CHEMISTRY

BOOKS - MODERN PUBLICATION

SOLUTIONS

EXAMPLE

1. If 11g of oxalic acid are dissolved in 500 mL of solution $\left(density = 1.1 gmL^{-1}\right)$, what is the mass% of oxalic acid in solution?

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2. 2.46g of sodium hydroxide (molar mass=40) are dissolved in water and the solution is made to $100 cm^3$ in a vomumetric flask. Caculate the molraity of the solution.

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3. Calculate the molarity of a solution containing 20.7 g of potassium carbonate the dissolved in 500 mL of solution (assume density of solution=$1 gmol^{-1}$).

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4. 2.5g of ethanoic acid (CH_3COOH) is dissolved in 75 g of benzene. Calculate the molarity of the solution.

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5. Calculate the mole fraction of ethylne glycol $(C_2H_6O_2)$ in a aqueous solution containing 20% of $C_2H_6O_2$ by mass.

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6. Calculate the normality of solution containing 31.5g of hydrated oxalic acid C2H2O4. 2H2O in 1250 ml of solution?

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7. 2.82 g of glucose (molar mass=180) are dissolved in 30 g of water. Calculate the molarity of glucose and water.

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8. 2.82g of glucose (Molar mass: 180g mol^{-1}) are dissolved in 30g of water . Calculate mole fraction of glucose and water.

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9. The molarity of pure water (density of water=$1gml^{-1}$)

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10. A solution is 25% water, 25% ethanol and 50% acetic acid by mass. Calculate the mole farction of each component.

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11. Calculate the number of moles of methanol in 5 L of its solution, if the density of solution is 0.981 kg L^{-1} (Molar mass of methanol = 32.0 g mol^{-1}).

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12. Calculate the mass percentage of aspirin (C9H804) in acetonitrile $(CH_3CN) when 6.5 g of C\_9H\_8O\_4 is dissolved \in 450 g of CH\_3CN`$.

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13. Calculate molality and molarity of Kl if density 20% (mass/mass)aqueous Kl is 1.202% g/mL

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14. A commercially available sample of sulphuric acid is 15% H_2SO_4 by weigth $\left(density = 1.1gmL^{-1}\right)$. Calculate the molarity?

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15. A commercially available sample of sulphuric acid is 15% H_2SO_4 by weigth $\left(density = 1.1gmL^{-1}\right)$. Calculate the normality?

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16. A commercially available sample of sulphuric acid is 15% H_2SO_4 by weigth $\left(density = 1.1gmL^{-1}\right)$. Calculate the molality of the solution?

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17. A sugar syrup of weigh 214.2 g contains 34.2 g of sugar $(C_{12}H_{22}O_{11})$. Calculate:

molal concentration?

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18. A sugar syrup of weight 214.2g contains 34.2g of sugar $(C_{12}H_{22}O_{11})$. Calculate (i) Molality and (ii) Mole fraction of sugar in syrup.

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19. An artifreeze solution is prepared from 222.6g of ethylene glycol, $C_2H_4(OH)_2$ and 200 g of water. Calculate the molality of the solution. If the density of this solution be $1.072gmL^{-1}$. What will be the molarity of the solution?

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20. What is the mole fraction of solute in 2.5m aqueous solution .

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21. Concentrated HNO_3 used in the laboratory is usually 69% by masds of HNO_3. Calculate the volume of the solution which contains 23 g of HNO_3. The density of concentrated HNO_3 is $1.41 gcm^{-3}$.

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22. The mole fraction of benzene in a solution with toluene 0.50 calculate the mass percent of benzene in the solution.

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23. A sample of drinking water was found to be severely contaminated with chloroform (CHC13) supposed to be a carcinogen. The level of contamination was 15 ppm (by mass): determine the molality of chloroform in the water sample.

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25. The mole fraction of water in sulphuric acid solution is 0.85. Calculate the molality of the solution.

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26. How many mL of a 0.1 M HCl are required to react completely with 1 g of mixture of Na_2HCO_3 contaiing equimolar amounts of two?

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27. Calculate the density of silver which crystallines in the face centred cubic structure. The distance between the nearest silver atoms in this structure is 287 pm. ($Molarmassofsilver = 107.87gmol^{-1}$).

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28. How many mL of sulphuric acid of density $1.84gmL^{-1}$ containing 95.6 mass % of H_2SO_4 should be added to one litre are 40 mass% solution of H_2SO_4 of density $1.31gmL^{-1}$ in order to prepare 50 mass% solution of sulphuric acid of density $1.40gmL^{-1}$.

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29. Calculate the density of H_2SO_4 solution whose molarity and molality are 10.8M and 92.6m respectively.

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30. How many grams of wet NaOH containing 15% water is required to prepare 6L of 0.5 M NaOH solution?

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31. Calculate the resulting molarity of a solution obtained by adding 6.2 g of KOH to 500 mL of $\frac{M}{5}$ KOH solution $\left(density = 1.06 gmL^{-1}\right)$. The density of resulting solution is $1.10 gmL^{-1}$.

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32. If N_2 gas is bubbled through the water is 293K, how many millimoles of N_2 gas would dissolve in 1 litre of water. Assume that N_2 exerts a

partial pressure of 0.987 bar. The K_H for N_2 at 293K is 76.48 K bar.

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33. The air is a mixture of number of gases. The major components are oxygen and nitrogen with approximate proportion of 20% is to 79% by volume at 298K. The water is in equilibrium with air at a pressure of 10 atm. Henry's law constants for oxygen and nitrogen at 298 K are $3.30 \times 10^7 mm$ and $6.51 \times 10^7 mm$ respectively. calculate the composition of these gases in water.

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34. Dry air contains 79% N_2 and 21% O_2. Determine the proporiton of N_2 and O_2 (in terms of mole fraction) dissolved in water at 1 atm pressure. Henry's law constant for N_2 and O_2 in H_2O are 8.54×10^4 atm and 4.56×10^4 atm respectively.

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35. A aqueous solution contains 10 moles of sucrose in 1 kg of solvent. calculate the molality of solution.

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36. Ethanol is an organic compound yet it is freely miscible with water.Explain.

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37. What is the normality of

$1.5MH_2SO_4$.

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38. What is the normality of

$1.2MCH_3COOH$

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39. What is the normality of

1.0 M NaOH?

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40. Which out of molarity or molality will change with change in temperature and why?

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41. Will the molarity of a solution at $50^{\circ} C$ be same, less or more than molarity at $25^{\circ} C$

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42. What is the sum of the mole fractions of all the components in a three component system?

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43. How is the molality of a solution different from its molarity?

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44. State the formula relating pressure of a gas with its mole fraction in liquid solution in contact with it.

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45. At a same temperature, hydrogen is more soluble in water than helium. Which of them will have a higher value of k_H and why?

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46. What is the relation between normality and molarity of given solution of sulphuric acid ?

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47. Fill in the blanks- Wheat, gram, pea crops are called as_____ crops.

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48. The dissolution of ammonium chloride in water is endothermic process. What is the effect of temperature on its solubility?

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49. Give reasons, at higher altitudes, people suffer from a disease called anoxia. In this disease, they become weak and cannot think clearly?

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50. The vapour pressure of ethyl alcohol at 298K is 40 mm of Hg. Its mole fraction in a solution with methyl alcohol is 0.80. what is the vapour pressure in solution if the mixture obeys Raoult's law?

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51. An aqueous solution of glucose is made by dissolving 10 g of glucose $(C_6H_{12}O_6)$ in 90 g of water at 303 K. if the vapour pressure of pure water at 303 K be 32.8 mm Hg, what would be the vapour pressure of the solution?

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52. At 298 K the vapour pressure of pure benzene C_6H_6 is 0.256 bar and vapour pressure of pure toluene, C_6H_8 is 0.925 bar. If the mole fraction of

benzene in solution is 0 . 40 , find the total vapour pressure of solution. Also find the mole fraction of toluene in vapour phase

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54. Vapour pressure of chlolfom $(CHCI_3)$ and dichloromethane (CH_2CI_2) at 298 K are 200 mm Hg and 415 mm Hg respectively. Calculate the vapour pressure of the solution prespared by miximng 25 g of $CHCI_3$ and 45 g of CH_2CI_2 at 298 K. Also find the mole fraction of CHI_3 in the vapour phase .

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56. Two liquids X and Y on mixing form an ideal solution. The vapour pressure of the solution containing 3 mol of X and 1 mole of Y is 550 mm of Hg. But when 4 mol of X and 1 mol of Y are mixed, the vapour pressure of the solution thus, formed is 560 mm of Hg. what will be the vapour pressure of the pure X and pure Y at this temperature?

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57. Vapour pressure of water at 20^C is 17.5 mm of Hg and lowering of vapour pressure of a sugar soluton is 0.061 mm of Hg. Calculate relative lowering of vapour pressure?

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58. Vapour pressure of water at 20^C is 17.5 mm of Hg and lowering of vapour pressure of a sugar soluton is 0.061 mm of Hg. Calculate vapour pressure of the solution.

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59. Vapour pressure of water at 20^C is 17.5 mm of Hg and lowering of vapour pressure of a sugar soluton is 0.061 mm of Hg. Calculate mole fraction of sugar and water.

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60. The vapour pressure of pure benzene at a certain temperature is 0.850 bar. A non-volatile, non-electrolyete solid weighing 0.5g when added to 39.0 g of benzene (molar mass 78 g mol^{-1}. Vapour pressure of the solution, then, is 0.845 bar. What is the molar mass of the solid substance?

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61. Calculate the mass of a non-volatile solute (molar mass 40g mol^{-1}) which should be dissolved in 114g octane to reduce its vapour pressure to 80%.

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62. Calculate the vapour pressure of an aqueous solution containing 5% by mass of urea (NH_2CON_2) at 298K. The vapour pressure of water at 298K is 23.75 mm Hg.

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63. A solution containing 30 g of non-volatile solute exactly in 90 g of water has a vapour pressure of 2.8 kPa at 298 K. Further, 18 g of water is then added to the solution and the new vapour pressure becomes 2.9 kPa at 298 K. Calculate: vapour pressure of water at 298 K.

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64. A solution containing 30 g of non-volatile solute exactly in 90 g of water has a vapour pressure of 2.8 kPa at 298 K. Further, 18 g of water is then added to the solution and the new vapour pressure becomes 2.9 kPa at 298 K. Calculate: vapour pressure of water at 298 K.

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65. Molal elevation constant for benzene is 2.53K/m. A solution of some organic substance in benzene boils at 0.126° C higher than benzene. What is the molality of the solution?

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66. Boiling point of benzene is 353.23 K . When 1 . 80 g of non-volatile solute was dissolved in 90 g of benzene the boiling point is raised to 354. 11 K? Calculate molar mass of solute .

(K_b for benzene is 2 . 53 K kg mol^{-1})

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67. The vapour pressure of water at 293K is 0.0231 bar and the vapour pressure of a solution of 108.24 g of a compound in 1000 g of water at the same temperature is 0.0228 bar. Calculate the molar mass of the solute.

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68. On dissolving 3.24g of sulphur in 40g of benzene, boiling point of solution was higher than that of benzene by 0.81K. K_b value for benzene

is $2.53 K kg mol^{-1}$. What is the molecular formula of sulphur?

$\left(A \rightarrow micmass of sphur = 32 g mol^{-1}\right)$.

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69. What would be the molar mass of a compound if 6.21g of it dissolved in 24.0 g of chloroform form a solution that has a higher boiling point of $68.04^{\circ} C$ and the boiling point of pure chloroform is 61.7^{C} and the boiling point elevation constant K_b for chloroform is $3.63^{\circ} \frac{C}{m}$.

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70. A solution of glycerol $(C_3H_8O_3)$ in water as prepared by dissolving some glycerol in 500 g of water. This solution has a boiling point of 100 . 42° C. What mass of glycerol was dissolved to make the solution ? K_b for H_2O = 0 . 512 K kg mol^{-1}

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71. A solution prepared by dissolving 1.25g of oil of winter green (methyl salicylate) in 99.0 g of benzene has a boiling point of $80.31^{\circ}C$. Determine the molar mass of this compound. (B.P of pure benzene=$80.10^{\circ}C$ and K_b for benzene=$2.53^{\circ}Ckgmol^{-1}$).

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72. 18 g of glucose is dissolved in 1 kg of water. At what temperature will the solution boil ? (K_b for water is 0.52 K kg mol^{-1})

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73. 45g of ethylene glycol ($C_2H_6O_2$) is mixed with 600g of water. Calculate

The freezing point depression

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74. 45g of ethylene glycol $(C_2H_6O_2)$ is mixed with 600 g of water. Calculate:

the freezing point of the solution.

$\left(K_f f \text{ or } water = 1.86 K kg mol^{-1}\right)$.

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75. Addition of 0.643g of a compound to 43.95g of benzene lowers the freezing point from 5.51°C to 5.03°C. If K_f for benzene is 5.12K kg mol^{-1}, calculate the molar mass of the compound.

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76. The freezing point of a solution containing 0.1g of $K_3\left[Fe(CN)_6\right]$ in 100 g of water. $\left(K_f = 1.86 K kg mol^{-1}\right)$ is

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77. A solution containing 0.730 g of camphar (molar mass=152) in 36.8g of acetone $(b.\,p.\,56.30^\circ C)$ boils at $56.55^\circ C$. A solution of 0.564 g of an unknown compound in the same weight of solvent boils at $56.46^\circ C$. Calculate the molar mass of the unknown compound.

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78. Ethylene glycol $\left(molarmass = 62gmol^{-1}\right)$ is a common automobile antifreeze. Calculate the freezing point of a solution containing 12.4 g of this substance in 100 g of water. Would it be advisable to keep this substance in car radiator during summer?

$\left(K_f f \text{ or } water = 1.86Km^{-1} \text{ and } K_b f \text{ or } water = 0.512Km^{-1}\right).$

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79. Two elements A and B form compounds having formula AB2 and AB4. When dissolved in 20 g of benzene (C_6H_6), 1 g of AB_2 lowers the freezing point by 2.3 K whereas 1.0 g of AB_4 lowers it by 1.3 K. The molar

depression constant for benzene is 5.1 K kg mol^{-1}. Calculate atomic masses of A and B.

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80. 200 cm^3 of an aqueous solution of a protein contains 1.26g of the protein . The osmotic pressure of such a solution at 300K is found to be 2.7×10^{-3} bar. Calculate the molar mass of the protein (R=0.083 L bar $mol^{-1}K^{-1}$)

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81. If 1 .71 g of sugar (molar mass = 342) are dissolved in $500cm^3$ of solution at 300 K, what will be its osmotic pressure ?

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82. Calculate the osmotic pressure of a solution obtained by mixing 100 mL of 1.5 percent solution of urea (mol.mass of 60) and 100 mL of 3.42 percent solution of cane sugar (mol. Mass=342) at $20^{\circ}C$.

$\left(R = 0.82 litre atm K^{-1} mol^{-1}\right)$

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83. At 300 K, 36 g of glucose present in a litre of its solution has an osmotic pressure of 4.98 bar. If the osmotic pressure of the solution is 1.52 bars at the same temperature, what would be its concentration?

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84. A solution of an organic compound is prepared by dissolving 68.4 g in 1000 g of water. Calculate the molecular mass of the compound when elevation in boiling point is 0.104 and K_b for water is 0.52 K m^ -1.

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85. A solution prepared by dissolving 8.95 mg of a gene fragment in 35.0 mL of water has an osmotic pressure of 0.335 torr at $25^{\circ}C$. Assuming that the gene fragment is a non-electrolyte, calculate its molar mass.

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86. A solution containing 15g of urea (molar mass=$60gmol^{-1}$) per litre of solution in water has the same osmotic pressure (isotonic) as a solution of glucose (molar mass= $180gmol^{-1}$) in water. Calculate the mass of glucose presenty in one litre of its solution.

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87. How many grams of sucrose (molecular mass 342) should be dissolved in 100 g water in order to produce a soluton having difference between the boiling point and freezing point equal to $105^{\circ}C$?

$\left(K_b = 0.512Km^{-1}, K_f = 1.86Km^{-1}\right)$.

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88. An aqueous solution of 2% non-volatile solute exerts a pressure of 1.004 bar at the normal boiling point of the solvent. What is the molar mass of the solute?

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89. 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 ?

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90. Calculate the amount of ice that will be separate out on cooling a solution containing 50 g of ethylene glycol in 200 g of water to $-9.3^\circ C$. $\left(K_f f \text{ or } water = 1.86 Km^{-1}\right)$

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91. A liquid is in equilibrium with its vapour at its boiling point. On the average, the molecules in the two phases have equal.

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92. At $10^{\circ}C$ the osmotic pressure of urea solution is 500 mm Hg. The solution is diluted and the temperature is raised to $25^{\circ}C$, when the osmotic pressure is found to be 105.3 mm Hg. Calculate the extent of dilution.

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93. Calculate the boiling point of solution when 2 g of Na_2SO_4 $\left(M = 142gmol^{-1}\right)$ was dissolved in 50 g of water, assuming Na_2SO_4 undergoes complete ionization. $\left(K_bf \text{ or } water = 0.52Kkgmol^{-1}\right)$.

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94. Calculate the amount of $CaCl_2$ (molar mass = 111g mol^{-1}) which must be added to 500 g of water of lower its freezing point by 2K, assuming $CaCl_2$ is completely dissociated.

(Kf for water = 1.86 k kg mol^{-1}).

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95. 3.9 g of benzoic acid dissolved in 49 g of benzene shows a depression in freezing point of 1.62K. Calculate the Van't Hoff factor and predict the nature of solute (associated or dissociated). (Given: Molar mass of benzoic acid= $122gmol^{-1}$, K_f for benzene= $49Kkgmol^{-1}$)

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96. A solution containing 2.44 g of solute dissolved in 75 g of water boiled at $100.413^{\circ}C$. What will be the molar mass of the solute?

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97. 2g of benzoic acid (C_6H_5COOH) is dissolved in 25g of benzene show depression in freezing point equal to 1.62K. Molar depression constant for benzene, K_f=4.9K $kgmol^{-1}$. What is percentage association of acid if it forms a dimer in solution?

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98. The freezing point of a solution containing 0.3 g of acetic acid in 30.0 g of benzene is lowered by 0.45°. Calculate the Van's Hoff factor. $\left(K_f f \text{ or } benze \neq = 5.12Kkgmol^{-1}\right)$.

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99. The freezing point of a solution containing 0.3 g of acetic acid in 30.0 g of benzene is lowered by 0.45°. Calculate the Van's Hoff factor. $\left(K_f f \text{ or } benze \neq = 5.12Kkgmol^{-1}\right)$.

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100. 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?

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101. 0 . 6 ml of acetic acid (CH_3COOH)having density $1.06gmL^{-1}$ dissolved in 1 litre of water . The depression in freezing point observed for this strength of acid was 0.0205 K. Calculate the Van't Hoff factor and dissociation constant of the acid .(K_f for water = 1. 86 K kg mol^{-1})

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102. The measured freezing point depression for a 0.1 m aqueous CH_3COOH soluton is $0.19^{\circ}C$. The acid dissociation constant K_a at this

concentration will be (Give K_f, the molal cryoscopic constant= $1.86 K kgmol^{-1}$)

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103. What mass of NaCl (molar mass=$58.5 gmol^{-1}$) must be dissolved in 65.0 g of water to lower the freezing point by $7.50^{\circ} C$? The freezing point depression constant, K_f, for water is $1.86 K kgmol^{-1}$. Assume Van's Hoff factor for NaCl is 1.87.

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104. Calculate the freezing point of solution when 1.9 g of $MgCl_2 (M = 95 gmol^{-1})$ was dissolved in 50 g of water, assuming $MgCl_2$ undergoes complete ionization. $(K_f f \text{ or } water = 1.86 K kgmol^{-1})$.

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105. Calculate the boiling point of a solution prepared by adding 15.00 g of NaCl to 250.0 g of water. $\left(K_b f \text{ or } water = 0.512 K kg mol^{-1}\right)$ and molar mass of NaCl= $58.44 g mol^{-1}$

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106. A 1.00 molal solution of trichloroacetic acid $(\mathbb{C}Cl_3COOH)$ is heated to its boiling point. The solution has the boiling point of $100.18^\circ C$. Determine the Van't Hoff factor for trichloroacetic acid $\left(K_b f \text{ or } water = 0.512 K kg mol^{-1}\right)$

A. A) 0.351

B. B) 3.11

C. C) 0.55

D. D) 0.541

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107. Determine the osmotic pressure of solution prepared by dissolving $2.5 \times 10^{-2} g$ of K_2SO_4 in 2L of water at $25^{\circ}C$, assuming that it is completely dissociated. $\left(R = 0.0821 L atm K^{-1} mol^{-1}\right)$, Molar mass of $K_2SO_4 = 174 g mol^{-1}$

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108. 3.9 g of benzoic acid dissolved in 49 g of benzene shows a depression in freezing point of 1.62K. Calculate the Van't Hoff factor and predict the nature of solute (associated or dissociated). (Given: Molar mass of benzoic acid= $122 g mol^{-1}$, K_f for benzene= $49 K kg mol^{-1}$)

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109. A 0.004 M solution of sodium sulphate is isotonic with .010 M solution of glucose. The apparent percentage dissociation sodium sulphate is

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110. To $500cm^3$ of water, $3.0 \times 10^{-3}kg$ of acetic acid is added. If 23% of acetic acid is dissociated, what will be te depression in freezing point? K_f and density of water are $1.86Kkgmol^{-1}$ and $0.997gcm^{-3}$ respectively.

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111. The freezing point of a 0.08 molal soluton of $NaHSO_4$ is $-0.372^\circ C$. Calculate the dissociation constant for the reaction:

$(HSO_4) \Leftrightarrow H^+ + SO_4^{2-}$

$\left(K_f f \text{ or } water = 1.86Km^{-1}\right)$

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112. A storage battery contains a solution of H_2SO_4 38% by weight. At this concentration Van's Hoff factor is 2.50. At what temperature, will the battery content freeze?

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113. A certain mass of a substance when dissolved in 100 g of benzene lowers the freezing point by $1.06^{\circ}C$. The same mass of solute dissolved in 100 g of water lower molecular weight in benzene and is completely dissociated in water, into how many ions does it dissociate in water? K_f for water and benzene are 1.86 and $5.12Kkgmol^{-1}$ respectively.

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114. Out of 1M glucose and 2M glucose, which one of the higher boiling point and why?

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115. What happens when the external pressure applied becomes more than the osmotic pressuer of solution?

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116. Blood cells are isotonic with 0.9% sodium chloride solution. What happens if we place blood cells in a solution containing 1.2% sodium chloride solution?

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117. Blood cells are isotonic with 0.9% sodium chloride solution. What happens if we place blood cells in a solution containing 0.4% sodium chloride solution?

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118. What will happen if pressure greater than osmotic pressure is applied on the solution separated by a semipermeable membrane from the solvent?

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119. Will the elevation in boiling point be same if 0.1 mole of sodium chloride or 0.1 mole of sugar is dissolved in 1 L of water?

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120. When dehydrated fruits and vegetables are placed in water they slowly swell and return to original form why ? What is the effects of temperature on the process ?

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121. Why is great care is taken in intravenous injection to have comparable concentration of solutions to be injected to that of blood plasma /

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122. Which colligative property is preferred for the molecular mass determination of macromolecules?

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123. Will the depression in freezing point be same or different if 0.1 mole of sugar or 0.1 mole of glucose is dissolved in one litre of water?

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124. Outer hard shells of two eggs are removed. One of the eggs is placed in pure water and the other is placed in saturated solution of sodium chloride. What will be observed and why?

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125. The osmotic prssure of equimolar solutions of glucose: sodium chloride and barium chloride wil be in the order:

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126. Why is it advised to add ethylene glycol to water in a car radiator while driving in a hill station.

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127. What is de-icing agent ? How does it function ?

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128. Sodium chloride solution freezes at lower temparature than water but boils at higher temparature than water . Explain.

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129. Why is camphor preferred as a sovent for measuring the molecular mass of napthalene by Rast method?

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130. When mercuric iodide is added to the aqueous solution of KI, then the :

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131. Arrange the following in increasing order of freezing point?

0.2M NaOH, 0.2M Na_2CO_3, $0.1MAgNO_3$, 0.1M $(NH_4)_2SO_4$. $FeSO_{4.6}H_2O$.

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132. Why does an axeotropic mixture distils without any change in composition?

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133. Under what conditions Van't Hoff factor , i

is eaual to unity

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134. Under what conditions Van't Hoff factor , i

less than one

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135. Under what conditions Van't Hoff factor , i

more than one

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136. What would be the value of Vant Hoff's factor for a dilute solution of K_2SO_4 in water?

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137. State the conditions resulting in reverse osmosis?

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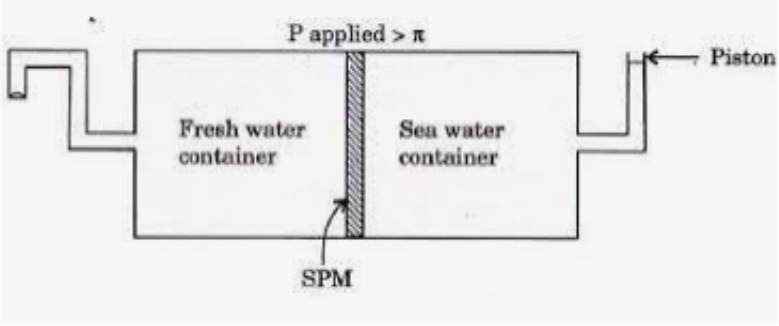
138. Given below is the sketch of a plant for carrying out a process



Name the process occuring in the above plant.

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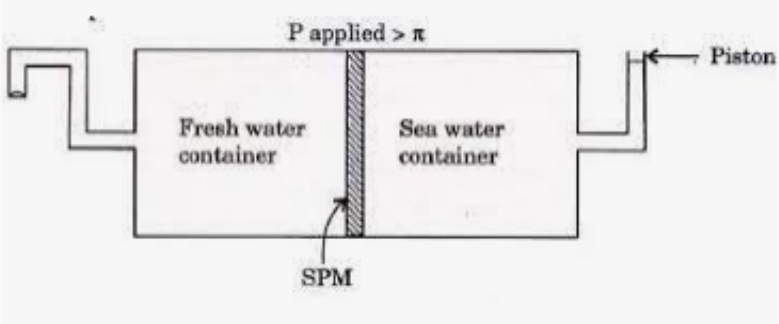
139. Given below is the sketch of a plant for carrying out a process



To which container does the net flow of solvent take place?

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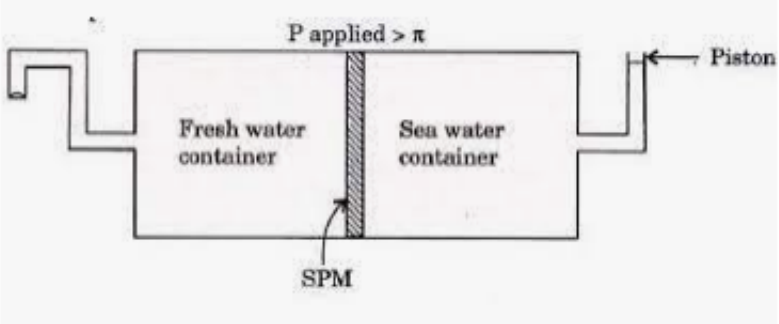
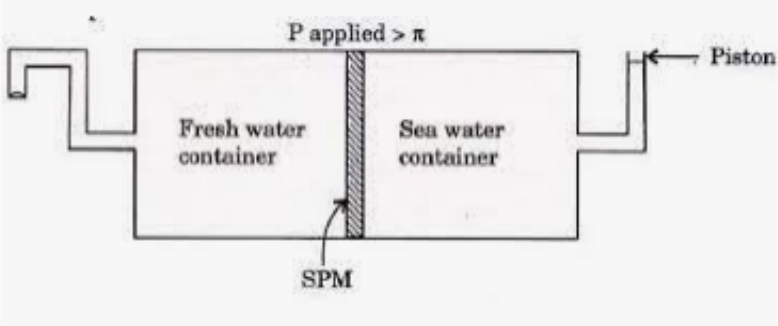
140. Given below is the sketch of a plant for carrying out a process



Name one SPM which can be used in this plant.

Watch Video Solution

141. Given below is the sketch of a plant for carrying out a process



Give one practical of the plant.

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142. Why is person suffereing from high blood pressure is advised to take minimum quantity of common salt?

Watch Video Solution

143. Arrange the following solutions in increasing order of Vant's Hoff factor:

0.1 M $CaCl_2$, 0.1M KCl, 0.1M $Al_2(SO_4)_3$, 0.1 M $C_{11}H_{22}O_{11}$.

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144. Calculate the mass percentage of benzene (C_6H_6) and carbon tetrachloride $(\mathbb{C}l_4)$ if 22 g of benzene is dissolved in 122 g of carbon tetrachloride.

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145. Calculate the mole fraction of benzene in solution containing 30% by mass in carbon tetrachloride.

Watch Video Solution

146. Calculate the molarity of each of the following soluton:

$30gofCO(NO_3)_2.6H_2O$ in 4.3 L of solution.

Watch Video Solution

147. Calculate the molarity of each of the following soluton:

$30mLof0.5MH_2SO_4$, dilute to 500 mL of H2SO4.

Watch Video Solution

148. Calculate the mass of urea (NH_2CONH_2) required in making 2.5 kg of 0.25 molal aqueous solution.

Watch Video Solution

149. Calculate

molality of KI if density of 20% (mass/mass) aqueous solution of KI is $1.202gmL^{-1}$?

Watch Video Solution

150. Calculate molality and molarity of KI if density 20% (mass/mass)aqueous KI is 1.202% g/mL

Watch Video Solution

151. Calculate

mole fraction of KI if density of 20% (mass/mass) aqueous solution of KI is $1.202 gmL^{-1}$?

Watch Video Solution

152. H_2S a toxic gas with rotten egg like smell is used for qualitative analysis. If the solubility of H_2S in water at STP is 0.195m, calculate the Henry's law constant.

Watch Video Solution

153. Henry's law constant for CO_2 in water is 1.67xx10^(-8) Pa at 298 K. Calcuated the quantity of CO_2 in 500 mL of soda water when paked under 2.5 atm CO_2 pressure at 298K.

Watch Video Solution

154. The vapour pressure of pure liquids A and B are 450 and 700 mm Hg at 350 K respectively. Find out the composition of the liquid mixture if total vapour pressure is 600 mm Hg. Also find the composition of the vapour phase.

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155. Vapour pressue of pure water at 298K is 23.8 mm Hg. 50 g of urea (NH_2CONH_2) is dissolved in 850 g of water. Calculate the vapour pressure of water for this solution and its relative lowering.

Watch Video Solution

156. Boiling point of water at 750 mm Hg is 96.63 degree celsius. How many sucrose is to be added to 500 g of water such that it boils at 100 degree celsius ? Molal elevation constant for water is 0.52 kg mol^{-1} .

Watch Video Solution

157. Calculate the osmotic pressure in Pascals exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 185, 000 in 450 mL of water at $37^{\circ}C$?

Watch Video Solution

158. Caculate the mass of a compound $\left(molarmass = 256gmol^{-1}\right)$ to be dissolved in 75g of benzene to lower its freezing point by 0.48K $\left(K_f = 5.12Kkgmol^{-1}\right)$

Watch Video Solution

159. Define the term solution. How many types of solutions are formed ? Write briefly about each type with an exampes

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160. Suppose a solid solution is formed between two substances one whose particles are very large and the other whose particles are very small. What kind of solid solution is this likely to be?

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161. Define

Mole fraction

Watch Video Solution

162. Define the following terms:

Molality?

Watch Video Solution

163. Define the following terms

Molarity

Watch Video Solution

164. Define the following terms :

Mass percentage (w/w)

Watch Video Solution

165. A solution of glucose in water is labelled as 10 percent w/w . What would be the molality and mole fraction of each component in the

solution? If the density of the solution is 1.2g mL^{-1} , then what shall be the molarity of the solution?

Watch Video Solution

166. How many mL of 0.1 M HCl are required to react completely with 1 g of mixtures of Na_2CO_3 and $NaHCO_3$ molarity of the solution?

Watch Video Solution

167. A solution is obtained by mixing 300 g of 25% solution and 400 g of 40% solution by mass. Calculate the mass percentage of the resulting solution.

Watch Video Solution

168. An antifreeze solution is prepared fro, 222.6g of ethylene glycol, $C_2H_4(OH)_2$ and 200g of water. Calculate the molality of the solution . If

the density of the solution is 1.072g mL^{-1} , then what shall be the molarity of the solution?

Watch Video Solution

169. A sample of drinking water was found to be severely contaminated with chloroform (CHC13) supposed to be a carcinogen. The level of contamination was 15 ppm (by mass): determine the molality of chloroform in the water sample.

Watch Video Solution

170. A sample of drinking water was found to be severly contaminated with chlorofoem $(CHCl_3)$, supposed to be a carcinogen. The level of contmination was 15ppm (by mass):

determine the molality of the chloroform in the water sample.

Watch Video Solution

171. What role does the molecular interaction play in a solution of alcohol and water?

Watch Video Solution

172. Why do gases always tend to be less soluble in liquids as the temperature is raised?

Watch Video Solution

173. State Henry's law and mention its some important applications.

Watch Video Solution

174. The partial pressure of ethane over a solution containing $6.56\{10^{-3}\}$g of ethane is 1 bar. If the solution contains $5.00\{10^{-2}\}$g of ethane, then what shall be the partial pressure of the gas?

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175. What is meant by positive and negative deviation from Raoult's law and how is the sign of $\delta_{mix}H$ related to positive and negative deviation from Raoult's law?

Watch Video Solution

176. An aqueous solution of 2% non-volatile solute exerts a pressure of 1.004 bar at the normal boiling point of the solvent. What is the molar mass of the solute?

Watch Video Solution

177. Heptane and octane form ideal solution . At 373K , the vapour pressure of the two liquid components are 105.2k Pa and 46.8k Pa respectively. What will be th vapour pressure of a mixture of 26.0g of heptane and 35.0g of octane?

Watch Video Solution

178. The vapour pressure of water is 12.3 kPa at 300K. Calculate the vapour pressure of 1 molar solution of a solute in it.

Watch Video Solution

179. Calculate the mass of a non volatile solute $\left(molarmass40gmol^{-1}\right)$ which should be dissolved in 114 g octane to reduce its vapour pressure to 8%.

Watch Video Solution

180. A solution containing 30 g of non-volatile solute exactly in 90 g of water has a vapour pressure of 2.8 kPa at 298 K. Further, 18 g of water is then added to the solution and the new vapour pressure becomes 2.9 kPa at 298 K. Calculate: molar mass of the solute

Watch Video Solution

181. A solution containing 30 g of non-volatile solute exactly in 90 g of water has a vapour pressure of 2.8 kPa at 298 K. Further, 18 g of water is then added to the solution and the new vapour pressure becomes 2.9 kPa at 298 K. Calculate: vapour pressure of water at 298 K.

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182. A 5% solution (by mass) of cane sugar in water has freezing point of 27IK Calculate the freezing point of 5% glucose in water if freezing point of pure water is 273.15 K.

Watch Video Solution

183. Two elements A and B form compounds having formula AB2 and AB4. When dissolved in 20 g of benzene (C_6H_6), 1 g of AB_2 lowers the freezing point by 2.3 K whereas 1.0 g of AB_4 lowers it by 1.3 K. The molar

depression constant for benzene is 5.1 K kg mol^{-1}. Calculate atomic masses of A and B.

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184. At 300 K, 36 g of glucose present in a litre of its solution has an osmotic pressure of 4.98 bar. If the osmotic pressure of the solution is 1.52 bars at the same temperature, what would be its concentration?

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185. Suggest the most important type of intermolecular attractive interaction in the following pairs: n-hexane and n-octane

Watch Video Solution

186. Suggest the most important type of intermolecular attractive interaction in the following pairs: I_2 and CCl_4

Watch Video Solution

187. Name any three examples of kharif crops?

Watch Video Solution

188. Name three common crops that are known as rabi crops?

Watch Video Solution

189. Suggest the most important type of intermolecular attractive interaction in the following pairs: acetonitrile (CH_3CN) and acetone (C_3H_6O).

Watch Video Solution

190. Amongst the following compounds, identify which are insoluble, partially soluble and highly soluble in water: phenol

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191. Amongst the following compounds, identify which are insoluble, partially soluble and highly soluble in water: toluene

Watch Video Solution

192. Amongst the following compounds, identify which are insoluble, partially soluble and highly soluble in water: formic acid

Watch Video Solution

193. Amongst the following compounds, identify which are insoluble, partially soluble and highly soluble in water: ethylene glycol

Watch Video Solution

194. Amongst the following compounds, identify which are insoluble, partially soluble and highly soluble in water: chloroform

Watch Video Solution

195. Amongst the following compounds, identify which are insoluble, partially soluble and highly soluble in water: pentanol

Watch Video Solution

196. If the density of some lake water is 1.25g mL^{-1} and contains 92 g of Na^{+} ions per kg of water, calculate the molality of Na+ ions in the lake.

Watch Video Solution

197. If the solubility product of CuS is 6×10^{-16}, calculate the maximum molarity of CuS in aqueous solution.

Watch Video Solution

198. Calculate the mass percentage of aspirin (C9H804) in acetonitrile $(CH_3CN) when 6.5 gof$C_9H_8O_4$ is dissolved \in 450 gof$CH_3CN`.

Watch Video Solution

199. Nalorphene $(C_{19}H_{21}NO_3)$, similar to morphine, is used to comobat withdrawl symptoms in narcotic users. Does the nalrophene generally given is 1.5 mg. Calculate the mass of $1.5 \times 10^{-3} m$ in aqueous solution required for the above dose.

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200. Calculate the amount of benzoic acid (C_6H_5COOH) required for preparing 250 mL of 0.15 M solution in methanol.

Watch Video Solution

201. The depression in freezing point of water observed for the same amount of acetic acid, trichloroacetic acid and trifluoroacetic acid increases in the order given above. Explain briefly.

Watch Video Solution

202. Calculate the depression in the freezing point of water when 10 g of $CH_3CH_2CHClCOOH$ is added to 250 g of water. $K_a = 1.4x10^{-3}$, $K_f = 1.86Kkgmol^{-1}$.

Watch Video Solution

203. 19.5 g of CH_2FCOOH is dissolved in 500 g of water. The depression in the freezing point of water observed is 1.0° C. Calculate the van't Hoff factor and dissociation constant of fluoroacetic acid.

Watch Video Solution

204. Vapour pressure of water at 293 K is 17.535 mm Hg. Calculate the vapour pressure of water at 293 K when 25 g of glucose is dissolved in 450 g of water.

Watch Video Solution

205. Henry's law constant for the molality of methane in benzene at 298 K is 4.27×10^5 mm Hg. Calculate the solubility of methane in benzene at 298 K under 760 mm Hg.

Watch Video Solution

206. 100 g of liquid A $\left(molarmass 140 gmol^{-1}\right.$ was dissolved in 1000 g of liquid B $\left(molarmass 180 gmol^{-1}\right)$. The vapour pressure of pure liquid B was found to be 500 torr. Calculate the vapour pressure of pure liquid A and its vapour pressure in the solution if the total vapour pressure of the solution is 475 Torr.

Watch Video Solution

207. Fill in the blanks- _____ and _____ are called as rabi crops.

Watch Video Solution

208. Benzene and toluene form ideal solution over the entire range of composition. The vapour pressure of pure benzene and toluene at 300 K are 50.71 mm Hg and 32.06 mm Hg respectively. Calculate the mole fraction of benzene in vapour phase if 80 g of benzene is mixed with 100 g of toluene.

Watch Video Solution

209. The air is a mixture of number of gases. The major components are oxygen and nitrogen with approximate proportion of 20% is to 79% by volume at 298K. The water is in equilibrium with air at a pressure of 10 atm. Henry's law constants for oxygen and nitrogen at 298 K are $3.30 \times 10^7 mm$ and $6.51 \times 10^7 mm$ respectively. calculate the composition of these gases in water.

Watch Video Solution

210. Determine the amount of $CaCl_2$ (i = 2.47) dissolved in 2.5 litre of water such that its osmotic pressure is 0.75 atm at 27° C.

Watch Video Solution

211. Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 litre of water at 25° C, assuming that it is completely dissociated.

Watch Video Solution

212. Components of a binary mixture of two liquids A and B were being separated by distillation. After some time separation of components stopped and composition of vapour phase becomes same as that of liquid phase. Both the components started coming in the distillate. explain why this happened.

Watch Video Solution

213. Explain why on addition of 1 mol of NaCl to 1 litre of water, the boiling point of water increases, while addition of 1 mol of methyl alcohol to one litre of water decreases its boiling point.

A.

B.

C.

D.

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214. Explain the solubility rule "like dissolves like" in terms of intermolecular forces that exist in solutions.

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215. Concentration terms such as mass percentage, ppm, mole fraction and molality are independent of temperature, however molarity is a function of temperature. Explan?

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216. What is the significance of Henry's law constant K_H?

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217. Why aquatic species feel more comfortable in cold water than hot water ?

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218. Explain the following phenomena with the help of Henry's law

Painful condition known as bends.

Watch Video Solution

219. Explain the following phenomena with the help of Henry's law

Feeling of weakness and discomfort in breaking at high altitude.

Watch Video Solution

220. Why soda water bottle kept at room temperature fizzes on opening?

Watch Video Solution

221. Why the vapour pressure of a solution of glucose in water is lower than of pure water

Watch Video Solution

222. How does sprinkling of salt help in clearing the snow covered roads in hilly areas? Explain the phenomenon involved in the process.

Watch Video Solution

223. What is a semi-permeable membrane ?

Watch Video Solution

224. Give an example of a material used for making semipermeable membrane for carrying out reverse osmosis.

Watch Video Solution

225. Why is person suffereing from high blood pressure is advised to take minimum quantity of common salt?

Watch Video Solution

226. Why water cannot be separated completely from ethanol by fractional distillation?

Watch Video Solution

227. Why is melting point of a substances used as a criterion for testing the purity of a substances?

Watch Video Solution

228. If glycerol, $C_3H_5(OH)_3$ and methyl alcohol, CH_3OH are sold at the same price per kg, which would be cheaper for preparing an anti freeze solution for the radiator of car?

Watch Video Solution

229. If K_f for water is $\frac{1.86^C}{m}$ explain why 1 m NaCl in water does not have a freezing point equal to

$-3.72^\circ C$?

Watch Video Solution

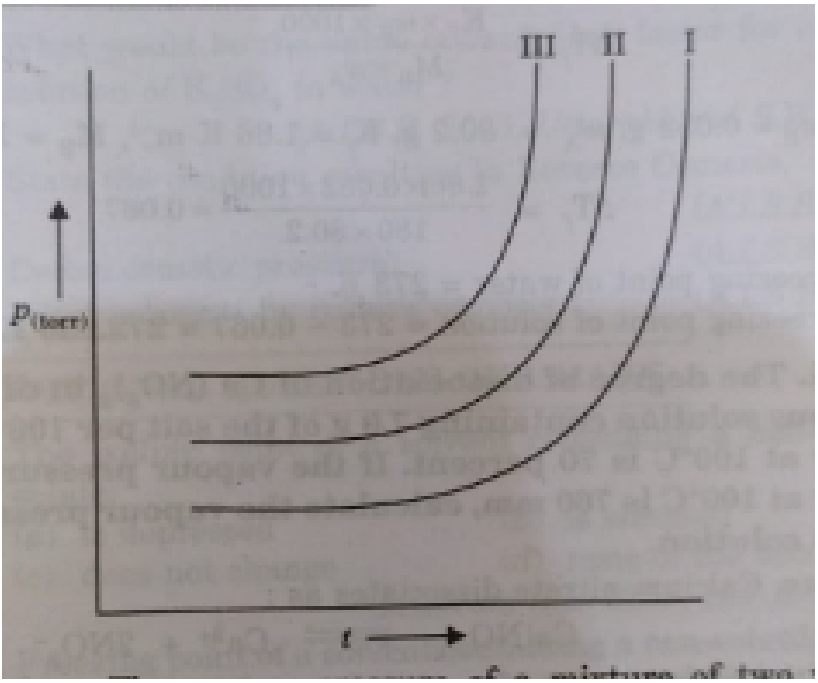
230. 0.5 molal aqueous solution of a weak acid is 20% iionized. If K_f for water is $1.86 Kkgmol^{-1}$. The lowering in freezing point of the solution is

Watch Video Solution

231. Why is camphor preferred as a sovent for measuring the molecular mass of napthalene by Rast method?

Watch Video Solution

232. The following figure shows vapour pressure curves of two pure liquids and solution of the two. Which curves I,II or III represent pure liquids and which represents the solution?



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233. If vapour pressure of liquid A is greater than the vapour presure of liquid B, then boiling point of A is lower than that of liquid B,. Do you agree with the statement. Explain?

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234. The vapour pressure of pure benzene and toulene at a particular temperature are 100 mm and 50 mm respectively. Then the mole fraction of benzene in vapour pressure is constant with equimolar soluton of benzene and toulene is

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235. 0.052g of glucose $(C_6H_{12}O_6)$ has been dissolved in 80.2 g of water. Calculate

the freezing point of the solution $\left(K_f = 1.86Km^{-1}, K_b = 5.2Km^{-1}\right)$

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236. 45g of ethylene glycol $(C_2H_6O_2)$ is mixed with 600 g of water. Calculate:

the freezing point of the solution.

$\left(K_f f \text{ or } water = 1.86 K kg mol^{-1}\right)$.

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237. The degree of dissociation of $Ca(NO_3)_2$ in dilute aqueous solution containing 7.0 g of the salt per 100 g of water at $100^\circ C$ is 70 percent. If the vapour pressure of water at $100^\circ C$ is 760 mm, calculate the vapour pressure of the solution.

Watch Video Solution

238. A motor vehicle radiator was filled with 8L of water to which 2 L of methyl alcohol (density 0.8g/mL) were added. What is the lowest

temperature at which the vehicle can be parked outdoors without a danger that water in the radiator will freeze? K_f of water $=1.86 Km^{-1}$.

Watch Video Solution

239. The mole fraction of toluene in a solution with benzene is 0.50. calculate the weight percent of toluene in solution.

Watch Video Solution

240. 45g of ethylene glycol ($C_2H_6O_2$) is mixed with 600g of water. Calculate

The freezing point depression

Watch Video Solution

EXERCISE

1. Calculate the percentage composition of C2H5OH.

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2. 18g of glucose $\left(molarmass 180 gmol^{-1}\right)$ is present in $500 cm^3$ of its aqueous solution. What is the molarity of the solution? What additional data is required if the molality of the solution is also required to be calculated?

Watch Video Solution

3. A solutionm of glucose $\left(C_6H_{12}O_6\right)$ in water is labelled as 10% by weight. What would be the molality of the solution?

Watch Video Solution

4. What volume of 10%(w/v) solution of Na_2CO_3 will be required to neutralise 100 mL of HCl solution containing 3.65 g of HCl?

Watch Video Solution

5. What volume of 95 mass% sulphuric acid $\left(density = 1.85\frac{g}{c}m^3\right)$ and what mass of water must be taken to prepare $100cm^3$ of 15 mass% solution sulphuric acid $\left(density = 1.10gcm^3\right)$?

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6. Calculate the mole fraction of ethanol and water in a sample of rectified spirit which contains 95% ethanol by mass..

Watch Video Solution

7. Calculate the mole fraction of water in a mixture of 12 g water, 108 g acetic acid and 92 g ethanol.

Watch Video Solution

8. One litre solution of N/2 HCl is heated in a beaker. It was observed that when the volume of the solution is reduced to 600 mL, 3.25 g of HCl is lost. Calculate the normally of the new solution.

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9. Concentrated H_2SO_4 has a density 1 . 9 g/mL and is $99\,\%$ H_2SO_4 by mass. Calculate the molarity of the acid

Watch Video Solution

10. Calculate the molality and mole fraction of the solute in aqueous solution containing 3.0 g urea per 250 g of water (molecular mass of urea = 60g).

Watch Video Solution

11. The molarity of a solution of ethyl alcohol (C_2H_5OH) in water in 1.55 m. How many grams of ethyl alcohol are dissolved in 2 kg of water?

Watch Video Solution

12. Commercially available concentrated HCI contains $38\,\%$ HCI by mass and has density $1.\ 19gmL^{-1}$ Calculate molarity of this acid

Watch Video Solution

13. Calculate the formality of sodim thiosulphate $(Na_2S_2O_{3.5}H_2O)$ solution, 1.24 g of which are dissolved in $100cm^3$ of the solution.

Watch Video Solution

14. 4.0 g of NaOH are contained in one declitre of a solution. Calculate mole fraction of NaOH.

Watch Video Solution

15. 4.0 g of NaOH are contained in one declitre of a solution. Calculate molarity of NaOH

Watch Video Solution

16. 4.0 g of NaOH are contained in one declitre of a solution. Calculate molality of solution.$\left(densityofsolution = 1.038gmL^{-1}\right)$.

Watch Video Solution

17. Calculate molarity and molality of solution prepared by mixing equal volumes of $30\,\%$ by mass of H_2SO_4 (density = 1 .218 g mL^{-1}) and$70\,\%$ by mass of H_2SO_4 (density $= 1.\,610 gmL^{-1}$)

Watch Video Solution

18. The concentration of solution of sulphuric acid is 18M and has density $1.84 gcm^{-3}$. What is the mole fraction and weight percentage of H_2SO_4 in the solution?

Watch Video Solution

19. Calculate the number of molecules of oxalic acid $(H_2C_2O_4.\,2H_2O)$ in 100 mL of 0.2N oxxalic acid solution.

Watch Video Solution

20. The mole fraction of benzene in a solution with toluene 0.50 calculate the mass percent of benzene in the solution.

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21. $8.0575 \times 10^{-2} kg$ of Glauber's salt is dissolved in water to obtain $1 dm^3$ of solution of density $1077.2 kgm^{-3}$. Calculate the molarity?

Watch Video Solution

22. $8.0575 \times 10^{-2} kg$ of Glauber's salt is dissolved in water to obtain $1 dm^3$ of solution of density $1077.2 kgm^{-3}$. Calculate the molality?

Watch Video Solution

23. $8.0575 \times 10^{-2} kg$ of Glauber's salt is dissolved in water to obtain $1 dm^3$ of solution of density $1077.2 kgm^{-3}$. Calculate the molarity?

Watch Video Solution

24. Calculate the molarity of a solution of $CaCl_2$ if on chemical analysis it is found that 500 mL of $CaCl_2$ solution contain $1.505 \times 10^{23} Cl^-$ ions.

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25. 100 mL of a solution containing 5 g of NaOH are mixed with 200 mL of $\frac{M}{5}$ NaOH solution. Calculate the molarity of the resulting solution.

Watch Video Solution

26. The density of a 2.05 M acetic acid in water is $1.02 gcm^{-3}$. Calculate the molality of the solution.

Watch Video Solution

27. Concentrated HNO_3 used in the laboratory is usually 69% by masds of HNO_3. Calculate the volume of the solution which contains 23 g of HNO_3. The density of concentrated HNO_3 is $1.41 gcm^{-3}$.

Watch Video Solution

28. An aqueous solution containing 6 g of ureas in 500 mL of solution has a density equal to 1.05. if the molar mass of urea is 60. then the molality of solution is

Watch Video Solution

29. Hundred gram of $Al(HNO_3)_3$ (molar mass $213 gmol^{-1}$) is dissolved in 1 L of water at $20^\circ C$. The density of water at this temperature is $0.9983 gcm^{-3}$and the density of resulting solution is $0.9990 gcm^{-3}$. Calculate the molarity and molality of this solution.

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30. Sugarcane, groundnut, pulses, cotton are called _____ crops.

Watch Video Solution

31. 1 kg of water under a nitrogen pressure of 1 atmosphere dissolves 0.02 gm of nitrogenat 293 k. Calculate Henry' s law constant :

Watch Video Solution

32. Calculate the amount of CO_2 dissolved at 4 atm in $1dm^3$ of water at 298K. The Henry's law constant for CO_2 at 298K is 1.7 k bar.

Watch Video Solution

33. At what partial pressure, oxygen will have a solubility of $0.06gL^{-1}$ in water at 293 K? Henrys law constant (k_H) of O_2 in water at 303 K is 46.82

k bar.

(Assume the density of the solution to be and same as that of water)

Watch Video Solution

34. The mole fraction of He gas in a saturated solution at $20^\circ C$ is $1.25x10^{-6}$. Calculate the pressure of He gas above the solution. $(k_H of Heat 20^\circ C = 144.98k$bar

Watch Video Solution

35. The vapour pressure of pure liquid A at $310^\circ C$ is 0.158bar. The vapour pressure of this liquid in solution with liquid B is 0.095 bar. Calculate the mole fraction of A in the solution if the mixture obeys Raoult's law.

Watch Video Solution

36. At 293 K, ethyl acetate has vapour pressure of 72.8 torr ethyl proprionatr has vapour pressure of 27 . 7 torr. Assuming their mixture to obey Raoult's law determine the vapour pressure of the mixture containing 25 g ethyl acetate and 50 g of ethyl propomoate

Watch Video Solution

37. 600 mL of aqueous solution containing 2.5 g of a protein shows an osmotic pressure of 25mm Hg at $27^{\circ} C$. Determine the relative molecular mass of protein.

Watch Video Solution

38. Benzene and toluene form nearly ideal solution. At a certain temperature the vapour pressure of pure benzene and toluene are 150 and 50 torr. respectively. Calculate the vapour pressure of solution containing equal weights of benzene and toluene at this temperature .

Watch Video Solution

Watch Video Solution

39. The vapour pressure of ethanol and methanol are 44.5 and 88.7 mm of Hg at 298 K. An ideal solution is formed at the same temperature by mixing 60 g of ethanol and 40 g methanol. Calculate the total vapour pressure of the solution and the mole fraction of methanol in the vapour phase.

Watch Video Solution

40. Methanol and ethanol forms nearly ideal solution at 300K. A solution of made by mixing 32g of methanol and 23 g of ethanol. Calculate the partial pressure of its consitituents and the total pressure of the solution. (at 300K, $\rho^{\circ}(CH_3OH) = 90mm$, $\rho^{\circ}(C_2H_5OH) = 51mmHg$).

Watch Video Solution

41. At $20^{\circ} C$ the vapour pressure of pure liquid A is 22 mm Hg and that of pure liquid B is 75mm Hg. What is the composition of the solutions of these two components that has a vapour pressure of 48.5 mm Hg at this temperature?

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42. Two liquids A and B have vapour pressure of 0.658 bar and 0.264 bar respectively. In an ideal solution of the two, calculate the mole fraction of A at which the two liquids have equal partial pressures.

Watch Video Solution

43. The liquids X and Y from ideal solution having vapour pressures 200 and 100mm Hg respectively. Calculate the mole fraction of component X in vapour phase in equilibrium with an equimolar solution of the two.

Watch Video Solution

44. At a certain temperature, the vapour pressure (in mm Hg) of CH_3OH and C_2H_5OH solution is represented by P=119x+135 where x is the mole fraction of CH_3OH. What are the vapour pressures of pure components at this temperture?

Watch Video Solution

45. The vapour pressure of water is 12.3 kPa at 300 K. Calculate vapour pressure of 1 molal solution of a non-volatile solute in it.

Watch Video Solution

46. Vapour pressure of water at 20^C is 17.5 mm of Hg and lowering of vapour pressure of a sugar soluton is 0.061 mm of Hg. Calculate relative lowering of vapour pressure?

Watch Video Solution

47. The vapour pressure of water at $20^{\circ}C$ is 17.5 mm Hg. A soluton of sucrose (molar mass=342) is prepared by dissolving 68.4g in 1000 g of water. Calculate

Vapour pressure of solution.

Watch Video Solution

48. The vapour pressure of pure bronze at a certain temparature is 262atm. At the same temparature the V.P. of a solution containing 2.0g of non-volatile solid in 100g bronze is 256atm . What is the molecular mass of the solid?

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49. The vapour pressure of pure liquids A and B are 450 and 700 mm Hg at 350 K respectively. Find out the composition of the liquid mixture if total vapour pressure is 600 mm Hg. Also find the composition of the vapour phase.

Watch Video Solution

50. The vapour pressure of a 5% aqueous solution of a non-volatile organic substances at 373K is 745 mm. calculate the molar mass of the solute. (Vapour pressure of water at 373K=760mm Hg).

Watch Video Solution

51. Threshing is a process where-

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52. At $25^{\circ}C$ the vapour pressure of pure water is 23.76 mm of Hg and that of an aqueous dilute solution of urea is 22.98 mm of Hg. Calculate the molality of the solution.

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53. What mass of a non-volatile solute, urea (NH_2CONH_2) need to be dissolved in 100 g of water in order to decrease the vapour pressure of water by 25%? What is the molality of the solution?

Watch Video Solution

54. Urea forms an ideal solution in water. Determine the vapour pressure of an aqueous solution contianing 10% by mass of urea at $40^\circ C$. (Vapour pressur of water at $40^\circ C$=55.3 mm of Hg)

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55. The vapour pressure of water at 293K is 0.0231 bar and the vapour pressure of a solution of 108.24 g of a compound in 1000 g of water at the same temperature is 0.0228 bar. Calculate the molar mass of the solute.

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56. A solution containing 2.44 g of solute dissolved in 75 g of water boiled at $100.413^{\circ} C$. What will be the molar mass of the solute?

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57. The boiling point of a solution containing 1.5 g of a dichlorobenzene in 100 g of benzene was higher by $0.268^{\circ} C$. Calculate the molar mass of dichlorobenzene $\left(K_b f \text{ or } benze \neq = 2.62 degree molal^{-1}\right)$.

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58. 18 g of glucose is dissolved in 1 kg of water. At what temperature will the solution boil ? (K_b for water is 0.52 K kg mol^{-1})

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59. The boiling point of Benzene (C_6H_6) is 353.23 K. When 1 . 80 g of a non - volatile solute was dissolved in 90 g of C_6H_6 the boiling point is

raised to 354 . 11 K. Calculate the molar mass of solute .

(Given K_b for benzene is 2 . 53 K kg mol^{-1})

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60. A solution containing 0.730 g of camphar (molar mass=152) in 36.8g of acetone $(b.\ p.\ 56.30^\circ C)$ boils at $56.55^\circ C$. A solution of 0.564 g of an unknown compound in the same weight of solvent boils at $56.46^\circ C$. Calculate the molar mass of the unknown compound.

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61. 10g of non-volatile solute when dissolved in 100g of benzene raises its boiling point by 1° C. What is the molecular mass of the solute. (k_b for benzene=2.53 K kg mol^{-1})

Watch Video Solution

62. What elevation in boiling point of alcohol is to be excepted when 5 g of urea (molar mass=60) are dissolved in 75 g of it? The molar elevation constant for alcohol is $1.15^{\circ}C$.

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63. A solution containing 0.45 g of a urea in 22.5 g of water gave a boiling point elevation of 0.17 K. Calculate the molal elevation constant of water. Molar mass of urea is 60 g mol^{-1}.

Watch Video Solution

64. Caculate the mass of a compound $\left(molarmass = 256gmol^{-1}\right)$ to be dissolved in 75g of benzene to lower its freezing point by 0.48K $\left(K_f = 5.12Kkgmol^{-1}\right)$

Watch Video Solution

65. 15 g of an unknown molecular substance was dissolved in 450 g of water. The resulting solution freezes at $-0.34^{\circ}C$. What is them molar ass of the substance ? (K_f for water = 1. 86 K kg mol^{-1})

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66. 1.00g of a non-electrolyte solute dissolved in 50g of benzene lowered the freezing point of benzene by 0.40K. The freezing point depression constant of benzene is 5.12K mol^{-1} . Find the molar mass of the solute.

Watch Video Solution

67. When 2.56g of sulphur was dissolved in 100 g of CS_2, the freezing point lowered by 0.383K. Calculate the formula of sulphur (S_x).

$(k_f$ for CS_2= $3.83Kkgmol^{-1}$, Atomic mass of sulphur =$32gmol^{-1})$.

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68. How many grams of ethylene glycol (molar mass = 62) should be added to 10 kg of water, so that the resulting solution freezes at $-10^{\circ}C$ (K_f for water = 1.86 K mol^{-1}).

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69. The aqueous solutions containing respectively 7.5 g of urea (molar mass=60) and 42.75 g of substance X in 100 g of water freeze at the same temperatuer. Calculate the molecular weight of X.

Watch Video Solution

70. 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 ? ($K_f = 1.86^{\circ}Ckgmol^{-1}$)

Watch Video Solution

71. In winter, the normal temperature in a Himalayan's valley was found to be -10° C . Is a $30\,\%$ by mass of an aqueous solutions of ethylene glycol (molar mass = 62) suitable for car radiator ? K_f for water is $1.\,86 Km^{-1}$

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72. An aqueous solution freezes at 272.07K, while pure water freezes at 273K. Determine the molality of the solution.

(given K_f for water=$1.86 \frac{K}{m}$

Watch Video Solution

73. A solution containing 0.45 g of a urea in 22.5 g of water gave a boiling point elevation of 0.17 K. Calculate the molal elevation constant of water. Molar mass of urea is 60 g mol^{-1}.

Watch Video Solution

74. Calculate the temperature at which a solution containing 54 gms of glucose $(C_6H_{12}O_6)$ in 250 gms of water will freeze. K_f for water . $(1.86 K kg mol^{-1})$

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75. in a cold climate water gets frozen causing damage to the radiator of a car . Ethylene glycol is used as an antifreezing agent . Calculate the amount of ethylene glycol to be added to 4kg of water to prevent it from freezing at -6° C . (K_f for water 1.85Km^{-1}).

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76. A solution of sucrose (molar mass= $342 g mol^{-1}$) is prepared by dissolving 68.4 g of it per litre of solution. What is the osmotic pressure at 300K?

Watch Video Solution

77. Osmotic pressure of a solution containing 3.5 g of dissolved protein per 50cc of a solution is 25 mm. at $37^{\circ}C$. Calculate the molar mass of protein.

Watch Video Solution

78. The osmotic presure of a solution containing 9.2 g of a substance (molar mass=176) ion 302 ml of solution was found to be 4.1 atmosphere at $15.5^{\circ}C$. Calculate the value of solution constant.

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79. Calculate the osmotic pressure of a solution obtained by mixing 100 mL of 1.5 percent solution of urea (mol.mass of 60) and 100 mL of 3.42 percent solution of cane sugar (mol. Mass=342) at $20^{\circ}C$.

$(R = 0.82 litre atm K^{-1} mol^{-1})$

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80. 3.0 g of non-volatile solute when dissolve in 1 litre water, shows an osmotic pressure of 2 atmosphere at 300 K. Calculate the molar mass of the solute. (R = 0.0821 litre atm $K^{-1}\text{mol}^{-1}$).

Watch Video Solution

81. A solution containing 10.2 g of gylcerine per litre is found to be isotonic with a 2% solution of glucose. Calculate the molar mass of glycerine (molar mass=180).

Watch Video Solution

82. Calculate the osmotic pressure of a solution containing 10 gram each of glucose $(C_6H_{12}O_8)$ and sucrose $(C_{12}H_{22}O_{11})$ in $1000cm^3$ of the soluton at $25^\circ C$.

$\left(R = 0.083L\overline{K}^{-1}mol^{-1}\right)$

Watch Video Solution

83. A 5% solution of cane sugar (molar mass=342) is isotonic with 0.877% soluton of urea. Calculate the molar mass of urea.

Watch Video Solution

84. What is the concentration of solution of sucrose (molar mass=342) which is isotonic with a solution containing 6 g of urea per litre?

Watch Video Solution

85. Osmotic pressure of a solution containing 3.5 g of dissolved protein per 50cc of a solution is 25 mm. at $37^{\circ}C$. Calculate the molar mass of protein.

Watch Video Solution

86. A solution of an organic compound is prepared by dissolving 34.2 g in 500 g of water. Calculate the molecular mass of the compound and freezing point of the solution. Given that K_b for water=$0.52Km^{-1}$, b.p.t of solution =100.14^@C, $K, f \text{ or } water =$ 1.87 Km^-1`.

Watch Video Solution

87. A solution is prepared by dissolving 2g of substance A in 18g of water. calculate the mass percentage of solute?

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88. The average osmotic pressure of human blood is 7.7 atm at $40^\circ C$. What would be the total concentration of various solutes in the blood?

Watch Video Solution

89. The average osmotic pressure of human blood is 7.7 atm at $40^{\circ} C$. What would be the total concentration of various solutes in the blood?

Watch Video Solution

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

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91. 200 cm^3 of an aqueous solution of a protein contains 1.26g of the protein . The osmotic pressure of such a solution at 300K is found to be 2.7×10^{-3} bar. Calculate the molar mass of the protein (R=0.083 L bar $mol^{-1} K^{-1}$)

Watch Video Solution

92. Decinormal solution of NaCl developed an osmotic pressure of 4.6 atm at 300K. Calculate the degree of dissociations.

Watch Video Solution

93. Calculate the freezing point of a one molar aqueous solutoin $\left(density 1.04 g L^{-1}\right)$ of KCl. ($K_f of water = 1.86 K g mol^{-1}$, atomic masses of K=39, Cl=35.5)

A. 1) -1.32 degree Celsius

B. 2) -1.92 degree celsius

C. 3) -2.9 degree Celsius

D. 4) 2 degree Celsius

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94. Calculate the boiling point of a one molar aqueous solution of KBr $(density 1.06 gmL^{-1})$.

($K_b f$ or $water = 0.52 kgmol^{-1}$, atomic masses: K=39, Br=80)

Watch Video Solution

95. Calculate the amount of KCl which must be added to 1 kg of water so that its freezing point is depressed by 2 K.

Watch Video Solution

96. Phenol associates in benzene to form a dimer $(C_6H_5OH)_2$. The freezing point of a soluton contianing 5 g of phenol in 250 g of benzene is lowerd by $0.70^\circ C$. Calculate the degree of association of phenol in benzene. $(K_f f$ or $benze \neq = 5.12 Km^{-1})$

Watch Video Solution

97. 1 . 5 of Ba $(NO_3)_2$ dissolved in 100 g of water shows a depression in freezing point equal to $0.28^\circ C$. What is the percentage dissociation of the salt ? (K_f for water = 1 . 86 K/m and molar mass of Ba $(NO_3)_2$ = 261.)

Watch Video Solution

98. 0.2 m aqueous solution of a weak acid is 20% dissociated. The boiling point of this solution is $\left(K_b of water = 0.52 K m^{-1}\right)$

Watch Video Solution

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

$\left(K_f f \text{ or } benze \neq = 5.12 K mol^{-1} kg\right)$

Watch Video Solution

100. Calculate the normal freezing point of a sample of sea water containing 3.8% NaCl and 0.12% $MgCl_2$ by mass. $\left(K_f f \text{ or } water = 1.86 Km^{-1}\right)$

Watch Video Solution

101. Calculate the molality of NaCl solution whose elevtaion in boiling point is equal to the depresson in freezing point of 0.25 m sodium carbonate the solution in water assuming complete dissociation of salts. $\left(K_f = 1.86 Km^{-1}, K_b = 0.52 Km^{-1}\right)$

Watch Video Solution

102. 0.01 m aqueous solution of sodium sulphate depresses the freezing point of water by $0.0284^\circ C$. Calculate the degree of dissociation of the salt. $\left(k_f ofwater = 1.86 Km^{-1}\right)$

Watch Video Solution

103. Calculate the amount of KCl which must be added to 1 kg of water so that its freezing point is depressed by 2 K.

Watch Video Solution

104. An aqueous solution containing 4.9 g of a solute dissolved in 500 mL of the solution shows an osmotic pressure of 2.1 atmosphere at $27^{\circ}C$. What is the nature of the solute (associated or dissociated, if the molar mass of the solute is 57 a.m.u)

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105. A 0.1539 molal aqueous solution of cane sugar ($molarmass - 342gmol^{-1}$) has a freezing of 271K while the freezing point of pure water is 273.15K. What will be the freezing point of an aqueous solution containing 5 g of glucose $\left(mol.\ mass = 180gmol^{-1}\right)$ per 100 g of solution.

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106. Calculate the freezing point of an aqueous solution containing 10.50 g of $MgBr_2$ in 200 g of water. $\left(Molarmass of MgBr_2 = 184, f \text{ or } water = 1.86 kgmol^{-1}\right)$

Watch Video Solution

107. Do molality and mole fraction changes with temperature ?

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108. True or false

The solubilities of all ionic substances increase with increase of temperature.

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109. True or false

The depression in freezing point for 1 m solution of a solute in water and benzene is same.

Watch Video Solution

110. True or false

If observed value of the colligative property is more than the normal value of same property then Van't Hoff factor is more than one.

Watch Video Solution

111. True or false

Van't Hoff factor, $i<1$ if there is association of the solute in the solution.

Watch Video Solution

112. True or false

The freezing point of 0.1 m soluton of acetic acid in benzene is more than freezng point of 0.01m solution.

Watch Video Solution

113. True or false

Lowering in vapour pressure is a colligative property.

Watch Video Solution

114. True or false

Two liquids A and B boil at $125^{\circ}C$ and $146^{\circ}C$ respectively. Liquid A will have higher vapour pressure.

Watch Video Solution

115. True or false

Elevation in boiling point of 0.1 m NaCl solution will be nearly twice that of 0.1 m glucose solution.

Watch Video Solution

116. True or false

Solution of ethanol and cyclohexane shows positive derivation from Raoult's law.

Watch Video Solution

117. True or false

Colligative properties depend only upon the moles of solute and are independent of the nature of solute and solvent.

Watch Video Solution

118. True or false

The more concentrated solution is said to be hypertonic with respect to less concentrated solution.

Watch Video Solution

119. Define azeotropes. What type of azeotrope is formed by positive deviation from Raoult's law? Give an example.

Watch Video Solution

120. True or false

For solution showing positive deviation form Raoult's law

$\Delta V_{mixing} = -ve$ and $\Delta H_{mixing} = +ve$

Watch Video Solution

121. Molality of the solution is

Watch Video Solution

122. Fill ups

At the same temperature., nitrogen gas is â€¦â€¦â€¦â€¦â€¦.solube in water than oxygen.

Watch Video Solution

123. True or false

For solution showing positive deviation form Raoult's law

$\Delta V_{mixing} = -ve$ and $\Delta H_{mixing} = +ve$

Watch Video Solution

124. Fill ups

The solubility of a solute decreases with increase in temperature if dissolution process is.....and increase with increase in temperature if dissolution is ..... .

Watch Video Solution

125. for an aqueous solution of `K^4[Fe(CN)_6], the value of van't Hoff factor , I is 5(approx).

Watch Video Solution

126. Fill ups

If observed molar mass of a solute is more than calculated molar mass, then the solute undergoes.....in the solvent.

Watch Video Solution

127. Fill ups

The sum of mole fraction of all the components in a three component system is equal to.....

Watch Video Solution

128. Fill ups

If 0.1 m solution of NaCl freezes at $04.2^{\circ} C$, then 0.1 m solution of glucose will freeze atâ€¦â€¦â€¦â€¦â€¦.in the same solvent.

Watch Video Solution

129. Fill ups

The molarity of pure water isâ€¦â€¦â€¦. .

Watch Video Solution

130. Fill in the blanks- _____,_____,_____ are the fruits that grown in Kharif season.

Watch Video Solution

131. Fill ups

A solution which has lower osmotic pressure compared to that of other solution is called..... .

Watch Video Solution

132. Discuss the behaviour of non-ideal solution having negative deviations from Raoult's law.

Watch Video Solution

133. A solution of solute X'in benzene boils at $0.126K$ higher than benzene. What is the molality of the solution ?

(K_b for benzene = 2.52 K/m)

Watch Video Solution

134. Calculate the molecular mass of Li2O

Watch Video Solution

135. Fill ups

Desalination of sea water is based on the phenomenon of..... .

Watch Video Solution

136. Fill ups

The variation of solubility of $Na_2SO_4.10H_2O$ is a discontinous curve. With increase in temperature, it firstâ€¦â€¦â€¦â€¦.and thenâ€¦â€¦â€¦.. .

Watch Video Solution

137. Fill ups

Because of low concentration of oxygen in the blood and tissues, people living at high altitude suffer from a disease called..... .

Watch Video Solution

138. Fill ups

People taking a lot of salt develop swelling or puffiness of their tissues. This disease is called..... .

Watch Video Solution

139. Fill ups

The solution having same osmotic pressure are called.....and they have same..... .

Watch Video Solution

140. Choose the correct alternative:

The concentration term independent of temperature is molarity/molality.

Watch Video Solution

141. Paddy crop is harvested in-

Watch Video Solution

142. Fill in the blanks-The process of putting seeds into the soil is called_____.

Watch Video Solution

143. Define the following term- Manure.

Watch Video Solution

144. Fill in the blanks- Process of removing unwanted plants is called as_____.

Watch Video Solution

145. Choose the correct alternative:

A non-ideal solution showing positive deviation form an azeotrope with lowest/highest boiling point.

Watch Video Solution

146. Rabi crop is defined as_____

Watch Video Solution

147. Fill in the blanks- The artificial method of watering the crops is known as_____.

Watch Video Solution

148. Is reverse osmosis takes place by applying pressure more than Osmotic pressure ?

Watch Video Solution

149. Choose the correct alternative

Watch Video Solution

150. Solubility of gases in liquids decreases with increase in

Watch Video Solution

151. Choose the correct alternative:

Elevation of boiling point of 0.1 m $CaCl_2$ solution less/more than 0.1m NaCl solution.

Watch Video Solution

152. Given an example each of solid in gas and liquid in gas solution

Watch Video Solution

153. Why does the molality of a solution remain unchanged with temperature ?

Watch Video Solution

154. What will be mole fraction of water in methanol solution containing equal number of moles of water and methanol?

Watch Video Solution

155. Define molar depression constant

Watch Video Solution

156. The boiling point increases and freezing point decreases when sodium chloride is added to water. Why ?

Watch Video Solution

157. Sodium chloride is used to clear snow from roads. Explain.

Watch Video Solution

158. What is the effect of temperature on solubility of a gas n a liquid ?

Watch Video Solution

159. When is the value of Vant Hoff's factor more than one?

Watch Video Solution

160. Why does water from the soil rise to the top of a tall tree?

Watch Video Solution

161. What is the effect of temperature on the molality of a solution

Watch Video Solution

162. What is the normality of

$1.5MH_2SO_4$.

Watch Video Solution

163. How is ΔT_f and ΔT_b related to molecular mass of a solute?

Watch Video Solution

164. What is the normality of 0.5M aqueous solution of tribasic acid?

Watch Video Solution

165. Two liquids A and B boil at $145^\circ C$ and $190^\circ C$ respectively. Which of them has a higher vapour pressure at $80^\circ C$?

Watch Video Solution

166. Under what conditions Van't Hoff factor , i

less than one

Watch Video Solution

167. Under what conditions Van't Hoff factor , i

is eaual to unity

Watch Video Solution

168. Define Raoult's law.

Watch Video Solution

169. Define Henry law ?

Watch Video Solution

170. Why does rubbing of isopropyl alcohol give a cooling sensation to the skin?

Watch Video Solution

171. Define Azeotropic mixture. Give one example.

Watch Video Solution

172. Which of the two, molarity and molality, is better to express concentration and why?

Watch Video Solution

173. Mention the enthalpy of mixing $(\Delta_{mix}H)$ value to form an ideal solution?

Watch Video Solution

174. What is the sum of the mole fractions of all the components in a three component system?

Watch Video Solution

175. How is the molality of a solution different from its molarity?

Watch Video Solution

176. What would be the value of Vant Hoff's factor for a dilute solution of K_2SO_4 in water?

Watch Video Solution

177. State the conditions resulting in reverse osmosis?

Watch Video Solution

178. Define osmotic pressure.

Watch Video Solution

179. What is reverse osmosis ?

Watch Video Solution

180. The boiling point of a solvent containing non volatile solute :

A. is depressed

B. is elevated

C. does not change

D. none of the above

Watch Video Solution

181. Freezing point of a solvent containing a non volatile solute

A. is depressed

B. is elevated

C. does not change

D. none of the above

Watch Video Solution

182. Which of the following solution shows maximum depression in freezing point.

A. 0.5 M Li_2SO_4

B. $1MNaCl$

C. $0.5MAl_2(SO_4)_3$

D. $0.5MBaCl_2$

Watch Video Solution

183. The molarity of pure water (density of water=$1gml^{-1}$)

A. 55.5

B. 50.5

C. 18

D. 60.5

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184. Constant boiling mixtures are called

A. ideal solutions

B. azeotrops

C. isotonic

D. none of these

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185. Colligative properties of solutions are those which depend upon

A. the nature of the solute

B. the nature of the solvent

C. the number of particles of solute

D. the molecular mass of solute.

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186. Which of the not affected by temperature ?

A. Normality

B. Molality

C. Molarity

D. Formality

Watch Video Solution

187. The number of moles of NaCl in 3 litres of 3 M solution is:

A. 1

B. 3

C. 9

D. 27

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188. Collegative property among the following is

A. Osmotic pressure

B. Boiling point

C. Vapour pressure

D. Viscosity

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189. In countries nearer to polar region , the roads are sprinkled with $CaCl_2$. This is

A. to minimise the effect of snow on roads

B. to minimise pollution

C. to minimise the accumulaation of dust on the road

D. to minimise the wear and tear of the roads

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190. For solutes which do not undergo any association or dissociation in a solute, Van't Hoff factor (i) will be

A. less than 1

B. more than 1

C. equal to 1

D. zero

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191. Which of the following aqueous solution should have the highest boiling point ?

A. Na_2SO_4

B. KCl

C. Glucose

D. Urea

Watch Video Solution

192. Which of the following 0.1 M aqueous solution will have lowest freezing point?

A. $0.1MFeCl_3$

B. $0.1MBaCl_2$

C. $0.1MNaCl$

D. $0.1MUrea$

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193. Isotonic solutions have

A. same boiling point

B. same vapouor pressure

C. same melting point

D. same osmotic pressure

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194. The value of Henry's constant K_H

A. increase with increase in temperature

B. decreases with increase in temperature

C. remains constant

D. fist increases, then decreases

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195. Establish a relationship between the mole fraction of solute and molarity of a binary dilute solution.

Watch Video Solution

196. What is the effect of temperature on the molality of a solution

Watch Video Solution

197. Show that osmotic pressure is a colligative property?

Watch Video Solution

198. Define Raoult's law.

Watch Video Solution

199. Explain the following with suitable examples

Mole fraction.

Watch Video Solution

200. Explain the following with suitable examples

Molarity.

Watch Video Solution

201. Explain the following with suitable examples

Molality?

Watch Video Solution

202. How is the colligative property changed when the solute undergoes association in solution?

Watch Video Solution

203. Osmotic pressure of a solution is

Watch Video Solution

204. Why do you get sometimes abnormal molecular mass of substances by using colligative properties of the solution? State the factors with examples which produces abnormality in the result.

Watch Video Solution

205. How can you justify the observtation that the vapour pressure of the solution of a non-voltile solute in a given solvent is lower than that of the pure solvent. Also the laws concerning this observations.

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206. Mixture of acetone and chloroform shows negative deviation from Raoult's law. Why?

Watch Video Solution

207. What is meant by positive and negative deviation from Raoult's law and how is the sign of $\delta_{mix}H$ related to positive and negative deviation from Raoult's law?

Watch Video Solution

208. Why is person suffereing from high blood pressure is advised to take minimum quantity of common salt?

Watch Video Solution

209. A poled egg when dipped in water swells while is saturated brine solution it shrinks. Explain

Watch Video Solution

210. Why liquid ammonia bottle is cooled before opening the seal ?

Watch Video Solution

211. Explain

Semipermeable membrane of $Cu_2\left[Fe(CN)_6\right]$ is not used for studying osmosis in non-aqueous solutions?

Watch Video Solution

212. What is osmotic pressure and how is it related to the molecular mass of the non-volatile substance?

Watch Video Solution

213. What advntage the osmotic pressure has over th elevation in boiling point method for determining the molecular masses?

Watch Video Solution

214. What are minimum boiling azetropes ? Give an example.

Watch Video Solution

215. Choose the correct option- Which of the following is Rabi crop-

A. Paddy

B. Cucumber

C. Maize

D. Mustard

Watch Video Solution

216. When dehydrated fruits and vegetables are placed in water, they slowly swell and return to original form. Why? Would a temperature increase accelerate the process? Explain.

Watch Video Solution

217. Lowering of vapour pressure on dissolving a non-volatile solute in a liquid is a colligative property.

Watch Video Solution

218. Sodium chloride solution freezes at lower temparature than water but boils at higher temparature than water . Explain.

Watch Video Solution

219. What are hypertonic solutions. Explain with the help of example.

Watch Video Solution

220. Define osmotic pressure. How can molar mass of a substance be determined from te measurement of osmotic pressure of a solution?

Watch Video Solution

221. Define

Henry's law.

Watch Video Solution

222. Define osmotic pressure.

Watch Video Solution

223. What is Van't Hoff factor ?

Watch Video Solution

224. Define

Mole fraction

Watch Video Solution

225. What is meant by lowering of vapour pressure? How does the relative lowering of vapour pressure depend on the number of moles of solute in a solution?

Watch Video Solution

226. Discuss the behaviour of non-ideal solution having negative deviations from Raoult's law.

Watch Video Solution

227. Define an ideal solution and write one of its characterstics.

Watch Video Solution

228. What are Azeotropes ?

Watch Video Solution

229. State Henry's law. What is the effect of temperature on the solubility of a gas in a liquid?

Watch Video Solution

230. Sate Raoult's law for the solution containing volatile components. What is the similarity between Raoult's law and Henry's law.

Watch Video Solution

231. $CaCl_2$ is used to clear snow in cold countries. Explain.

Watch Video Solution

Watch Video Solution

232. Define the following and write the units:

Molarity?

Watch Video Solution

233. Define the following and write the units:

Molality?

Watch Video Solution

234. Define the following and write the units:

Molality?

Watch Video Solution

235. What are colligatives properties? Show that relative lowering in vapour pressure is a colligative property?

Watch Video Solution

236. Define the following:

Boiling point.

Watch Video Solution

237. Define the following:

Molal depression constant.

Watch Video Solution

238. Why is boiling point of water increased on addition of a non-volatile solute in it.

Watch Video Solution

239. Why does NaCl solution freeze at lower temperature than water but boils at higher temperature than water?

Watch Video Solution

240. Calculate the molecular mass of Li2O

Watch Video Solution

241. What is meant by lowering of vapour pressure? How does the relative lowering of vapour pressure depend on the number of moles of solute in a solution?

Watch Video Solution

242. State Henry's law. Give one of its limtation.

Watch Video Solution

243. State Henry's law and mention some important applications.

Watch Video Solution

244. What would be the value of Vant Hoff's factor for a dilute solution of K_2SO_4 in water?

Watch Video Solution

245. State Raoult's law. What condition are necessary for a solution to show ideal behaviour?

Watch Video Solution

246. What is meant by saying that the molality of a solution is 0.1?

Watch Video Solution

247. Define the following terms- kharif crop.

Watch Video Solution

248. How is the molecular mass of a solute related to the depression in freezing point of the solution?

Watch Video Solution

249. What is meant by van't Hoff factor?

Watch Video Solution

250. What is meant by positive deviations from Roult's law and how is sign f $\Delta_{\text{mix}}H$ related to positive deviation from Raoult's law ?

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251. Define azeotropes. What type of azeotrope is formed by positive deviation from Raoult's law? Give an example.

Watch Video Solution

252. Two solutions are isotonic. What is meant by the statement?

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253. When a little amount of common salt is added in water, the boiling point increases. Explain why?

Watch Video Solution

254. What are the main sources of irrigation?

Watch Video Solution

255. What are colligative properties? Prove that relative lowering in vapour pressure is a colligative property?

Watch Video Solution

256. State whether the statement is true or false- Wheat is grown in kharif season.

Watch Video Solution

257. Define boiling point. What is the elevation in boiling point? How will you find the molecular mass of a solute by using this property?

Watch Video Solution

258. What is osmotic pressure? How is it related to the concentration of a solute in a solution?

Watch Video Solution

259. State whether the statement is true or false- Paddy crop is known as rabi crop.

Watch Video Solution

260. State Henry's law for solubility of a gas in a liquid. Explain the significance of Henry's law constant. At the same temperature hydrogen is moe soluble in water than helium. Which of them will have a higher value of K_H and why?

Watch Video Solution

261. Why the vapour pressure of a solution of glucose in water is lower than of pure water

Watch Video Solution

262. State the formula relating pressure of a gas with its mole fraction in liquid solution in contact with it.

Watch Video Solution

263. State Raoult's law. What condition are necessary for a solution to show ideal behaviour?

Watch Video Solution

264. Define the following terms:

Mole fraction?

Watch Video Solution

265. Define the following terms:

Van't Hoff factor?

Watch Video Solution

266. What is meant by:

colligative properties.

Watch Video Solution

267. What is meant by

Molality of a solution?

Watch Video Solution

268. Explain the importance of crop rotation?

Watch Video Solution

269. State the following:

Raoult's law in its general form in reference to solution.

Watch Video Solution

270. What will happen if a farmer plant only one type of crop in his field?

Watch Video Solution

271. Differentiate between molality and molarity of a solution. What is the effect of the temperature change on molarity and molality of a solution?

Watch Video Solution

272. Define the following terms:

Mole fraction?

Watch Video Solution

273. Define the following terms:

Isotonic solutions?

Watch Video Solution

274. Define the following terms:

Van't Hoff factor?

Watch Video Solution

275. State whether the statement is true or false- Crop rotation results in the deprivation of nutrients in the soil.

Watch Video Solution

276. Why do gases always tend to be less soluble in liquids as the temperature is raised?

Watch Video Solution

277. Write differences between ideal and non-ideal solutions.

Watch Video Solution

278. Which colligative property is preferred for the molecular mass determination of macromolecules?

Watch Video Solution

279. Which solution show minimum boiling azeotropes ?

Watch Video Solution

Watch Video Solution

280. Define Ideal and non-ideal solution. Give examples each of ideal and non-ideal solutions .

Watch Video Solution

281. Name two conditions that are very important for proper growth of a crop?

Watch Video Solution

282. What is Van't Hoff factor? What possible values can it have if the solute molecules undergo

association. Prove that osmotic pressure is a colligative property?

Watch Video Solution

283. What is Van't Hoff factor? What possible values can it have if the solute molecules undergo

dissociation in solution. Prove that osmotic pressure is a colligative property?

Watch Video Solution

284. Differentiate between molarity and molality for a solution. How does a change in temperature influence their values?

Watch Video Solution

285. Fill in the blanks- _____ and _____ are the summer season crops.

Watch Video Solution

286. Show that osmotic pressure is a colligative property?

Watch Video Solution

287. Give two examples of summer crops?

Watch Video Solution

288. Why paddy crop cannot be grown in summer season?

Watch Video Solution

289. A solution containing 12.5 g of a non-electrolyte substance in 175g of water gave boiling point elevation of 0.70K. Calculate the molar mass of the substance. $\left(K_b f \text{ or } water = 0.52 K kg mol^{-1}\right)$.

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290. Write differences between ideal and non-ideal solutions.

Watch Video Solution

291. Find the molarity and molality of a 37% solution of HCI by weight . The density of the solution is 1 19 g/cc. and the molec lar mass of hydrochloric acid is 36. 5

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292. Show that osmotic pressure is a colligative property?

Watch Video Solution

293. 200 cm^3 of an aqueous solution of a protein contains 1.26g of the protein . The osmotic pressure of such a solution at 300K is found to be 2.7×10^{-3} bar. Calculate the molar mass of the protein (R=0.083 L bar $mol^{-1}K^{-1}$)

Watch Video Solution

294. Difference between osmosis and diffusion.

Watch Video Solution

295. Find the molarity and molality of a 67% solution of HNO_3 by weight . The density of the solution is 1.50 4 g/ cc and the molecular mass of nitric acid is 63

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296. What is elevation in boiling point? How can you calculate the molecular mass of a solute using it? Show that it is a colligative property?

Watch Video Solution

297. Calculate molality and molarity of Kl if density 20% (mass/mass)aqueous Kl is 1.202% g/mL

Watch Video Solution

298. What are colligative properties? Explain the following colligative properties:

Relative lowering of vapour pressure.

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299. Define boiling point. What is elevation in boiling point ?

Watch Video Solution

300. State and explain Raoult's law.

Watch Video Solution

301. Define the terms:

Freezing point.

Watch Video Solution

302. Define the terms:

Depression in freezing point.

Watch Video Solution

303. Define molar depression constant

Watch Video Solution

304. What is Osmotic pressure?

Watch Video Solution

305. Explain why the moelcular mass of NaCl determined by the elevation of boiling point method is half its actual molecular mass.

Watch Video Solution

306. Calculate the osmotic pressure exerted by solution prepared by dissolving 1.5 g of a polymer of molar mass 185000 in 500 ml of water at $37^{\circ}C$. $\left[R = 0.0821 Latm K^{-1} mol^{-1}\right]$

Watch Video Solution

307. A solution of NaOH is made by dissolving of 0.9 g of it in 100 ml of its solutoin. Calculate the molarity of the solution.

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308. What happens to the vapour pressure of a liquid when a non-volatile solute is added to it

Watch Video Solution

309. Either

Calculate the molar mass of a substance 1.3 g of which when dissolved in 169g of water gave the solution which will boil at $100.025^{\circ}C$ at 1atm.

$\left(k_b = 0.52Km^{-1}\right)$

Watch Video Solution

310. Find the molarity and molality of a 15% solution and H_2SO_4 whose density is 1.02 g cm^{-3}.

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311. Either

State Henry's law of solubility of gases in liquid. Why of we see effervescence when a cold drink bottle is opened?

Watch Video Solution

312. Either

Molar mass of CH_3COOH in aqueous solution as determined by the use of colligative properties is approximately double for expected value. Why?

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313. Which is not a colligative property?

Watch Video Solution

314. Which is not a colligative property?

Watch Video Solution

315. Which is not a colligative property?

Watch Video Solution

316. Which is not a colligative property?

Watch Video Solution

317. 200 cm^3 of an aqueous solution of a protein contains 1.26g of the protein . The osmotic pressure of such a solution at 300K is found to be 2.7×10^{-3} bar. Calculate the molar mass of the protein (R=0.083 L bar $mol^{-1}K^{-1}$)

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318. What is Van't Hoff factor ?

Watch Video Solution

319. State and explain :

Raoult's law for volatile solute.

Watch Video Solution

320. What is elevation in boiling point? How can you calculate the molecular mass of a solute using it? Show that it is a colligative property?

Watch Video Solution

321. Fill in the blanks- Dissolving salt in water is a _____ change.

Watch Video Solution

322. Define osmotic pressure.

Watch Video Solution

323. Calculate the molarity of a solution containing 11.7 g of NaCl in 2.0 L solution. $\left(M_{NaCl} = 58.5 gmol^{-1}\right)$

Watch Video Solution

324. The number of moles of a substance are given by

Watch Video Solution

325. The number of moles of a substance are given by

Watch Video Solution

326. The number of moles of a substance are given by

Watch Video Solution

327. The number of moles of a substance are given by

Watch Video Solution

328. What is the significance of van't Hoff factor?

Watch Video Solution

329. The vapour pressure of pure benzene at a certain temperature is 0.850 bar. A non-volatile, non-electrolyete solid weighing 0.5g when added to 39.0 g of benzene (molar mass 78 g mol^{-1}. Vapour pressure of the solution, then, is 0.845 bar. What is the molar mass of the solid substance?

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330. What is meant by:

colligative properties.

Watch Video Solution

331. Molality of the solution is

Watch Video Solution

332. What concentration of nitrogen should be present in a glass of water at room temperature? Assume a temperature of $25^{\circ}C$, a total pressure of 1 atmosphere and mole fraction of nitrogen in air of 0.78.

$\left(K_H f \text{ or } nitro \geq n = 8.42 \times 10^{-17} \frac{M}{mmHg}\right)$

Watch Video Solution

333. Dalton's law of partial pressure is related-with

Watch Video Solution

334. State and explain :

Raoult's law for volatile solute.

Watch Video Solution

335. A solution prepared by dissolving 8.95 mg of a gene fragment in 35.0 mL of water has an osmotic pressure of 0.335 torr at $25^{\circ}C$. Assuming that the gene fragment is a non-electrolyte, calculate its molar mass.

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336. What is the effect of temperature on the molality of a solution

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337. What would be the molar mass of a compound if 6.21g of it dissolved in 24.0 g of chloroform form a solution that has a higher boiling point of $68.04^{\circ}C$ and the boiling point of pure chloroform is 61.7^{C} and the boiling point elevation constant K_b for chloroform is $3.63^{\circ}\frac{C}{m}$.

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338. Define the following terms:

Mole fraction?

Watch Video Solution

339. Define the following term:

Ideal solution.

Watch Video Solution

340. Give one example of crop rotation?

Watch Video Solution

341. What are the advantages of seed drill?

Watch Video Solution

342. Explain the following:

Boiling point elevation constant for a solvent.

Watch Video Solution

343. Why should weeds be removed?

Watch Video Solution

344. Fill in the blanks- _____ is the machine used for harvesting and threshing both.

Watch Video Solution

345. 1.00g of a non-electrolyte solute dissolved in 50g of benzene lowered the freezing point of benzene by 0.40K. The freezing point depression constant of benzene is 5.12K mol^{-1} . Find the molar mass of the solute.

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346. Define the following term:

Ideal solution.

Watch Video Solution

347. Define the following term:

Azeotrope

Watch Video Solution

348. Define the following terms:

Osmotic pressure

Watch Video Solution

349. Name some animals from which milk can be obtained?

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350. What type of deviation is shown by a mixture of ethanol and acetone? Give reason?

Watch Video Solution

351. A solution of glucose (molar mass=$180 gmol^{-1}$) in water is labelled as 10% by mass. What would be the molality and molarity of the solution? $\left(Densityofsolution = 1.2 gmol^{-1}\right)$.

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352. The density of a 3 M sodium thiosulphate $(Na_2S_2O_3)$ solution is $1.25 gmL^{-1}$. Calculate

the % by weigth of sodium thiosulphate.

Watch Video Solution

353. Name some animals which are reared for obtaining meat?

Watch Video Solution

354. Fill in the blanks- Wheat crop is grown in the month of_____ and harvested in the month of_____.

Watch Video Solution

355. Fill in the blank- Mustard crop is grown in the month of _____ and harvested in the month of _____.

Watch Video Solution

356. Fill in the blanks- _____ helps in fermentation.

Watch Video Solution

357. Calculate the freezing point of an aqueous solution of a non electrolyte having an osmotic pressure at 2 atm at 300K $\left(K_f = 1.86 Cm^{-1}, R = 0.082 Latm K^{-1} mol^{-1}\right)$

Watch Video Solution

358. 0.01 m aqueous solution of sodium sulphate depresses the freezing point of water by $0.0284^{\circ}C$. Calculate the degree of dissociation of the salt. $\left(k_f ofwater = 1.86Km^{-1}\right)$

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359. Ice begins to separate at $-0.744^{\circ}C$ from a solution containing 2.4 g of non-electrolyte solute in 100 g of water. Calculate the molecular weight of non-electrolyte and osmotic pressure which the solution would exert at $20^{\circ}C$?

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360. A solution of glycerol $(C_3H_8O_3)$ in water as prepared by dissolving some glycerol in 500 g of water. This solution has a boiling point of 100 .

42° C. What mass of glycerol was dissolved to make the solution ? K_b for H_2O = 0 . 512 K kg mol^{-1}

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361. Calculate the osmotic pressure in Pascals exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 185, 000 in 450 mL of water at $37^\circ C$?

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362. 1.00g of a non-electrolyte solute dissolved in 50g of benzene lowered the freezing point of benzene by 0.40K. The freezing point depression constant of benzene is 5.12K mol^{-1} . Find the molar mass of the solute.

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363. 0.052g of glucose $(C_6H_{12}O_6)$ has been dissolved in 80.2 g of water. Calculate

the boiling point of the solution $\left(K_f = 1.86Km^{-1}, K_b = 5.2Km^{-1}\right)$

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364. Boiling point of water at 750 mm Hg is 96.63 degree celsius. How many sucrose is to be added to 500 g of water such that it boils at 100 degree celsius ? Molal elevation constant for water is

0.52 kg mol^{-1} .

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365. 7.45 gKCl is dissolved in 100 g of water. What will be the molality of KCl in solution.

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366. The freezing point of a solution containing 0.2 g of acetic acid in benzene is lowered by $0.45^{\circ}C$. Colculate the degree of dimerization of acetic acid in benzene . K_f for benzene is 5.12 Kmol^{-1}kg:

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367. Calculate the boiling point of one molar aquesous solution $(density 1.03 gmL^{-1})$ of NaCl. K_b for water= $0.52 Km^{-1}$.

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368. Calculate the osmotic pressure at 273K of a 5% solution of compound A. (molecular mass-60) (Given R=$0.0821 LatmK^{-1}mol^{-1}$)

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369. Calculate the molality of a solution containing 20.7g potassium carbonate dissolved in 500ml of solution (assume of density of solution =

1g/ml)

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370. A 0.1539 molal aqueous solution of cane sugar ($molarmass - 342gmol^{-1}$) has a freezing of 271K while the freezing point of pure water is 273.15K. What will be the freezing point of an aqueous solution containing 5 g of glucose $\left(mol.\ mass = 180gmol^{-1}\right)$ per 100 g of solution.

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371. Calculate the temperature at which a solution containing 54 gms of glucose $(C_6H_{12}O_6)$ in 250 gms of water will freeze. K_f for water . $\left(1.\ 86Kkgmol^{-1}\right)$

Watch Video Solution

372. A solution containing 8 g of a substance in 100 g of diethyl ether boils at $36.86^{\circ}C$, whereas pure ether boils at $35.60^{\circ}C$. Determine molecular mass of the solute $\left(F \text{ or } etherK_b = 2.02Kkgmol^{-1}\right)$.

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373. 600 mL of aqueous solution containing 2.5 g of a protein shows an osmotic pressure of 25mm Hg at $27^{\circ}C$. Determine the relative molecular mass of protein.

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374. How many grams of ethylene glycol (molar mass = 62) should be added to 10 kg of water, so that the resulting solution freezes at $-10^{\circ}C$ (K_f for water = 1.86 K mol^{-1}).

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375. 15 g of an unknown molecular substance was dissolved in 450 g of water. The resulting solution freezes at $-0.34^{\circ}C$. What is them molar ass of the substance ? (K_f for water = 1. 86 K kg mol^{-1})

Watch Video Solution

376. What mass of NaCl must be dissolved in 65.0 g of water to lower the freezing point of water by $7.50^{\circ}C$? The freezing point depression constant $\left(k_f\right)$ for water is $1.86^{\circ}\frac{C}{m}$. Assume that Van't Hoff factor for NaCl is 1.87. (Molar mass of NaCl =58.5g).

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377. Sangeeta's gardner was suffereing from high blood pressure but he was not caring for his health. One day Sangeeta took him to the doctor. The doctor advised him to take less quantity of salt in his diet. Sangeeta suggested gardner's wife to cook food for her husband with very little salt.

Answer the following questions:

Why did the doctor advise Sangeeta's gardner to take less quantity of salt?

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378. What is edema?

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379. Sangeeta's gardner was suffereing from high blood pressure but he was not caring for his health. One day Sangeeta took him to the doctor. The doctor advised him to take less quantity of salt in his diet. Sangeeta suggested gardner's wife to cook food for her husband with very little salt.

Answer the following questions:

Why did the doctor advise Sangeeta's gardner to take less quantity of salt?

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380. Rishi went to Shimla to say at this uncle's place during holidays. One morning, he found a thick blanket of snow in front of his door. His uncle started sprinkling common salt on the ice slit in front of his door.

Answer the following questions

Can we use any other substance instead of common salt?

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381. Rishi went to Shimla to say at this uncle's place during holidays. One morning, he found a thick blanket of snow in front of his door. His uncle started sprinkling common salt on the ice slit in front of his door.

Answer the following questions

Can we use any other substance instead of common salt?

Watch Video Solution

382. Rishi went to Shimla to say at this uncle's place during holidays. One morning, he found a thick blanket of snow in front of his door. His uncle started sprinkling common salt on the ice slit in front of his door.

Answer the following questions

what is de-icing agent?

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383. Rohit went to Jaipur with a school trip to visit some historical places. He and his friends observed that some old glass objects looked milky and windows pane of old buildings were looking slightly thicker at the bottom than at the top.

Answer the following questions

Under what conditions could quartz be converted into glass?

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384. Raman went to a hospital with his father to see his uncle who was admitted there because of some health problems. The doctor asked Raman to bring a particular injection to be given to his uncle. When Raman brought the injection, the doctor asked him to get the injection changed from the chemist. Raman insisted that it was the same injection as prescribed by him and its expiry date is also next year. But the doctor explained Raman that the injection has not been expired but it was not of compatible concentration as prescribed by him. Raman felt satisfied and got the injection changed

Answer the following questions:

What was the reason for asking Raman to get hte injection of compatible concentration?

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385. Fill in the blanks- _____ bacteria helps to fix the nitrogen from the atmosphere in the soil.

Watch Video Solution

386. Why is it advised to add ethylene glycol to water in a car radiator while driving in a hill station.

Watch Video Solution

387. Why is it advised to add ethylene glycol to water in a car radiator while driving in a hill station.

Watch Video Solution

388. The osmotic prssure of equimolar solutions of glucose: sodium chloride and barium chloride wil be in the order:

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389. Deep sea divers have been using the compressed air containing N_2 in addition to O_2 for breathing. When the sea divers breathes in compressed air at a depth, more N_2 dissolves in the blood and other body fluids than would dissolved at the surface because the pressure at the depth is far greater than surface atmospherice p ressure. when the diver comes towards the surface, the pressure decreases and N_2 comes out of the body quickly forming bubbles in the stream which restrict blood flow and affect the transmission of nerve impuses. this results into a condition called 'the bends' which is dangerous and painful. To avoid this condition, professionals now use air diluted with helium. As a student of chemistry, can you analyse as to why helium is used?

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390. Rekhe observed that her mother placed shrinkled or dried vegetables in water before cutting these for cooking. After sometime, these vegetables looked fresh.

Answer the following questions:

Why did Rekha's mother place the shrinkled or dried vegetables in water?

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391. Rekhe observed that her mother placed shrinkled or dried vegetables in water before cutting these for cooking. After sometime, these vegetables looked fresh.

Answer the following questions:

What is the name of the process used and define it.

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392. When dehydrated fruits and vegetables are placed in water, they slowly swell and return to original form. Why? Would a temperature increase accelerate the process? Explain.

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393. The amount of solute required to prepare 10 litres of decimolar solution is:

A. 0.01 mole

B. 0.2 mole

C. 0.05 mole

D. 1.0 mole

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394. The molarity of pure water (density of water=$1gml^{-1}$)

A. 18

B. 5.56

C. 55.6

D. 100

Watch Video Solution

395. One kilogram of water contains 4 g of NaOH. The concentration of the solution is best expressed as:

A. 0.1 molal

B. 0.1 molar

C. decinormal

D. about 0.1 mole

Watch Video Solution

396. The number of moles of NaCl in 3 litres of 3 M solution is:

A. 1

B. 3

C. 9

D. 27

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397. Isotonic solutions have

A. surface tensionq

B. vapour pressure

C. osmotic pressure

D. viscosity

Watch Video Solution

398. When 0.6 g of urea is dissolved in 100 g water, the water will boil at (Kb, for water = 0.52 kJ/mol and normal boiling point of water $= 100^{\circ} C$):

A. 372.48K

B. 273.52K

C. 373.052K

D. 273.052K

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399. At high altitude ,the boiling point of water decreases because

A. the atmospheric pressure is high

B. the temperature is low

C. the atmospheric pressure is low

D. the temperature is high

Watch Video Solution

400. Colligative property of dilute solutions depends on :

A. the nature of the solute

B. the nature of the solute and solvent

C. the number of particels

D. the number of particles of solvent.

Watch Video Solution

401. Which of the following is not a colligative property?t

A. Depression in freezing point

B. Elevation in boiling point

C. osmotic pressure

D. Lowering in vapour pressure

Watch Video Solution

402. A pressure cooker reduces cooking time because :

A. heat is more evenly distributed

B. the high pressure tendrises the food

C. the boiling point of water inside the cooker is elevated

D. the boiling point of water inside the cooker is depressed

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403. A solution of solute X'in benzene boils at $0.126K$ higher than benzene. What is the molality of the solution ?

(K_b for benzene = 2.52 K/m)

A. 0.05

B. 2

C. 1

D. 20

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

A. shows negative deviation

B. is a minimum boiling azeotrope

C. in an ideal solution

D. has ΔH_{mixIng} positive

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405. The osmotic prssure of equimolar solutions of glucose: sodium chloride and barium chloride wil be in the order:

A. $BaCl_2 > NaCl > glu\cos e$

B. $BaCl_2 > glu\cos e > NaCl$

C. $Glu\cos e > BaCl_2 > Nacl$

D. $NaCl > BaCl_2 > glu\cos e$

Watch Video Solution

406. An aqueous solution containing 6 g of ureas in 500 mL of solution has a density equal to 1.05. if the molar mass of urea is 60. then the

molality of solution is

A. 0.2

B. 0.19

C. 0.1

D. 1.2

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407. The vapour presure of a pure liquid 'A' is 70 torr at $27^\circ C$. It forms an ideal solutons with another liquid B. the mole fraction of B in the solutin is 0.2 and total pressure of solution is 84 torr at $27^\circ C$. The vapour pressure of pure liquid is B at $27^\circ C$:

A. 14 torr

B. 56 torr

C. 140 torr

D. 70 torr

Watch Video Solution

408. The osmotic pressure of 0.2 molar solution of urea at $27^{\circ}C$ (R=0.082 litre atm $\mathrm{mol}^{-1}K^{-1}$) is

A. 4.92 atm

B. 1 atm

C. 0.2 atm

D. 27 atm.

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

A. $\rho_{total} = \rho_A^\circ + \left(\rho_A^\circ - \rho_B^\circ\right) x_A$

B. $\rho_{total} = \rho_{\cdot}{}^{\circ} + \left(\rho_A^\circ - \rho_B^\circ\right) x_A$

C. $\rho_{total} = \rho_B^\circ + \left(\rho_B^\circ - \rho_A^\circ\right) x_A$

D. $\rho_{total} = \rho_A^\circ + \left(\rho_B^\circ - \rho_A^\circ\right) x_A$

Watch Video Solution

410. The expression relating molality and mole fraction of the solute in a solution is (molar mass of solvent=M_1):

A. $x_2 = \dfrac{mM_1}{1000 - mM_1}$

B. $x_2 = \dfrac{1000 - mM_1}{mM_1}$

C. $x_2 = \dfrac{mM_1}{1000 + mM_1}$

D. $x_2 = \dfrac{1000 + mM_1}{mM_1}$

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411. When mercuric iodide is added to the aqueous solution of KI, then the :

A. freezing point does not change

B. boiling point does not change

C. freezing point is lowered

D. freezing point is raised

Watch Video Solution

412. An aqueous solution containing 1 g of urea boils at $100.25^{\circ}C$. The aqueous solution containing 3 g of glucose in the same volume will boil at

A. $100.75^{\circ}C$

B. $100.5^{\circ}C$

C. $100^\circ C$

D. $100.25^\circ C$

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

A. plot of $\frac{1}{P_{total}}$ vs y_A is linear (mol fraction of A in vapour phase)

B. Plot of P_{total} vs y_A is linear

C. plot of p_{total} vs y_B is linear

D. plot of $\frac{1}{p_{total}}$ vs y_B is non linear

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414. Which of the following has highest boiling point?

A. Urea (NH_2CONH_2)

B. Glucose $(C_6H_{12}O_6)$

C. Sodium chloride (NaCl)

D. Calcium chloride $(CaCl_2)$

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415. Which one of the following pairs of solutions can be expected to be isotonic at the same temperature ?

A. 0.1 M urea and 0.1 M NaCl

B. 0.1 M urea and 0.1 M $MgCl_2$

C. 0.1 M NaCl and 0.1 M Na_2SO_4

D. 0.1 M $Ca(NO_3)_2$ and 0.1 M Na_2SO_4

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416. A soluton of glycerol , molar mass=$92gmol^{-1}$ in water was prepared by dissolving some glycerol in 500 g of water. This solution has a boiling point of $100.42^{\circ}C$. What mass of glycerol was dissoled to make this solution? K_b for water= $0.512Kkgmol^{-1}$.

A. 1.2×10^{21}

B. 2.0×10^{22}

C. 3.0×10^{23}

D. 6.0×10^{11}

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417. Osmotic pressure of a solution is

A. $1/10$

B. $1/5$

C. $1/2$

D. double

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418. 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. $-0.45^\circ C$

B. $-0.90^\circ C$

C. $-0.31^\circ C$

D. $-0.53^\circ C$

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419. For an ideal liquid

A. C_2H_5Br and C_2H_5I

B. C_6H_5Br and C_6H_5I

C. C_6H_6 and $C_6H_5CH_3$

D. C_2H_5I and C_2H_5OH

Watch Video Solution

420. The vapour pressure of the solvent decreased by 10 mm of Hg when a non volatile solute was added to the solvent. The mole fraction of the solute in the solution is 0.2. What should be the fraction of the solvent if a decrease in vapour pressure of 20 mm of Hg is desired:

A. 0.6

B. 0.8

C. 0.4

D. 0.2

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421. For a molar solution of NaCl in water at $25^{\circ}C$ and $1atm$ pressure shows that:

A. ρ

B. 1.5ρ

C. 0.5ρ

D. 0.75ρ

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422. 0.01 M solution each of ura, common salt and sodium sulphate are taken, the ratio of depression in freezing point of thes solutions is

A. $1:1:1$

B. $1:2:1$

C. $1:2:3$

D. $2:2:3$

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423. Which of the following 0.10 m aqueous solution will have the lowest freezing point?

A. $Al_2(SO_4)_3$

B. $C_6H_{12}O_6$

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

D. KI

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424. The Van't Hoff factor for 0.1 M $Ba(NO_3)_2$ solution is 2.74. the degree of dissociation is

A. 0.913

B. 0.87

C. 1

D. 0.74

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425. 2.5 litre of 1 M NaOH solution are mixed and another 3 litre of 0.5 M NaOH solution. Then the molarity of the resulting solution is

A. 0.80M

B. 0.1M

C. 0.73M

D. 0.50M

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426. In a 0.2 molal aqueus solution of a weak acid HX the degree of dissociation is 0.25. The freezing point of the solution will be nearest to: ($K_f = 1.86 K kg \text{mol}^{-1}$)

a) $-0.26^\circ C$

b) $0.465^\circ C$

c) $-0.48^\circ C$

d) $-0.465^\circ C$

A. $-0.360^\circ C$

B. $-0,\ 206^\circ C$

C. $+0.480^{\circ}C$

D. $-0.480^{\circ}C$

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427. Which one of the following statements is false?

A. The correct order of osmotic pressure for 0.01M aqueous solution of each compound is

$BaCl_2 > KCl > CH_3COOH > Sucrose$

B. The osmotic pressure of a solution is given by the equation π=MRT, where M is the molarity of the solution

C. Raoult's law states that the vapour pressure of a component over a solution is proportional to its mole fraction

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

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428. Comphor is often used in molecules mass determination bacause

A. it has a very high cryoscopic constant

B. it is volatile

C. it is solvent for organic substances

D. it is really avilable

Watch Video Solution

429. In 100 g of napthalene 2.423 g of sulphur was dissolved. Melting point of napthalene =$80.1^\circ C$, $\Delta T_f = 0.661^\circ C$, $L_f = 35.7 ca \frac{l}{g}$ of napthalene. Molecular formula of Sulphur added is:

A. S_2

B. S_4

C. S_6

D. S_8

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430. Ethylene glycol is added to water as an antifreeze. It will

A. decrese the freezing point of water in the winter and increase the boiling point of water in summer.

B. only decrease the freezing point of water.

C. only increase the boiling point of water

D. be used for cleaning the radiator in a car.

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431. The volume of 4N HCl and 10 N HCl required to make 1 litre of 6N HCl lare

A. 0.75 litre of 4 N HCl and 0.25 litre of 10N HCl

B. 0.25 litre of 4N HCl and 0.75 litre of 10N HCl

C. 0.67 litre of 4N HCl and 0.33 litre of 10 N HCl

D. 0.50 litre of 4N HCl and 0.20 litre of 10N HCl

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432. Which of the following colligatives property can provide molar mass of proteings with greater precision?

A. Relative lowering of vapour pressure?

B. Elevation in boiling point

C. Depression in freezing point

D. Osmotic pressure

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433. When a gas is bubbled through water at 298K, a very dilute solution of the gas is obtained. Henry's law constant for the gas at 298K is 100 kbar. If the gas exerts a partial pressure of 1 bar. The number of millimoles of the gas dissolved in one litre of water is

A. 0.555

B. 5.55

C. 0.0555

D. 55.5

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434. What is the mole fraction of solute in 2.5m aqueous solution .

A. 0.25

B. 0.125

C. 0.1

D. 0.075

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435. 1 g of non - electrolyte solute (molar mass 250 g/mol) was dissolved in 5.12g of benzene. If the freezing point of depression constant, k_f of benzene is 5.12 K kg/mol, the freezing point of benzene will be lowered by

A. 0.3 K

B. 0.5K

C. 0.2 K

D. 0.4 K

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436. _____ is used for loosening of soil, adding fertilizers to crops, removing the weeds.

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437. Concentrated aqueous sulphuric acid is 98% H_2SO_4 by mass and has a density of $1.80 gmL^{-1}$. Volume of acid required to make one litre of $0.1M H_2SO_4$ is

A. 5.55 mL

B. 11.10 mL

C. 16.65 mL

D. 22.20 mL

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438. 0.5 molal aqueous solution of a weak acid is 20% iionized. If K_f for water is $1.86 K kg mol^{-1}$. The lowering in freezing point of the solution is

A. $-0.56K$

B. $-1.12K$

C. $0.56K$

D. $1.12K$

Watch Video Solution

439. A 0.0020 m aqueous soluton of an ionic compound $CO(NH_3)_5(NO)_2Cl$ freezes at $-0.00732^\circ C$. Number of moles of ions

which 1 mol of ionic compound produces on being dissolved in water will be $\left(K_f = 1.86^\circ \frac{C}{m}\right)/$

A. 3

B. 4

C. 1

D. 2

Watch Video Solution

440. 25.3 g of sodium carbonate Na_2CO_3 is dissolved in enough water to make 250 ml of solution. If sodium carbonate dissociated completely, molar concentration of sodium ion, Na^+ and carbonate ions , CO_3^{2-} are respectively $\left(Molarmassof Na_2CO_3 = 106 g mol^{-1}\right)$.

A. 1.90M and 1.910 M

B. 0.477M and 0.0477 M

C. 0.955 and 1.910M

D. 1.910 M and 0.955M

Watch Video Solution

441. An aqueous solution is 1.00 molalin KI. Which change will cause the vapour 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

A. addition of 1.00 molal KI

B. addition of water

C. addition of NaCl

D. addition of Na_2SO_4

Watch Video Solution

442. A solution of glucose has been prepared at 298K dissolving 7.2 g of glucose in 100 g of water. k_f water is $1.86 Km^{-1}$.

The freezing point of the solsution at 298K will be

A. $+0.372^\circ C$

B. $-0.570^\circ C$

C. $-0.372^\circ C$

D. $-0.520^\circ C$

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443. The van't Hoff factor i for an electrolyte which undergoes dissociation and association in solvents respectively are:

A. less than one and greater than one

B. less than and less than one

C. greater than one and less than one

D. greater than one and greater than one.

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444. Mole fraction of the solute in 1 molal aqueous solution is

A. 0.177

B. 0.0177

C. 0.0344

D. 1.77

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445. P_A and P_B are the vapour pressure of pure liquid components A and B respectively of an ideal binary solution. If X_A represent the mole fraction of component A, then the total pressure of the solution will be

A. $\rho_A + x_A(\rho_B - \rho_A)$

B. $\rho_A + x_A(\rho_A - \rho B)$

C. $\rho_B + x_A(\rho_B - \rho_A)$

D. $\rho_B + x_A(\rho_A - \rho_B)$

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446. 6.02×10^{20} molecules of urea are present in 100mL of its solution. The concentration of solution is

A. 0.001M

B. 0.1 M

C. 0.02M

D. 0.01M

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447. How many grams of concentrated nitric acid soluton should be used to prepare 250mL of $2.0MHNO_3$? The concentrated acid is 70% HNO_3.

A. 90.0g conc. HNO_3

B. 70.0 g conc.HNO_3

C. 54.0 g conc. HNO_3

D. 45.0 g conc. HNO_3

Watch Video Solution

448. Which of the following 0.10 m aqueous solution will have the lowest freezing point?

A. KCl

B. $C_6H_{12}O_6$

C. $Al_2(SO_4)_3$

D. K_2SO_4.

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449. The boiling point of $0.2molkg^{-1}$ solution of X in water in greater than equimolal solution of Y in water. Which one of the following statements is true in this case?

A. Molecular mass of X is less than the molecular mass of Y.

B. Y is undergoing dissociation in water while X undergoes no change.

C. X is undergoing dissociation in water.

D. Molecular mass of X is greater than the moelcular mass of Y.

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450. Fill in the blanks- rhizobium bacteria is present in the_____ of the legumes.

Watch Video Solution

451. Which one of the folloiwng statement about the composition of the vapour over an ideal 1:1 molar mixture of benzene and toluene is correct? Assume that the temperature of constant at $25^{\circ}C$. (given ,vapour pressure data at $25^{\circ}C$, benzene=12.8kPa, toulent=3.85kPa)

A. The vapour will contain equal amounts of benzene and toulent

B. Not enough information is given to make a prediction

C. The vapour will contain a higher percentage of benzene.

D. The vapour wil contain a higher percentage of toulene.

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452. At $100^\circ C$, the vapour pressure of a solution of 6.5 g of solute in 100 g of water is 732 mm. If k_b is 0.52 klm, the boiling point of solution will be:

A. $102^\circ C$

B. $103^\circ C$

C. $101^\circ C$

D. $100^\circ C$

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453. Which one of the following is incorrect for an ideal soluton?

A. $\Delta H_{mix} = 0$

B. $\Delta V_{mix} = 0$

C. $\Delta P = P_{obs} - P_{calcatedbyRaot'slaw} = 0$

D. $\Delta G_{mix} = 0$

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454. The Van't Hoff factor i for a dilute aqueous solution of the strong electrolyte barium hydroxide is

A. 0

B. 1

C. 2

D. 3

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455. Fill in the blanks- _____ and _____ are called as leguminous plants.

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456. Which of the following 0.1 M aqueous solution will have lowest freezing point?

A. freezing point will be lowest for solution I

B. freezing point will be highest for solution IV

C. vapour pressure will be highest for solution II

D. osmotic pressure will be highest for solution II

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457. The temperature at which 10% aqueous solution of glucose will exhibit the osmotic pressure of 16.4 atm is ($R = 0.082 \mathrm{dm}^3$ atm/K/mol)

A. $360^\circ C$

B. 180K

C. 90K

D. 300K

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458. 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. 300mm of Hg

B. 40mm of Hg

C. 500mm of Hg

D. 600 mm of Hg

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459. Henry's law constant of oxygen $1.4 \times 10^{-3} molL^{-1} atm^{-1}$ at 298K. How much of oxygen is dissolved in 100 mL at 298K when partial pressure of oxygen is 0.5 atm?

A. 1.4 g

B. 3.2 g

C. 22.4mg

D. 2.24 mg

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460. The solubility of a gas in water at 300 K under a pressure of 100 atmospheres is 4xx10^-3Kg L^-1`. Therefore, the mass of the gas in kg dissolved in 250mL of water under a pressure of 250 atmospheres at 300K is

A. 2.5×10^{-3}

B. $2.0XX10^{-3}$

C. $1.25XX10^{-3}$

D. $5.0XX10^{-3}$

Watch Video Solution

461. Which of the following statements is false?

A. Raoult's law states that the vapour pressure of a component over a binary solution of volatile liquids is directly proportional to its mole fraction

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

C. The correct order of osmotic pressures of 0.01 M solution of each compound is $BaCl_2 > KCl > CH_3COOH > glu\cos e$

D. IN the equation osmotic pressure P=MRT, M is the molatity of the solution.

Answer: The molecular weight of Nacl determined by colligative property of measurement is less than its theoretical moelcular weight.

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462. 1.5 g of a non-volatile non-electrolyte is dissolved in 50 g of benzene $\left(K_b = 2.5Kkgmol^{-1}\right)$. The elevation of boiling point of the solution is

0.75K. The molecular weigth of the solute is $gmol^{-1}$ is

A. 200

B. 50

C. 75

D. 100

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463. 0.01 M solution of KCl and $BaCl_2$ are prepared in water. The freezing point of KCl is found to be $-2^{\circ}C$. What freezing point would you except for $BaCl_2$ solution assuming both KCl and $BaCl_2$ to be completely ionized?

A. $-2^{\circ}C$

B. $-3^{\circ}c$

C. $-1.5^{\circ}c$

D. $-1.66^{\circ}c$

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464. The degree of ionization of HF in 0.100m aqueous solution is (freezing point of the solution $= -0.197^{\circ}C$ and k_f for water $= 1.86^{\circ}C$)

A. 0.06

B. 0.12

C. 0.03

D. 0.09

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465. The partial pressure of nitrogen in air is 0.76 atm and its Henry's Law constant is 7.6×10^4 atm at 300 K. What is the mole fraction of N_2 in the solution obtained when air is bubbled through water at 300 K.

A. 1×10^{-4}

B. 2×10^{-4}

C. 1×10^{-5}

D. 2×10^{-5}

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466. The experimental and calculate elevation in boiling points of an electrolyte AB in its aqeuous solution at a given concentration are 0.81K and 0.54K respectively. The percentage ionization of the electrolyte at this concentration is

A. 20

B. 40

C. 50

D. 60

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467. Which one of the following binary liquid mixtures exhibits negative deviation from Raoult's law?

A. n-Hexane-n-Heptane

B. Chlorofrom-Acetone

C. Bromomethane-Chloroethane

D. Benzene-Toulene

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468. state whether the statement is true or false- Plants get nitrogen from the soil with the help of a bacteria.

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469. The density of 2.0 M solution of solute is 1.2 gm/ml. If the molecular mass of solute is 100 gm mol^{-1} then the molality of the solution is

A. 2.0m

B. 1.2m

C. 1.0m

D. 0.6m

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470. How is the colligative property changed when the solute undergoes association in solution?

A. $\alpha = \frac{n(i-1)}{1-n}$

B. $\alpha = \frac{i(n-1)}{1+n}$

C. $\alpha = \frac{i(n-1)}{1-n}$

D. $\alpha = \frac{i(n+1)}{n-1}$

Answer: $\alpha = \frac{n(1-i)}{1-n}$

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471. The vapour pressure of a solvent at 293K is 100mm Hg. Then the vapour pressure of a solution containg 1 mole of a strong electrolyte in 99 moles of the solvent at 293K is (assume complete dissociation of solute)

A. 103mm Hg

B. 99mm Hg

C. 101mm Hg

D. 97mm Hg

Answer: 98 mm Hg

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472. What is the correct sequence of osmotic pressure of 0.01 M aq. Solution of :

(1)$Al_2(SO_4)_3$ (2)Na_3PO_4

(3) $BaCl_2$ (4) Glucose

A. $Sucrose > CH_3COOH > KCl$

B. $CH_3COOH > Sucrose > KCl$

C. $KCl > Sucrose > CH_3COOH$

D. $Sucrose > KCl > CH_3COOH$

Answer: $KCl > CH_3COOH > Sucrose$

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473. A 5.25% soluton of a substance is isotonic with a 1.5% solution of urea $\left(molarmass = 60gmol^{-1}\right)$ in the same solvent. If the densities of both the solutons are assumed to be equal to $1.0gcm^{-3}$, molar mass of the substance will be

A. $90.0gmol^{-1}$

B. $115.0gmol^{-1}$

C. $105.0gmol^{-1}$

D. $210.0gmol^{-1}$

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474. State whether the statement is true or false- Nitrogen fixing bacteria is present in the stems of the leguminous plants.

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475. At $80^\circ C$ the vapour pressure of pure liquid 'A' is 520 mm Hg and that of pure liquid 'B' is 1000 mm Hg. If a mixture of solution of 'A' and 'B' boils at $80^\circ C$ and 1 atm prssure, the amount of 'A' in the mixture is (1atm=760mm Hg)

A. 50 mol percent

B. 52 mol percent

C. 34 mol percent

D. 48 mol percent

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476. The vapour pressure of pure water at $20^\circ C$ is 17.5 mm Hg. If 18g of glucose $(C_6H_{12}O_6)$ is added to 178.2 g of water at $20^\circ C$, the vapour pessure of resulting solution will be

A. 17.325 mm Hg

B. 17.675 mm Hg

C. 15.750 mm Hg

D. 16.500 mm Hg

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477. The term "Crop" is defined as_____.

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478. If sodium sulphate is considered to be compeltely dissociated into cations and anions in aqueous soluton, the change in freezing point of water, when 0.01 mole of sodium sulphate is dissolved in 1 k gof water is $\left(K_f = 1.86 K kg mol^{-1}\right)$

A. 0.0744 K

B. 0.0186 K

C. 0.0372 K

D. 0.0558 K

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479. On mixing heptane octane from an ideal solution. At 373K, the vapour pressures of the two liquid components are 105kPa and 45kPa respectively. Vapour pressure of the solution obtained by mixing 25.0 g of heptane and 35 g of octane will be (molar mass of heptane=$100 gmol^{-1}$ and of octane=$114 gmol^{-1}$)

A. 96.2 kPa

B. 144.5 kPa

C. 72.0 kPa

D. 36.1 kPa

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480. What are the advantages of honey?

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481. Ethylene gylcol is used as an antifreeze in a cold climate. Mass of ethylene glycol which should be added to 4 kg of water to prevent it from freezing at $-6^{\circ}C$ will be $\left(Kf \text{ or } water = 1.86Kkgmol^{-1}, \text{ and } molarmassofethy \leq \neq glycol =\right.$

A. 400.00g

B. 304.60g

C. 804.32g

D. 204.30g

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482. The degree of dissociation of a weak electrolyte, A_xB_y is related to Van't Hoff factor by the expression:

A. $\alpha = \dfrac{x+y-1}{i-1}$

B. $\alpha = \dfrac{x+y+1}{i-1}$

C. $\alpha = \dfrac{i-1}{x_Y-1}$

D. $\alpha = \dfrac{i-1}{x+y-1}$

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483. The molality of a urea solution in which 0.0100 g of urea, $\left[(NH_2)_2CO\right]$ is added to $0.3000dm^3$ of water at S.T.P is

A. $5.55 \times 10^{-4}m$

B. 33.3m

C. $3.33 \times 10^{-2}m$

D. 0.555m

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484. A farmer grows wheat crop during rainy season, will he get a good yield of crop?

Watch Video Solution

485. The density of a solution prepared by dissolving 120 g of urea in 1000 g of water is 1.15g/mL. the molarity of this solution is

A. 1.78M

B. 1.02 M

C. 2.05 M

D. 0.50M

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486. K_f for water is $1.86 K kg mol^{-1}$. If your automobile radiator holds 1.0 kg of water, how many grams of ethylene glycol $(C_2H_6O_2)$ must you add to get the freezing point of the solution lowered to $0.8^\circ C$?

A. 93g

B. 39 g

C. 27 g

D. 72 g

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487. The molarity of a solution obtained by mixing 750 mL of 0.5 M HCl with 250 mL of 2M HCl will be

A. 0.875 M

B. 1.00 M

C. 1.75M

D. 0.975M

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488. A farmer grows moong during the rainy season. Will he get the good yield of crop?

Watch Video Solution

489. The vapour pressure of acetone at $20^\circ C$ is 185 torr. When 1.2 g of a non-volattile substance was dissolved in 100 g of acetone at $20^\circ C$, it molar vapour pressure was 183 torr. The molar mass $\left(gmol^{-1}\right)$ of the substnace is

A. 128

B. 488

C. 32

D. 64

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490. A farmer grows paddy crop in winter season. Will he get a good yield of the crop?

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491. Two liquids X and Y from an ideal soluton. The mixture has a vapour pressure of 400 mm at 300K when mixed in the molar ratio of 1:1 and a vapour pressure of 350mm when mixed in the molar mass ratio of 1:2 at the same temperature. The vapour pressures of the two pure liquids X and Y respectively are

A. 250mm, 550mm

B. 350mm, 450mm

C. 350mm, 700mm

D. 550mm, 250mm

Answer: 550mm, 250mm

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492. Fill in the blanks- Cutting and gathering of crops after maturation is called _____.

Watch Video Solution

493. The difference between the boiling point and freezing point of an aqueous solution containing sucrose $\left(mo \leq c\underline{a}rwt. = 342gmol^{-1}\right)$ in 100g of water is $105^{\circ}C$. If K_f and K_b of water are 1.86 and $0.51Kkgmol^{-1}$ respectively, the weigth of sucrose in solution is about

A. 34.2 g

B. 342 g

C. 7.2 g

D. 72 g

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494. Give the advantages of loosening of soil in the fields?

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495. A solution containing 1.8g of a compound in 40 g of water is observed to freeze at $-0.465^{\circ}C$. The molecular formulas of the compound is $\left(K_f ofwater = 1.86KgKmol^{-1}\right)$

A. $C_2H_4O_2$

B. $C_3H_6O_3$

C. $C_4H_8O_4$

D. $C_5H_{10}O_5$

Answer: $C_6H_{12}O_6$

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496. What is the manual method of removing the weeds?

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497. 58.5 g of NaCl and 180 g of glucose were separately dissolved in 1000 mL of water. Identify the correct statement regarding the elevation of boiling point of the resulting solutions

A. NaCl soluton will show higher elevation of b.p.t

B. Glucose solution will show higher elevation of b.pt.

C. Both the solution will show equal elevation of b.pt

D. The b.pt of elevation will be shown by neither of the solution.

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498. Fill in the blanks- Yeast is called _____ in the process of fermentation.

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499. Freezing point of an aqueous solution is $-0.186^{\circ}C$. If the values of K_b and K_f of water are respectively $0.52Kkgmol^{-1}$ and $1.86Kkgmol^{-1}$ then the elevation of boiling point of solution of K is

A. 0.52

B. 1.04

C. 1.34

D. 0.134

Answer: 0.052

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500. The mass of a non-volatile solute of molar mass $40 gmol^{-1}$ that should be dissolved in 114 g of octane to lower its vapour pressure by 20% is

A. 8g

B. 11.4g

C. 9.8g

D. 12.8 g

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501. The vapur pressure of two liquids A and B in their pure states are in ratio of 1:2. A binary solution of A and B contains A and B in mole

proportion of 1:2. the mole fraction of A in the vapour phase of the solution will be

A. 0.333

B. 0.2

C. 0.25

D. 0.52

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502. The measured freezing point depression for a 0.1 m aqueous CH_3COOH soluton is $0.19^\circ C$. The acid dissociation constant K_a at this concentration will be (Give K_f, the molal cryoscopic constant= $1.86Kkgmol^{-1}$)

A. 4.76×10^{-5}

B. 4×10^{-5}

C. 8×10^{-5}

D. 2×10^{-5}

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503. Which of the following aqueous solution will exhibit highest boiling point?

A. 0.01M urea

B. $0.01MKNO_3$

C. $0.01MNa_2SO_4$

D. $0.015MC_6H_{12}O_6$

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504. if the elevation in boiling point of a solution of non-volatile, non-electrolytic and non-associanting solute in solvent ($K_b = xKkg\text{mol}^{-1}$)is yK,then the depression in freezing point of solution of same concentration would be

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

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

B. $\frac{yz}{x}$

C. $\frac{xz}{y}$

D. $\frac{yz}{2x}$

Answer: $\frac{xz}{2y}$

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505. The vapour pressure of pure benzene and toulene at a particular temperature are 100 mm and 50 mm respectively. Then the mole fraction

of benzene in vapour pressure is constant with equimolar soluton of benzene and toulene is

A. 0.67

B. 0.75

C. 0.33

D. 0.5

Answer: 0.2

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506. To observe an elevation of boiling point at $0.05^{\circ}C$, the amount of solute (mol.wt =100) to be added to 100g of water $(k_b = 0.5)$ is

A. 2g

B. 0.5g

C. 1g

D. 0.75g

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507. An aqueous solution containig 3 g of a solute of molar mass $111.6 gmol^{-1}$ in a certain mass of water freeze of $-0.125^{\circ} C$. The mass of water in grams present in the soluton is $\left(K_f = 1.86 Kkgmol^{-1}\right)$

A. 300

B. 600

C. 500

D. 400

Answer: 250

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508. A solution of 1.25 g of P in 50 g of water lowers freezing point by $0.3K$. Molar mass of P is 94 and $k_{f\,(water)} = 1.86Kkgmol^{-1}$).

The degree of association of P if it forms dimers in water is

A. 0.8

B. 0.6

C. 0.65

D. 0.75

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509. Van't Hoff factor of centimolal solution of $K_3\left[Fe(CN)_6\right]$ is 3.333. calculate the per cent dissociations of $K_3\left[Fe(CN)_6\right]$ is

A. 33.33

B. 0.78

C. 78

D. 23.33

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510. Mustard, peas and wheat crops can be grown in-

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511. Choose the correct option- Which of the following is kharif crop-

A. wheat

B. tomato

C. mustard

D. paddy

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512. Which of the following aqueous solution has the higher freezing point?

A. 0.01m NaCl

B. $0.01mNa_2SO_4$

C. 0.1 m Sucrose

D. 0.1 m NaCl

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513. Density of 3M NaCl solution is 1.28g/cc. the molality of the solution is

A. 2.79 molal

B. 0.279 molal

C. 1.279 molal

D. 3.85 molal

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514. What is the mole fraction of solute in 2.5m aqueous solution .

A. 0.043

B. 0.053

C. 0.063

D. 0.073

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515. A solution containing 2.44 g of solute dissolved in 75 g of water boiled at $100.413^{\circ} C$. What will be the molar mass of the solute?

A. $40.96 gmol^{-1}$

B. $20.48 gmol^{-1}$

C. $81.92 gmol^{-1}$

D. None of these

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516. If P° and P are the vapour pressure of the pure solvent and solution and n_1 and n_2 are the moles of solute and solvent respectively in the solution, then the correct relation between P and P° is

A. $P^\circ = P\left[\frac{n_1}{n_1 + n_2}\right]$

B. $P^\circ = P\left[\frac{N_2}{N_1 + N_2}\right]$

C. $P = P^\circ\left[\frac{n_1}{n_1 + n_2}\right]$

D. $P = P^\circ\left[\frac{n_1}{n_1 + n_2}\right]$

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517. The equation that represents van't Hoff factor general solution equation is

A. $\pi = \frac{n}{V}RT$

B. $\pi = nRT$

C. $\pi = \frac{V}{n}RT$

D. $\pi = nVRT$

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518. Which of the following 0.1 M aqueous solution is liekly to have the highest boiling point?

A. Glucose

B. Sodium chloride

C. Calcium chloride

D. Ferric chloride

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519. 5.0 g of sodlium hydroxide $\left(molarmass40gmol^{-1}\right)$ is dissolved in little quantity water and the sodium is diluted up to 100 mL. what is the molarity of the resulting solution?

A. $0.1moldm^{-3}$

B. $1.0moldm^{-3}$

C. $0.125moldm^{-3}$

D. $1.25moldm^{-3}$

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520. Which law states the relation between solubility of gas in liquid at constant temperature and external pressure ?

A. Raoult's law states that the vapour pressure of a component over a binary solution of volatile liquids is directly proportional to its mole fraction

B. van't Hoff Boyle's law

C. Henry's law

D. van't Hoff Charles's law

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521. Calculate the molality of a solution that contains 51.2 g of napthalene, $(C_{10}H_8)$ in 500 mL of carbon tetrachloride. The density of $\mathbb{C}l_4$ is 1.60g/mL

A. 0.250 m

B. 0.500m

C. 0.750 m

D. 0.840m

Answer: 1.69 m

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522. 31 gm of ethylene glycol $(C_2H_6O_2)$ is mixed with 500 gm of solvent. $\left(K_f = 2Kkg\text{mol}^{-1}\right)$. What is the freezing point of the solution in K ? (freezing point of solvent = 273K)

A. 272

B. 271

C. 270

D. 274

Answer: 275

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523. Which of the following is not a colligative property?t

A. Osmotic pressure

B. Optical activity

C. Depression in freezing point

D. Elevation in boiling point.

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524. What is Van't Hoff factor ?

A. >1

B. <1

C. 0

D. 1

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525. Osmotic pressure of the solution can be increase by

A. incresing the temperature of the solution

B. decreasing the temperature of the solution

C. increasing the volume of the vessel

D. diluting the solution.

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526. The elevation in boiling point of a solution 13.44 g of $CuCl_2$ in 1 kg of water using following information will be (molecular wt. of $CuCl_2 = 134.4$, k_b =0.52K/molal)

A. 0.16

B. 0.05

C. 0.1

D. 0.2

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527. When 20 g of napthoic acid $(C_{11}H_8O_2)$ is dissolved in 50 g of benzene$\left(K = 1.72Kkgmol^{-1}\right)$ a freezing point depression of 2 K is observed. The Van't Hoff factor 'I' is

A. 0.5

B. 1

C. 2

D. 3

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

A. 4.0×10^{-4}

B. 4.0×10^{-5}

C. 5.0×10^{-4}

D. 4.0×10^{-6}

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529. Dissolving 120g of urea (mol.wt 60) in 1000g of water gave a solution of density 1.15g/ml. The molarity of solution is:

A. 1.78M

B. 2.00M

C. 2.05M

D. 2.22M

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530. The freezing point of a solution containing 0.1g of $K_3[Fe(CN)_6]$ in 100 g of water. $(K_f = 1.86 K kg mol^{-1})$ is

A. -2.3×10^{-2}

B. -5.7×10^{-2}

C. -5.7×10^{-3}

D. 01.2×10^{-2}

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531. For a dilute solution containing 2.5 g of a non volatile non electrolyte solution in 100 g of water, the elevation in boiling point at 1 atm pressure is $2^{\circ}C$. Assuming concentration of solute is much lower than the concentration of solvent, the vapour pressure (take k b = 0.76 K Kg mol^-1)

A. 724

B. 740

C. 736

D. 718

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532. Colligative properties of a solution are

A. independent of the nature of solute

B. inversly proportional molecular mass of solute

C. proportional to concentration of solute

D. independent of the amount of solvent

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533. The solution showing positive deviations

A. having $\Delta V(mi\xi ng) = +ve$

B. have $\Delta H(mi\xi ng) = -ve$

C. form miniimum boiling azeotropes.

D. have lower vapour pressure of each component in the solution than their pure vapour pressure

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534. Non-ideal solutions showing negative deviations are

A. acetone+ethyl alcohol

B. acetic acid+pyridine

C. chloroform+benzene

D. carbon tetrachloride+toulene

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535. Which of the following from nearly ideal solution?

A. Chlorobenzene+Bromobenzene

B. Hexane-Heptane

C. Ethanol+Cyclohexane

D. Acetic+Pyridine

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536. In the depression in freezing point experiment, it is obsreved that

A. the vapour pressure of the solution is less than that of pure solvent.

B. the vapour pressure of the solution is more than that of pure solvent

C. only solute molecules solidity of the frezing point

D. only solvent molecules solidify at the freezing point

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537. For 0.5m aqueous solution of KCl, the important physical properties at $27^\circ C$ are $K_{f\,(water)} = 1.86Km^{-1}, K_b(water) = 0.512Km^{-1}$

A. freezing point of solution $=-3.72^\circ C$

B. osmotic pressure =23.76 atm.

C. boiling point of solution=$100.512^{\circ} C$

D. observed molecular mass=37.25

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538. Fill the blank with appropriate answer- _____ and _____ are the examples of microorganisms.

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539. Benzene and napthalene form an ideal solution at room temperature. For this process, the true statement is

A. ΔG is positive

B. ΔS_{system} is positive

C. $De < S_{surround \in gs} = 0$

D. $\Delta H = 0$

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540. The solution which is isotonic with 6% solution of urea is/are is

A. 18%(m/v) solution of glucose

B. 0.5M solution of $BaCl_2$

C. 1M solution of sucrose

D. 1M solution of acetic acid

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541. Mixture showing positive deviation from Raoult's law at $35^\circ C$ is

A. carbon tetrachloride+acetone

B. carbon disulphde+acetone

C. benzene+toulene

D. phenol+aniline

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542. Vapour pessure of a liquid or a solution is the pressure exerted by the vapour in equilibrium with the liquid or solution at a particular temperature. It depends upon the nature of the liquid and temperature. It depends upon the nature of the liquid and temperature. According to Raoult's law in a solution, the vapour pressure of a component at a given temperature is equal to the mole fraction of that component in solution multiplied by the vapour pressure of that component in hte pue state. this solution in which each component obeys Raoult's law are called ideal solutions. there are two types of non ideal solutions, showing positive deviations and negative deviations from ideal behaviour.

If liquid A and B form ideal solution, then

A. 0.6

B. 0.5.

C. 0.2

D. 0.8

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543. Explain the following terms- Communicable diseases?

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544. Vapour pressure of a solution of heptane and octane is given by the equation:

p(sol.)(mm Hg)=35+65x, where x is the mole fraction of heptane. vapour pressure of pure heptane is

A. 100 mm Hg

B. 35 mm Hg

C. 30 mm Hg

D. 1.86 mm Hg

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545. Vapour pessure of a liquid or a solution is the pressure exerted by the vapour in equilibrium with the liquid or solution at a particular temperature. It depends upon the nature of the liquid and temperature. It depends upon the nature of the liquid and temperature. According to Raoult's law in a solution, the vapour pressure of a component at a given temperature is equal to the mole fraction of that component in solution multiplied by the vapour pressure of that component in hte pue state. this solution in which each component obeys Raoult's law are called ideal solutions. there are two types of non ideal solutions, showing positive deviations and negative deviations from ideal behaviour.

If liquid A and B form ideal solution, then

A. $\Delta G_{mix} = 0$

B. $\Delta H_{mixIng} = 0$

C. $\Delta G_{mix} = 0, \Delta S_{mix} = 0$

D. $\Delta S_{mixIng} = 0$

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546. A solution of glucose has been prepared at 298K dissolving 7.2 g of glucose in 100 g of water. k_f water is $1.86Km^{-1}$ and vapour pressure of water at 298K is 0.024 atm.

The amount of the sodium chloride that should be dissolved in the same amount of water to get the same freezing point will be

A. $-0.744^{\circ}C$

B. $-0.372^{\circ}C$

C. $-0.186^{\circ}C$

D. $-0.093^{\circ}C$

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547. A solution of glucose has been prepared at 298K dissolving 7.2 g of glucose in 100 g of water. k_f water is $1.86Km^{-1}$ and vapour pressure of water at 298K is 0.024 atm.

The vapour pressure of the solution at 298K will be

A. 0.0220 atm

B. 0.238 atm

C. 0.0238 atm

D. 0.220 atm

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548. A solution of glucose has been prepared at 298K dissolving 7.2 g of glucose in 100 g of water. k_f water is $1.86Km^{-1}$ and vapour pressure of water at 298K is 0.024 atm.

The amount of the sodium chloride that should be dissolved in the same amount of water to get the same freezing point will be

A. 11.79g

B. 1.179g

C. 2.34g

D. 23.4g

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549. A solution of glucose has been prepared at 298K dissolving 7.2 g of glucose in 100 g of water. k_f water is $1.86Km^{-1}$ and vapour pressure of water at 298K is 0.024 atm.

If on dissolving the above amount of sodium chloride in same amount of

water, the freezing point is found to be $-0.698^{\circ}C$, the percentage dissociation is

A. 72%

B. 80%

C. 92%

D. 88%

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550. Electrolyte A gives 4 ions and B is a non electrolyte. if 0.1 molar solution of solute B produces as osmotic pressure p, then 0.02 molar solution of A will produce osmotic pressure equal to

A. 0.02 p

B. 0.8 p

C. 0.4 p

D. 0.6 p

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551. 0.2 m aqueous solution of a weak acid is 20% dissociated. The boiling point of this solution is $\left(K_b of water = 0.52 K m^{-1}\right)$

A. $101.04^\circ C$

B. $100.104^\circ C$

C. $100.1248^\circ C$

D. $100.52^\circ C$

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552. Which of the following equimolar solution is expected to have lowest freezing point?

A. $0.5MH_3PO_3$

B. $0.5MNa_3PO_4$

C. $0.5MNaCl$

D. 0.5 m Aniline

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553. The elevation of boiling point for 1M urea, 1M glucose, 1M NaCl and $1M\ K_2SO_4$ are in the ratio

A. $1:1:2:3$

B. $3:2:1:1$

C. $1:2:3:4$

D. $2:2:3:4$

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554. The average osmotic pressure of human blood is 7.8 bar at $37^{\circ}C$. the concentration of aqueous of NaCl solution that could be used in the blood stream is

A. $7.8molL^{-1}$

B. $1.5molL^{-}1$

C. $0.075molL^{-1}$

D. $0.15molL^{-1}$

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555. What are colligative properties? Explain the following colligative properties:

Relative lowering of vapour pressure.

A. 268.7K

B. 268.5K

C. 234.2K

D. 150.9K

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556. Fill in the blanks- _____ is used for making pizza and bread.

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557. Properties such as boiling point, freezing point and vapour pressure of a pure solvent change when solute molecules are added to get a homogeneous solution. These are called colligative properties. Applications of colligative properties are very useful in day-to-day life One of its examples is the use of ethylene glycol and water mixture as an anti-freezing liquid in the radiator of automobiles.A solution M is prepared by mixing ethanol and water. The mole fraction of ethanol in the mixture is

0.9.Given: Freezing point depression constant of water (Kfwater)=1.86Kkgmol−1Freezing point depression constant of ethanol(Kfethanol)=2.0Kkgmol−1 Boiling point elevation constant of water(Kbwater)=0.52Kkgmol−1 Boiling point elevation constant of ethanol (Kbethanol)=1.2Kkgmol−1 Standard freezing point of water =273K Standard freezing point of ethanol =155.7K Standard boiling point of water =373K

Standard boiling point of ethanol =351.5K Vapour pressure of pure water =32.8mmHg Vapour pressure of pure ethanol =40mmHg Molecular weight of water =18gmol−1 Molecular weight of ethanol =46gmol−1 In answering the following questions, consider the solutions to be ideal dilute solutions and solutes to be non-volatile and non-dissociative.

Water is added to the solution M such that the mole faraction of water in the solution becomes 0.9. the boiling point of this solution is

A. 380.4K

B. 376.2K

C. 373.5K

D. 354.7K

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558. Assertion: ΔH_{mix} and ΔV_{mix} are zero for the ideal solution.

Reason : The interactions between the particles of the components of a solution are almost identical as between particles in the liquids.

A. (a) If both assertion and reason are CORRECT and reason if the CORRECT explanations of the assertion.

B. (b) If both assertion and reason are CORRECT and reason is not the CORRECT explanations of the assertion.

C. (c) If assertion is CORRECT but reason is incorrect.

D. (d) If assertion is incorrect but reason is correct

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559. Assertion: Increasing pressure on water decreases its freezing point

Reason: Density of water is maximum at 273K.

A. (a) If both assertion and reason are CORRECT and reason if the CORRECT explanations of the assertion.

B. (b) If both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

C. (c) If assertion is correct but reason is incorrect.

D. (d) If assertion is incorrect but reason is correct

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560. Assertion: 0.1 M glucose solution has higher increment in the freezing point than 0.1M urea solution.

Reason: K_f both has different values.

A. (a) If both assertion and reason are CORRECT and reason is the CORRECT explanations of the assertion.

B. (b) If both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

C. (c) If assertion is correct but reason is incorrect.

D. (d) If assertion and reason both are incorrect

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561. The questions given below consist of an Assertion and Reason. Use the following key to choose of the appropriate answer.

If both assertion and reason are CORRECT and reason if the CORRECT explanations of the assertion.

If both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

If assertion is CORRECT explanation of the assertion.

If both assertion and reason are INCORRECT.

Assertion: Sodium chloride is used to clear snow on the roads.

Reason: sodium chloride depresses the freezing point of water.

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562. The questions given below consist of an Assertion and Reason. Use the following key to choose of the appropriate answer.

If both assertion and reason are CORRECT and reason if the CORRECT explanations of the assertion.

If both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

If assertion is CORRECT explanation of the assertion.

If both assertion and reason are INCORRECT.

Assertion: The sum of mole fraction of temperature of a solution is unity.

Reason:Mole fraction is independent of temperature.

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563. The questions given below consist of an Assertion and Reason. Use the following key to choose of the appropriate answer.

If both assertion and reason are CORRECT and reason if the CORRECT explanations of the assertion.

If both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

If assertion is CORRECT explanation of the assertion.

If both assertion and reason are INCORRECT.

Assertion: Sodium chloride is used to clear snow on the roads.

Reason: sodium chloride depresses the freezing point of water.

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564. The questions given below consist of an Assertion and Reason. Use the following key to choose of the appropriate answer.

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If both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

If assertion is CORRECT explanation of the assertion.

If both assertion and reason are INCORRECT.

Assertion: The sum of mole fraction of temperature of a solution is unity.

Reason:Mole fraction is independent of temperature.

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565. The questions given below consist of an Assertion and Reason. Use the following key to choose of the appropriate answer.

If both assertion and reason are CORRECT and reason if the CORRECT explanations of the assertion.

If both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

If assertion is CORRECT explanation of the assertion.

If both assertion and reason are INCORRECT.

Assertion: Sodium chloride is used to clear snow on the roads.

Reason: sodium chloride depresses the freezing point of water.

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566. Fill in the blanks- _____ is the carrier of malaria disease.

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567. The questions given below consist of an Assertion and Reason. Use the following key to choose of the appropriate answer.

If both assertion and reason are CORRECT and reason if the CORRECT explanations of the assertion.

If both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

If assertion is CORRECT explanation of the assertion.

If both assertion and reason are INCORRECT.

Assertion: Camphor is usually used in molecular mass determination

Reason: Camphor has low cryscopic constant and therefore, causes greater depression is freezing point.

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568. Name one compound which gives CO_2 on heating?

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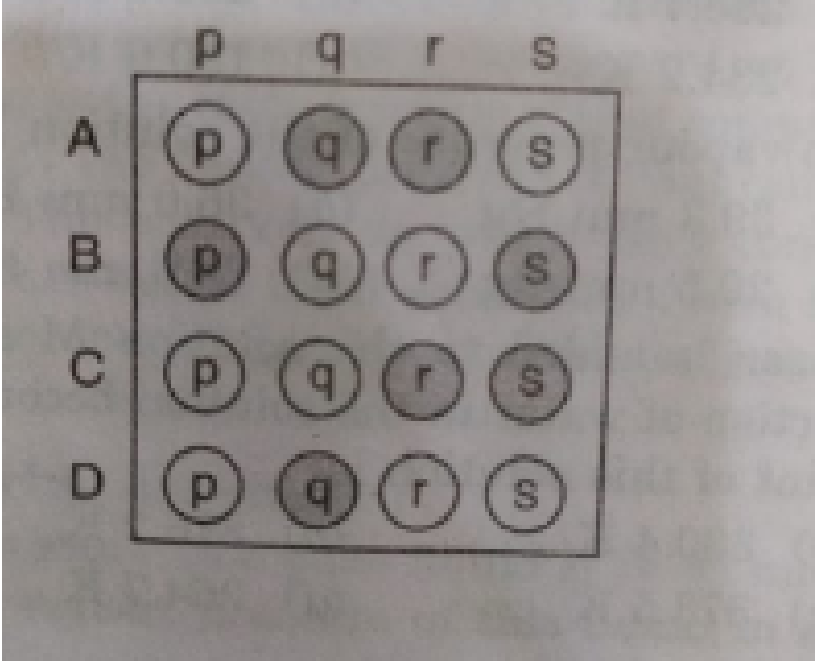
569. Each question contains statements given in two columns, which have to be mathced, statements in column I aer labelled as A,B,C and D whereas statements in Column II are labelled as p,q,r,s. Match the entries of Column I with appropriate entries of column II. Each entry in Column I may have one or more than one correct option from Column II. The answers to these questions have to be appropriate bubbled as illustrated in the following example.

If the correct matches aer A-q, B-p, C-r, C-s and D-q then the correctly bubbled matrix will like the following,



Match the type of solutions in Column I with the characterstic property mentioned in Column II

Column I	Column II
(A) Solution in which solute undergoes association	(p) Van't Hoff factor will be less than 1 observed
(B) Solution in which solute dissociation	(q) observed molecular mass will be more than normal value
(C) Solution containing non-electrolyte	(r) colligative property will be more than normal value
(D) 0.1M solution of benzoic acid in benzene	(s) Van't Hoff factor will be equal to 1.

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570. Plaster of paris is made from ?

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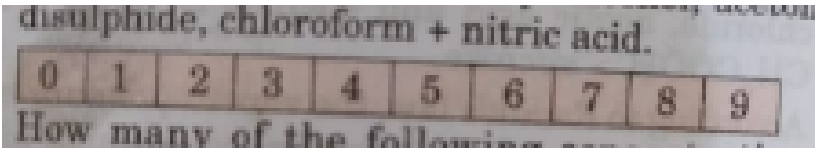
571. The depression in freezing point for 1 M urea, 0.5 M glucose, 1M NaCl, and 1M K_2SO_4 are in ratio x:1:y:z, The value of x+z is



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572. An aqueous solution with pH zero is :

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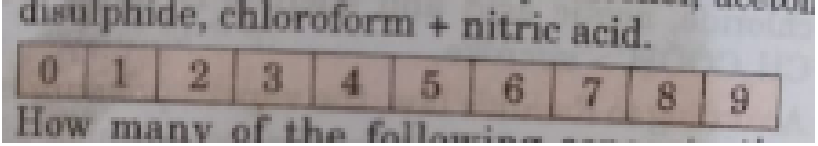
573. An electrolyte A_2B_3 ionizes in water upto 75%. The van't Hoff factor for it is



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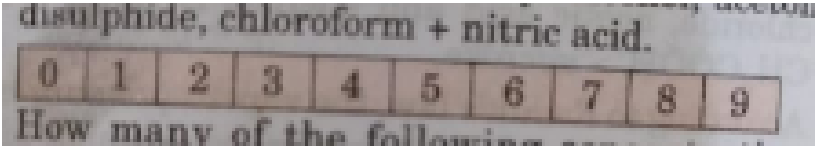
574. The depression in freezing point expected for 0.6 m $Al_2(SO_4)_3$ solution will be n times compared with 0.2 m Na_2SO_4 solution. The value of n is



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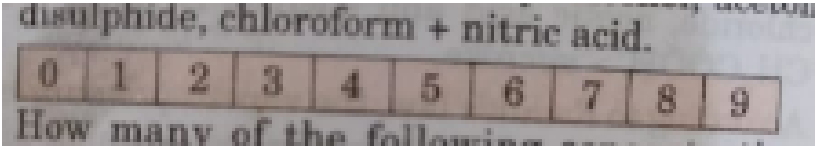
575. 29.2% stock solution has a density of $1.25 gmL^{-1}$. The molecular weight of HCl is $36.5 gmol^{-1}$. The volume of stock solution required to prepare 200 mL of 0.4 HCl is



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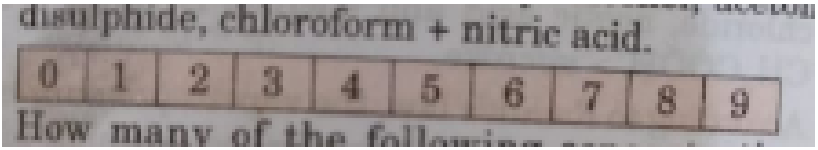
576. MX_2 dissociates into M^{2+} and X^- ions in an aqueous soluton, with a degree of dissciation of 0.5. The ratio of the observed depressio of freezing point of the aqueous solution to the value of the depression of freezing point in the absence of ionic dissociation is



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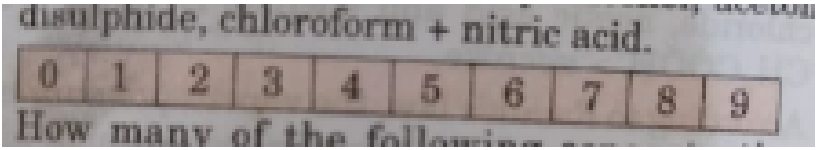
577. If the freezing point of a 0.01 molal aqueous solution of a cobalt chloride ammonia complex is $-0.0558^\circ C$, the number of chloride in the coordination sphere of the complex is $\left[K_f ofwater = 1.86 Kkgmol^{-1}\right]$



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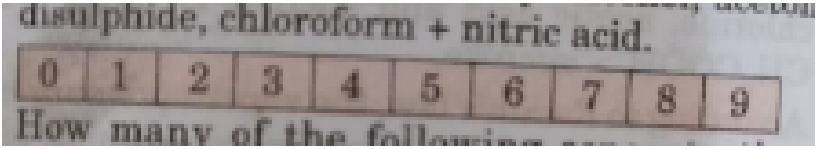
578. The mole fraction of a solute is 0.1. At 298K, molarity of this solution is the same as it molality. Density of this solution at 298K is $2.0 gcm^{-3}$. The ratio of the molecular weight of the solute and solvent. $\frac{MW_{solute}}{MW_{solvent}}$ is



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579. Which of the following units is useful in relating concentration of solution with its vapour pressure ?

A. mole fraction

B. parts per million

C. mass percentage

D. molality

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580. In which of the following cases is the solution of $AgCl$ unsaturated?

A. Sugar cystals in cold water.

B. Sugar crystals in hot water.

C. Powdered sugar in cold water.

D. Powdered sugar in hot water

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581. At equilibrium the rate of dissolution of a solid solute in a volatile liquid solvent is

A. less than the rate of crystallisation

B. greater than the rate of cyrstallisation

C. equal to the arte of crystallisation

D. zero

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582. When does reduction of substance take place in a reaction?

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583. Maximum amount of a solid solute that can be dissolved in a specificd amount of a given liquid solvent does not depend upon

A. Temperature

B. Nature of solute

C. Pressure

D. Nature of solvent

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584. Low concentration of oxygen in the blood and tissues of people living. At high altitude is due to:

A. low temperature

B. low atmospheric pressure

C. high atmospheric pressure

D. both low temperature and high atmospheric pressure.

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585. Which of the following mixture does not show positive deviation from the Raoult,s Law?

A. Methanol and acetone

B. Chlorofrom-Acetone

C. Nitric acid and water

D. Phenol and aniline

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586. True or false

Colligative properties depend only upon the moles of solute and are independent of the nature of solute and solvent.

A. the nature of the solsute particles dissolved in solution.

B. the number of solute particles in solution

C. the physical properties of the solute particles dissolved in solution

D. the nature of solvent particles.

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

A. 1.0M NaOH

B. $1.0MNa_2SO_4$

C. $1.0MNH_4NO_3$

D. $1.0MKNO_3$

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588. In comparison to a 0.01 M solution of glucose, the depression in freezing point of a 0.01M $MgCl_2$ solution is :

A. the same

B. about wise

C. about three twice

D. About six twice

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589. A fruit or vegetable placed in a concentrated salt solution to prepare pickle, shrivels because

A. it gains water due to osmosis

B. it loses water due to reverse osmosis

C. it gains water due to reverse osmosis

D. it loses water due to osmosis.

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590. At the given temperature, osmotic pressure of a concentrated solution of substances

A. is higher than that of dilute solution

B. is lower than that of a dilute solution

C. is same as that of a dilute solution

D. cannot be compared with osmotic pressure of dilute solution.

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591. Which of the following statements is false?

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

B. The osmotic pressure of a solution is given by the equation π=cRT, where c is the molarity of the solution

C. Decrasing order of osmotic presure for 0.01 M aqueous solutions of barium chloride, potassium chloride, acetic acid and sucrose is $BaCl_2 > KCl > Ch_3COOH > sucrose$

D. According to Raoult's law the vapour presusre exerted by a volatile componenet of a solution is directly proportioanl to is mole fraction in the solution.

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592. The values of Van't Hoff factor for KCl, NaCl and K_2SO_4 respectively are

A. 2,2 and 2

B. 2,2 and 3

C. 1,1 and 2

D. 1,1 and 1

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593. Which of the following statements is false?

A. Units of atmospheric pressure and osmotic pressure are the same

B. In reverse osmosis, solvent molecules move through a semipermeabl membrane form a region of lower concentration of solute to a region of higher concentration

C. The value of molal depression of solute constant depends on nature of solvent

D. Relative lowering of vapour pressure, is a dimensionless quantity.

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594. The value of Henry's constant K_H is :

A. increases with increase in temperature

B. greater for gases with lower solubility

C. constant for all gases

D. not related to the solubility of gases.

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595. We have three aqueous solutions of NaCl labelled as 'A', 'B' and 'C' with concentrations 0.1M, 0.01 and 0.001M, respectively. The Value of Van't Hoff factor for these solutions will be in the oder

A. $i_A < i_B > i_C$

B. $i_A > i_B > i_C$

C. $I_A = i_B = i_C$

D. $i_A < i_B < i_C$

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596. What type of interactions hold the molecules together in a polar molecular solid?

A. Solution (B) and © will follow Raoult's law

B. Solution (A) will follow Raoult's law.

C. Solution (B) will show negative deviation from Raoult's law

D. Solution (C) will show positive deviation from Raoult's law.

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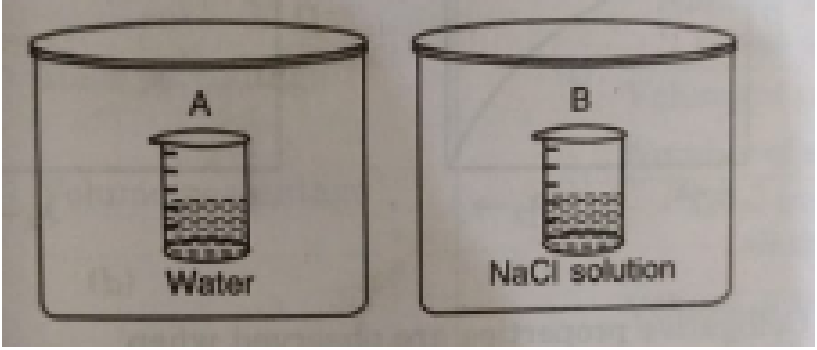
597. Two beakers of capcatity 500 mL were taken one of these beakers labelled as "A" was filled with 400 mL water whereas the beaker labelled "B" was filled with 400 mL of 2 M solution of NaCl. At the same temperature both the beakers were placed in close containers of same material and same capacity as shown in the figure given below:



At a given temperature, whihc of the following statement is correct about the vapour pressure of pure water and that of NaCl solution.

A. vapour pressure in container (A) is more than that in container (B).

B. vapour pressure in container (A) is less than that in container (B).

C. vapour pressure is equal to in both the containers

D. vapour pressure in container (B) is twice the vapour pressure in container (A).

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598. Components of a binary mixture of two liquids A and B were being separated by distillation. After some time separation of components stopped and composition of vapour phase becomes same as that of liquid phase. Both the components started coming in the distillate. explain why this happened.

A. A-B interactions are stronger than those between A-A or B-B.

B. vapour pressure of soluton increase because more number of molecules of liquids A and B can escape from the solution

C. vapour pressure of solution decreases because less number of molecules of only one of the liquids escape from the moelcules

D. A-B interactions are weaker than those beween A-A or B-B.

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599. 4L of 0.02 M aqueous solution of NaCI was diluted by adding one litre of water. The molality of the resultant solution is _____

A. 0.004

B. 0.008

C. 0.012

D. 0.016

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600. (Tick the correct option) Rest mass of a photon

A. At specific compostions methanol acetone mixture will from minimum boiling azeotrope and will show positive deviation from Raoult's law.

B. At specific compositons methanol-acetone mixture forms maximum boiling azeotropes and will show positive deviations fro Raoult's law.

C. At specific composition methanol acetone mixture will from minimum boiling azeotrope and will show negative deviation from Raoult's law.

D. At specific compositon methanol acetone mixture will from maximum boiling azeotrope and will some negative deviation from Raoult's law.

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601. K_H Value for $Ar(g), CO_2(g), HCHO(g)$ and CH_4 (g) are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively. Arrange these gases in the order of their increasing solubility.

A. $HCHO < CH_4 < CO_2 < Ar$

B. $HCHO < CO_2 < CH_4 < Ar$

C. $Ar < CO_2 < CH_4 < HCHO$

D. $Ar < CH_4 < CO_2 < HCHO$

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

A. (i) and (iii) at constant T

B. (i) and (ii) at constant T

C. (ii) and (iii) only

D. (iii) only

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603. Which of the following statements are not true?

A. $\Delta_{mix}H = zero$

B. $\Delta_{mix}V = zero$

C. These will form minimum boiling azeotropes

D. These will not form ideal solution

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604. Show that relative lowering in vapour pressure is a colligative property

A. It depends on the concentration of a non electrolyte solute in solution and does not depend on the nautre of the solute molecules.

B. It depends on number of particles of electrolyte solute in solution and does not depend on the nature of the solute particles.

C. It depends on the concentration of a non electrolyte solute in solutoin as well as on the nature of he solute molecules.

D. It depends on the concentration of an electrolyte or non electrolyte solute in solution as well as on the nature of the solute molecules.

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605. What is Van't Hoff factor ?

A. $i = \frac{N \text{ or } malmolarmass}{Ab||a||lmolarmass}$

B. $i = \frac{Ab||a||lmolarmass}{N \text{ or } malmolarmass}$

C. $i = \frac{Observedcolligative \propto erty}{Calcatecolligative \propto erty0}$

D. $i = \frac{Calcatecolligative \propto erty}{Observedcolligative \propto erty}$

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606. Isotonic solutions must have the same

A. solute

B. density

C. elevation in boiling point

D. depression in freezing point

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607. Which of the following binary operation is commutative ?

A. Benzene-Toulene

B. Water-Nitric acid

C. Water-Ethanol

D. n-hexane-n-heptane

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608. In isotonic solutions.....

A. solute and solvent both are same.

B. osmotic presure is same.

C. solute and solvent may or may not be same

D. solute is always same solvent may be different.

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609. Fill in the blanks- malaria is caused by _____.

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610. Colligative properties are observed when

A. a non volatile solid is dissolved in a volatile liquid

B. a non volatile liquid is dissolved in another volatile liquid

C. a gas is dissolved in non volatile liquid

D. a volatile liquid is dissolved in another volatile liquid.

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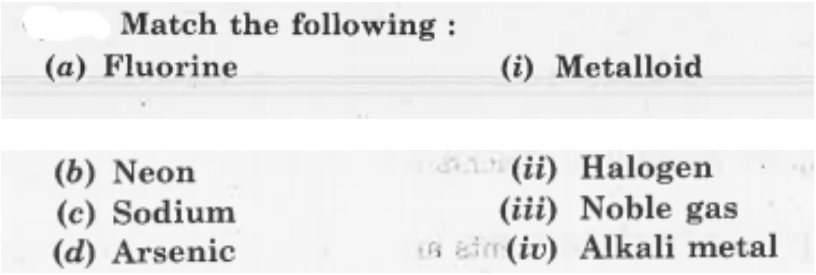
611. Match the following:



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612. Match the items given in column I with type of solutoins given in column II.

Column I	Column II
(a) Soda water	(i) A solution of gas in solid
(b) Sugar solution	(ii) A solution of gas in gas
(c) German silver	(iii) A solution of solid in liquid
(d) Air	(iv) A solution of solid in solid
(e) Hydrogen gas in palladium	(v) A solution of gas in liquid
	(vi) A solution of liquid in solid

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613. Match the laws given in Column I with expression given in Column II.

Column I	Column II
a) Raoult's law	(i) $\Delta T_f = K_f m$
b) Henry's law	(ii) $\pi = cRT$
c) Elevation of boiling point	(iii) $p = x_1 p_1^0 + x_2 p_2^0$
d) Depression in freezing point	(iv) $\Delta T_b = K_b m$
e) Osmotic pressure	(v) $p = K_H x$

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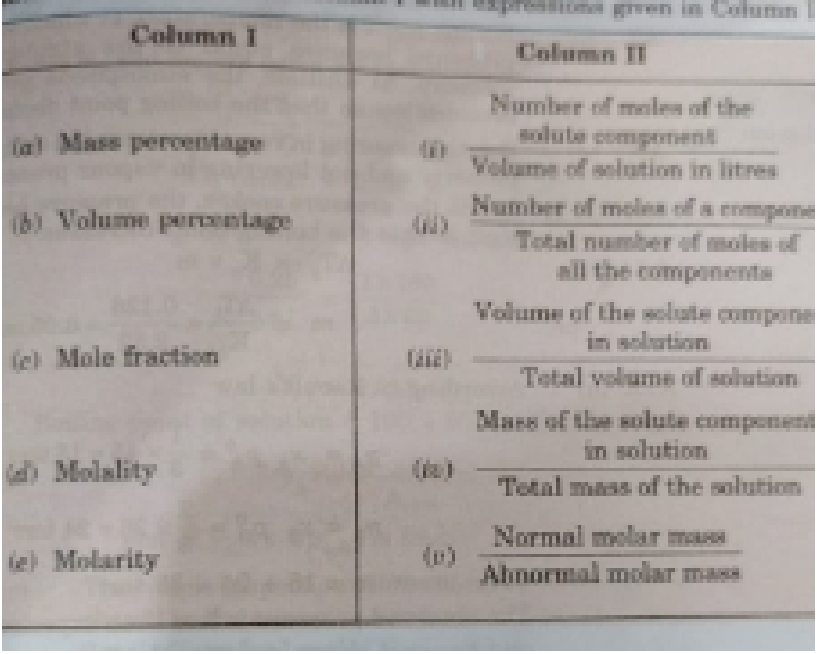
614. Match the terms given in Column I with expression given in Column II.



Column I	Column II
(a) Mass percentage	(i) $\frac{\text{Number of moles of the solute component}}{\text{Volume of solution in litres}}$
(b) Volume percentage	(ii) $\frac{\text{Number of moles of a compone}}{\text{Total number of moles of all the components}}$
(c) Mole fraction	(iii) $\frac{\text{Volume of the solute compone in solution}}{\text{Total volume of solution}}$
(d) Molality	(iv) $\frac{\text{Mass of the solute component in solution}}{\text{Total mass of the solution}}$
(e) Molarity	(v) $\frac{\text{Normal molar mass}}{\text{Abnormal molar mass}}$

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615. In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

Assertion and reason both are correct statements and reason is correct explanation for assertion

Assertion and reason both are correct statements but reason is not correct explanation for assertion.

Assertion is correct statement but reason is wrong statement.

Assertion is wrong statement but reason is correct statement.

Assertion: The packing efficiency is maximum for the fcc structure.

Reason The coordination number is 12 in fcc structure.

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Assertion and reason both are correct statements but reason is not correct explanation for assertion.

Assertion is correct statement but reason is wrong statement.

Assertion is wrong statement but reason is correct statement.

Assertion:Total numbr of octahedral voids present in unit cell of cubic close packing including the one that of present at the body centre is four

Reason: Besides the body centre there is one octahedral void present a the centre of each of the six faces of the unit cell and each of the which is shared between two adjacent unit cells.

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618. State the conditions resulting in reverse osmosis?

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619. 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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620. How will you calculate the molecular mass of a solute with the help of relative lowering in vapour pressure of a solution of a non volatile solute?

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621. What is the significance of van't Hoff factor?

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622. How is the molality of a solution different from its molarity?

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623. True or false

Solution of ethanol and cyclohexane shows positive derivation from Raoult's law.

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624. Why do gases always tend to be less soluble in liquids as the temperature is raised?

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625. How many grams of ethylene glycol (molar mass = 62) should be added to 10 kg of water, so that the resulting solution freezes at $-10^{\circ}C$ (K_f for water = 1.86 K mol^{-1}).

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626. Sodium chloride solution freezes at lower temparature than water but boils at higher temparature than water . Explain.

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627. True or false

Elevation in boiling point of 0.1 m NaCl solution will be nearly twice that of 0.1 m glucose solution.

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628. A solution contains 0.8960 g of K_2SO_4 in 500 mL solution. Its osmotic pressure is found to be 0.690 atm at $27^\circ C$. Calculate the value of Van's Hoff factor.

(At. Mass K=39.0, S=32, O-16, $R = 0.082 atm mol^{-1} K^{-1}$).

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629. Write differences between ideal and non-ideal solutions.

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630. Why do you get sometimes abnormal molecular mass of substances by using colligative properties of the solution? State the factors with examples which produces abnormality in the result.

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631. The aqueous solutions containing respectively 7.5 g of urea (molar mass=60) and 42.75 g of substance X in 100 g of water freeze at the same temperatuer. Calculate the molecular weight of X.

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632. Benzene and toluene form ideal solution over the entire range of composition. The vapour pressure of pure benzene and toluene at 300 K are 50.71 mm Hg and 32.06 mm Hg respectively. Calculate the mole fraction of benzene in vapour phase if 80 g of benzene is mixed with 100 g of toluene.

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633. Show that relative lowering in vapour pressure is a colligative property

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634. Calculate the normal freezing point of a sample of sea water containing 3.8% NaCl and 0.12% $MgCl_2$ by mass. $\left(K_f f \text{ or } water = 1.86 Km^{-1}\right)$

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635. Calculate the volume of 80% H_2SO_4 by weight $\left(density = 1.80 gmL^{-1}\right)$ required to prepare 1L of 0.2 M H_2SO_4.

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