triangle G}{T \triangle S}$

B. $\frac{\triangle H}{\triangle S}$

C. $\frac{\triangle G}{\triangle S}$

D. $\frac{\triangle S}{\triangle H}$

Answer: b

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66. Freezing point of a solution is smaller than freezing point of a solvent. It is due to :

A. $\triangle H$ of solution and solvent is almost identical since intermolecular force between solvent molecules are involved

B. $\triangle S$ solution (between solution and solid) is lager than that of the $\triangle S$of solvent (between solvent and solid)

C. $\triangle S$ of then solution is smaller than that of the solvent

D. $\triangle H$ of the solution is much higher than of solvent but $\triangle S$ of solvent than that of the solvent

Answer: b

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67. When 36.0 g of a solute having the empirical formula CH_2O is dissovled in 1.20 kg of water, the solution freezes at $-0.93^\circ C$. What is the moleculer formula of the solute ? ($K_f = 1.86^\circ Ckgmol^{-1}$)

A. C_2H_4O

B. $C_2H_2O_2$

C. $C_2H_4O_3$

D. $C_2H_4O_2$

Answer: d

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68. Calulate the molesules mass of a substance whose 7.0% by mass solution in water freezes at $-0.93^\circ C$. the cryosctopic constant of water is $1.86^\circ Ckgmol^{-1}$:

A. $140gmol^{-1}$

B. $150.5 gmol^{-1}$

C. $160 gmol^{-1}$

D. $155 gmol^{-1}$

Answer: b

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69. Camphor is often used in molecular mass determination because

A. it is readily available

B. it has a very high cryoscopic constant

C. it is volatile

D. if is solvent for organic substances

Answer: b

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70. For 1 molal solution of each compound minimum freezing point will be assuming compound ionisation in each case :

A. $\left[Fe(H_2O)_6\right]Cl_3$

B. $\left[Fe(H_2O)_5Cl\right]Cl_2.\ H_2O$

C. $\left[Fe(H_2O)_4Cl_2\right]Cl.2H_2O$

D. $\left[Fe(H_2O)_3Cl_3\right].3H_2O$

Answer: a

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71. Which of the following solutions $(1molal)$ will have the maximum freezing point, assuming equal ionization in each case?

A. $\left[Fe(H_2O)_6Cl\right]Cl_3$

B. $\left[Fe(H_2O)_5Cl\right]Cl_2.\ H_2O$

C. $\left[Fe(H_2O)_4Cl_2\right]Cl.2H_2O$

D. $\left[Fe(H_2O)_3Cl_3\right].3H_2O$

Answer: d

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72. $PtCl_4.6H_2O$can exist as hydrated complex 1 molal aq.solution has depression in freezing point of $3.72^\circ C$Assume $100\,\%$ ionisation and $K_f\left(H_2O = 1.86^\circ mol^{-1}\right)kg$ then complex is

A. $[pt(H_2O_6]Cl_4$

B. $\left[Pt(H_2O)_5Cl\right]Cl_2.\,2H_2O$

C. $\left[Pt(H_2O)_3Cl_3\right]Cl.\,3H_2O$

D. $\left[Pt(H_2O)_2Cl_4\right]Cl.\,4H_2O$

Answer: c

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73. A complex is represented as $CoCl_3.XNH_3$. Its 0.1 molal solution in aqueous solution shows $\Delta T_f = 0.558^\circ$. $\left(K_f \text{ for } H_2O \text{ is } 1.86 K \text{molality}^{-1}\right)$ Assuming $100\,\%$ ionisation of complex and co-ordination number of Co as six, calculate formula of complex.

A. $[Co(NH_3\_(4)CL_2]Cl$

B. $\left[Co(NH_3)_5Cl\right]Cl_2$

C. $\left[Co(NH_3)_4CL_2\right]Cl$

D. none of these

Answer: b

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74. The freezing point of equimolal soution will be highest for :

A. $C_6H_5NH_3Cl$

B. $Ca(NO_3)_2$

C. $La(NO_3)_2$

D. $C_6H_{12}O_6$

Answer: d

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75. The freezing point of 4% aqueous solution of 'A' is equal to the freezing point 10% aqueous solution of 'B'. If the molecules mass of 'A'is 60, then the molecules mass of 'B' will be:

A. 160

B. 90

C. 45

D. 180

Answer: a

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76. The depression in freezing point of $0.01m$ aqueous $CH_3C\infty H$ solution is 0.02046°, $1m$ urea solution freezes at $-1.86^\circ C$. Assuming molality equal to molarity, pH of CH_3COOH solution is

A. 2

B. 3

C. 4

D. 5

Answer: b

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77. When mercuric iodide is added to the aqueous solution of potassium iodide, then:

A. freezing point is raised

B. Freezing point is lowered

C. freezing point does not change

D. boilingpoint does not change

Answer: a

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78. Dimer of acetic acid in liquid benzene is in equilibrium with acetic acid monomer at certain temperature and pressure. If 25% of the dimer molecules are separated out then

A. freezing point of the solution reduces

B. average moler mass of solute incerases

C. boiling point of solution increases

D. molarmass of solute decreases

Answer: b

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79. The temperature of a city was found to be -9.3° C. A car used, whose rasiator was filled with 5 L of water . What minimum quantity of antifreezing agent ethylene glycol were added to water of raiator in order to use the car for teavelling? (K_f of water 1.861.86 k mol^{-1})

A. 3200 g

B. 1670 g

C. 1550 g

D. 2100 g

Answer: c

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80. The cryoscopic constant of water is 1.86 K kg mol^{-1}. A 0.01 molal acetic acid solution produces a depression of $0.0194^{\circ}C$ in the freezing

point. The degree of dissociation of acetic acid is :

A. zero

B. 0.043

C. 0.43

D. 1

Answer: b

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81. In a 0.5 molal solution KCl, KCl is 50% dissociated. The freezing point of solution will be (K_f = 1.86 K kg mol^{-1}):

A. 274.674 K

B. 271.60 K

C. 273 K

D. none of these

Answer: b

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82. A 1.0 g sample of co$(NH_2CH_2CH_2NH_2)_3Cl_3$ is dissolved in 25.0 g if water and the freezing point of the solution is $-0.87^\circ C$. How many ions are produced per mole of compound? The K_f of water is $1.86^\circ C/\text{molal}$

A. 2

B. 3

C. 4

D. 5

Answer: c

Watch Video Solution

83. An aqueous solution contain 3% and 1.8% by mass. Urea and glucose respectively. What is the freezing point of solution ? ($K_f = 1.86^\circ C/m$)

A. $-1.172^\circ C$

B. $-2.27^\circ C$

C. $-1.5^\circ C$

D. none of these

Answer: a

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84. phenol associates in benzene to a certain extent in dimerisation reaction. A solution containing 0.02 kg of phenol in 1.0 kg of benzene has its freezing point depressed 0.69 k. [$K_f(\_(6)H_6) = 5.12 k\text{mol}^{-1}$]

A. 0.63

B. 0.73

C. 0.83

D. 0.93

Answer: b

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85. Assuming complete ionisation, the solution having maximum freezing point will be:

A. 1 M CaF_2

B. 1.5 M $Al_2(SO_4)_3$

C. 2 M NaCl

D. 1 M $AgNO_3$

Answer: d

Watch Video Solution

86. In a 2.0 molal aqueous solution of a weak acid HX the degree of dissociation is 0.25. The freezing point of the solution will be nearest to: ($K_f = 1.86 Kkg\text{mol}^{-1}$)

A. $-0.26^\circ C$

B. $0.465^\circ C$

C. $-0.48^\circ C$

D. $-0.465^\circ C$

Answer: d

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87. An aqueous solution of 0.01 M KCl cause the same elevation in boiling point as an aqueous solution of urea. The concetration of urea solution is :

A. 0.01 m

B. 0.005 M

C. 0.02 M

D. 0.04 M

Answer: c

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88. when some NaCl was dissolved in water, the freezing point depression was unmerically equal to twice the molal f.p. depression constant. The relative lowering of vapour pressure of the solution in nearly :

A. 0.036

B. 0.018

C. 0.0585

D. 0.072

Answer: a

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89. Which one of the following statement is false ?

A. The correct order of osmotic pressure for 0.01 M aqueous solution of each follows $BaCl_2 > KCl > CH_3COOH > sucrose$

B. Isotonic solutions are those solutions which have the same osmotic pressure

C. Raoult's law state that the vapour pressure of a component over a solution is proportionto its mole fraction in liquid state

D. Two sucrose solutions of same molality prepared in different solvent will have the same freezing point depression

Answer: d

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90. 0.1 molal aqueous solution of an electrolyte AB_3 is 90% ionised. The boiling point of the solution at 1 atm is ($K_{b(H_2O)} = 0.52kg \ \ \text{mol}^{-1}$)

A. 273.19 K

B. 374.92 K

C. 376. 4 K

D. 373. 19 K

Answer: d

Watch Video Solution

91. Which of the following aqueous solutions has osmotic pressure nearest to pure salvent ?

A. Na_2SO_4

B. $BaCl_2$

C. $Al_2(SO_4)_3$

D. $C_{12}H_{22}O_{11}$

Answer: d

Watch Video Solution

92. 0.1 M NaCl and 0.05 M $BaCl_2$ solutions are separated by a sami-premeable membrane in a container. For this system, choose the correct answer

A. There is no movement of any solution across the membrane

B. Water flows from $BaCl_2$ solution towards NaCl solution

C. Water flows from NaCl solution towards $BaCl_2$ solution

D. Osmotic pressure of 0.1 M NaCl is lower than the osmotic pressure of $BaCl_2$(assume complete dissocition)

Answer: b

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93. Two aqueous solutions, A and B, are separated by a semi- permeable membrane. The osmotic pressure of solution A immediately begins to decrease. Which of the following statement is ture ?

A. The solvent molecular are moving from the solution of higher osmotic pressure to that of lower osmotic pressure

B. The initial osmotic pressure of solution B is greater than that of solution A.

C. Solvent molecules are moving from solution B into solution A.

D. Both (a) and (b) are ture statements.

Answer: c

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94. Which one of the following pairs of solution can we expect to be isotonic at the same temperature

A. 0.1 M urea and 0.1 M NaCl

B. 0.1 M urea and 0.2 M $MgCl_2$

C. 0.1 M NaCl and 0.1 M Na_2SO_4

D. 0.1 M $C(NO_3)_2 \text{and} 0.1m Na_2SO_4$

Answer: d

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95. The empirical formula of a non-electrolyte is CH_2O. A solution containing 3 g L^{-1} of the compound exerts the same osmotic pressure as that of 0.05 M glucose solution. The molecules formula of the compound is :

A. CH_2O

B. $C_2H_4O_2$

C. $C_4H_8O_4$

D. $C_3H_6O_3$

Answer: b

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96. A semipermeable membrane used in the measurement of osmotic pressure of a solution allows the passage of

A. solute molecular through it

B. solvent molecules though it

C. both solvent and solute molecules

D. either solvent or solute

Answer: b

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97. In the case of osmosis, solvent molecules move from :

A. higher vapour pressure to lower vapour pressure

B. higher concentration to lower concentration

C. lower vapour pressure to higher vopour pressure

D. higher osmotic pressure to lower osmotic pressure

Answer: a

Watch Video Solution

98. The osmotic pressures of equimolar solutions of urea, $BaCl_2$ and $AlCl_3$willl be in the order :

A. $AlCl_3 > BaCl_2$ gt urea

B. $BaCl_2 > AlCl_3$ gturea

C. urea gt$BaCl_2 > AlCl_3$

D. $BaCl_2 >$ urea $> AlCl_3$

Answer: a

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99. Assuming each salt to be $90\ \%$ dissociated which of the following will have the highest osmotic pressure?

A. decimolar aluminium sulphate

B. decimolar barium chloride solution

C. decomolar sodium sulphate solution

D. solution of valume of decimolar barium choride and decimolar sodium suphate solutions

Answer: a

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100. cansider 0.1 M solutions of two solutesX and Y. The behaves as a univalent electrolyte while the solute Y dimerises in solution. Which of

the following statement are correct regarding these solutions?

(1) The boiling point of the solution of X will be higher than that of Y

(2) The osmotic pressure of the solution of Y will be lower than that of X

(3) The freezing point of the solition of X will be lower than that of Y

(4) The relative lowering of vapour pressure of both the solutions will be the same lt brgt Select the correct answer from the option given below

A. 1, 2 and 3

B. 2, 3 and 4

C. 1, 2 and 4

D. 1, 3 and 4

Answer: a

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101. If M_{normal} is the normal molecular mass and α is the degree of ionization of $K_3\left[Fe(CN)_6\right]$, then the abnormal molecular mass of the complex in the solution will be :

A. $M_{\text{normol}}(1+2a)^{-1}$

B. $M_{\text{normol}}(1+3a)^{-1}$

C. $M_{\text{normol}}(1+a)^{-1}$

D. equal to M_{normol}

Answer: b

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102. Equal volumes of 0.1 M urea and 0.1 M glucose are mixed. The mixture will have :

A. lower osmotic pressure

B. same osmotic pressure

C. higher osmotic pressure

D. none of these

Answer: b

Watch Video Solution

103. A 5% (w/V) solution of cane sugar (molecular mass = 342) is isotonic with 1% (w/V) solution of a subtance X. The molecular mass of X is :

A. 34.2

B. 171.2

C. 68.4

D. 136.8

Answer: c

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104. Insulin $(C_2H_{10}O_5)_n$ is dissolved in a suitable solvent and the osmotic pressure (π) of solutions of various concentrations $\left(g/cm^3\right)C$ is measured at $20^\circ C$. The slope of a plot of π against C is found to be 4.65×10^{-3}. The molecular weight of insulin is:

A. 3 x 10^5

B. 9 x10^5

C. 4.5 x 10^5

D. 5.16 x 10^6

Answer: d

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105. An aqueous solution of sucrose ($C_{12}H_{22}O_{11}$) having a concentration of 34.2gram/ litra has an osmotic pressure of 2.38 atmospheres at 17° C. For an aqurous solution of glucose ($C_6H_{12}O_6$) to be isotonic with this solution , its concentration should be :

A. 34.2 gram per liter

B. 17.1 gram per liter

C. 18.0 gram per liter

D. 36.0 gram per liter

Answer: c

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106. Which of the following experimental methods is adopted to determine osmotic pressure?

A. Berkley- Hartely's method

B. Beckmann's method

C. Landsberger's method

D. Differential method

Answer: a

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107. Based upon the technique of reverse osmosis the approximate pressure required to desalinate sea water containing 2.5% (mass/volume)

KNO_3 at 27° C will be

A. 10.5 atm

B. 21 atm

C. 12.2 atm

D. 6.09 atm

Answer: c

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108. A 1% (mass/vol) KCl solution is ionised to the extent of 80%. The osmotic pressure at 27° C of the solution will be :

A. 6.95 atm

B. 5.94 atm

C. 2.71 atm

D. 3.30 atm

Answer: b

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109. Osmotic pressure of blood is 7.40 atm, at 27° C. Number of moles of glucose to be used per liter for an intravenous injection that is to have same osmotic pressure of blood is :

A. 0.3

B. 0.2

C. 0.1

D. 0.4

Answer: a

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110. The relationship between osmotic pressure ($\pi_1, \pi_2 \text{and} \pi_3$) at a definite temperature when 1 g glucose, 1 g urea and 1 g sucrose are dissovled in 1 literr of water is (assume I = 1 for all):

A. $\pi_1 > \pi_2 > \pi_3$

B. $\pi_3 > \pi_1 > \pi_2$

C. $\pi_2 > \pi_1 > \pi_3$

D. $\pi_2 > \pi_3 > \pi_1$

Answer: c

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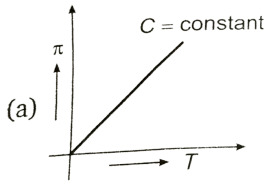
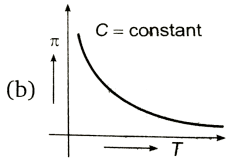
111. van't Hoff proved that osmotic pressure (π) is a colligative property. For an ideal solution, osmotic pressure(π) is helpful to determine that molecular mass of solute using $M_B = \frac{W_B RT}{\pi . V}$ Relation can exxpressed by the curve (C = concentration) :

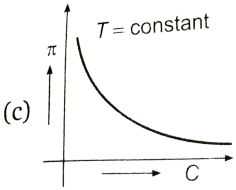
A.



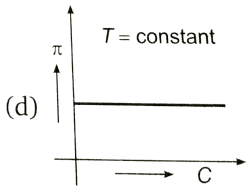
B.



C.



D.



Answer: a

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112. A solution containing 4.0 g of PVcC in 2 liter of dioxane (industrial solvent) was found to have an osmotic pressure 3.0 x 10^{-4}atm at $27^{\circ}C$.

The molar mass of the polymer (g/mol) will be :

A. 1.6 x 10^4

B. 1.6 x 10^5

C. 1.6 x 10^3

D. 1.6 x 10^2

Answer: b

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113. The osmotic pressures of 0.010 M solutions of KI and sucrose ($C_{12}H_{22}O_{11}$) are 0.432 atm and 0.24 atm respectively. The van't Hoff factor for KI is :

A. 1.8

B. 0.8

C. 1.2

D. 1

Answer: a

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114. What is the correct sequence of osmotic pressure of $0.01 Maq.$ solution of :

$(a) Al_2(SO_4)_3 \quad (b) Na_3PO_4 \quad (c) BaCl_2 \quad (d) Glucose$

A. $\pi_4 > \pi_2 > \pi_3 > \pi_1$

B. $\pi_3 > \pi_4 > \pi_2 > \pi_1$

C. $\pi_3 > \pi_4 > \pi_1 > \pi_2$

D. $\pi_1 > \pi_2 > \pi_3 > \pi_4$

Answer: d

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115. 1.0 molar solution of the complex of the salt, $CrCl_3.6H_2O$, displays an osmotic pressure of 3RT. 0.5 L of the same solution on treatment with excess of $AgNO_3$ solutionwill yield (assume a = 1):

A. 0.5 mole of AgCl

B. 1.0 mole of AgCl

C. 1.5 mole of AgCl

D. 3.0 mole of AgCl

Answer: b

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116. A 0.010 g sample of$Cr(NH_3)_4(SO_4)Cl$ is dissolved in 25.0 nL of water and the osmotic pressure of the solution is 59.1 torr at $25^\circ C$. How many moles of ions are produced per mole of compound?

A. 1

B. 4

C. 2

D. 3

Answer: c

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117. Which of the following aquous solutions should have the highest osmotic pressure?

A. 0.011 M $AlCl_3$ at $50^\circ C$

B. 0.03 m NaCl at $25^\circ C$

C. 0.012 m $(NH_4)_2SO_4$ at 25°

D. 0.03 m NaCl at $50^\circ C$

Answer: d

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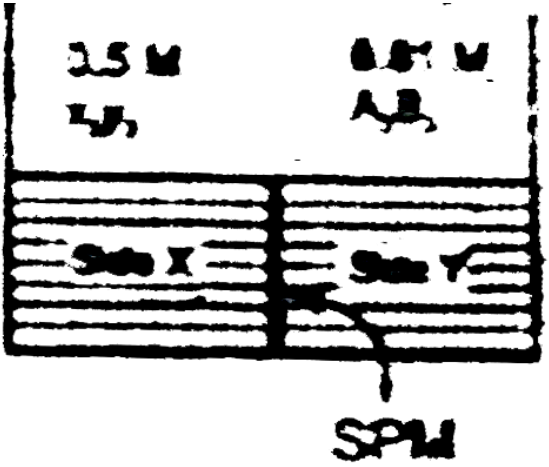
118. $X_3Y_2(i=5)$ when reacted with $A_2B_3(i=5$ in aqueous solution gives brown colour. These are separated by a semipermeable membrane AB as shown. Due to oxmosis there is :



A. brown colour formation in side X

B. brown colour formation in side Y

C. formation in both of the sides X and Y

D. no brown colour formation

Answer: d

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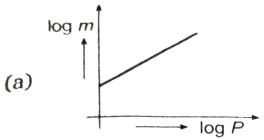
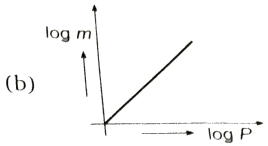
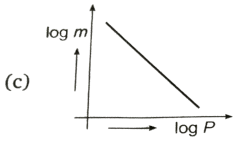
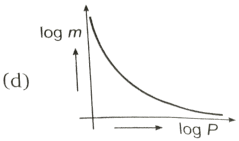
119. Which of the following curves represents the Henry's law ?

A. 

B. 

C. 

D. 

Answer: a

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120. According to Henry's law, the solubility of a gas in a given volume of liquid increases with increases in :

A. temperature

B. pressure

C. Both (a) and (b)

D. none of these

Answer: b

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121. At $300K$, $40mL$ of $O_3(g)$ dissolves in $100g$ of water at $1.0atm$. What mass of ozone dissolved in $400g$ of water at a pressure of $4.0atm$ at $300K$?

A. 0.1 g

B. 1.24 g

C. 0.48 g

D. 4.8 g

Answer: b

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122. 1 kg of water under a nitrogen pressure of 1 atmosphere dissolves 0.02 gm of nitrogenat 293 k. Calculate Henry' s law constant :

A. 7.2 x 10^{-4} L/atm

B. 7.7 x 10^{3} atm

C. 2 x 10^{-5} atm

D. 2 x 10^{-2} atm

Answer: a

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123. According to Henry's law, the partial pressure of gas $\left(p'_g\right)$ is directly proportional to mole fraction of gas in dissolved state, i.e.,

$P_{\text{gas}}' = K_H, X_{\text{gas}}$ where K_H is Henry's constant. Which are correct?

A. K_H is characteristic constant for a given gas-solvent system

B. Higher is the value of K_H, lower is solubility of gas for a given partial pressure of gas

C. K_H has temperature dependence

D. K_H decreases with increase of tempreature

Answer: d

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124. At 760 torr pressure and $20^\circ C$ tempreature , 1 L of water dissolves 0.04 gm of pure oxygen or 0.02 gm of pure nitrogen. Assuming that dry air is compound of 20% oxygen and 80% nitrogen (by volume), the masses (in g/L) of oxygen and nitrogen dissolved by 1 L of water at $20^\circ C$ exposed to air at a total pressur of 706 torr are respectively :

A. 0.008, 0.016

B. 0.016, 0.008

C. 0.16, 0.08

D. 0.04, 0.02

Answer: a

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125. The plots of $\frac{1}{X_A} vs. \frac{1}{Y_A}$ (where X_A and Y_A are the mole fraction of liquid A in liquid and vapour phase respectively) is linear with slope and intercept respectively are given as:

A. $\frac{P_A^\circ}{P_B^\circ}, \frac{P_B^\circ - P_A^\circ}{P_B^\circ}$

B. $\frac{P_B^\circ}{P_A^\circ}, \frac{P_A^\circ - P_B^\circ}{P_A^\circ}$

C. $\frac{P_B^\circ}{P_A^\circ}, \frac{P_B^\circ}{P_B^\circ - P_A^\circ}$

D. $P_A^\circ - P_B^\circ, \frac{P_A^\circ}{P_B^\circ}$

Answer: b

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126. At $48^\circ C$, the vapour pressure of pure CS_2 is 850torr . A solution of 2.0 g of sulphur in 100g of CS_2 has a vapour pressure 844.9 torr. Determine the atomicity of sulphur molecule :

A. 1

B. 2

C. 4

D. 8

Answer: d

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127. An ideal solution contains two volatile liquids $A(P^\circ = 100$ torr) and $B(P^\circ = 200$ torr). If mixture contain 1 mole of A and 4 mole of B then total vapour pressure of the distillate is :

A. 150

B. 180

C. 188.88

D. 198.88

Answer: c

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128. The vapoure pressure of two pure liquids A and B, that from an ideal solution are 100 and 900 torr respectively at temperature T. This liquid solution of A and B is composed of 1 mole of A and 1 mole of B. What will be the pressure, when 1 mole of mixture has been vaporized?

A. 800 torr

B. 500 torr

C. 300 torr

D. None of these

Answer: c

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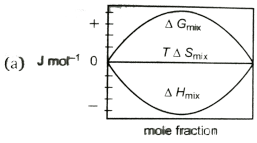
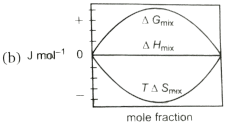
129. Which of the following represents correcty the changes in thermodynamic properties during the formation of 1 mole of an ideal binary solution :

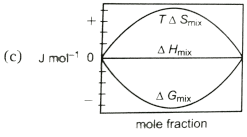
A.



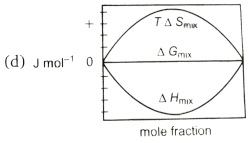
B.



C.



D.



Answer: c

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130. A certain non-volatile electrolyte contain 40% carbon, 6.7% hydrogen and 53.3% oxygen.An aqueous solution containing 5% by mass of the solute boils at 100.15° C. Determine molecular formula of the compound($K_b = 0.51^\circ C/m$):

A. HCHO

B. CH_3OH

C. C_2H_5OH

D. $C_6H_{12}O_6$

Answer: d

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131. A 0.10 M solution of a mono protic acid ($d = 1.01 g/cm^3$) is 5% dissociated what is the freezing point of the solution the molar mass of

the acid is 300 and $K_f(H_2O) = 1.86C/m$

A. $-0.189^\circ C$

B. $-0.194^\circ C$

C. $-0.199^\circ C$

D. none of these

Answer: c

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132. An aqueous solution boils at $101^\circ C$. What is the freezing point of the same solution?

(Gives : $K_f = 1.86^\circ C/m \text{and} K_b = 0.51^\circ C/m$)

A. $3.647^\circ C$

B. $-3.647^\circ C$

C. $-0.199^\circ C$

D. none of these

Answer: b

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133. An industrial waste water I found to contain 8.2% Na_3PO_4 and 12% $MgSO_4$ by mass in solution. If % ionisation of $Na_3PO_4 \text{and} MgSO_4$ Are 50 and 60 respectively then its normal boiliung point is [$K_b(H_2O) = 0.50 Kg \text{mol}^{-1}$] :

A. $102.3^\circ C$

B. $103.35^\circ C$

C. 101.785°

D. none of these

Answer: c

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134. Ratio of $\frac{\triangle T_b}{K_b}$ of 10 g AB_2 and 14 g A_2B per 100 g of solvent in their respective, solution (AB_2 and A_2Bboth are non-electrolytes) is 1 mole/ kg in both cases. Hence, atomic wt. of A and B are respectively :

A. 100, 40

B. 60, 20

C. 20, 60

D. None of these

Answer: b

Watch Video Solution

135. The freezing point of solution containing $0.2g$ of acetic acid in $20.0g$ of benzene is lowered by $0.45^\circ C$. Calculate the degree of association of acetic acid in benzene.

$\left(K_f = 5.12K^\circ mol^{-1}kg^{-1}\right)$

A. 0.527

B. 0.8

C. 0.945

D. None of these

Answer: c

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136. If the boiling point of an aqueous solution containing a non-volatile solute is $100.15^\circ C$. What is its freezing point? Given latent heat of fusion and vapourization of water $80calg^{-1}$ and $540calg^{-1}$, respectively.

A. $0.361^\circ C$

B. $-0.361^\circ C$

C. $-3.61^\circ C$

D. None of these

Answer: b

Watch Video Solution

137. 100 g of $C_6H_{12}O_6$ (aq.) solution has vapour pressure is equal to 40 torr at certain temperature. Vapour pressure of H_2O(l) is 40.18 torr at same temperature. If this solution is cooled to $-0.93^\circ C$, what mass of ice will be separated out? ($K_f = 1.86 kg \text{mol}^{-1}$):

A. 95.5 g

B. 4.5 g

C. 45.5 g

D. 47.8 g

Answer: d

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138. 1.0 g of a monobasic acid HA in 100 g water lowers the freezing point by 0.155 K. IF 0.75 g, of same acid requires 25 mL of N/5 NaOH solution for complete neutralisation then %, degree of ionization of acid is ($K_f of H_2O = 1.86 K kg \text{mol}^{-1}$):

A. 0.2

B. 0.25

C. 0.4

D. 0.5

Answer: b

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139. 0.1 M KI and 0.2 M $AgNO_3$ are mixed in 3 : 1 volume ratio. The depression of freezing point of the resulting solution will be [$K_b(H_2O) = 1.86 K kg \text{mol}^{-1}$]:

A. 3.72 K

B. 1.86 K

C. 0.93 K

D. 0.279 K

Answer: d

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140. If 0.1 M H_2SO_4(aq.) solution shows freezing point $-0.3906^\circ C$ then what is the K_{a2} for H_2SO_4? (Assume m = M and $K_{f\,(H_2O)} = 1.86 K kg mol^{-1}$)

A. 0.122

B. 0.0122

C. 1.11x 10^{-3}

D. None of these

Answer: b

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141. A living cell contains a solution which is isotonic with 0.2 M glucose solution. What osmotic pressure develops when the cell is placed in 0.05 M $BaCl_2$solution at 300 K ?

A. 1.23 atm

B. 3.69 atm

C. 6.15 atm

D. None of these

Answer: a

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142. What is the osmotic pressure of 0.2 M HX (aq.) solution at 300 K ?

A. 4.926 atm

B. 0.5024 atm

C. 5.024 atm

D. None of these

Answer: c

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143. A solution sontain 8 g of a carbohydrate in 100 g of water has a density 1.025 g/mL and an osmotic pressure of 5 atm at $27^{\circ}C$. What is the molar mass of the carbohydrate?

A. 387

B. 374

C. 3740

D. None of these

Answer: b

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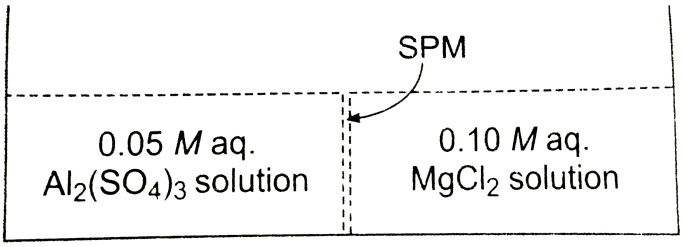
144. Study the following figure and choose the correct options. Assuming complete dissociation of electrolyte:



A. There will be net moment of any substance across the membrane

B. $MgCl_2$ will flow towards the $Al_2(SO_4)_3$ solution

C. $Al_2(SO_4)_3$ will flow towards the $MgCl_2$ solution

D. The π (osmotic pressure) of 0.1 M $MgCl_2$ is higher than the π of 0.05 M $Al_2(SO_4)_3$

Answer: d

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145. The vapoure pressure of two pure liquids A and B which from an ideal solution are 500 and 800 torr respectively at 300 K . A liquid solution of A and B for which the mole fraction of A is 0.60 is contained in a cylinder closed by a piston on which the pressure can be varied. The solution is slowly vaporized at 300 kmby dereasing the applied pressure.

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146. The composition of vapour when first bubble formed is:

A. $y_A = 0.6, y_b = 04$

B. $y_A = 0.48, y_b = 0.52$

C. $y_A = 0.52, y_b = 0.48$

D. $y_A = 0.5, y_b = 0.5$

Answer: b

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147. What is the composition of last droplet of liquid remaining in equilibrium with vapour?

A. $x_A = 0.6, x_B = 0.4$

B. $x_A = 0.5, x_B = 0.5$

C. $x_A = 0.7, x_B = 0.3$

D. $x_A = 0.3, x_B = 0.7$

Answer: c

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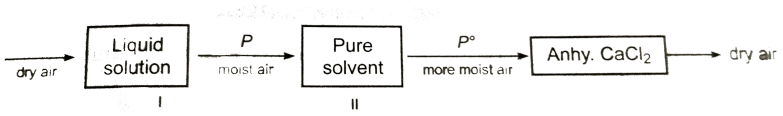
148. Lowering in vapour pressure is determined by Ostwald and Walker dynamic methed. It is based on the prinicipal , that when air is allowed to pass through a solvent or solution, it takes up solventvapour with it to get itself saturated at that temperature

I and II are weighted separately before and after passing dry air. Loss in mass of each set, gives the lowing of vapour pressure. The temperature

of air, the solution and the solvent is kept constant.



Loss in masss of solvent (w_{II})will be proportional to :

A. $P^\circ - P$

B. $P - P^\circ$

C. $\frac{P}{P^\circ}$

D. $P \times P^\circ$

Answer: a

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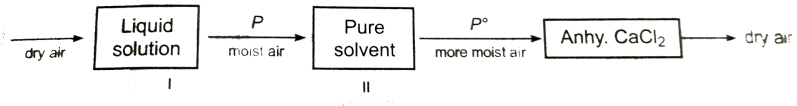
149. Lowering in vapour pressure is determined by Ostwald and Walker dynamic methed. It is based on the prinicipal , that when air is allowed to pass through a solvent or solution, it takes up solventvapour with it to get itself saturated at that temperature

I and II are weighted separately before and after passing dry air. Loss in mass of each set, gives the lowing of vapour pressure. The temperature of air, the solution and the solvent is kept constant.



Gain in mass of anhydrous $CaCl_2$ is proportional to :

A. P

B. P°

C. $P - P^\circ$

D. $P^\circ - P$

Answer: b

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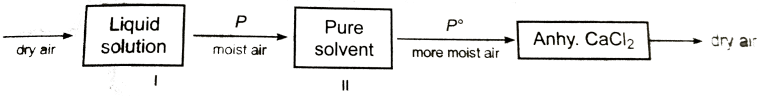
150. Lowering in vapour pressure is determined by Ostwald and Walker dynamic methed. It is based on the prinicipal , that when air is allowed to

pass through a solvent or solution, it takes up solventvapour with it to get itself saturated at that temperature

I and II are weighted separately before and after passing dry air. Loss in mass of each set, gives the lowing of vapour pressure. The temperature of air, the solution and the solvent is kept constant.



$\frac{P^\circ - P}{P^\circ}$ is equal to :

A. $\frac{w_I}{w_{II} + w_{II}}$

B. $\frac{w_{II}}{w_I + w_{II}}$

C. $\frac{w_I}{w_{II} - w_{II}}$

D. $\frac{w_{II}}{w_I}$

Answer: b

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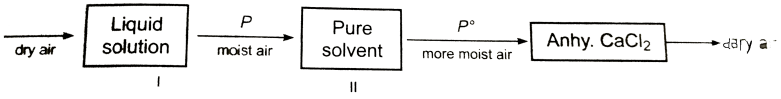
151. Lowering in vapour pressure is determined by Ostwald and Walker dynamic methed. It is based on the prinicipal , that when air is allowed to pass through a solvent or solution, it takes up solventvapour with it to get itself saturated at that temperature

I and II are weighted separately before and after passing dry air. Loss in mass of each set, gives the lowing of vapour pressure. The temperature of air, the solution and the solvent is kept constant.



Dry air was passed thorough 9.24 g of solute in 108 g of water and then through pure water. The loss in mass of solution was 3.2 g and that of pure water 0.08 g . The molecular mass (g/mol) of solute is nearly :

A. 50

B. 62

C. 70

D. 80

Answer: b

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152. A dilute solution contains 'x' moles of solute A 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 (a) :

$2A \Leftrightarrow A_2$

The van't Hoff factor will be:

A. I = 1 -2a

B. I = $1 - \frac{a}{2}$

C. I = $1 + \frac{a}{2}$

D. I = 1 + a

Answer: b

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153. A dilute solution contains 'x' moles of solute A 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 (a) :

$2A \Leftrightarrow A_2$

The molescular mass observed will be:

A. greater than actual molecular mass

B. lesser than actual molecular mass

C. equal to the actual molecular mass

D. cannot be predicted by the date given

Answer: a

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154. A dilute solution contains 'x' moles of solute A 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 (a) :

$2A \Leftrightarrow A_2$

The degree of assoicition is equal to :

A. $a = \frac{(K_b x - \triangle T_b)}{\triangle T_b 2}$

B. $a = \frac{2(K_b x - \triangle T_b)}{K_b x}$

C. $a = 2 + \frac{2 \triangle T_b}{K_b x}$

D. $a = \frac{\triangle T_b}{2K_b x}$

Answer: b

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155. Which of the following statement(s) is/are correct, if intermolecular forces in liquids A, B and C are in the order of A lt B lt C ?

A. B evaporates more readily than A

B. B evaporates more readily than C

C. A evaporate more readily than C

D. all evaporates at same rate at same temperature.

Answer: b,c

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156. When non-volatile solute is assed to a pure solvent, the:

A. vapour pressure of the solution becomes lower than the vapour pressure of the pure solvent

B. rate of evaporation of solvent is reduced

C. solute does not affect the rate of condensation

D. none of these

Answer: a,b,c

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157. The total vapour pressure of a binary solution is gives by

P = $(100X_A + 260X_B)$mm Hg

where,X_A and $X_B$are the molefractions of components A and B. This indicates that the:

A. vapour pressure of solution is less than the pure B component

B. vapour pressure of solution is less than the pure A component

C. vapour pressure of pure A is 100 mm Hg and that of pure B is 260 mm Hg

D. the vapour pressure of pure A and B are 260 mm Hg and 100 mm hg respectively

Answer: a,b,c

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158. Which of the following is correct for an ideal solution?

A. $\triangle H_{\text{mix}} = 0$ and $\triangle V_{mix} = 0$

B. $\triangle V_{\text{mix}} = 0$ and $\triangle S_{mix} > 0$

C. $\triangle H_{\text{mix}} > 0$ and $\triangle S_{mix} > 0$

D. $\triangle G_{\text{mix}} < 0$ and $\triangle S_{mix} > 0$

Answer: a,b,d

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159. Which of the following is correct for a non-ideal solution of liquids A and B showing negative deviation?

A. $\triangle H_{\text{mix}} = -ve$

B. $\triangle V_{\text{mix}} = -ve$

C. $\triangle S_{\text{mix}} = -ve$

D. $\triangle G_{\text{mix}} = -ve$

Answer: a,b,d

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160. A binary solution of liquids A and B will show positive deviation from Raoult's law if it fulfils the following condition:

A. $P_A > X_A P_{A^\circ} \text{and} P_B > X_B P_{B^\circ}$

B. The intermolecular forces of A -B lt A - A, B - B

C. $\triangle H$mixing is positive

D. $\triangle V$ mixing is negative

Answer: a,b,c

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161. Which of the following statement is/are correct about acetone and trichloromethane mixture?

A. Mixtures of acetone and trichoromethane show positive deviation from Raoult's law

B. The forces of attaction acting between molecules of acetone and trichoromethene in a mixture are stronger then those acting between the molecules in pure acetone

C. Pure acetone can be obtained by the careful fractional distillation of any mixture of acetone and trichloromethane

D. When acetone and trichoromethane are mixed, the enthapy changr negative

Answer: b,d

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162. The azeotropic solution of two miscible liquids:

A. can be separated by simple distillation

B. may show possitive or negative deviation from Raoult's law

C. are supersatureted solution

D. behave like a single component and boil at a constant temperature

Answer: b,d

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163. For exact determination of molecular mass through colligative properties measurement :

A. solute must be volatile

B. solution must be vary dilute

C. solution must be formed by similar nature of subtances

D. solute must not be dissociated

Answer: b,d

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164. In the depression of freezing point experiment, it is found that the:

A. vapour pressure of pure solvent is more than that of solution

B. vapour pressure of pure solvent is less than that of solution

C. only solute molecules solidify at the freezing point

D. only solute molecules sodilify at the freezing point

Answer: a,c

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165. The cryoscpic constant value depends upon:

A. the mole mass of the solute in the solution

B. the molar mass of the sovent in the solution

C. the enthalpy of fusion of the sovent

D. the freezing point of the solvent

Answer: b,c,d

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166. Consider 0.1 M solutions of two solutes X and Y. The solute X behaves as univalent electrolyte, while the solute Y dimerises in solution. Select correct statement(s) regarding these solutions:

A. The boiling point of solution of 'X' will be higher than that of 'Y'

B. The osmotic pressure of solution of 'Y' will be lower than that of 'X'

C. The freezing point of solution of 'X' will be lower than that of 'Y'

D. The relative lowering of vapour pressure of both the solution will be the same

Answer: a.b,c

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167. Consider following solutions: (I) I M glucose(aq) (II) 1 M sodium choride(aq)

(III) 1 M acetic acid in benzene (IV) 1 M ammonium phosphate (aq)

A. all are isotonic solutions

B. III is hypotonic of I, II, IV

C. I, II, Ivare hypertonic of III

D. IV is hypertonic I, II, III

Answer: b.c.d

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168. Which of the folloeing statement is (are) incorrect?

A. 0.1 M KCl solution will have the same osmotic pressure as 0.1 M glucose solution

B. 0.1 M KCl solution will have the same boiling point as 0.1 M urea solution

C. 0.1 m glucose and 0.1 m urea are ismotic

D. 0.1 m $MgCl_2$ solution will have less relative lowering of vapour pressure than 0.1 m NaCl

Answer: a,b,d

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169. Consider following solution:

0.1 m$C_6H_5NH_3^+Cl^-$, 0.1 m Kcl, 0.1 m Glucose, 0.1 m $Na_2C_2O_4.10H_2O$

A. the solution with higher boiling point is 0.1 $Na_2C_2O_4.10H_2O$

B. the solution with higher freezing point is 0.1 m glucose

C. 0.1 m $C_6H_5NH_3Cl$ and 0.1 m NaClwill have the same osmotic pressure

D. 0.1 m glucose solution will have the lowest osmotic pressure

Answer: a,b,c,d

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170. Column -I and Column -II contain four entries each. Entries of column-I are to be matched with some entries of column-II. One or more than one entries of column-I may have the matching with the same entries of column-II.

Column-I	Column-II
(A) $\pi_1 : 0.1\,M$ glucose; $\pi_2 : 0.1\,M$ urea	(P) π_1 and π_2 are isotonic
(B) $\pi_1 : 0.1\,M$ NaCl; $\pi_2 : 0.1\,M\,Na_2SO_4$	(Q) No net migration of solvent across the membrane
(C) $\pi_1 : 0.1\,M$ 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

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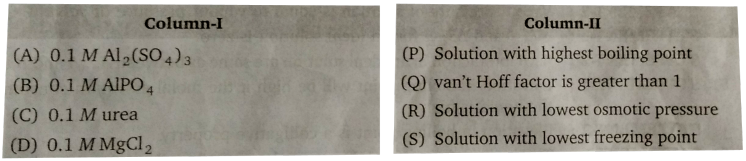
171. Column -I and Column -II contain four entries each. Entries of column-I are to be matched with some entries of column-II. One or more than one

entries of column-I may have the matching with the same entries of column-II.



Column-I	Column-II
(A) 0.1 M $Al_2(SO_4)_3$	(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

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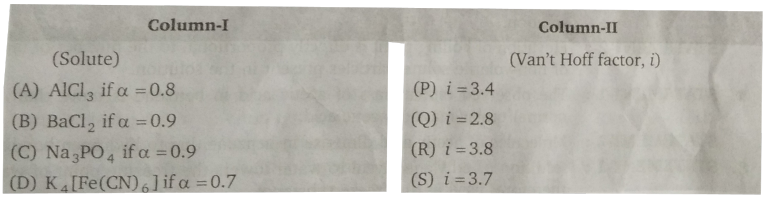
172. Column -I and Column -II contain four entries each. Entries of column-I are to be matched with some entries of column-II. One or more than one entries of column-I may have the matching with the same entries of column-II.



Column-I (Solute)	Column-II (Van't Hoff factor, i)
(A) $AlCl_3$ if $\alpha = 0.8$	(P) $i = 3.4$
(B) $BaCl_2$ if $\alpha = 0.9$	(Q) $i = 2.8$
(C) Na_3PO_4 if $\alpha = 0.9$	(R) $i = 3.8$
(D) $K_4[Fe(CN)_6]$ if $\alpha = 0.7$	(S) $i = 3.7$

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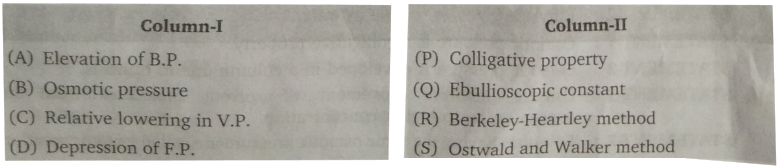
173. Column -I and Column -II contain four entries each. Entries of column-I are to be matched with some entries of column-II. One or more than one

entries of column-I may have the matching with the same entries of column-II.



Column-I	Column-II
(A) Elevation of B.P.	(P) Colligative property
(B) Osmotic pressure	(Q) Ebullioscopic constant
(C) Relative lowering in V.P.	(R) Berkeley-Heartley method
(D) Depression of F.P.	(S) Ostwald and Walker method

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174. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : An increase in surface area increases the rate of evaporation.

STATEMENT - 2 : Stronger the intermolecular attaction force, faster is the rate of evaporation at a given temperature.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: C

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175. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : An ideal solution obeys Raoult's law.

STATEMENT - 2 : In an ideal solution, solute-solvent as well as solvent-solvent, interactions are similar to solute - solvent interactions.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: A

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176. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : if a liquid solute more volatile than the solvent is added to the solvent, the vapour pressure of the solution is greater than vapour pressure of pure solvent.

STATEMENT - 2 : Vapour pressure of solution is eqeal to vapour pressure of sovent.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: C

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177. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : $\triangle V_{\text{mix}}$ and $\triangle S$mixfor an ideal solution is zero.

STATEMENT - 2 : A...B interaction in an ideal solution are same as between A...A and B...B.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: D

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178. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : Elevation in boiling point will be high if the molal elevation constant of the liquid is high.

STATEMENT - 2 : Elevation in boiling point is a colligative property.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: B

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179. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : The boiling point of 0.1 M urea solution is less than that of 0.1 M KClsolution.

STATEMENT - 2 : Elevation of boiling point is directly proportional to the number of moles of non-volatile solute particles present in the solution.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: A

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180. Statement-1 : The observed molar mass of acetic acid in benzene is more than the nomal molar mass of acetic acid.

Statement-2 : Molecules of acetic and dimerise in benzene due to hydrogen same.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: A

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181. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : addition of ethylene glycol to water lowers the freezing point of water, therefore, used as antifreeze substance.

STATEMENT - 2 : Ethylene glycol is soluble in water.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: B

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182. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : Osmotic pressure is a colligative property.

STATEMENT - 2 : Osmotic pressure is developed in a column due to osmosis.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: B

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183. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : Osmotic involves movement of solvent molecules from lower concentration to higher concentration.

STATEMENT - 2 : Solutions having the same osmotic pressure are called isotonic solutions.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: B

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184. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : Isotonic solutions must hsve the same molal concentration.

STATEMENT - 2 : Solution which have the same osmotic pressure are known as isotonic solution.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: D

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185. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : Isotonic solutions do not show phenomenon of osmosis.

STATEMENT - 2 : Isotonic solutions have same molal concentration at same temperature.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: A

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186. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : When dried fruits and vegetables are placed in water, they slowly get swollen.

STATEMENT - 2 : It happens due to the phenomenon of osmosis.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: A

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187. Statement- Reverse osmosis is used to purify saline water.

Explanation- Solvent molecules pass from concentrate solution to dilute solution through semipermeable membrane if high pressure is applied on solution side.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: B

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188. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : All solute becomes more soluble in water at higher temperature.

STATEMENT - 2 : Solubility of solute depends upon tempreature.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: D

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189. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : Henry's law is alawys applicable for gases. ltSTATEMENT - 2 : RA]aoult's law is a special case of Henry's law.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: D

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190. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : Increasing pessure on pure water decrease its freezing point.

STATEMENT - 2 : Density of water is maximum at 273 K.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: C

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191. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : The molescular mass of acetic acid determined by depression in freezing point method in benzene and water was found to be differrent.

STATEMENT - 2 : Water is polar and benzene is non-polar.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: A

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192. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : If red blood cells wrer removed from the body and placed in pure water, pressure inside the cell increases.

STATEMENT - 2 : The concentration of the salt content in the cells increases.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: C

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193. Each question contains STATEMENT-I(Assertion) and STATEMENT-2(Reason).the statement carefully and mark the correct answer accoring to the instrution given below:

STATEMENT - 1 : Azeotrope is a binary mixture formed by ideal solutions.

STATEMENT - 2 : Azeotrope boils with unchanged composition.

A. If both the statements are TURE and STATEMENT-2 is the correct explanation STATEMENT-1

B. If both the statements are TURE but STATEMENT-2 is NOT the correct explanation STATEMENT-1

C. If STATEMENT-1 is TURE and STATEMENT-2 is FALSE

D. If STATEMENT-1 is FA,SE and STATEMENT-2 is TRUE

Answer: D

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194. The vspour preesure of two pure liquids A and B are 5 and 10 torr respectively. Calculte the total pressure of the solution (in torr) obtainrd by mixing 2 mole of A and 3 mole of B.

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195. The vapour pressure of two pure liquids A and B are 50 and 40 torr respectively. If 8 molrs of A is mixed with x moles of B , then vapour pressure of solution obtained is 48 torr. What is the value of x.

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196. The vapour pressure of a liqid solution containing A and B is 99 torr. Colvulate mole % of in vapour phese.

(Given : $P_{A^\circ} = 100 \to rr, P_{B^\circ} = 80 \to rr$)

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197. If 30 g a solute of molecular mass 154 is dissolved in 250 g of benzene. What will be the elevation in boiling point of the resuling solution ?

(Given : $K_B(C_6H_6) = 2.6Kkgmol^{-1}$)

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198. Calculate elevation in boiling point for 2 molal aqueous solution of glucose.

(Given $K_b(H_2O) = 0.5 kgmol^{-1}$)

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199. Calculate depression of freezing point for 0.56 molal aq. Solution of KCl.

(Given : $K_{f\,(H_2O)} = 1.8 kgmol^{-1}$).

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200. What is the maximum value of van't Hoff factor for $AlCl_3$?

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201. A solution containing 500 g of a protein per liter is isotonic with a solution containing 3.42 g sucrose per liter. The molecular mass of protein in 5 x 10^x, hence x is.

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202. An aqueous solution of urea has a freezing point of $-0.515^\circ C$. Predict the osmotic pressure (in atm) of the same solution at $37^\circ C$.

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203. 0.2 aq. Solution of KCl is istonic with 0.2 M K_2SO_4 at same temperature. What is the van't Hoff fector of K_2SO_4 ?

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Level 1 Q 62 To Q 91

1. If 1m solution of benzoic acid in benzene has a freezing point depression of $3.84^{\circ}C$. $\left(K_f = 5.12^{\circ}Cmol^{-1}\text{kg}\right)$ and boiling point elevation of $2.53^{\circ}C\left(K_b\right.$ $=2.53^{\circ}C\text{mol}^{-1}kg\Big)$, then select the correct statement/s :lt brgtstatement I : there are dimar formation when under =going freezing

Statement II : there are no change when undergoing boiling

Statement III : reverse of I and II ltbr. Statement IV : dimer formation in freezing and boiling state

A. I, II

B. II, III

C. III, I

D. only I

Answer: a

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Level 2

1. Two beaker A and B present in a closed vessel. Beaker A contains 152.4 g aqueous soulution of urea, containing 12 g of urea. Beaker B contain 196.2 g glucose solution, containing 18 g of glocose. Both solution allowed to attain the equilibrium. Determine mass % of glocose in its solution at equilibrium allowed to attain the equilibrium :

A. 6.71

B. 14.49

C. 16.94

D. 20

Answer: b

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2. A saturated solution of XCl_3 has a vapour pressure 17.20 mm Hg at $20^\circ C$, while pure water vapour pressure is 17.25 mm Hg. Solubility

product (K_{sp}) of XCl_3 at 20° C is :

A. 9.8×10^{-2}

B. 10^{-5}

C. 2.56x10^{-6}

D. 7x10^{-5}

Answer: d

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3. The total vapoure pressure of a 4 mole % solutionof NH_3 in water at 293 K is 50.0 torr. The vapour pressure of pure water is 17.0 torr at this temperature . Applying Henry's and Raoult's laws, calcilate the total vapour pressure for a 5 mole % solution:

A. 58.25 torr

B. 33 torr

C. 42.1 torr

D. 52.25 torr

Answer: a

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Level 3 Match The Column

1. Column -I and Column -II contain four entries each. Entries of column-I are to be matched with some entries of column-II. One or more than one entries of column-I may have the matching with the same entries of column-II.

Column-I	Column-II
(A) *n*-hexane + *n*-heptane	(P) Can be separated by fractional distillation
(B) Acetone + chloroform	(Q) Maximum boiling azeotrope
(C) Chlorobenzene and bromobenzene	(R) Cannot be separated by fractional distillation completely
(D) Ethanol + water	(S) Minimum boiling azeotrope

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