CHEMISTRY

BOOKS - R SHARMA CHEMISTRY (HINGLISH)

SOLUTIONS

Example

1. An alloy of copper and aluminium is prepared from 65.6 g of Cu and 423.1 g of Al. Calculate the mass percent of each component in this solid solution.

Strategy: The mass precentage of a component of a solution is define as:

Mass% of a component

$$= \frac{\text{Mass of the component in the solution}}{\text{Total mass of the solution}} \times 100\ \%$$

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2. A chemist prepared a solution by adding by $230g$ of pure ethanol (C_2H_5OH) to $144g$ of water. Calculate the mole fractions of these two components. The molar masses of ethanol and water are $64g$ and $18g$, respectively.

Strategy: To calculate the mole fractions, we must find the number of moles of ethanol and of water. To find the moles, we must divide the given mass by the respective molar mass.

In a two-component system made up of A and B molecules, the mole fraction of a component of a solution, say, component A is written χ_A and is defined as

Mole fraction of component $A = \chi_A$

$$= \frac{\text{moles of A}}{\text{sum of moles of A and B}}$$

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3. Calculate molarity from mass and volume:

A solution is prepared from $22.5g$ of glucose $(C_6H_{12}O_6)$ and enough water for a volume of $250cm^3$. Find the molarity of the glucose.

Strategy: We first convert mass glucose to moles, because the molarity equals moles of solute (giucose) divided by volume of solution in litres. To calculate moles, we must divide the given mass of glucose by its molar mass. Molar is gram atomic mass (if solute consists of atoms), gram molecular mass (if solute consists of molecules) or gram formula mass (if solute consista of formula units)

Gram atomic mass is the mass in grams, numerically equal to the atomic mass expressed in amu. Gram molecular mass is the mass in grams, which is numerically equal to the molecular mass expressed in amu. Gram formula mass is the mass in grams, numerically equal to formula mass expressed in amu.

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4. Using molarity as a conversion factor: An experiment calls for the addition to a reaction vessel of $0.200g$ of sodium hydroxide $(NaOH)$ in aqueous solution. How many milliliters of $0.200MNaOH$ should be added?

Strategy: According to equating 2.13

$$M = \frac{n_{solute}}{V_L}$$

First we need to convert grams $NaOH$ to moles $NaOH$, because molarity relates moles of solute to volume of solution.

Then, we convert moles $NaOH$ to litres of solution, using the molarity as a conversion factor. Here, $0.200M$ means that $1L$ of solution contains 0.200 moles of solute $(NaOH)$, so the conversion factor is:

$$\frac{1Lsoln}{0.200molNaOH}$$ (Converts mol NaOH to L soln)

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5. Converting mass percent to molarity: the density of a 24.5 mass % solution of sulphuric acid (H_2SO_4) in water is $1.176gmL^{-1}$ at $25.0^\circ C$. What is the molarity of the solution?

Stregy: Use mass % to calculate number of moles of solute and use density of solution to calculate volume of solution. Describing a solution as 24.5 mass % H_2SO_4 in H_2O means that every 100.0 g of solution contains 24.5 g of H_2SO_4 and 75.5 g of H_2O. Since we want to calculate the concentration in

molarity, we first need to find the number of moles of H_2SO_4 dissolved in a specific mass of solution. Next we use density as a conversion factor to find the volume of that solution and then calculate molarity by dividing the number of moles of H_2SO_4 by the volume of solution.

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6. Diluting a solution: How would you prepare 500.0 mL of 0.2500 M NaOH solution starting from a concentration of 1.00 M?

Strategy: The problem gives initial and final concentration $(M_i \text{ and } M_f)$ and final volume (V_f) and asks for the initial volume (V_i) that we need to dilute.

Write the dilute formula (2.17) and rearrange it to give the initial volume.

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7. Neutrakization of acid by base: Stomach acid, a dilute solution of HCl in water can be neutralized by reaction with sodium hydrogen carbonate, $NaHCO_3$, according to the equation

$$HCl(aq.) + NaHCO_3(aq.) \rightarrow NaCl(aq.) + H_2O(l) + CO_2(g)$$

How many millilitres of 0.125 M $NaHCO_3$ solution are needed to neutralize 18.0 mL of 0.100 M HCl?

Strategy: Solving stoichiometry problems always requires finding the number of moles of the first reactant. using the coefficients of the balanced chemical equation to find the number of moles of the second reactant, and then finding the amount of the second reactant. The flow diagram in Figure 2.1 summarizes the situation.

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8. Calculate the Quantity of substance in a Titrated solution: A flask contains 20 mL of a solution with an unknown amount of HCl. This solution is titrated with 0.207 M NaOH. It takes 4.47 mL NaOH to complete the rection. What is mass and the molority of the HCl?

Strategy: Convert the volume of NaOH to moles of NaOH (using the molar of NaOH). Then convert moles NaOH to moles HCl, using the chemical equation. Finally, convert moles HCl to gram HCl and molaruty HCl.

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9. How many mL of a $0.1MHCl$ are required to react completely with $1g$ mixture of Na_2CO_3 and $NaHCO_3$ containing equimolar amounts of two?

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10. Calculate the normality of 9.0 gram of oxalic acid, $(COOH)_2$, dissolved in 250 mL of solution.

Strategy: Find the equivalent mass of oxalic acid by dividing its formula mass by its basicity, which is two, because oxalic acid is a dibasic acid. Use the numerical value of equivalent mass to get gram equivalent mass. Then convert grams of $(COOH)_2$ to equivalent of $(COOH)_2$, which lets to calculate the nirmality

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11. Consider 10 litres of 1.0 M aqueous solution of barium hydroxide. Calculate the number of milliequivalents of barium hydroxide.

Strategy: Find the n factor (Z) to convert molarity into normality. Number of milliequivatents is normality times volume of solution in millilitres

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12. Volume required for neutralization: What volume of 0.100 N HCl solution is required to netralize completely 50.0 mL of a $0.150N$ solution of $Ba(OH)_2$?

Strategy: We know three of the four variables in the relationship.

$mL_{acid} \times N_{acid} = mL_{base} \times N_{base}$

and so we solve for mL_{acid}

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13. Standardization of Acid Solution: Calculate the normality of a solution of H_2SO_4 if 40.0 mL of the solution reacts completely with 0.364 gram of Na_2CO_3. Strategy: Refer to the balanced equation. We are given the mass of Na_2CO_3, so we convert grams of Na_2SO_3 to equivalents of Na_2CO_3, then to equivalents of H_2SO_4, which let us calculate the normality of the H_2SO_4 solution.

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14. $25grams$ of a sample of ferrous sulphate is dissolved in dilute sulphuric acd. By adding water, its volume is made up to 1 litre.$25mL$ of this solution requries $20mL$ of $N/10KMnO_4$ solution for oxidation. Calculate the percentage of $FeSO_4.7H_2O$ in the sample.

Strategy: Percentage of $FeSO_4.7H_2O$

$$= \frac{\text{mass}_{\text{ferrous sulphate}}}{\text{mass of sample}} \times 100\,\%$$

To get the mass of ferrous suphate, we need to calculate equivalents of ferrous sulphate. By law of equivalrnce, the milli equivalents of $KMnO_4$ must be equal to the miliequivalents of ferrous sulphate. We can find the milliequivalents of $KMnO_4$ by taking the product of millilitres of solution and its normality.

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15. To a $25mL$ of H_2O_2 solution, excess of acidified solution of KI was added. The iodine liberated required $20mL$ of 0.3 N $Na_2S_2O_3$ solution. Calculate the volume strength of H_2O_2 solution.

Strategy : Volume strength of H_2O_2 solution is related to its normality by the following relation

Volume strength $(V) = 5.6 \times \text{Normality}(N)$

where, Normality $= \frac{(meq)H_2O_2}{V_{mL}}$

According to the law of equivalence

$(meq)_{Na_2S_2O_3} = (meq)_{I_2} = (meq)_{H_2O_2}$

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16. Calculate the molality of sugar $(C_{12}H_{22}O_{11})$ in an aqueous solution that is $5.30\,\%$ sugar by mass.

Strategy: To calculate molality, we must find the number of moles of sugar and mass of water (solvent). From the given mass percent, we can find the mass of sugar in $100g$ of solution. The difference will give us the mass of solute.

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17. What is the molality of a solution made by dissolving 3.42 g of table sugar (sucrose, $C_{12H_{22}O_{11}}$ in 50.0 mL of water?

Strategy: Molality is the number of moles of solute dissolved per kilogram of solvent. Thus, we must find how many moles are present in 3.42 g of sucrose and how many kilograms are contained in 50.0 mL of water.

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18. Converting molality to molarity: Ethylene glycol, $C_2H_4(OH)_2$ is a colourless liquid used as an automobile antifreeze. If the density at $20^\circ C$ of a $4.500m$ solution of ethylene glycon in water is $1.279gmL^{-1}$, what is the molarity of the solution? The molar mass of ethylene giycon is $62.00gmol^{-1}$.

Strategy: A $4.500m$ solution of ethylene glycol water contains

$4.500mol$ of glycol in every one kilogram of water. To find the solution's molarity, we must find the number of moles of solute per litre of solution. We can find volume fome the mass the mass of the solution by using density as a conversion factor.

So we cam take the mass of solution that contains $1kg$ of H_2O and use the density to convert this quantity of solution to volume.

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19. Converting molarity to mole fraction, mass percent and molality: A $0.750M$ solution of H_2SO_4 in water has a density of $1.049gmL^{-1}$ at $20^\circ C$. What is the concentration of this solution in (a) mole fraction, (b) mass percent. And (c) molality?

Strategy: To solve this problem, we need to know the mass of

solute as well as mass of solvent. There is $0.750 mol H_2SO_4$ per liter of solution. Let's pick an arbitrary amount of the solution that will make the calculations easy, say $1.00 L$. Consider $1 L(= 1000 ml)$ of solution and calculate its mass, using the density. We can then calculate the mass of H_2SO_4 and find the mass of H_2O by difference. Now we can calculate the mole fraction, mass precent and morality.

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20. Applying Henry's law: The solubility of pure $N_2(g)$ at $25^\circ C$ and 1 atm is $6.8 \times 10^{-4} mol L^{-1}$. If the partial pressure of $N_2(g)$ in the atmosphere is $0.78 atm$, calculate the concentration of $N_2(g)$ dissolved in water under atmospheric conditions.

Strategy: According to Henry's law, the solubility of a gas in water is KP. Thus, the first step is to calculate the quantity K.

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21. Applying Henry's law: At $1.0atm$ pressure, $24g$ of acetylene (C_2H_2) dissolves in $1L$ of acetone. If the partial pressure of acetylene is increased to $12atm$, what is the solubility in acetone?

Strategy: Let S_1 be the solubility of the gas at partical pressure P_1, and let S_2 be the solubility at partial pressure P_2. Writing Henry's law for both pressure, we have

$$S_1 = KP_1$$

$$S_2 = KP_2$$

Dividing the second equation by the first, we get

$$\frac{S_2}{S_1} = \frac{KP_2}{KP_1}$$

or $\frac{S_2}{S_1} = \frac{P_2}{P_1}$

we can use this relation to find the solubility at one pressure given the solubility at another.

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22. If N_2 gas is bubbled through water at $293K$, how many millimoles of N_2 gas would dissolve in $1L$ of water. Assume that N_2 exerts a partial pressure of 0.987 bar. Given that Henry law constant for N_2 at $293K$ is 76.48 kbar.

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23. Vapor pressure of a solution of Volatile components and composition of vapor: Consider a solution containing $738g$ of water and $253g$ of ethanol (C_2H_5OH) at $323K$. At this

temperature, the vapour pressure of pure ethanol is $0.292atm$ and the vapor pressure of pure water is $0.122atm$. Calculate the vapour pressure of the solution and mole fraction of every component in vapour phase.

Strategy: First calculate the moles and the mole fraction of each component in the liquid solution. Then apply Raoult's law to each of the two volatile components to calculate their partial pressures. The total vapour pressure is the sum of the partial vapour pressures of the components and the mole fraction of a components in a gaseous mixture equals the ratio of its partial pressure to the total pressure.

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24. How many grams of sucrose must be added to 320 g of water to lower the vapor pressure by $1.5mmHg$ at $25^{\circ}C$? The

vapor pressure of water is 23.8 mmHg and the molar mass of sucrose is $342 gmol^{-1}$.

Strategy: If the solute like sucrose is nonvolatile, the vapor pressure of the solution is entirely due to the vapor pressure of the solvent, $P_{\text{solution}} = P_{\text{solvent}}$. According to Raoult's law, $P_{\text{soln}} = P^0_{\text{solv}} \chi_{\text{solv}}$, which can be rearranged to the form $\chi_{\text{solv}} = P_{\text{soln}} / P^0_{\text{solv}}$. This equation can then be solved to find the number of moles of sucrose and hence the grams.

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25. At TK, the vapor pressure of pure benzene is $750 mmHg$ and that of a solution obtained by dissolving a nonvolatile solute is $700 mmHg$. Estimate the molarity of the solution.

Strategy: Using $2nd$ Raoult's law, find the mole fraction of ninvolatile solute. Through the knowledge of mole fraction, we

can find the moles of solute of solvent. Finally we can convert the moles of solvent into grams of solvent to calculate the molality.

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26. The vapor pressure of pure benzene at a certain temperature is $640 mmHg$. A nonvolatile nonelectrolyte solid weighing $2.0g$ is added to $39g$ of benzene. The vapor pressure of the solution is $600 mmHg$. What is the molecular mass of the solid substance.

Strategy: Use Equation (2.58) as the concept of colligative properties is based on dilute solution. The moleculsr mass of benzene is $78u$.

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27. Calculate the boiling point of a solution of $18.2g$ DDT $(C_{14}H_9Cl_5)$, a nonvolatile, non electrolytes substance, in 342 g of chloroform, $CHCl_3$. K_b for $CHCl_3$ is $3.63Kkgmol^{-1}$ and boiling point (bp) is $334.9K$.

Strategy: First find the increase in boiling point form the relationship. $\Delta T_b = K_b m$. The boiling point of solution is bigger by this amount than the normal boiling point of pure $CHCl_3$.

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28. Calculate the mass of glucose, $C_6H_{12}O_6$, which must be dissolved in $100gH_2O$ raise the boiling point of the water to $374.20K$.

Strategy: Combine the definition of molality given in Equation (2.39) with the definition of boiling point elevation given in

equation (2.64) to calculate number of moles of glucose. Next convert the number of moles into number of grams using the molar mass of glucose.

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29. when $1.80g$ of a nonvolatile solute is dissolved in $90g$ of benzene, the boiling point is raised to $354.11K$. If the boiling point of benzene is $353.23K$ and K_b for benzene is $2.53KKgmol^{-1}$, calculate the molecular mass of the solute.

Strategy: From the boiling point of the solution, calculate the boiling point elevation, ΔT_b, then solve the equation $\Delta T_b = K_b m$ for the molality m. Molality equals moles of solute divided by kilograms of solvent (benzene). By substituting values for molality and kilograms C_6H_6, we can solve for moles of solute. The molar mass of solute equals mass

of solute $(1.80g)$ divided by moles of solute. The molecular mass (in amu) has the same numerical value as molar mass in $gmol^{-1}$.

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30. Freezing Point Depression: when $15.0grams$ of ethyl alcohol (C_2H_5OH) is dissolved in $750grams$ of formic acid, the freezing point of the solution is $7.20^\circ C$. The freezing point of pure formic acid is $8.40^\circ C$ Evalulate K_f for formic acid.

Strategy: First calculate the molality and the depression of the freezing point. Then solve the equation $\Delta T_f = K_f m$ for K_f by substituting values for m and ΔT_f.

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31. The Rast method, one of the older techniques for finding the molecular mass of an unknown, measures the freezing point depression of solution in camphor. Camphor is used because its freezing point is very sensitive to added solution solute (It has highest K_f). A solution of $2.342g$ of an unknown substancein $49.88g$ of camphor freezes at $441.2K$. If K_f for camphor is $40.0Kgmol^{-1}$, calculate the molecular mass of the unknown.

Strategy: Find the molality of the solution from the freezing point of the pure camphor, the freezing point of the solution and the value of K_f by using the relationship $\Delta T_f = K_f m$. From the molality, find the no. of moles of solute in given mass of solvent. Finally find the molar mass (Melting point of pure camphar is 453.0 K)

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32. Calculating osmotic pressure: The fomula for low molecular mass starch is $(C_6H_{10}O_5)_n$, where n averages 2.00×10^2. When $0.798g$ of starch is dissolved in $100.0mL$ of water solution, what is the osmotic pressure at $25^\circ C$?

Strategy: Work out the molecular mass of $(C_6H_{10}O_5)_{200}$, and use it to obtain the molarity of the starch solution. Substitute into the formula for the osmotic pressure, $\pi = CRT$.

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33. Molecular mass from osmotic pressure: Pepsin is an enzyme present in the human digestive tract. A solution of a $0.500gram$ sample of purified pepsin in $30.0mL$ of aqueous solution exhibits an osmotic pressure of 892 torr at $27^\circ C$. Estimate the molecular mass of pepsin.

Strategy: An enzyme is a protein that acts as a biological

catalyst. Pepsin catalyzes the metabolic cleavage of amino acid chain (called peptide chains) in other proteins. To determine molecular mass, we must first find the number of moles (n) of pepsin represented by the $0.500g$ sample. We can do this by first rearranging the equation $\pi = CRT$ for osmotic pressure to find the molarity of the pepsin solution and then multiplying it by the volume of the solution to obtain the number of moles of pepsin.

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34. The osmotic pressure of $0.010M$ potassium iodide solution (KI) at $25^\circ C$ is $0.465atm$. Calculate the van't hoff factor for KI at this concentration.

Strategy: Use the modified equation (2.78) to account for the effect of dissociation of KI in water.

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35. Determining colligative properties of ionic solutions: Estimate the freezing point of a $0.010m$ aqueous solution of aluminium sulphate, $Al_2(SO_4)_3$. Assume the value of i based on the formula of the compound.

Strategy: Use the modified equation (2.77) to account for the effect of dissociation of $Al_2(SO_4)_3$ in water. The van't hoff factor, i, is equal to the number of ions furnished per formula unit (assuming $100\,\%$ dissociation.)

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36. A $0.01m$ aqueous solution of potassium ferricy freezes at $-0.062^\circ C$. What is the apparent percentage of dissociation? (K_3 for $H_2O - 1.86$).

Strategy: Potassium is $K_3\left[Fc(CN)_6\right]$. The appearent percentage of dissociation is degree of dissociation x 100%. To calculate degree of dissociation we must determine the value of van't hoff factor for which we need to work out calculated colligative property.

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37. Two grams of benzoic acid (C_6H_5COOH) dissolved in $25.0g$ of benzene shows a depression in freezing point equal to $1.62K$. Molal depression constant for benzene is $4.9Kkg^{-1}mol^{-1}$. What is the percentage association of acid if it forms dimer in solution?

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38. $0.6mL$ of acetic acid (CH_3COOH) having density $1.06gmL^{-1}$ is dissolved in $1L$ of water. The depression in freezing point observed for this strength of acid was $0.0205^\circ C$ .Calculate the Van't Hoff factor and dissociation constant of the acid. K_f for $H_2O = 1.86Kkg^{-1}\text{mol}^{-1}$)

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Follow Up Test 1

1. Which of the following statements is incorrect about a solution?

A. Solutions are always homogenous mixtures of two or more substances in a single phase

B. All gas mixtures are solutions

C. All liquid form solutions on mixing

D. Solid solutions are common in case of mixture of metals

Answer: 3

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2. Carat is a measure of diamonds and other gems, formerly 3.17 grains $(0.2053g)$, now standarized as the international carat g is -

A. `0.200

B. `0.250

C. `0.3175

D. `0.333

Answer: 1

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3. 18 carat gold contains 18 parts in 24 parts and has a fineness of

A. `0.75

B. `7.5

C. `75

D. `750

Answer: 4

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4. $CuSO_4.5H_2O$, a hydrated salt, is a coordination compound of Cu^{2+} ions with H_2O molecules as the ligands. It can also be regarded as a solution of

A. a solid in a liquid

B. a liquid in a solid

C. a solid in a solid

D. a liquid in a liquid

Answer: 2

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5. Which of the following represents a metastable system?

A. Supersaturated solution

B. Saturated solution

C. unsaturated solution

D. Concentrated solution

Answer: 1

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Follow Up Test 2

1. Which of the following fluorides is soluble in water?

A. SrF_2

B. CaF

C. MgF_2

D. BeF_2

Answer: 4

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2. Which of the following sulphates in moderately soluble in water?

A. Ag_2SO_4

B. $HgSO_4$

C. $PbSO_4$

D. $BaSO$

Answer: 1

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3. Which of the following chlorides is soluble in hot water?

A. $AgCl$

B. $PbCl$

C. Hg_2Cl_2

D. All of these

Answer: 2

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4. Which of the following oxides is soluble in water

A. Li_2O

B. Na_O

C. K_2O

D. All of these

Answer: 4

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5. Which of the following bromides is moderately soluble?

A. $HgBr_2$

B. $AgBr$

C. Hg_2Br_2

D. $PbBr_2$

Answer: 1

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6. Which of the following compounds are moderately soluble?

A. $AgNO_2$

B. $KClO_4$

C. CH_COOAg

D. All of these

Answer: 4

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7. Ionic solutes that do not react with the solvent undergo

A. solvolysis

B. solvation

C. hydration

D. hydrolysis

Answer: 2

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8. The ease of dissolution of a solute depends on change in

A. internal energy

B. enthalpy

C. entropy

D. both (2) and (3)

Answer: 4

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9. Most dissolving processes are accompanied by an overall increase in disorder. One of the few exceptions is the disolution of

A. NaI

B. NaCl

C. NaF

D. NaBr

Answer: 3

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10. A good illustration of the increase in dissorder as a driving force in the solution process is provided by the mixing of

A. liquids in liquids

B. solids in liquids

C. two non reacting gases

D. solids in solids

Answer: 3

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11. The value of the heat of solution for a substance result form an interplay of

A. solvent-solvent interactions

B. solute-solute interactions

C. solvent-solute interactions

D. All of these

Answer: 4

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12. Which of the following compounds is used in instant cold pack to injuries of athletes?

A. $CaCl_2$

B. NH_4NO_3

C. $MgSO_4$

D. Both (1) and (3)

Answer: 2

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Follow Up Test 3

1. Ions are stabilized in solution by hydration, which involves

A. ion-dipole interaction

B. ion-induced dipole interaction

C. ion-instaneous dipolw interaction

D. All of these

Answer: 1

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2. The solubility of ionic compound in nonpolar solvents can be drastically increased by using a class of compounds called

A. crown alcohols

B. crown ethers

C. crown aldehydes

D. crown acids

Answer: 2

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3. Which of the following ionic compounds has negative enthalpy of solution?

A. NH_4NO_3

B. NH_4Cl

C. KCl

D. $CaCl_2$

Answer: 4

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4. The attractive forces between molecules of a molecular crystal are

A. relatively weak dipole-dipole intractions

B. relatively weak dispersion forces

C. strong hydrogen bonding

D. any of these

Answer: 4

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5. Magnitude of crystal lattice enthalpies generally

A. increase with increasing charge and size of ions

B. increase with decreasing charge and size of ions

C. increase with increasing charge and decreasing size of ions

D. increase with decreasing charge anf increasing size of ions

Answer: 3

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Follow Up Test 4

1. We can make only qualitative predictions about the solubility of one substance in another. The best rule for predictions is that like dissolves like, meaning that

A. a solute will dissolve in any solvent that is chemically similar

B. a solute tends to dissolve in solvents that are chemically similar to it

C. a solute will dissolve in any solvent is phusically as well as chemically similar

D. a solute tends to dissolve in solvents that are physically as well as chemically similar to it

Answer: 2

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2. Which of the following is correct

I Water and octane are essentially in one another

II Water acetone are miscible

III $LiCl$ is highly soluble in water, less solube in acetone and does not dissolve at all octane

IV Naphthalene is virtually insoluble in water

A. I, II, III, IV

B. I, II, III

C. II, III

D. III, IV

Answer: 1

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3. Glucose, an organic compound, dissolves in water because of the

A. dipole-dipole interactions

B. dispersion forces

C. hydrogen bonding

D. ion-dipole interactions

Answer: 3

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4. The process in which dissolved solute comes out of solution and forms crystals is called

A. crystallization

B. precipitation

C. peptisation

D. any of these

Answer: 1

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5. Which of the following solutions in not in equilibrium with the solid substance?

A. Saturated solution

B. Supersaturated solution

C. Unsaturated solution

D. both (2) and (3)

Answer: 4

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6. Supersaturated solutions are prepared by dissolving those solutes whose solubilities

A. decrease at lower temperatures

B. increase at higher temperatures

C. do not change with temperatures

D. increase at lower temperatures

Answer: 2

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Follow Up Test 5

1. The concentration of solutions is sometimes expressed in terms of percentage of mass or volume precent in total mass or volume of the solution. When nothing is mentioned, it satnds for

A. mass percent

B. volume percent

C. mass by volume percent

D. volume by mass percent

Answer: 1

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2. The mole fraction of sugar $(C_{12}H_{22}O_{11})$ in an aqueous solution that is $5.30\ \%$ sugar by mass is

A. 0.99706

B. 0.00294

C. 0.79906

D. 0.20094

Answer: 2

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3. What volume of diethly ether must be mixed with $0.125L$ water to form a solution in which the volume precent of the diethyl ether is 3.2% ?

A. $0.0041L$

B. $0.0037L$

C. $0.0027L$

D. $0.0078L$

Answer: 1

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4. One volume precent measurement that appears frequently in everyday life is proof, which is equal to the volume percent of enthanol in water.

A. thrice

B. half

C. twice

D. one-third

Answer: 3

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5. A solution of ethanol in water is 10% by volume. If the solution and pure ethanol have densities of $0.9866gmL^{-1}$ and $0.785mL^{-1}$ respectively, the mass precent will be

A. 0.0957

B. 0.0759

C. 0.0579

D. 7.95%`

Answer: 4

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6. In a solution of ethanol in water, the mole fraction of ethanol is 0.05 and the density of solution is $1.94 gmL^{-1}$. The molarity of the solution is ___ M

A. 9.8

B. 5

C. 4.7

D. 2.5

Answer: 2

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7. One litre of milk weight $1.032kg$. If it contains butter fat (density $= 800kgm^{-3}$) to the extent of 4% by volume, then the density of "skimmed milk" will be __ kgm^{-3}

A. 1240

B. 1402

C. 1042

D. 2104

Answer: 3

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8. A $5.00g$ sample of vinegar is titrated with $0.108MNaOH$. If the vinger requires $39.1mL$ of the $NaOH$ for complete reaction, the mass percentage of acetic acid (CH_3CO_2H) in the vinegar is

A. 0.0605

B. 0.0407

C. 0.0786

D. 0.0506

Answer: 4

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9. The concentrations of solutions are also expressed in Demal units. One demal unit represents one mole of solute present in one litre of the solution at

A. $25^\circ C$

B. $37^\circ C$

C. $0^\circ C$

D. any specified temperature

Answer: 3

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Follow Up Test 6

1. Which of the following expressions is correct?

A. $N = \frac{meq}{L}$

B. $N = \frac{meq}{mL}$

C. $N = \frac{mmol}{\text{molar mass}}$

D. $N = \frac{meq}{mg/meq}$

Answer: 2

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2. If m_1 and m_2 are masses of two reactants in any reaction, having their gram equivalent masses E_1 and E_2 respectively, which of the following equatios represents the law of equivence correctly?

A. $m_{E\ \_} = m_2 E_2$

B. $m_1 m_1 = E_1 E$

C. $m_1 E_2 = m_2 E_1$

D. $\sqrt{m_1 / E_1} = \sqrt{m_2 / E_2}$

Answer: 3

Watch Video Solution

3. Which of the following gas minimum equivalent volume?

A. one equivalent of hydrogen

B. one equivalent of oxygen

C. one equivalent of nitrogen

D. all have volumes

Answer: 3

Watch Video Solution

4. Consider the following equation

$$Ca(OH)_2 + H_3PO_4 \rightarrow CaHPO_4 + 2H_2O$$

The equivalent mass of phosphoric acid (H_3PO_4) is

A. $\frac{\text{Formula mass}}{2}$

B. $\frac{\text{Formula mass}}{3}$

C. $\frac{\text{Formula mass}}{1}$

D. $\frac{\text{Formula mass}}{1.5}$

Answer: 1

Watch Video Solution

5. If equivalent mass of suiphur in SCl_2 is $16u$, then equivalent mass of S in D_2Cl_2 will be

A. 16

B. 64

C. 8

D. 32

Answer: 4

Watch Video Solution

6. The equivalent mass of $MnSO_4$ is half its molecular mass when it is converted to

A. MnO_4^{2-}

B. Mn_{O_3}

C. MnO_2

D. MnO_1^-

Answer: 3

Watch Video Solution

7. Which of following indicators is used in the titration of oxalic acid with sodium hydroxide solution?

A. Phenolpthein

B. Methyl red

C. Methyl orange

D. Bromophenol blue

Answer: 1

Watch Video Solution

8. Which of the following is a primary standard substance?

A. H_2SO_4

B. $K_Cr_{O_7}$

C. $KBrO$

D. KOH

Answer: 2

Watch Video Solution

9. Which of the following is a secondary standard substance?

A. $Na_2CO_3.10H_2O$

B. $FeSO_4.(NH_4)_SO_4.6H_2O$

C. $KMnO_4$

D. $Na_2S_2O_3.5H_2O$

Answer: 3

View Text Solution

10. Which of the following indicators is used in the titration of $KMnO_4$ against sodium oxalate in an acidic medium?

A. Starch

B. Phenolphthalein

C. Eriochrome black T

D. No indicator is required

Answer: 4

Watch Video Solution

11. Which of the following indicators is used in the titration of $Na_2S_2O_3$ against $CuSO_4$ solution?

A. Starch

B. Barium diphenylamine sulphonate

C. Cresol red

D. Iodine solution

Answer: 1

View Text Solution

12. It $100mL$ of $0.6NH_2SO_4$ and $200mL$ of $0.3NHCl$ are mixed together, the normality of the resulting solution will be

A. $\frac{3}{5}$

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

C. $\frac{2}{5}$

D. $\frac{5}{3}$

Answer: 3

Watch Video Solution

13. A sample of $Na_2CO_3.H_2O$ weighing $0.62g$ is added to $100mL$ of $0.1NH_2SO_4$. The resulting solution will be

A. acidic

B. basic

C. amphoteric

D. neutral

Answer: 4

Watch Video Solution

Follow Up Test 7

1. A molal solution is one that contains 1 mol of a solute dissolved in

A. 22.4 L of the solution

B. 1 L of the solution

C. 1 L of the solvent

D. 1000 g of the solvent

Answer: 4

Watch Video Solution

2. In which mode of expression, the concentration of a solution remains independent of temperature?

A. Molality

B. Molarity

C. Formality

D. Normality

Answer: 1

Watch Video Solution

3. The molality of a solute in a solvent (molar mass, $20 g mol^{-1}$) is $0.1 mol kg^{-1}$.

What is the mole fraction of the solute?

A. $\frac{0.1}{50}$

B. $\frac{0.1}{50.1}$

C. $\frac{0.1}{20 + 0.1}$

D. $\frac{0.1}{20}$

Answer: 2

Watch Video Solution

4. If the density of a 1-ltre solution of $98\ \%\ H_2SO_4(wt.\ /vol.\ )$ is $1.88gmol^{-1}$, the molality of the solution will be

A. 13.13

B. 10.10

C. `11.11

D. 12.12

Answer: 3

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5. Calculation the molarity and molality of a solution made by mixing equal volumes of $35\ \%$ by mass of H_2SO_4 (density= $1.22gmL^{-1}$) and $65\ \%$ by H_2SO_4 (density $= 1.62gmL^{-1}$).

A. $8.66M$, $13.3m$

B. $5.77M$, $10.1m$

C. $9.86M$, $12.2m$

D. $7.55M$, $11.1m$

Answer: 4

Watch Video Solution

Follow Up Test 8

1. The solubility of most ionic solids increases with increasing temperature. However, there are many exceptions to this rule. Which of the following salts shows a decrease in the solubility as the temperature goes up?

A. KNO_3

B. $CuSO_4$

C. $NaCl$

D. $Ce_2(SeO)_3$

Answer: 4

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2. Solubility of a gas in a liquid solvent increases with

A. decrease of pressure as well as temperature

B. increase of pressure and decrease of temperature

C. decrease of perssure and increase of temperature

D. increase of pressure as well as temperrature

Answer: 2

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

A. 0. 762 bar

B. 0.895 bar

C. 0.653 bar

D. 0.540 bar

Answer: 1

Watch Video Solution

4. Henry's law constant for CO_2 in water is $1.67 \times 10^8 Pa$ at $298K$. Calculate the quantity of CO_2 in $500mL$ of soda water when packed under $2.5atm CO_2$ pressure at $298K$.

A. $2.786g$

B. $0.9273g$

C. $1.854g$

D. $3.478g$

Answer: 3

Watch Video Solution

Follow Up Test 9

1. Which of the following behaviors is not true for an ideal solution?

A. Plot of $P_{\text{total}} versus \chi$ is nonlinear

B. Plot of $P_{\text{total}} versus \chi_1 (\text{ or } X_{\square})$ is linear

C. Plot of $P_1 versus \chi_1$ is linear

D. Plot of $P_2 versus \chi_2$ is linear

Answer: 1

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2. Which of the following behaviours is true for an ideal binary liquid solution?

A. Plot of $1/P_{\text{total}} versus Y_A (\text{ or } Y_B)$ is nonlinear

B. Plot of $P_{\text{total}} versus Y_A$ is linear

C. Plot of $P_{\text{total}} versus Y_B$ is linear

D. Plot of $1/P_{\text{total}} versus Y_A(\text{ or } Y_B)$ is linear

Answer: 4

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3. For an ideal solution with $P_A^0 > P_B^0$, which of the following is true?

A. $(\chi_A)_{\text{liquid}} < (\chi_A)_{\text{vapor}}$

B. $(\chi_A)_{\text{liquid}} > (\chi_A)_{\text{vapor}}$

C. $(\chi_A)_{\text{liquid}} = (\chi_A)_{\text{vapor}}$

D. $(\chi_A)_{\text{liquid}}$ and $(\chi_A)_{\text{vapor}}$ cannot be correlated witheach other

Answer: 1

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4. The vapor pressure 'P' in mmHg of a binary solution of two volatile components A and B at a certain temperature is represented by the equation

$P = 245 - 101\chi$

where χ is the mole fraction of component A. The vapor pressures of the pure components A and B are___ respectively

A. $245mmHg, 144mmHg$

B. $144mmHg, 245mmHg$

C. $346mmHg, 144mmHg$

D. $144mmHg, 346mmHg$

Answer: 2

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5. The vapor pressure of water is $23.8mm$ of Hg at $25^\circ C$. If $28.5g$ of sucrose, $C_{12}H_{22}O_{11}$ (molecular mass=$342u$) is dissolved in $100g$ of H_2O, then the vapor pressure of the resulting solution will be ___ mmHg

A. 32.5

B. 20.6

C. 23.2

D. 19.8

Answer: 3

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

A. $0.7432m$

B. $0.8976m$

C. $0.6753m$

D. $0.9811m$

Answer: 1

Watch Video Solution

7. The molal lowering of vapor pressure for H_2O at $100^\circ C$ is

A. $20.67 mmHg$

B. $13.45 mmHg$

C. $9.78 mmHg$

D. $30.02 mmHg$

Answer: 2

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8. Benzene and toluene form an ideal solution. The vapor pressures of pure benzene and pure toluene are $75 mmHg$ and $25 mmHg$ at $20^\circ C$. If the mole fractions of benzene and toluene in vapor phase are 0.63 and 0.37 respectively, then the vapor pressure of the ideal mixture will be

A. $49.78mmHg$

B. $78.67mmHg$

C. $58.76mmHg$

D. $39.68mmHg$

Answer: 4

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9. At $300K$, the vapour pressure of an ideal solution containing one mole of A and 3 mole of B is $550mm$ of Hg. At the same temperature, if one mole of B is added to this solution, the vapour pressure of solution increases by $10mm$ of Hg. Calculate the $V.P.$ of A and B in their pure state.

A. $300Hg$

B. $600Hg$

C. $400Hg$

D. $500Hg$

Answer: 3

Watch Video Solution

Follow Up Test 10

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

A. $\Delta_{mix}V = 0$ and $\Delta_{mix}S = 0$

B. $\Delta_{mix}H > 0$ and $\Delta_{mix}S > 0$

C. $\Delta_{mix}V = 0$ and $\Delta_{mix}S > 0$

D. $\Delta_{mix} H = 0$ and $\Delta_{mix} > 0$

Answer: 3

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2. Positive deviation from Raoult's law are exhibited by binary liquid mixtures

A. in which the molecules tend to attract each other and hence their escape into the vapor phase is retarted.

B. in which the molecules repel each other and hence enter the vapor phase more readly than do the molecules of the pure liquids.

C. In which the molecules attract each other and hence enter the vapour phase more readly than do the molecules of the pure liquids.

D. In which the molecules repel each other and hence do not enter the vapor phase as the molecules of the pure liquids do.

Answer: 2

Watch Video Solution

3. Which of the following paris will show a negative deviation from Raoult's law?

A. Ethanol and trichloromathane

B. Pyridine and ethanoic acid

C. Heptane and tetrachloromethane

D. both (1) and (2)

Answer: 4

Watch Video Solution

4. Which one of the following is not an ideal solution?

A. A mixture of C_2H_5I and C_2H_5OH

B. A mixture of C_6H_6 and $C_6H_5CH_3$

C. A mixture of C_2H_5Cl and C_2H_5Br

D. A mixture of C_2H_5Br and C_2H_5I

Answer: 1

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5. An azeotropic solution of two liquids has a boiling point higher than either of the two when it

A. is saturated

B. shows no deviation from Raoult's law

C. shows a negative deviation from Raoult's law

D. shows a positive deviation from Raoult's law

Answer: 3

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6. An azeotropic mixture of HCl and water has

A. $63\ \%\ HCl(w/v)$

B. $20.2\ \%\ HCl(w/w)$

C. $84\ \%\ HCl(w/v)$

D. $22.2\ \%\ HCl(w/w)$

Answer: 2

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7. Pure water boils at $373.15K$ and nitric acid boils at $359.15K$. An azeotropic mixture of H_2O and HNO_3 boils at $393.15K$. Distilling the azeotropic mixture will cause

A. pure water to distil over first

B. pure nitric acid to distil over first

C. one of them to distil over with a small amount of the other.

D. both of them to distil over in the same composition as that of the mixture being distilled.

Answer: 4

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Follow Up Test 11

1. Colligative properties of a dilute solution are properties that

A. do not depend on the number of moles of the solute but depend on the number of moles of the solvent

B. depend both on the number of moles of the solute and on the nature of the solute

C. depend on the number of moles of the solute and not on the nature of the solute

D. depend on the nature of solute as well as nature of solvent

Answer: 3

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2. Which one of the following is not a colligative property?

A. Osmotic pressure

B. Critical temperature

C. Elevation in boiling point of solvent

D. Depression of freezing point of solvent

Answer: 2

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3. The vapour pressure of pure benzene at a certain temperature is 0.850 bar. A non-volatile, non-electrolyte solid weighting $0.5g$ when added to $39.0g$ of benzene (molar mass $78gmol^{-1}$). The vapour pressure of the solution then is 0.845 bar. What is the molar mass of the solid substance?

A. 170 amu

B. 160 amu

C. 120 amu

D. 190 amu

Answer: 1

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4. Ebullioscopic constant K_b corresponds to the change in boiling point produced by a one ___ ideal solution of a nonvolatile nonelectrilyte.

A. molar

B. molal

C. normal

D. formal

Answer: 2

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5. If the mass of a nonvolatil, nonelectrolyte dissolved in a solvent is doubled but that of solvent is quadrupled, the elevation in boiling point of the solvent will be

A. unchanged

B. doubled

C. halved

D. quadrupled

Answer: 3

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Follow Up Test 12

1. A solution contains $0.1mol$ of acetamide $[CH_3CONH_2]$ in $1dm^3$ of glacial acetic acid. When the solution is cooled, the first crystals that appeared at freezing point contain the molecules of

A. both acetamide and acetic acid

B. acetic acid only

C. acetamide only

D. either acetamide or acetic depending upon the conditions of the experiment

Answer: 2

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2. Ethylene glyed $(EG), CH_2(OH)CH_2(OH)$, is a common automobile antifreeze. It is water solube and fairly nonvolatile $(bp197^\circ C)$. The freezing point of a solution containing $651g$ of this substance in $2505g$ of water is

A. $-7.79^\circ C$

B. $7.79^\circ C$

C. $9.77^\circ C$

D. $-9.77^\circ C$

Answer: 1

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3. Molal freezing point depression constant (K_f) may be calculated from the following thermodynamically derived equation

A. $K_f = \dfrac{RT_f^2 \Delta H_{fus}}{1000}$

B. $K_f = \dfrac{RT_f}{1000 \Delta H_{fus}}$

C. $K_f = \dfrac{RT_f^2}{1000 L_{fus}}$

D. $K_f = \dfrac{T_b^2}{1000 L_{vap}}$

Answer: 3

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

A. only solute molecules through it

B. only solvent molecules through it

C. both solute and solvent molecules through it

D. either solute or sovent molecules through it

Answer: 1

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5. Which one of the following statements is incorrect?

A. Osmotic pressure is directly proportional to the temperature of the solution

B. Osmotic pressure is the pressure applied on the solution to prevent the entry of the solvent into it through the

semipermeable membrane.

C. Osmotic pressure is the hydrostatic pressure of the liquid column set up due to osmosis.

D. During osmosis, the flow of solvent is only form dilute solution to concentrated solution.

Answer: 4

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Follow Up Test 13

1. Which of the following molecules is associated in benzene solvent?

A. $C_6H_5CH_3$

B. $B(OH)_3$

C. $C_6H_5CO_2H$

D. $(COOH)_2$

Answer: 3

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2. From a measurement of the freezing point depression of benzene, the molecular weight of acetic acid in a benzene solution was determined to be 100. The percentage association of acetic acid is

A. $100\ \%$

B. $79\ \%$

C. $93\ \%$

D. $83\ \%$

Answer: 2

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3. The degree of association (α) is given by the expression

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

B. $\alpha = \dfrac{i-1}{n-1}$

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

D. $\alpha = \dfrac{1-i}{n-1}$

Answer: 3

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4. The van't hoff factor can be expressed as the ratio of

(i) normal molar mass to that of abnormal molar mass

(ii) Observed colligative to that of calculated colligative property

(iii) Total number of moles of particles after association// dissociation to that of total number of moles of particles before association//dissociation

(iv) Observed molality to that of calculate molality

A. (i), (ii), (iii)

B. (i), (ii), (iii), (iv)

C. (ii), (iv)

D. (i). (ii)

Answer: 1

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5. For a solute undergoing association in a solvent, the van't hoff factor

A. is always greater than one

B. has zero value

C. is always less than one

D. has negative value

Answer: 3

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6. The ratio of the value of any colligative property for a $K_4[Fe(CN)_6]$ solution (assuming complete dissociation) to

that of the corresponding property for a sucrose solution is

A. 6

B. 11

C. 4

D. 5

Answer: 4

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7. Among the following, the solution which shows the highest osmotic pressure is

A. $0.04MFeSO_4.(NH_4)_2SO_4.H_2O$

B. $0.05MK_4\left[Fe(CN)_6\right]$

C. $0.05Mk_{Cu(CN)_4}$

D. $0.05MAl(NO_3)_3$

Answer: 2

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8. When mercuric iodide in added to the aqueous solution of potassium iodode

A. freezing point is lowered

B. freezing point is raised

C. boiling point is lowered

D. both (2) and (3)

Answer: 4

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9. Which of the following $0.1M$ aqueous solutions will have the lowest freezing point?

A. Sodium chloride

B. Potassium sulphate

C. Glucose

D. Urea

Answer: 2

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10. The boiling point, among the following equimolal aqueous solutions, will be lowest for

A. $La(NO_3)_3$

B. $Ca(NO_3)$

C. $C_6H_{12}O_6$

D. $C_6H_5NH_3Cl$

Answer: 3

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11. When $0.004M Na_2SO_4$ is an isotonic acid with $0.01M$ glucose, the degree of dissociation of Na_2SO_4 is

A. $75\ \%$

B. 85 %

C. 50 %

D. 25 %

Answer: 1

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Question Bank Building The Knowledge

1. The simplest example of a molecular solution is

A. one gas dissolved in another gas

B. one liquid dissolved in another liquid

C. one solid dissolved in another solid

D. all of these

Answer: 1

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2. A liter of sea water (which weighs $1030g$) contains about $6 \times 10^{-3}g$ of dissolved oxygen (O_2), such a small concentration can be exoressed as ___ ppm of sea waer

A. 5.8

B. 4.8

C. 6.8

D. 3.8

Answer: 1

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3. Aqeous solution of which acid is called "stomach acid"?

A. Acetic acid

B. Oxalic acid

C. Hydrochloric acid

D. Sulphuric acid

Answer: 3

Watch Video Solution

4. According to Raoult's law, relative lowering of vopour pressure of a solvent is equal to

A. moles of solute

B. mole fraction of solute

C. moles of solvent

D. mole fraction of solvent

Answer: 2

Watch Video Solution

5. Which one of the following salts will have the same value of van't hoff factor (i) as that of $K_4\left[Fe(CN)_6\right]$?

A. Na_2SO_4

B. $Al(NO_3)_3$

C. $NaCl$

D. $Al(SO)_3$

Answer: 2

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6. If $0.1M$ solution of glucose and $0.1M$ solution of urea are placed on two sides of the semipermeable membrane to equal heights, then it will be be correct to say that

A. water will flow from urea solution to glucose

B. urea will flow toward glucose solution

C. glucose will flow toward urea solution

D. there will be no net movement

Answer: 4

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7. Which of the following is a colligative property?

A. osmotic property

B. freezing points

C. boiling points

D. vapour pressure

Answer: 1

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8. The solubility of a solute in a solvent (that is, the extent of the mixing of the solute and solvent species) depends on

A. the natural tendency for the solute and solvent species to mix

B. the natural tendency for a system to have the lowest energy possible

C. a balance between (1) and (2)

D. neither (1) and (2)

Answer: 3

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9. Which of the following alcohols is not is not miscible in water?

A. Methnol

B. Ethanol

C. Propan-l-ol

D. Butan-l-ol

Answer: 4

Watch Video Solution

10. The normal procedure for obtaining crystals of many compounds is to use a ___ solution

A. supersaturated

B. Saturated solution

C. unsaturated

D. either (2) or (3)

Answer: 1

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11. If $100mL$ of $0.100MHCl$ solution and $100mL$ of $0.100MNaOH$ are mixed, what is the molarity of the salt in the resulting sollution? Assuming that the volumes are additive.

A. $0.0100M$

B. $0.0500M$

C. $0.0033M$

D. $0.0025M$

Answer: 2

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12. Molarity of K^+ ions in $0.33M$ potassium sulphate aqueous solution is

A. less than 0.33 M

B. equal to 0.33 M

C. more than 0.33 M

D. $0.66M$

Answer: 4

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13. In the laboratory we often measure the volume of one solution that is required to react with a given volume of

another solution of known concentration. Then we calculate the concentration of the first solution. The process is called

A. neutralization

B. precipitation

C. titration

D. combination

Answer: 3

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14. Solutions of accurately known concentrations are called

A. standard solutions

B. normal solutions

C. molar solution

D. perfect solutions

Answer: 1

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15. A solution is 0.150 mole fraction glucose $(C_6H_{12}O_6)$ and 0.850 mole fraction water (H_2O). The molality of glucose in the solution is

A. $9.80m$

B. $8.90m$

C. $7.86m$

D. $6.87m$

Answer: 1

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16. When an aqueous solution containing a nonvolatile solute freezes,

A. the vapor pressure of the solvent becomes abnormally high

B. it is the water that solidifies first

C. it is the solute that solidifies first

D. the solvent and the solute solidify at the same time

Answer: 2

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17. The main ingredient of automobile antifreeze mixtures is

A. $CH_2(OH)CH(OH)CH_2(OH)$

B. $C(CH_OH)_4$

C. $CH_2(OH)CH(OH)CHO$

D. $CH_2(OH)CH_2(OH)$

Answer: 4

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18. The vapor pressure of acetone at $20^\circ C$ is 185 torr. When $1.2g$ of a non-volatile solute was dissolved in $100g$ of acetone at $20^\circ C$, it vapour pressure was 183 torr. The molor mass $\left(gmol^{-1}\right)$ of solute is:

A. 64

B. 128

C. 488

D. 32

Answer: 1

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19. Consider separate solutions of $0.500MC_2H_5OH(aq)$, $0.100MMg_3(PO_4)(aq)$,$0.250MKBr(aq)$, and $0.125MNa_3PO_4(aq)$ at $25^\circ C$. Which statement is true about these solutions, assuming all salts to be strong electrolytes?

A. $0.125MNa_3PO_4(aq)$ has the highest osmotic pressure

B. $0.500MC_{H_5}OH(aq)$ has the highest osmotic pressure

C. they all have the same osmotic pressure

D. $0.100MMg_3(PO)_2(aq)$ has the highest osmotic pressure.

Answer: 3

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20. A compound H_2X with molar mass of $80g$ is dissolved in a solvent having density of $0.4gmL^{-1}$. Assuming no change in volume upon dissolution, the molality of a 3.2 molar solution is

A. 9

B. 6

C. 5

D. 8

Answer: 4

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21. The molarity of a solution obtained by mixing $750mL$ of $0.5(M)HCl$ with $250mL$ of $2(M)HCl$ will be:

A. $1.00M$

B. $1.75M$

C. $0.975M$

D. $0.875M$

Answer: 4

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22. The degree of dissociation (α) of a weak electrolyte, A_xB_y is related to van't Hoff's factor (i) by the expression:

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

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

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

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

Answer: 1

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23. Ethylene glycol is used as an antifreeze in a cold cliamate Mass of ethylene glycol which should be added to 4 kg for water to prevent it from freezing at $-6^{\circ}C$ will be (K_f for

water $=1.86 K kg mol^{-1}$ and molar mass of ethylene glycol $= 62 g mol^{-1}$)

A. $400 g$

B. $800 g$

C. $304.60 g$

D. $204.30 g$

Answer: 2

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

A. 17.675 mmHg

B. $15.750 mmHg$

C. $16.500 mmHg$

D. $17.325 mmHg$

Answer: 4

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

a. $50 mol\ \%$, b.$52 mol\ \%$,c.$34 mol\ \%$,d.$48 mol\ \%$

A. 48 mol precent

B. 52 mol precent

C. 50 mol precent

D. 34 mol precent

Answer: 3

Watch Video Solution

26. $25mL$ of a solution of barium hydroxide on titration with 0.1molar solution of hydrochloric acid give a titre value of $35mL$. The molarity of barium hydroxide is:

A. 0.07

B. 0.14

C. 0.28

D. 0.35

Answer: 1

Watch Video Solution

27. To neutralize completely $20mL$ of $0.1M$ aqueous solution of phosphorus (H_3PO_3) acid the volume of $0.1M$ aqueous KOH solution required is:

A. $10mL$

B. $20mL$

C. $40mL$

D. $60mL$

Answer: 3

Watch Video Solution

28. How many grams of a dibasic acid (mol. Mass 200) should be present in $100mL$ of the aqueous solution to give $0.1N$ solution.

A. $1g$

B. $20g$

C. $10g$

D. $2g$

Answer: 1

Watch Video Solution

29. The vapour pressure of benzene at a certain temperature is $640mmHg$. A non-volatile and non-electrolyte soild weighing

$2.175g$ is added to $39.08g$ of benzene. If the vapour pressure of the solution is $6mmHg$. What is the molecular mass of solid substance?

A. $79.82u$

B. $69.40u$

C. $59.60u$

D. $49.50u$

Answer: 2

Watch Video Solution

30. If solution containing $0.15g$ of solute dissolved in $15g$ of solvent boils at a temperature higher by $0.216^{\circ}C$ than that of

pure solvent, the molecular mass of the substance is $(K_b = 2.16^\circ C)$

A. $10u$

B. $1.01u$

C. $10.1u$

D. $100u$

Answer: 4

Watch Video Solution

31. The vapour pressure of a solvent decreased by $10mm$ of Hg when a non-volatile solute was added to the solvent. The mole fraction of solute is 0.2, what would be the mole fraction of solvent if the decrease in vapour pressure is $20mm$ of Hg.

A. 0.2

B. 0.6

C. 0.4

D. 0.8

Answer: 2

Watch Video Solution

32. The volume strength of $1.5NH_2O_2$ solution is

A. 8.4

B. 4.8

C. 8.8

D. 5.2

Answer: 1

Watch Video Solution

33. Which of the following $0.10M$ aqueous solution will have the lowest freezing point?

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

B. $C_5H_{10}O_8$

C. $Al_2(SO_4)$

D. KI

Answer: 3

Watch Video Solution

34. The vapour pressure at a given temperature of an ideal solution containing $0.2mol$ of non-volatile solute and $0.8mol$ of a solvent is $60mm$ of Hg. The vapour pressure of the pure solvent at the same temperature will be

A. $120mmHg$

B. $60mmHg$

C. $150mmHg$

D. $75mmHg$

Answer: 3

Watch Video Solution

35. At$25^\circ C$the highest osmotic pressure is exhibited by $0.1M$ solution of

A. Urea

B. glucose

C. $CaCl_2$

D. KCl

Answer: 3

Watch Video Solution

36. Which of the following modes of expressing concentration is not independent of temperature?

(I) Normality

(II) Formality

(III) Molarity

A. I, II, III, IV

B. I, II, IV

C. I, II

D. I, III, IV

Answer: 2

Watch Video Solution

37. Blood cells retain their normal shape in solution which are

A. hypertonic to blood

B. isotonic to blood

C. hypotonic to blood

D. isoelectronic to blood

Answer: 2

Watch Video Solution

38. Which of the following aqueous solution has minium freezing point?

A. $0.005mMgSO_4$

B. $0.005mC_{H\ \_}(5)OH$

C. $0.00mMgI_2$

D. $0.01mNaCl$

Answer: 4

Watch Video Solution

39. The relative of vapour pressure is equal to the ratio between the number of

A. solvent molecules to the total number of ions of the solute

B. solvent molecules to the total molecules in the solution

C. solute molecules to the molecular in the solution

D. solute molecules to the solvent molecules

Answer: 2

Watch Video Solution

40. All form ideal solution except

A. C_2H_5I and C_2H_5OH

B. C_6H_5Cl and C_6H_5Br

C. C_2H_5Cl and C_2H_5I

D. C_6H_6 and C_6H_6 and $C_6H_5Ch_3$

Answer: 1

Watch Video Solution

41. An ideal solution is formed when its components same

A. high solubility

B. no enthalpy change on mixing

C. no volume change on mixing

D. baton (2) and (3)

Answer: 4

Watch Video Solution

42. If $100mL$ of $1.00MHCl$ and $100mL$ of $0.80MNaOH$ solution are mixed, the molarity of Cl^- ions in the resulting solutions will be

A. $0.10M$

B. $0.50M$

C. $0.40M$

D. $0.30M$

Answer: 2

Watch Video Solution

43. What volume of $0.00300MHcl$ solution would just neutralize $30.0mL$ of $0.00100MCa(OH)_2$ solution?

A. $20.0mL$

B. $30.0mL$

C. $78.60mL$

D. $25.22mL$

Answer: 1

Watch Video Solution

44. If the density of methanol is $0.793kgL^{-1}$ what ia its volume needed for making 2.5 L of its $0.25M$ solution?

A. $32.25mL$

B. $45.98mL$

C. `78.60 mL

D. $25.22mL$

Answer: 4

Watch Video Solution

45. A sample of drinking water was found to be severely contaminated with chloroform, $CHCl_3$, supposed to be carcinogen. The level of contamination was 15 ppm (by mass).

(i) Express this in per cent by mass.

(ii) Determine the molality of chloroform in the water sample.

A. $2.317 \times 10^{-4}m$

B. 0.7864×10^{-4}

C. $1.255 \times 10^{-4} m$

D. $0.5555 \times 10^{-4} m$

Answer: 3

Watch Video Solution

46. H_2Sgas is used in qualitative analysis of inorganic cations. Its solubility in water at STP is $0.195 mol Kg^{-1}$.Thus, Henry's law constant (in atm molal^{-1})forH_2S is

A. 386 bar

B. 195 bar

C. 478 bar

D. 282 bar

Answer: 4

Watch Video Solution

47. If

$m =$ molality of solution $\left(molKg^{-1}\right)$

$\chi_{solute} =$ mole fraction of solute

$M_{solvent} =$ molar mass of solvent $\left(gmol^{-1}\right)$

A. $\chi_{solute} = 1000 + mM_{solvent} / mM_{solvent}$

B. $\chi_{solute} = mM_{solvent} / mM_{solvent} - 1000$

C. $\chi_{solute} = \dfrac{mM_{solvent}}{1000 + mM_{solvent}}$

D. $\chi_{solute} = 1000mM_{solvent} / mM_{solvent}$

Answer: 3

Watch Video Solution

48. Assuming ideal behavior, what mass of naphthalence $(C_{10}H_8)$ would have to be dissolved in $200g$ of octane (C_8H_{18}) to lower the vapor pressure of pure octane by $20\ \%$

A. $56g$

B. $47g$

C. $69g$

D. $35g$

Answer: 3

Watch Video Solution

49. The vapour pressure of pure benzene at $88^{\circ}C$ is $957mm$ and that of toluene at the same temperature is $379.5mm$. The composition of benzene-toluene mixture boiling at $88^{\circ}C$ will be

A. $\chi_{benz} = 0.341$

B. $\chi_{\text{benzene}} = 0.786$

C. $\chi_{benz} = 0.214$

D. $\chi_{\text{benzene}} = 0.659$

Answer: 4

Watch Video Solution

50. Vapor pressure of A $\left(\text{molar mass} = 78 mol^{-1}\right)$ and $B\left(\text{molar mass} = 92 g mol^{-1}\right)$ at $20^{\circ} C$ are $75 mm Hg$ and $22 mm Hg$ respectively. $23.4 g$ of A and $64.4 g$ of B are mixed to form an odeal solution. If the vapors are in equilibrium with the liquid mixture at the same tamperature, then the mole fraction of A in the vapor phase will be

A. 0.59

B. 0.31

C. 0.69

D. 0.41

Answer: 1

Watch Video Solution

51. Two liquids X and Y from an ideal solution at $300K$, Vapour pressure of the Solution containing 1mol of X and 3mol of Y is 550mmHg . At the same temperature, if 1 mol of Y is further added to this solution ,vapour pressur of the solutions increases by 100mmHg Vapour pressure (in mmHg) of X and Y in their pure states will be,respectively

A. $200 \text{ and } 300$

B. $300 \text{ and } 400$

C. $400 \text{ and } 600$

D. $500 \text{ and } 600$

Answer: 3

Watch Video Solution

52. The density $\left(\text{in} gmL^{-1}\right)$ of a $3.60M$ sulphuric acid solution that is $29\,\%\, H_2SO_4$ (Molar mass $= 98 gmol^{-1}$) by mass will be:

A. 1.22

B. 1.45

C. 1.64

D. 1.88

Answer: 1

Watch Video Solution

53. The density of $3M$ solution of $NaCl$ is $1.25 gmL^{-1}$. The molality of the solution is

A. $3.86 molkg^{-1}$

B. $1.97 molkg^{-1}$

C. $2.79 molkg^{-1}$

D. $0.786 molkg^{-1}$

Answer: 3

Watch Video Solution

54. In a 0.2 molal aqueous solution of weak acid HX (the degree of dissociation 0.3) the freezing point is (given $K_f = 1.85 Kmolality^{-1}$):

A. $+0.480^\circ C$

B. $-0.480^\circ C$

C. -0.360°

D. $+0.360^{\circ}$

Answer: 2

Watch Video Solution

55. A 5% solution of cane sugar is isotonic with 0.877% solution of urea. Calculate the molecular mass of urea if the molecular mass of cane sugar is 342.

A. $68.4u$

B. $136.8u$

C. $171.2u$

D. $34.24u$

Answer: 1

Watch Video Solution

56. In a pair of immiscible liquida, a common solute dissolves in both and the equilibrium is reached. Then, the concentration of the solute in upper layer is

A. lower than the lower is

B. in fixed ratio with that in the lower layer

C. higher than the lower layer

D. same as the lower layer

Answer: 2

Watch Video Solution

57. If the equivalent mass of a metal is doble that of oxygen then the weight of its oxide is ___ times greater than the weight of the metal.

A. 1.5

B. 0.5

C. 2.5

D. 2.0

Answer: 1

Watch Video Solution

58. Consider a solution of ethanol in water in which the mole fraction of ethnol is 0.040. If the density of H_2O is taken to be

$1g/mL$ the molarity of ethanol in solution is

A. $3.41M$

B. $2.31M$

C. $4.75M$

D. $1.78M$

Answer: 2

Watch Video Solution

59. The relation between molarity (C) and molality (m) is given by)d= density of solution, M =molar mass of solute):

A. $m = \frac{1000CM}{1000C - d}$

B. $m = \frac{1000C}{1000d - CM}$

C. $m = \dfrac{Cd}{1000d - CM}$

D. $m = \dfrac{CMd}{1000 - dM}$

Answer: 2

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60. If $C =$ molar concentration $\left(molL^{-1}\right)$

$d =$ density of solution $\left(KgL^{-1}\right)$

χ_{solute} = mole fraction of solute

M_{solute} = molar mass of solute in $gmol^{-1}$

$M_{solvent}$ = molar mass of solvent in $gmol^{-1}$

then

A. $\chi_{solute} = \dfrac{CM_{solv}}{C(M_{solv} + M_{solute}) + 1000d}$

B. $\chi_{solute} = \dfrac{CM_{solv}}{C(M_{solv} - M_{solute}) + 1000d}$

C. $\chi_{solute} = \frac{CM_{solv} \times 1000d}{C(M_{solv} - M_{solute})}$

D. $\chi_{solute} = \frac{CM_{solv}}{C(M_{solv} + M_{solute}) + 1000d}$

Answer: 2

Watch Video Solution

Archives

1. 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

Answer: 4

Watch Video Solution

2. Which one of the following is incorrect for ideal solution?

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

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

C. $\Delta P = P_{mix} - P_{\text{calculate by raoult's law}} = 0$

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

Answer: 4

Watch Video Solution

3. At $100^\circ C$ the vapour pressure of a solution of $6.5g$ of an solute in $100g$ water is $732mm$.If $K_b = 0.52$, the boiling point of this solution will be :

A. $103^\circ C$

B. $101^\circ C$

C. $100^\circ C$

D. $102^\circ C$

Answer: 2

Watch Video Solution

4. Which of the following statements about the composition of the vapour over an ideal $1:1$ mol mixture of benzene and

toluene is correct? Assume that the temperature is constant at $25^{\circ}C$. (Given: vapour pressure Date at $25^{\circ}C$, benzene=12.8 kP, toluene=3.85 kPa)

A. Not enough information is given to make predicition.

B. The vapour will contain a higher precentage of benzene.

C. The vapour will contain a higher percentage of toluene

D. The vapour will contain equal amounts of benzene and toluene.

Answer: 2

Watch Video Solution

5. What is the fraction of the solute in a 1.00 m aqueous solution ?

A. 0.0354

B. 0.0177

C. 0.177

D. 1.77

Answer: 2

Watch Video Solution

6. 20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 g magnesium oxide. What be the percentage purity of magnsesium carbonate in the sample?

A. 60

B. 84

C. 75

D. 96

Answer: 2

Watch Video Solution

7. What is the mass of the precipitate formed when 50 mL of 16.9% solution of $AgNO_3$ is mixed with 50 mL of 5.8% NaCl solution?

A. 7 g

B. 14 g

C. 28 g

D. 3.5 g

Answer: 1

Watch Video Solution

8. Which one is not equal to zero for an ideal solution?

A. $\Delta P = P_{\text{observed}} - P_{Raot}$

B. ΔH_{mix}

C. ΔS_{mix}

D. ΔV_{mix}

Answer: 3

Watch Video Solution

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

A. Y is undergoing dissociation in water while X indergoes no change

B. X is undergoing dissociation in water

C. Molecular mass of X is greater than the molecular mass of Y

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

Answer: 2

Watch Video Solution

10. Which of the following electrolytes has the same value of van't Hoff factor (i)is that of $Al_2(SO_4)_3$(if all are $100\ \%$ ionised?

A. $K_4\left[Fe(CN)_6\right]$

B. K_SO_4

C. $K_{Fe\,(\,CN\,)_{\,6}}$

D. $Al(NO_3)_3$

Answer: 1

Watch Video Solution

11. Of the following$0.10m$ aqueous solutions,which one will exhibits the largest freezing point depression?

A. KCl

B. $C_6H_{12}O_6$

C. $Al_2(SO_4)$

D. K_2SO

Answer: 3

Watch Video Solution

12. How many grams of concentrated nitric acid solution should be used to prepare $250mL$ of $2.0MHNO_3$? The concentrated acid is $70\,\%\ HNO_3$:

A. $90.0gconc.\ HNO_3$

B. $70.0gconc.\ HNO_3$

C. $54.0gconc.\ HNO$

D. $45.0gconc.\ HNO_3$

Answer: 4

Watch Video Solution

13. 6.02×10^{20} molecules of urea are present in $100mL$ solution. The concentration of urea solution is:

A. $0.01M$

B. $0.001M$

C. $0.1M$

D. $0.02M$

Answer: 1

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14. P_A and P_B are the vapour pressure of pure liquid components ,Aand B respectively of an ideal binary solution,If x_A represents the mole fraction of component A, the total pressure of the solution will be

A. $P_A^\circ + \chi_A(P_B^\circ - P_A^\circ)$

B. $P_A^\circ + \chi_A(P_A^\circ - P_B^\circ)$

C. $P_B^\circ + \chi_A(P_B^\circ - P_A^\circ)$

D. $P_B^\circ + \chi_A(P_A^\circ - P_B^\circ)$

Answer: 4

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15. What is the fraction of the solute in a 1.00 m aqueous solution ?

A. 1.77

B. 0.177

C. 0.0177

D. 0.0344

Answer: 3

Watch Video Solution

16. The van't Hoff factor i for a compound which undergoes dissociation in one solvent and association in other solvent is respectively.

A. greater than one greater than one

B. less than one and greater than one

C. less than one and less than one

D. greater than one and less than one

Answer: 4

Watch Video Solution

17. The freezing point depression constant for water is $-1.86^{\circ} Cm^{-1}$. if $5.00 g Na_2SO_4$ is dissolved in $45.0 g H_2O$, the freezing point is changed by $-3.82^{\circ} C$, Calculate the van't Hoff factor for Na_2SO_4

A. 0.381

B. 2.05

C. 2.63

D. 3.11

Answer: 3

Watch Video Solution

18. A 0.1 molal aqueous solution of a weak acid is $30\,\%$ ionized. If K_f for water is $1.86^\circ C/m$, the freezing point of the solution will be.

A. $-0.24^\circ C$

B. $-0.18^\circ C$

C. $-0.54^\circ C$

D. $-0.36^\circ C$

Answer: 1

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19. $200cm^3$ 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 2.57×10^{-3} bar. Calculate the molar mass of the protein.

A. $61038gmol^{-1}$

B. $51022gmol^{-1}$

C. $122044gmol^{-1}$

D. $31011gmol^{-1}$

Answer: 1

Watch Video Solution

20. $25.3g$ sodium carbonate, Na_2CO_3, was dissolved in enough water to make $250mL$ of solution. If sodium carbonate dissociates completely, molar concentration of Na^+ and carbonate ions are respectively:

A. 0.477 M and 0.477 M

B. 0.955 M and 1.910 M

C. 1.910 M and 0.955 M

D. 1.90 M and 1.910 M

Answer: 3

Watch Video Solution

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

A. addition of water

B. addition of NaCl

C. addition of Na_2SO_4

D. addition of 1.00 molal Kl

Answer: 1

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22. A solution of sucrose (molar mass $342 g mol^{-1}$ has been produced by dissolving $68.5 g$ sucrose in $1000 g$ water .The

freezing point of the solution obtained will be $\left(K_f \text{ for } H_2O = 1.86 kgmol^{-1}\right)$

A. $-0.570^\circ C$

B. $-0.372^\circ C$

C. $-0.520^\circ C$

D. $+0.372^\circ C$

Answer: 2

Watch Video Solution

23. A $0.002M$ aqueous solution of an ionic compound $\left[Co(NH_3)_5(NO_2)\right]Cl$ freezes at $-0.00732^\circ C$. Find the number of moles of ions which 1 mole of ionic compound produces of being dissolved in water. $\left(K_f = -1.86^\circ C/m\right)$.

A. 3

B. 4

C. 1

D. 2

Answer: 4

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24. The number of mole of $KMnO_4$ that will be needed to react completely with one mole of ferrous oxalate in acidic solution is:

A. 0.2 moles

B. 0.6 moles

C. 0.4 moles

D. 7.5 moles

Answer: 2

Watch Video Solution

25. 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 $0.1MH_2SO_4$ solution is:

A. $22.20mL$

B. $5.55mL$

C. $11.10mL$

D. $16.65mL$

Answer: 2

Watch Video Solution

26. A 0.5molal aqueous solution of a weak acid (HX) is 20 per cent ionized.The lowering in freezing point of this solution is $\left(K_f = 1.86\mathrm{K/m} \text{ for water}\right)$

A. $1.12K$

B. $-0.56K$

C. $-1.12K$

D. $0.56K$

Answer: 1

Watch Video Solution

27. The number of moles of $KMnO_4$ that will be needed to react with one mole of ferrous sulphite in acidic solution is

A. $2/5$

B. 1

C. $3/5$

D. $4/5$

Answer: 1

Watch Video Solution

28. A solution containing $10gperdm^3$ of urea (mol.wt. $= 60gmol^{-1}$) is isotonic with a 5% (mass//vol.) of a non-volatile solute. The molecular mass of non-volatile solute is:

A. $200 gmol^{-1}$

B. $250 gmol^{-1}$

C. $300 gmol^{-1}$

D. $350 gmol^{-1}$

Answer: 3

Watch Video Solution

29. $1.0g$ of a non-electrolyte solute(mol. Mass $250.0 gmol^{-1}$) was dissolved in $5.12g$ benzene. If the freezing point depression constant, K_f of benzene is $51.2 Kkgmol^{-1}$, the freezing point of benzene will be lowered by:

A. $0.2K$

B. $0.4K$

C. $0.3K$

D. $0.5K$

Answer: 2

Watch Video Solution

30. A solution of acetone in ethnol

A. obeys Raoult's law

B. shows a negative deviation from Raoult's law

C. shows a positive deviation from Raoult's law

D. behaves like a near ideal solution

Answer: 3

Watch Video Solution

31. During osmosis, flow of water through a semipermeable membrane is:

A. from solution having lower concentration only

B. from solution having higher concentration only

C. from both sides of semipermeable membrane with equal flow rates

D. from both sides of semipermeable membrane with inequal flow rates

Answer: 4

Watch Video Solution

32. A solution of urea (mol. Mass $60gmol^{-1}$) boils of $100.18^{\circ}C$ at one one atmospheric pressure. If k_f and K_b for water are 1.86 and $0.512Kkgmol^{-1}$ respectively, the above solution will freeze at:

A. $-6.54^{\circ}C$

B. $6.54^{\circ}C$

C. $0.654^{\circ}C$

D. $-0.654^{\circ}C$

Answer: 4

Watch Video Solution

33. A solution has $1:4$ mole ratio of pentane to hexane . The vapour pressure of pure hydrocarbons at $20^{\circ}C$are 440 mmHgfor pentane and 120mmHg for hexane .The mole

A. 0.200

B. 0.478

C. 0.549

D. 0.786

Answer: 2

Watch Video Solution

34. The vapour pressure of two liquid P and Q are 80 torr and 60 torr respectively. The total vapour pressure obtained by

mixing 3 moles of P and 2 mole of Q would be

A. 72 torr

B. 20 torr

C. 68 torr

D. 140 torr

Answer: 1

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35. Camphor is often used in molecular mass determination because

A. it is reading available

B. it has a very high cryoscopic constant

C. it is volatile

D. it is a solvent for organic substances

Answer: 2

Watch Video Solution

36. Formation of a solution from two componenets can be considered as :

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

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

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

solution so formed will be ideal if :

A. $\Delta H_{sol} = \Delta H_{\_\Delta} H_2 - \Delta H_3$

B. $\Delta H_{sol} = \Delta H_1 + \Delta H_{\_\Delta} H_3$

C. $\Delta H_{soln} = \Delta H_1 + \Delta H_2 + \Delta H$

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

Answer: 2

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37. A solution containing components A and B follows Raoult's law, when

A. A-B attraction force is greater than A-A and B-B attractive forces

B. A-B attraction force is less than A-A and B-B attractive forces

C. A-B attraction force remains same as A-A and B-B attractive forces

D. Volume of solution is different from sum of volumes of solute and solvent.

Answer: 3

 Watch Video Solution

38. 2.5 litre of 1 M NaOH solution are mixed with another 3 litre of 0.5 M NaOH solution Then the molarity of the resulting

A. 0.80 M

B. 1.0 M

C. 0.73 M

D. 0.50 M

Answer: 3

Watch Video Solution

39. A solution contains non-volatile solute of molecular mass M_2which of the following can be used to calculate the molecular mass of solute in terms of osmotic pressure?

(m_2 =mass of solute,V=volume of solution,π =osmotic pressure)

A. $M_2 = \left(\frac{m_2}{V}\right)RT$

B. $M_= (m/V)\frac{RT}{\pi}$

C. $M_2 = \left(\frac{m_2}{V}\right)\pi RT$

D. $M_2 = \left(\frac{m_2}{V}\right)\frac{\pi}{RT}$

Answer: 2

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40. Pure water can be obtained from sea water by

A. centrifugation

B. plasmolysis

C. reverse Osmosis

D. sedimentation

Answer: 3

Watch Video Solution

41. Molarity of liquid HCl with density equal to $1.17g/mL$ is:

A. 36.5

B. 18.25

C. 32.05

D. 42.10

Answer: 3

Watch Video Solution

42. Which of the following colligative property can provide molar mass of proteins (or polymers or colloids) with greatest precision?

A. Osmotic pressure

B. Elevation in boiling point

C. Depression in freezing point

D. Relative lowing of vapor pressure

Answer: 1

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