**ACTIVE SITE TUTORIALS**

**Date :**23-07-2019 **TEST ID: 161**

**Time :** 08:35:00 **CHEMISTRY**

**Marks :** 2060

2.SOLUTIONS

**Single Correct Answer Type**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | A super saturated solution is a metastable state of solution in which solute concentration. | | | | | | | |
|  | a) | Is equal to the solubility of that substance in water | | | | | | |
|  | b) | Exceeds than its solubility | | | | | | |
|  | c) | Less than its solubility | | | | | | |
|  | d) | Continuously change | | | | | | |
| 2. | Colligative properties of a solution depends upon | | | | | | | |
|  | a) | Nature of both solvent and solute | | | b) | Nature of solute only | | |
|  | c) | Number of solvent particles | | | d) | The number of solute particles | | |
| 3. | The partition coefficient of solute in between immiscible liquids and is 10 in favour of . The partition coefficient of in favour of is : | | | | | | | |
|  | a) | 0.1 | b) | 10 | c) | 0.01 | d) | 100 |
| 4. | Which one is a colligative property? | | | | | | | |
|  | a) | Raoult’s law states that the vapour pressure of a component over a solution is proportional to its mole fraction | | | | | | |
|  | b) | The osmotic pressure ()of a solution is given by the equation = *MRT*, where , *M* is the molarity of the solution | | | | | | |
|  | c) | The correct order of osmotic pressure for 0.01 M aqueous solution of each compound is sucrose | | | | | | |
|  | d) | Two sucrose solutions of same molality prepared in different solvents will have the same freezing point depression | | | | | | |
| 5. | At , the highest osmotic pressure is exhibited by 0.1 M solution of | | | | | | | |
|  | a) | Urea | b) | Glucose | c) | KCl | d) |  |
| 6. | The vapour pressure of two liquids *X* and *Y* are 80 and 60 Torr respectively. The total vapour pressure of the ideal solution obtained by mixing 3 moles of *X* and 2 moles of *Y* would be | | | | | | | |
|  | a) | 68 Torr | b) | 140 Torr | c) | 48 Torr | d) | 72 Torr |
| 7. | Dilute 1 L one molar solution by 5 L water, the normality of that solution is | | | | | | | |
|  | a) | 0.33 N | b) | 33.0 N | c) | 0.11 N | d) | 11.0 N |
| 8. | Solution *A* contains 7 g/L of and solution *B* contains 7 g/L of NaCl. At room temperature, the osmotic pressure of | | | | | | | |
|  | a) | Solution *A* is greater than *B* | | | | | | |
|  | b) | Both have same osmotic pressure | | | | | | |
|  | c) | Solution *B* is greater than *A* | | | | | | |
|  | d) | Cannot be determine | | | | | | |
| 9. | Which one of the following aqueous solutions will exhibit highest boiling point? | | | | | | | |
|  | a) |  | b) |  | c) | 0.015 M urea | d) | 0.015 M glucose |
| 10. | The modal elevation constant of water is . The boiling point of 1.0 modal aqueous KCl solution (assuming complete dissociation of KCl), therefore, should be | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 11. | The increase in boiling point of a solution containing 0.6 g urea in 200 g water is Find the molal elevation constant. | | | | | | | |
|  | a) | 10 K kg | b) | 10 K g | c) | 10 K kg mol | d) | 1.0 K kg |
| 12. | Which is correct representation of phase rule? | | | | | | | |
|  | a) |  | | | | | | |
|  | b) |  | | | | | | |
|  | c) |  | | | | | | |
|  | d) | None of these | | | | | | |
| 13. | 40% by weight solution will contain how much mass of the solute in 1L solution, density of the solution is 1.2 g/mL? | | | | | | | |
|  | a) | 480 g | b) | 48 g | c) | 38 g | d) | 380 g |
| 14. | 20 g of binary electrolyte (mol. wt. =100) are dissolved in 500 g of water. The depression in freezing point of the solution is ( the degree of ionisation of the electrolyte is | | | | | | | |
|  | a) | 0% | b) | 100% | c) | 75% | d) | 50% |
| 15. | What is the molality of pure water? | | | | | | | |
|  | a) | 1 | b) | 18 | c) | 55.5 | d) | None of these |
| 16. | Iodine was added to a system of water and . The concentrations of iodine in water and were found to be respectively. The ratio will not change only if : | | | | | | | |
|  | a) | More iodine is added | | | | | | |
|  | b) | More water is added | | | | | | |
|  | c) | More is added | | | | | | |
|  | d) | The temperature is changed | | | | | | |
| 17. | Which of the following associated with isotonic solutions is not correct? | | | | | | | |
|  | a) | They will have the same osmotic pressure | | | | | | |
|  | b) | They will have the same vapour pressure | | | | | | |
|  | c) | They have same weight concentrations | | | | | | |
|  | d) | Osmosis does not take place when the two solutions are separated by a semipermeable membrane | | | | | | |
| 18. | The freezing point (in of a solution containing 0.1 g of (mol.wt.329) in 100 g of water is : () | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 19. | The Henry’s law constant for the solubility of gas in water at 298 K is . The mole fraction of In air is 0.8 The number of moles of from air dissolved in 10 moles of water of 298 K and 5 atm pressure is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 20. | Van’t Hoff factor more than unity indicates that the solute in solution has | | | | | | | |
|  | a) | Dissociated | b) | Associated | c) | Both (a) and (b) | d) | Cannot say anything |
| 21. | The condition for the validity of Henry’s law are : | | | | | | | |
|  | a) | The pressure should not be too high | | | | | | |
|  | b) | The temperature should not be too low | | | | | | |
|  | c) | The gas should neither dissociate not enter into chemical combination with solvent | | | | | | |
|  | d) | All of the above | | | | | | |
| 22. | In an osmotic pressure measurement experiment, a 5% solution of compound ‘*X’* is found to be isotonic with a 2 % acetic acid solution . The gram molecular mass of ‘*X*’ is | | | | | | | |
|  | a) | 24 | b) | 60 | c) | 150 | d) | 300 |
| 23. | Which is a colligativeproperty ? | | | | | | | |
|  | a) | Osmotic pressure | b) | Free energy | c) | Heat of vaporisation | d) | Change in pressure |
| 24. | for water is 1.86 K-kg-. If your automobile radiator holds 1.0 kg of water, how many grams of ethylene glycol must you add to get the freezing point of the solution lowered to ? | | | | | | | |
|  | a) | 93 g | b) | 39 g | c) | 27 g | d) | 72 g |
| 25. | Vapour pressure of a solvent containing non-volatile solute is : | | | | | | | |
|  | a) | More than the vapour pressure of a solvent | | | | | | |
|  | b) | Less than the vapour pressure of solvent | | | | | | |
|  | c) | Equal to the vapour pressure of solvent | | | | | | |
|  | d) | None of the above | | | | | | |
| 26. | Among the following mixtures, dipole-dipole as the major interaction is present in : | | | | | | | |
|  | a) | Benzene and ethanol | | | | | | |
|  | b) | KCl and water | | | | | | |
|  | c) | Acetonitrile and acetone | | | | | | |
|  | d) | Benzene and | | | | | | |
| 27. | The vapour pressure of water depends upon : | | | | | | | |
|  | a) | Surface area of container | | | | | | |
|  | b) | Volume of container | | | | | | |
|  | c) | Temperature | | | | | | |
|  | d) | All of these | | | | | | |
| 28. | Which of the following solution highest boiling point? | | | | | | | |
|  | a) | 0.1 M urea | b) | 0.1 M sucrose | c) | 0.1 M | d) | 0.1 M |
| 29. | At certain temperature a 5.12% solution of cane sugar is isotonic with a 0.9% solution of an unknown solute. The molar mass of solute is | | | | | | | |
|  | a) | 60 | b) | 46.17 | c) | 120 | d) | 90 |
| 30. | A mixture of ethane and ethene occupies 41 L at 1 atm and 500 K. the mixture reacts completely with mole of to produce and . The mole fraction of ethane and ethene in the mixture are respectively | | | | | | | |
|  | a) | 0.50, 0.50 | b) | 0.75, 0.25 | c) | 0.67, 0.33 | d) | 0.25, 0.75 |
| 31. | If sodium sulphate is considered to be completely dissociated into cations and anions in aqueous solution, the change in freezing point of water (), when 0.01 mole of sodium sulphate is dissolved in 1 kg of water, is ( | | | | | | | |
|  | a) | 0.0372 K | b) | 0.0558 K | c) | 0.0744 L | d) | 0.0186 K |
| 32. | 2.5 L of NaCl solution contain 5 moles of the solute.What is the molarity ? | | | | | | | |
|  | a) | 5M | b) | 2M | c) | 2.5M | d) | 12.5M |
| 33. | If for a sucrose solution elevation in boiling point is then what will be boiling point of solution for the same molal concentration? | | | | | | | |
|  | a) | 0.1 | b) | 0.2 | c) | 0.16 | d) | 0.26 |
| 34. | In two solutions having different osmotic pressure, the solution of higher osmotic pressure is called : | | | | | | | |
|  | a) | Isotonic solution | | | | | | |
|  | b) | Hypertonic solution | | | | | | |
|  | c) | Hypotonic solution | | | | | | |
|  | d) | None of these | | | | | | |
| 35. | Isotonic solution have the same | | | | | | | |
|  | a) | Normality | b) | Density | c) | Molar concentration | d) | None of these |
| 36. | Vapour pressure of pure *A* = 100 torr, moles = 2; vapour pressure of pure *B*=80 torr, moles = 3. Total vapour pressure of the mixture is | | | | | | | |
|  | a) | 440 torr | b) | 460torr | c) | 180 torr | d) | 88 torr |
| 37. | Which of the following is incorrect? | | | | | | | |
|  | a) | Relative lowering of vapour pressure is independent of the solute and the solvent. | | | | | | |
|  | b) | The relative lowering of vapour pressure is a colligative property. | | | | | | |
|  | c) | Vapour pressure of a solution is lower than the vapour pressure of the solvent. | | | | | | |
|  | d) | The relative lowering of vapour pressure is directly proportional to the original pressure. | | | | | | |
| 38. | Density of a 2.05 M solution of acetic acid in water is 1.02 g/mL. The molality of the solution is | | | | | | | |
|  | a) | 23.077% | b) | 230.77% | c) | 2.3077% | d) | 0.23077% |
| 39. | The atmospheric pressure is sum of the | | | | | | | |
|  | a) | Pressure of the biomolecules | | | | | | |
|  | b) | Vapour pressure of atmospheric constituents | | | | | | |
|  | c) | Vapour pressure of chemicals and vapour pressure of volatiles | | | | | | |
|  | d) | Pressure created on to atmospheric molecules | | | | | | |
| 40. | Lowering in vapour pressure is the highest for: | | | | | | | |
|  | a) |  | | | | | | |
|  | b) |  | | | | | | |
|  | c) |  | | | | | | |
|  | d) |  | | | | | | |
| 41. | molecules of urea are present in 100 mL of its solution. The concentration of urea solution is | | | | | | | |
|  | a) | 0.1 M | b) | 0.01 M | c) | 0.001 M | d) | 0.02 M |
| 42. | The osmotic pressure (At) of an aqueous solution (200 mL) containing 6 g of a protein is If R=0.080 L atm , the molecular weight of protein is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 43. | 100 cc of 0.6 N and 200 cc of 0.3 N HCl were mixed together. The normality of the solution will be | | | | | | | |
|  | a) | 0.2 N | b) | 0.4 N | c) | 0.8 N | d) | 0.6 N |
| 44. | Mole fraction of any solution is equal to | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 45. | Which is not a colligative property in the following? | | | | | | | |
|  | a) | pH ofa buffer solution | | | b) | Boiling point elevation | | |
|  | c) | Freezing point depression | | | d) | Vapour pressure lowering | | |
| 46. | The normality of 10% (weight/volume) acetic acid is | | | | | | | |
|  | a) | 1 N | b) | 1.3 N | c) | 1.7 N | d) | 1.9 N |
| 47. | Two solutions have different osmotic pressure. The solution of lower osmotic pressure is called : | | | | | | | |
|  | a) | Isotonic solution | | | | | | |
|  | b) | Hypertonic solution | | | | | | |
|  | c) | Hypotonic solution | | | | | | |
|  | d) | None of these | | | | | | |
| 48. | Osmatic pressure is 0.0821 atm at temperature of 300 K. Find concentration in mole per litre | | | | | | | |
|  | a) | 0.33 | b) |  | c) |  | d) |  |
| 49. | A 5% solution of cane sugar (molar mass 342) is isotonic with 1% of a solution of an unknown solute. The molar mass of unknown solute in g/mol is | | | | | | | |
|  | a) | 136.2 | b) | 171.2 | c) | 68.4 | d) | 34.2 |
| 50. | The distribution law holds good for : | | | | | | | |
|  | a) | Heterogeneous systems | b) | Homogeneous systems | c) | Both (a) and (b) | d) | None of these |
| 51. | Two solutions of and are prepared separately. Molarity of both is 0.1 M and osmatic pressures are and respectively. The correct relationship between the osmatic pressures is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 52. | The freezing point of aqueous solution that contains 5% by mass urea, 1.0% by mass KCl and 10% by mass of glucose is : () | | | | | | | |
|  | a) | 290.2 K | b) | 285.5 K | c) | 269.93 K | d) | 250 K |
| 53. | Which of the following solutions has the highest normality? | | | | | | | |
|  | a) | 6 g of /100 | b) |  | c) | N phosphoric acid | d) | 8 g of KOH/L |
| 54. | 100 of 0.3 is mixed with 200 mL of . The final normality of the resulting solution will be | | | | | | | |
|  | a) | 0.3 N | b) | 0.2 N | c) | 0.5 N | d) | 0.1 N |
| 55. | A solute when distributed between two immiscible phases remains associated in phase II and dissociated in phase I. If is the degree of dissociation and is the number of molecules associated then : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 56. | Which solution would exhibit abnormal osmotic pressure? | | | | | | | |
|  | a) | Aqueous solution of urea | | | | | | |
|  | b) | Aqueous solution of common salt | | | | | | |
|  | c) | Aqueous solution of glucose | | | | | | |
|  | d) | Aqueous solution of sucrose | | | | | | |
| 57. | If is the degree of dissociation of the van’t Hoff factor (*i*) used for calculating the molecular mass is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 58. | The temperature at which vapour pressure of a solvent in its liquid and solid phase becomes same is called : | | | | | | | |
|  | a) | b. p. | b) | f. p. | c) | Krafft point | d) | None of these |
| 59. | The vapour pressure of a pure liquid *A* is 40 mm Hg at 310 K. The vapour pressure of this liquid in a solution with liquid *B* is 32 mm Hg. What is the mole fraction of *A* in the solution if it obeys the Raoult’s law? | | | | | | | |
|  | a) | 0.5 | b) | 0.6 | c) | 0.7 | d) | 0.8 |
| 60. | Which of the following shows maximum depression in freezing point? | | | | | | | |
|  | a) |  | b) | NaCl | c) | Urea | d) | glucose |
| 61. | The substances whose solubility decreases with increase in temperature : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | All of these |
| 62. | 3.65 g of is dissolved in 16.2 g of water. The mole fraction of HCl in the resulting solution is | | | | | | | |
|  | a) | 0.1 | b) | 0.2 | c) | 0.3 | d) | 0.4 |
| 63. | How many moles of would be in 50 g of the substance? | | | | | | | |
|  | a) | 0.083 mol | b) | 0.952 mol | c) | 0.481 mol | d) | 0.140 mol |
| 64. | Phenol dimerises in benzene having van’t Hoff factor 0.54. What is the degree of association? | | | | | | | |
|  | a) | 1.92 | b) | 0.98 | c) | 1.08 | d) | 0.92 |
| 65. | 0.004 M is isotonic with 0.01 M glucose.Degree of dissociation of is | | | | | | | |
|  | a) | 61 | b) | 244 | c) | 366 | d) | 122 |
| 66. | What is the freezing point of a solution containing 8.1 g in 100 g water assuming the acid to be 90% ionised ( for water )? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 67. | Choose the correct statement.  When concentration of a salt solution is increased | | | | | | | |
|  | a) | Boiling point increases while vapour pressure decreases. | | | | | | |
|  | b) | Boiling point decreases while vapour pressure increases. | | | | | | |
|  | c) | Freezing point decreases while vapour pressure increases. | | | | | | |
|  | d) | Freezing point increases while vapour pressure decreases. | | | | | | |
| 68. | Which of the following aqueous solutions produce the same osmotic pressure?  (i)0.1 M solution  (ii) 0.1 M glucose solution  (iii)0.6 g urea in 100 mL solution  (iv)1.0 g of a non-electrolyte solute in 50 mL solution (molar mass of ) | | | | | | | |
|  | a) | (i), (ii), (iii) | b) | (ii), (iii), (iv) | c) | (i), (ii), (iv) | d) | (i), (iii), (iv) |
| 69. | In the case of osmosis, solvent molecules move from : | | | | | | | |
|  | a) | Higher vapour pressure to lower vapour pressure | | | | | | |
|  | b) | Higher concentration to lower concentration | | | | | | |
|  | c) | Lower vapour pressure to higher vapour pressure | | | | | | |
|  | d) | Higher osmotic pressure to lower osmotic pressure | | | | | | |
| 70. | If the temperature increase from at atmospheric pressure, which of the following processes is expected to take place more in case of liquids? | | | | | | | |
|  | a) | Freezing | b) | Vaporization | c) | Sublimation | d) | None of these |
| 71. | The freezing point of water is depressed by in a 0.01 mol NaCl solution. The freezing point of 0.02 molal solution of urea is depressed by | | | | | | | |
|  | a) | Hypotonic | b) | Isotonic | c) | Equimolar | d) | Hypertonic |
| 72. | Camphor is used as solvent to determine mol. wt. of non-volatile solute by Rast method because for camphor : | | | | | | | |
|  | a) | It is readily available | | | | | | |
|  | b) | It is volatile | | | | | | |
|  | c) | Molal depression constant is high | | | | | | |
|  | d) | It is solvent for organic substances | | | | | | |
| 73. | The van’t Hoff factor for a compound which undergoes dissociation in one solvent and association in other solvent is respectively : | | | | | | | |
|  | a) | Greater than one and 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 | | | | | | |
| 74. | The melting point of most of the solid substances increase with an increase of pressure acting on them. However, ice melts at a temperature lower than its usual melting point, when the pressure increase. This is because : | | | | | | | |
|  | a) | Ice is less denser than water | | | | | | |
|  | b) | Pressure generates heat | | | | | | |
|  | c) | The bonds break under pressure | | | | | | |
|  | d) | Ice is not a true solid | | | | | | |
| 75. | Partition coefficient of benzoic acid-ether-water in favour of ether is 2. A solution containing 8 g/litre benzoic acid in ether layer is shaken with 2 litre water. The concentration of acid in water layer is : | | | | | | | |
|  | a) | 1 | b) | 2 | c) | 3 | d) | 4 |
| 76. | A solution is prepared by dissolving 24.5 g of sodium hydroxide in distilled water to give 1L solution. The molarity of NaOH in the solution is  (Given, that molar mass of NaOH) | | | | | | | |
|  | a) | 1000 g of solvent | b) | 1 L of solvent | c) | 1 L of solution | d) | 1000 g of solution |
| 77. | Molecular weight of glucose is 180. A solution of glucose which contains 18 g/L, is | | | | | | | |
|  | a) | 0.1 molal | b) | 0.2 molal | c) | 0.3 molal | d) | 0.4 molal |
| 78. | The elevation in boiling point for one molal solution of a solute in a solvent is called : | | | | | | | |
|  | a) | Cryoscopic constant | | | | | | |
|  | b) | Boiling point constant | | | | | | |
|  | c) | Molal ebullioscopic constant | | | | | | |
|  | d) | None of the above | | | | | | |
| 79. | of 0.2 N HCl is titrated against 0.1 N NaOH solution. The titration is discontinued after adding of NaOH. The remaining titration is completed by adding 0.5 NKOH. The volume of KOH required for completing the titration is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 80. | The depression in f. p. of 0.01 aqueous solution of urea, sodium chloride and sodium sulphate is in the ratio : | | | | | | | |
|  | a) | 1 : 1 : 1 | b) | 1 : 2 : 3 | c) | 1 : 2 : 4 | d) | 2 : 2 : 3 |
| 81. | Colligative properties are used for the determination of | | | | | | | |
|  | a) | Molar mass | | | b) | Equivalent weigh | | |
|  | c) | Arrangement of molecules | | | d) | Melting and boiling points | | |
| 82. | In a solution of 7.8 g benzene and 46.0 g toluene , the mole-fraction of benzene is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 83. | Mole fraction of solute in an aqueous solution which boils at 100.104. for = 0.52 K : | | | | | | | |
|  | a) |  | b) | 0.004 | c) |  | d) | 0.996 |
| 84. | On a humid day in summer, the mole fraction of gaseous a (water vapour) in the air at can be as high as 0.0287. Assuming a total pressure of 0.977 atm. What is the partial pressure of dry air? | | | | | | | |
|  | a) | 94.9 atm | b) | 0.949 atm | c) | 949 atm | d) | 0.648 atm |
| 85. | The natural semipermeable membrane is : | | | | | | | |
|  | a) | Gelatinous | | | | | | |
|  | b) | Gelatinous | | | | | | |
|  | c) | Plant cell | | | | | | |
|  | d) | Phenol layer | | | | | | |
| 86. | Which of the following is true when components forming an ideal solution are mixed? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 87. | The energy that opposes the dissolution of a solute in a solvent is called : | | | | | | | |
|  | a) | Solvent energy | | | | | | |
|  | b) | Hydration energy | | | | | | |
|  | c) | Lattice energy | | | | | | |
|  | d) | Ionization energy | | | | | | |
| 88. | If molecular interaction of two different liquid molecules are stronger than the molecular interactions of the same liquid molecules the mixture is expected to show : | | | | | | | |
|  | a) | Positive deviations | | | | | | |
|  | b) | Negative deviations | | | | | | |
|  | c) | No deviations | | | | | | |
|  | d) | Positive as well as negative deviations | | | | | | |
| 89. | Which of the following is not correct for ideal solution? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | Obeys Raoult’s law |
| 90. | When mercuric iodide is added to the aqueous solution of potassium iodide, the | | | | | | | |
|  | a) | Freezing point is raised | | | b) | Freezing point is lowered | | |
|  | c) | Freezing point does not change | | | d) | Boiling point does not change | | |
| 91. | Which statement is wrong for distribution law? | | | | | | | |
|  | a) | The two solvents should be mutually immiscible | | | | | | |
|  | b) | The substance should not chemically react with any of the two solvents | | | | | | |
|  | c) | The temperature should not change during experiment | | | | | | |
|  | d) | The concentration of the solute in both the solvents must be kept high | | | | | | |
| 92. | How much of 0.1 M solution is required to neutralise 50 mL of 0.2 M NaOH solution? | | | | | | | |
|  | a) | 50 mL | b) | 5.0 mL | c) | 0.50 mL | d) | 100 mL |
| 93. | A 0.5 molal aqueous solution of a weak acid (H*X*) is 20 per cent ionized. The lowering in freezing point of this solution is : | | | | | | | |
|  | a) | 0.56 K | b) |  | c) | 1.12 K | d) |  |
| 94. | A solution of 4.5 g of a pure non-electrolyte in 100 g of water was found to freeze at . The molecular weight of the solute closest to () | | | | | | | |
|  | a) | 135.0 | b) | 172.0 | c) | 90.0 | d) | 180.0 |
| 95. | If and are the vapour pressure of solvent and solution respectively and and are the mole of solute and solvent then : | | | | | | | |
|  | a) |  | | | | | | |
|  | b) |  | | | | | | |
|  | c) |  | | | | | | |
|  | d) | All of the above | | | | | | |
| 96. | A solution is prepared by dissolving 24.5 g of sodium hydroxide in distilled water to give 1L solution. The molarity of NaOH in the solution is  (Given, that molar mass of NaOH) | | | | | | | |
|  | a) | 0.2450 M | b) | 0.6125 M | c) | 0.9800 M | d) | 1.6326 M |
| 97. | The relative lowering of vapour pressure of a dilute aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is about | | | | | | | |
|  | a) | 0.70 | b) | 0.50 | c) | 0.90 | d) | 0.80 |
| 98. | The freezing point (in) of solution containing 0.1 g of in 100 g of water ()is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 99. | If 0.15 g of a solute, dissolved in 15 g of solvent, is boiled at a temperature higher by than that of the pure solvent. The molecular weight of the substance (molal elevation constant for the solvent is is | | | | | | | |
|  | a) | 100 | b) | 10.1 | c) | 10 | d) | 1.001 |
| 100. | Molarity of 0.2 N is | | | | | | | |
|  | a) | 0.2 | b) | 0.4 | c) | 0.6 | d) | 0.1 |
| 101. | When an ideal binary solution is in equilibrium with its vapour, molar ratio of the two components in the solution and in the vapour phase is : | | | | | | | |
|  | a) | Same | | | | | | |
|  | b) | Different | | | | | | |
|  | c) | May or may not be same depending upon volatile nature of the two components | | | | | | |
|  | d) | None of the above | | | | | | |
| 102. | In a 0.2 molal aqueous solution of a weak acid , the degree of ionization is 0.3. Taking for water as 1.85, the freezing point of the solution will be nearest to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 103. | The distribution law was given by : | | | | | | | |
|  | a) | Henry | b) | Nernst | c) | van’t Hoff | d) | Ostwald |
| 104. | Which of the following is incorrect? | | | | | | | |
|  | a) | 0.1 m sucrose | b) | 0.1 m urea | c) | 0.1 m ethanol | d) | 0.1 m glucose |
| 105. | When 20 g of naphthoic acid () is dissolved in 50 g of benzene (), 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 |
| 106. | The vapour pressure of water at is 17.54 mm. When 20 g of a non-ionic, substance is dissolved in 100 g of water, the vapour pressure is lowered by 0.30 mm. What is the molecular mass of the substance? | | | | | | | |
|  | a) | 200.8 | b) | 206.88 | c) | 210.5 | d) | 215.2 |
| 107. | The highest temperature at which vapour pressure of a liquid can be measured is : | | | | | | | |
|  | a) | b.p. of liquid | | | | | | |
|  | b) | Critical temperature | | | | | | |
|  | c) | Critical solution temperature | | | | | | |
|  | d) | Inversion temperature | | | | | | |
| 108. | Solution *A* contains 7 g/L of and solution *B* contains 7 g/L of NaCl. At room temperature, the osmotic pressure of | | | | | | | |
|  | a) | 50 | b) | 180 | c) | 102 | d) | 25 |
| 109. | When g solute (molecular mass ) dissolves in g solvent, the molality of the solution is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 110. | The statement “the relative lowering of the vapour pressure is equal to th ratio ot moles of the solute to the total number of the moles in the solution” refers to | | | | | | | |
|  | a) | Hess’s law | b) | Dalton’s law | c) | Raoult’s law | d) | Charles’law |
| 111. | Elevation in boiling point was when 6 g of a compound was dissolved in 100 g of water. Molecular weight of *X* is (water is per 100 g water ) | | | | | | | |
|  | a) | 120 | b) | 60 | c) | 600 | d) | 180 |
| 112. | The amount of anhydrous present in 250 mL of 0.25 M solution is | | | | | | | |
|  | a) | 6.625 g | b) | 66.25 g | c) | 662.5 g | d) | 6625 g |
| 113. | The azeotropic mixture of water (b. pt.) and (b.pt. ) boils at .When this mixture is distilled it is possible to obtain | | | | | | | |
|  | a) | Pure HCl | | | b) | Pure water | | |
|  | c) | Pure water as well as HCl | | | d) | Neither HCl nor in their pure states | | |
| 114. | A 5% solution of sugarcane (mol. wt. = 342) is isotonic with 1% solution of *X* under similar conditions. The molecular weight of *X* is | | | | | | | |
|  | a) | 136.2 | b) | 689.4 | c) | 34.2 | d) | 171.2 |
| 115. | Van’thoff factor of is | | | | | | | |
|  | a) | One | b) | Two | c) | Three | d) | four |
| 116. | Which of the following is incorrect? | | | | | | | |
|  | a) | Relative lowering of vapour pressure is independent | | | | | | |
|  | b) | Vapour pressure of a solution is lower than the vapour pressure of the solvent | | | | | | |
|  | c) | The vapour pressure is a colligative property | | | | | | |
|  | d) | The relative lowering of vapour pressure is directly proportional to the mole fraction solute | | | | | | |
| 117. | One gram of silver gets distributed between of molten zinc and of molten lead at The percentage of silver still left in the lead layer in approximately | | | | | | | |
|  | a) | Henry | b) | Van’t Hoff | c) | Nernst’s | d) | Ostwald |
| 118. | Two solutions of glucose have osmotic pressure 1.0 and 3.5 atm. If 1 L of first solution is mixed with L of second solution, the osmotic pressure of the resultant solution becomes 2.5 atm. Volume of second solution is | | | | | | | |
|  | a) | 1.0 L | b) | 1.5 L | c) | 2.5 L | d) | 3.5 L |
| 119. | 5% (wt./vol.) aqueous NaCl solution and 5% (wt./vol.) aqueous KCl solution are : | | | | | | | |
|  | a) | Isotonic | b) | Isomolar | c) | Equinormal | d) | None of these |
| 120. | Azeotropic mixture are | | | | | | | |
|  | a) | Constant temperature boiling mixture | | | b) | Those which boils at different temperatures | | |
|  | c) | Mixture of two solids | | | d) | None of the above | | |
| 121. | Boiling point of water is defined as the temperature at which : | | | | | | | |
|  | a) | Vapour pressure of water is equal to one atmospheric pressure | | | | | | |
|  | b) | Bubbles are formed | | | | | | |
|  | c) | Steam comes out | | | | | | |
|  | d) | None of the above | | | | | | |
| 122. | When a solute distributes itself between two immiscible liquids in contact with each other, a mathematical constant ratio exists between : | | | | | | | |
|  | a) | The weight of the solute in the two liquids | | | | | | |
|  | b) | The concentration of solute in the two liquids | | | | | | |
|  | c) | The number of mole of the solute in the two liquids | | | | | | |
|  | d) | The number of atoms of the solute in the two liquids | | | | | | |
| 123. | The molal elevation constant for water is 0.52. What will be the boiling point of 2 molar sucrose solution at 1 atm pressure? (Assume b.p. of pure water is ) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 124. | The molal elevation/depression constant depends upon : | | | | | | | |
|  | a) | Nature of solvent | | | | | | |
|  | b) | Nature of solute | | | | | | |
|  | c) | Temperature | | | | | | |
|  | d) | solution | | | | | | |
| 125. | When 10 g of a non-volatile solute is dissolved in 100 g of benzene, it raises boiling point by then molecular mass of the solute is ( for ) | | | | | | | |
|  | a) | 223 g | b) | 233 g | c) | 243 g | d) | 253 g |
| 126. | According to phase rule, if then must be equal to : | | | | | | | |
|  | a) | 2 | b) | 1 | c) | Zero | d) | 4 |
| 127. | A thermometer which can be used only for accurate measurement of small differences in temperature is known as a: | | | | | | | |
|  | a) | Beckmann thermometer | | | | | | |
|  | b) | Contact thermometer | | | | | | |
|  | c) | Clinical thermometer | | | | | | |
|  | d) | Platinum resistance thermometer | | | | | | |
| 128. | When two liquids and are mixed then their boiling points becomes greater than both of them. What is the nature of this solution? | | | | | | | |
|  | a) | Ideal solution | | | b) | Normal solution | | |
|  | c) | Negative deviation with non-ideal solution | | | d) | Positive deviation with non-ideal solution | | |
| 129. | The plots of (where respectively) is linear with slope and intercepts respectively: | | | | | | | |
|  | a) | and | | | | | | |
|  | b) | and | | | | | | |
|  | c) | and | | | | | | |
|  | d) | and | | | | | | |
| 130. | Which of the following liquid pair shows a positive deviation from Raoult’s law? | | | | | | | |
|  | a) | Water-nitric acid | | | b) | Acetone-chloroform | | |
|  | c) | Water-hydrochloric acid | | | d) | Benzene-methanol | | |
| 131. | What is the total number of moles of needed to prepare 5.0 L of a 2.0 M solution of ? | | | | | | | |
|  | a) | 2.5 | b) | 5.0 | c) | 10 | d) | 20 |
| 132. | The van’thoff factor for 0.1 m solution is 2.74. The degree of dissociation is | | | | | | | |
|  | a) | 91.3% | b) | 87% | c) | 100% | d) | 74% |
| 133. | The solubility of iodine in water is 0.8 g/L. If the partition coefficient of iodine between and water (in favour of is 82, the solubility of iodine in is : | | | | | | | |
|  | a) | 102.5 g/L | b) | 65.6 g/L | c) | 0.009 g/L | d) | 81.2 g/L |
| 134. | An aqueous solution of 6.3 g oxalic acid dihydrate is made up to 250 mL. The volume of 0.1 N sodium hydroxide required to completely neutralise 10 mL of this solution is | | | | | | | |
|  | a) | 40 mL | b) | 20 mL | c) | 10 mL | d) | 4 mL |
| 135. | One gram of silver gets distributed between of molten zinc and of molten lead at The percentage of silver still left in the lead layer in approximately | | | | | | | |
|  | a) | 2 | b) | 5 | c) | 3 | d) | 1 |
| 136. | Water will boil at 101.5 at which of the following pressure? | | | | | | | |
|  | a) | 76 cm of Hg | b) | 76 mm of Hg | c) | > 76 cm of Hg | d) | < 76 cm of Hg |
| 137. | Depression in freezing point is 6 K for NaCl solution if for water is 1.86 K/kg mol, amount of NaCl dissolved in 1 kg water is | | | | | | | |
|  | a) | 3.42 | b) | 1.62 | c) | 3.24 | d) | 1.71 |
| 138. | The density of a 3.60 M sulphuric acid solution that is 29% by mass will be | | | | | | | |
|  | a) | 1.64 | b) | 1.88 | c) | 1.22 | d) | 1.45 |
| 139. | The vapour pressure (VP) of a dilute solution of non-volatile solute is and the VP of pure solvent is , the lowering of the VP is : | | | | | | | |
|  | a) | +ve | b) | ⎯ve | c) |  | d) |  |
| 140. | Vapour pressure ofat is 143 mm of Hg and 0.5 g of a non-volatile solute (mol. wt=65) is dissolved in. Find the vapour pressure of the solution. (Density of ) | | | | | | | |
|  | a) | 94.39 mm | b) | 141.93 mm | c) | 134.44 mm | d) | 199.34 mm |
| 141. | How many gram of NaOH will be required to prepare 500 g solution containing 10% NaOH solution? | | | | | | | |
|  | a) | 100 g | b) | 50 g | c) | 0.5 g | d) | 5.0 g |
| 142. | Conc has a density of 1.98 g/mL and is 98% by weight. Its normality is | | | | | | | |
|  | a) | 19.6 N | b) | 29.6 N | c) | 39.6 N | d) | 49.6 N |
| 143. | The phenomenon in which cells are shrinked down if placed in hypertonic solution is called : | | | | | | | |
|  | a) | Plasmolysis | b) | Haemolysis | c) | Endosmosis | d) | None of these |
| 144. | Beckmann thermometer are used to measure : | | | | | | | |
|  | a) | Boiling point of the solution | | | | | | |
|  | b) | Freezing point of the solution | | | | | | |
|  | c) | Any temperature | | | | | | |
|  | d) | Elevation in boiling point or depression in freezing point | | | | | | |
| 145. | molecules of urea are present in 100 mL of its solution. The concentration of urea solution is  (Avogadro constant, | | | | | | | |
|  | a) | 0.001 M | b) | 0.01 M | c) | 0.02 M | d) | 0.1 M |
| 146. | When a crystal of the solute is introduced into a super saturated solution of the solute : | | | | | | | |
|  | a) | The solute dissolves | | | | | | |
|  | b) | The excess solute crystallizes out | | | | | | |
|  | c) | The solution becomes unsaturated | | | | | | |
|  | d) | The solution remains super saturated | | | | | | |
| 147. | The mole fraction of the solute in one modal aqueous solution is | | | | | | | |
|  | a) | 0.018 | b) | 0.027 | c) | 0.036 | d) | 0.048 |
| 148. | Which of the following solutions will have the highest boiling point ? | | | | | | | |
|  | a) | Camphor | b) | Naphthalene | c) | Benzene | d) | Water |
| 149. | The normality of mixture obtained by mixing 100 mL of 0.2 M +  100 mL of 0.2 M NaOH is | | | | | | | |
|  | a) | The nature of gas | | | b) | The temperature | | |
|  | c) | The nature of the solvent | | | d) | All of the above | | |
| 150. | When attraction between is more than that of and , the solution will show…..deviation from Raoult’s law | | | | | | | |
|  | a) | Positive | b) | Negative | c) | No | d) | Cannot predicted |
| 151. | A solution containing 4 g of polyvinyl chloride polymer in one litre of dioxane was found to have an osmotic pressure of atm at . The approximate molecular weight of the polymer is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 152. | The solubility of a gas in water depends on : | | | | | | | |
|  | a) | Nature of the gas | b) | Temperature | c) | Pressure of the gas | d) | All of these |
| 153. | Which of the following is not a colligative property? | | | | | | | |
|  | a) | Optical activity | | | b) | Osmotic pressure | | |
|  | c) | Depression of freezing point | | | d) | Elevation of boiling point | | |
| 154. | The freezing point depression of 0.001 m, is . If for water, is 1.86 K Kg , value of will be | | | | | | | |
|  | a) | 4 | b) | 3 | c) | 2 | d) | 1 |
| 155. | The vapour pressure of benzene at a certain temperature is 640 mm of Hg. A non-volatile and non-electrolyte solid weighing 2.175 g is added to 39.08 g of benzene. If the vapour pressure of the solution is 600 mm of Hg, what is the molecular weight of solid substance? | | | | | | | |
|  | a) | 49.50 | b) | 59.60 | c) | 69.60 | d) | 79.82 |
| 156. | For an aqueous solution, freezing point is . Elevation of the boiling point of the same solution is (kg and | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 157. | The partial pressure of ethane over a saturated solution containing g of ethane is 1 bar. If the solution contains g of ethane, the partial pressure of ethane will be : | | | | | | | |
|  | a) | 0.762 bar | b) | 1.762 bar | c) | 0.1 bar | d) | 0.2 bar |
| 158. | The vapour pressure of benzene at 90 is 1020 torr. A solution of 5 g of a solute in 58.5 g benzene has vapour pressure 990 torr. The molecular weight of the solute is : | | | | | | | |
|  | a) | 78.2 | b) | 178.2 | c) | 206.2 | d) | 220 |
| 159. | The osmatic pressure of 0.4% urea solution is 1.66 atm. and that of a solutions of sugar of 3.42% is 2.46 atm. When both the solutions are mixed then the osmatic pressure of the resultant solution will be | | | | | | | |
|  | a) | 1.02 atm | b) | 2.06 atm | c) | 3.04 atm | d) | 0.02 atm |
| 160. | Vapour pressure of dilute aqueous solution of glucose is 750 mm of mercury at 373 K. The mole fraction of solute is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 161. | The relative lowering of vapour pressure produced by dissolving 71.5 g of a substance in 1000 g of water is 0.00713. The molecular weight of the substance will be : | | | | | | | |
|  | a) | 180 | b) | 18.0 | c) | 342 | d) | 60 |
| 162. | 5 L of a solution contains 25 mg of What is its concentration in ppm? (mol. wt. of is 100) | | | | | | | |
|  | a) | 25 | b) | 1 | c) | 5 | d) | 2500 |
| 163. | Binary liquid solutions which exhibit negative deviations from Raoult’s law boil at temperature ….than the expected value : | | | | | | | |
|  | a) | Lower | b) | Higher | c) | Same | d) | Cannot be said |
| 164. | A substance will be deliquescent it its vapour pressure is : | | | | | | | |
|  | a) | Equal to the atmospheric pressure | | | | | | |
|  | b) | Equal to that of water vapour in the air | | | | | | |
|  | c) | Greater than that of water vapour in the air | | | | | | |
|  | d) | Lesser than that of water vapour in the air | | | | | | |
| 165. | The distribution coefficient of in between and is 85 in favour of at 25. If solubility of in at is 0.33 g lin is ……..g . | | | | | | | |
|  | a) | 28.05 | b) | 30.05 | c) | 40.05 | d) | 26.05 |
| 166. | 1.0 g of a non-electrolyte solute (molar mass 250 g ) was dissolved in 51.2 g of benzene. If the freezing point depression constant of benzene is 5.12 K kg , the lowering in freezing point will be : | | | | | | | |
|  | a) | 0.5 K | b) | 0.2 K | c) | 0.4 K | d) | 0.3 K |
| 167. | Which of the following concentration term is/are independent of temperature? | | | | | | | |
|  | a) | Molarity | | | b) | Molarity and mole fraction | | |
|  | c) | Mole fraction and molality | | | d) | Molality and normality | | |
| 168. | An azeotropic mixture of two liquids has boiling point lower than either of them, when it | | | | | | | |
|  | a) | Shows a negative deviation from Raoult’s law | | | b) | Shows no deviation from Raoult’s law | | |
|  | c) | Shows positive deviation from Raoult’s law | | | d) | Is saturated | | |
| 169. | The molal elevation constant for water is 0.52 K . The elevation caused in the boiling point of water by dissolving 0.25 mole of a non-volatile solute in 250 g of water will be : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 170. | At benzene has a vapour pressure of 900 torr and toluene has a vapour pressure of 360 torr. What is the mole fraction of benzene in the mixture with toluene that will boil at at 1 atm pressure, benzene-toluene form an ideal solution? | | | | | | | |
|  | a) | 0.416 | b) | 0.588 | c) | 0.688 | d) | 0.740 |
| 171. | Which one of the statements given below concerning properties of solutions, describes a colligative effect? | | | | | | | |
|  | a) | Vapour pressure of pure water decreases by the addition of nitric acid | | | | | | |
|  | b) | Boiling point of pure water decreases by the addition of ethanol | | | | | | |
|  | c) | Boiling point of pure benzene increases by the addition of toluene | | | | | | |
|  | d) | Vapour pressure of pure benzene decreases by the addition of naphthalene | | | | | | |
| 172. | An example of a solution having liquid in gas is: | | | | | | | |
|  | a) | Moist air | | | | | | |
|  | b) | Dry air | | | | | | |
|  | c) | Au-Hg | | | | | | |
|  | d) |  | | | | | | |
| 173. | Which of the given solutions has highest osmotic pressure? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 174. | At high altitude the boiling of water occurs at low temp. because : | | | | | | | |
|  | a) | Atmospheric pressure is low | | | | | | |
|  | b) | Temperature is low | | | | | | |
|  | c) | Atmospheric pressure is high | | | | | | |
|  | d) | None of the above | | | | | | |
| 175. | If a 5.25% (wt./vol.) solution of a non-electrolyte is isotonic with 1.50% (wt./vol.) solution of urea, (mol-wt =60) is the same solvent then the molecular weight of non-electrolyte is : | | | | | | | |
|  | a) | 210.0 | b) | 90.0 | c) | 115.0 | d) | 105 |
| 176. | Which solution will have least vapour pressure? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 177. | The phenomenon in which cells are swelled up and then burst if placed in hypotonic solution is called : | | | | | | | |
|  | a) | Plasmolysis | b) | Haemolysis | c) | Exosmosis | d) | None of these |
| 178. | If 117 g NaCl is dissolved in 1000 g of water the concentration of the solution is said to be | | | | | | | |
|  | a) | 2 molar | b) | 2 molal | c) | 1 normal | d) | 1 molal |
| 179. | 0.1 molal aqueous solution of freezes at at atmospheric pressure for water is . The percentage of dissociation of the salt in solution is | | | | | | | |
|  | a) | 90 | b) | 80 | c) | 58 | d) | 98 |
| 180. | Increasing the temperature of an aqueous solution will cause | | | | | | | |
|  | a) | Decrease in molarity | | | b) | Decrease in molarity | | |
|  | c) | Decrease in mole fraction | | | d) | Decrease in % | | |
| 181. | The vapour pressure of two liquids and are 80 torr and 60 torr respectively. The total vapour pressure obtained by mixing 3 mole of and 2 mole of would be : | | | | | | | |
|  | a) | 68 torr | b) | 20 torr | c) | 140 torr | d) | 72 torr |
| 182. | The molal boiling point constant of water is When 2 mole of glucose are dissolved in 4000 g of water, the solution will boil at : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 183. | One mole of non-volatile solute is dissolved in two mole of water. The vapour pressure of the solution relative to that of water is : | | | | | | | |
|  | a) | 2/3 | b) | 1/3 | c) | 1/2 | d) | 3/2 |
| 184. | The for between and is 588 in favour of One litre of aqueous solution containing 1 g of is shaken with 50 mL of . What will be the amount of in aqueous layer? | | | | | | | |
|  | a) | 0.035 g | b) | 0.010 g | c) | 0.05 g | d) | 0.04 g |
| 185. | How many grams of dibasic acid (mol. wt. 200) should be present in 100 mL of the aqueous solution to give 0.1 N? | | | | | | | |
|  | a) | 10 g | b) | 20 g | c) | 2 g | d) | 1 g |
| 186. | The vapour pressure of a dilute solution is not influenced by : | | | | | | | |
|  | a) | Temperature of solution | | | | | | |
|  | b) | Melting point of solute | | | | | | |
|  | c) | Mole fraction of solute | | | | | | |
|  | d) | Degree of dissociation of solute | | | | | | |
| 187. | 35.4 mL of HCl is required for the neutralisation of a solution containing 0.275 g of sodium hydroxide. The normality of hydrochloric acid is | | | | | | | |
|  | a) | 0.97 N | b) | 0.142 N | c) | 0.194 N | d) | 0.244 N |
| 188. | Molal elevation constant of a liquid is : | | | | | | | |
|  | a) | The elevent in b.p. which would be produced by dissolving one mole of solute in 100 g of solvent | | | | | | |
|  | b) | The elevation of b.p. which would be produced by dissolving 1 mole solute in 10 g of solvent. | | | | | | |
|  | c) | Elevation in b.p. which would be produced by dissolving 1 mole of solute in 1000 g of solvent | | | | | | |
|  | d) | None of the above | | | | | | |
| 189. | The solubility of gas in liquid depends upon : | | | | | | | |
|  | a) | Nature of gas | | | | | | |
|  | b) | Nature of solvent | | | | | | |
|  | c) | Temperature and pressure | | | | | | |
|  | d) | All of the above | | | | | | |
| 190. | Relative lowering of vapour pressure of a dilute solution is 0.2. What is the mole fraction of the non-volatile solute ? | | | | | | | |
|  | a) | 0.8 | b) | 0.5 | c) | 0.3 | d) | 0.2 |
| 191. | If 0.1 M solutions of each electrolyte are taken and if all electrolytes are completely dissociated, then whose boiling point will be highest ? | | | | | | | |
|  | a) | Glucose | b) | KCl | c) |  | d) |  |
| 192. | *A* and *B* ideal gases. The molecular weights of *A* and *B* are in the ratio of 1:4. The pressure of a gas mixture containing equal weight of *A* and *B* is *p* atm. What is the partial pressure (in atm) of *B* in the mixture? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 193. | What amount of water is added in 40 mL of NaOH (0.1 N) which is neutralised by 50 mL of HCl (0.2 N)? | | | | | | | |
|  | a) | 80 mL | b) | 60 mL | c) | 40 mL | d) | 90 mL |
| 194. | The amount of ice that will separate out on cooling a solute containing 50 g of ethylene glycol in 200 g water to will be | | | | | | | |
|  | a) | 8.37 g | b) | 161.3 g | c) | 3.87 g | d) | 38.7 g |
| 195. | The freezing point depression constant for water is If 5.00 g is dissolved in 45.0 g , the freezing point is change by Calculate the van’t Hoff factor for . | | | | | | | |
|  | a) | 0.381 | b) | 2.05 | c) | 2.63 | d) | 3.11 |
| 196. | At, the vapour pressure of pure liquid ‘*A*’ is 520 mm Hg and that of pure liquid ‘*B*’ is 1000 mm Hg. If a mixture solution of ‘*A*’ and ‘*B*’ boils at and 1 atm pressure, the amount of ‘*A*’ in the mixture is  (1 atm = 760 mm Hg) | | | | | | | |
|  | a) | 52 mole per cent | b) | 34 mole per cent | c) | 48 mole per cent | d) | 50 mole per cent |
| 197. | The elevation of boiling point method is used for the determination of molecular weight of: | | | | | | | |
|  | a) | Non-volatile and soluble solute | | | | | | |
|  | b) | Non-volatile and insoluble solute | | | | | | |
|  | c) | Volatile and soluble solute | | | | | | |
|  | d) | Volatile and insoluble solute | | | | | | |
| 198. | What is the freezing point of a solution containing 8.1 g HBr in 100 g water assuming the acid to be 90% ionised? () | | | | | | | |
|  | a) | 0.85 | b) | -3.53 | c) | 0 | d) | -0.35 |
| 199. | Equimolal solutions will have the same boiling point, provided they do not show : | | | | | | | |
|  | a) | Electrolysis | | | | | | |
|  | b) | Association | | | | | | |
|  | c) | Dissociation | | | | | | |
|  | d) | Association or dissociation | | | | | | |
| 200. | Volume of 0.1 M required to oxidise 35 mL of 0.5 M solution is | | | | | | | |
|  | a) | 29.2 mL | b) | 17.5 mL | c) | 175 mL | d) | 145 mL |
| 201. | A solution of two liquids boils at a temperature more than the boiling point of either them. Hence, the binary solution shows | | | | | | | |
|  | a) | Negative deviation from Raoult’s law | | | | | | |
|  | b) | Positive deviation from Raoult’s law | | | | | | |
|  | c) | No deviation from Raoult’s law | | | | | | |
|  | d) | Positive or negative deviation from Raoult’s law depending upon the composition | | | | | | |
| 202. | Vapour pressure of pure ‘*A*’ is 70 mm of Hg at It from an ideal solution with ‘*B*’ in which mole fraction of *A* is 0.8. If the vapour pressure of the solution is 84 mm of Hg at the vapour pressure of pure ‘*B*’ at is | | | | | | | |
|  | a) | 28 mm | b) | 56 mm | c) | 70 mm | d) | 140 mm |
| 203. | Abnormal colligative properties are observed only when the dissolved non-volatile solute in a given dilute solution | | | | | | | |
|  | a) | Is a non-electrolyte | | | b) | Offers an intense colour | | |
|  | c) | Associates of dissociates | | | d) | Offers no colour | | |
| 204. | As a result of osmosis, the volume of the concentrated solution : | | | | | | | |
|  | a) | Gradually decreases | | | | | | |
|  | b) | Gradually increases | | | | | | |
|  | c) | Suddenly increases | | | | | | |
|  | d) | None of these | | | | | | |
| 205. | At a suitable pressure near the freezing point of ice, there exists : | | | | | | | |
|  | a) | Only ice | | | | | | |
|  | b) | Ice and water | | | | | | |
|  | c) | Ice and vapour | | | | | | |
|  | d) | Ice, water and vapours, all existing side by side | | | | | | |
| 206. | Which of the following concentration units is independent of temperature? | | | | | | | |
|  | a) | Normality | b) | Molarity | c) | Molality | d) | ppm |
| 207. | In cold countries, ethylene glycol is added to water in the radiators of cars during winters. It results in : | | | | | | | |
|  | a) | Lowering in boiling point | | | | | | |
|  | b) | Reducing viscosity | | | | | | |
|  | c) | Reducing specific heat | | | | | | |
|  | d) | Lowering in freezing point | | | | | | |
| 208. | Calculate the molal depression constant of a solvent which has freezing point and latent heat of fusion 180.75 . | | | | | | | |
|  | a) | 2.68 | b) | 3.86 | c) | 4.68 | d) | 2.86 |
| 209. | The freezing point depression constant for water is 1.86 K kg. If 45 g of ethylene glycol is mixed with 600 g of water , the freezing point of the solution is | | | | | | | |
|  | a) | 2.2 K | b) | 270.95 K | c) | 273 K | d) | 275.35 K |
| 210. | The movement of solvent molecules through a semipermeable membrane is called | | | | | | | |
|  | a) | Electrolysis | b) | Electrophoresis | c) | Osmosis | d) | Cataphoresis |
| 211. | An aqueous solution of methanol in water has vapour pressure | | | | | | | |
|  | a) | Less than that of water | | | b) | More than that of water | | |
|  | c) | Equal to that of water | | | d) | Equal to that of methanol | | |
| 212. | Which pair shows a contraction in volume on mixing along with evolution of heat? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | All of these |
| 213. | The vapour pressure of water at  is added to 178.2 g of water at , 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 |
| 214. | At 80, the vapour pressure of pure liquid is 520 mm Hg and that of pure liquid is 1000 mm Hg. If a mixture of solution boils at and 1 atm pressure, the amount of in the mixture is : (1 atm = 760 mm Hg) | | | | | | | |
|  | a) | 50 mol per cent | b) | 52 mol per cent | c) | 34 mol per cent | d) | 48 mol per cent |
| 215. | Van’t Hoff factor | | | | | | | |
|  | a) | Is less than one in case of dissociation | | | | | | |
|  | b) | Is more than one in case of association | | | | | | |
|  | c) | <img src="215\_A3.gif" > | | | | | | |
|  | d) | <img src="215\_A4.gif" > | | | | | | |
| 216. | Following solutions at the same temperature will be isotonic : | | | | | | | |
|  | a) | 3.42 g of cane sugar in one litre water and 0.18 g of glucose in one litre water | | | | | | |
|  | b) | 3.42 g of cane sugar in one litre water and 0.18 g of glucose in 0.1 litre water | | | | | | |
|  | c) | 3.42 g of cane sugar in one litre water and 0.585 g of NaCl in one litre water | | | | | | |
|  | d) | 3.42 g of cane sugar in one litre water and 1.17 g of NaCl in one litre water | | | | | | |
| 217. | The osmatic pressure of a 5% (wt./vol) solution of cane sugar at is | | | | | | | |
|  | a) | 3.078 atm | b) | 4.078 atm | c) | 5.078 atm | d) | 2.45 atm |
| 218. | Ethylene glycol 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 will be ( and molar mass of ethylene glycol = ) | | | | | | | |
|  | a) | 804.32 g | b) | 204.30 g | c) | 400.00 g | d) | 304.60 g |
| 219. | Mole fraction of solute in benzene is 0.2 then find molality of solute | | | | | | | |
|  | a) | 3.2 | b) | 2 | c) | 4 | d) | 3.6 |
| 220. | When a solute is added in two immiscible solvents, it distributes itself between two liquids so that its concentration in first liquid is and that in the second liquid is . If the solute forms a stable trimer in the first liquid, the distribution law suggests that : | | | | | | | |
|  | a) |  | | | | | | |
|  | b) | <img src="220\_A2.gif" > | | | | | | |
|  | c) | <img src="220\_A3.gif" > | | | | | | |
|  | d) | <img src="220\_A4.gif" > | | | | | | |
| 221. | Which is not applicable to distribution law? | | | | | | | |
|  | a) | Parke’s process | | | | | | |
|  | b) | Solvent extraction | | | | | | |
|  | c) | Pattinson’s process | | | | | | |
|  | d) | Partition chromatography | | | | | | |
| 222. | Which of the following is the expression of Raoult’s law?  (vapour pressure of pure solvent, vapour pressure of the solution) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 223. | For determination of molar mass of colloids, polymers and protein, which property is used ? | | | | | | | |
|  | a) | Diffusion pressure | | | b) | Atmospheric pressure | | |
|  | c) | Osmotic pressure | | | d) | Turgor pressure | | |
| 224. | 3.0 molal solution has a density of 1.110 g/. The molarity of the solution is | | | | | | | |
|  | a) | 3.9732 | b) | 2.9732 | c) | 1.9732 | d) | 0.9732 |
| 225. | Sodium sulphate is soluble in water, while barium sulphate is sparingly soluble because : | | | | | | | |
|  | a) | The hydration energy of sodium sulphate is more than its lattice energy | | | | | | |
|  | b) | The lattice energy of barium sulphate is less than the hydration energy | | | | | | |
|  | c) | The lattice energy has no role to play in solubility | | | | | | |
|  | d) | The hydration energy of sodium sulphate is less than its lattice energy | | | | | | |
| 226. | Distribution law is applicable when : | | | | | | | |
|  | a) | Temperature remains constant | | | | | | |
|  | b) | Dilute solutions are employed | | | | | | |
|  | c) | The two solvents are mutually insoluble | | | | | | |
|  | d) | All are correct | | | | | | |
| 227. | of 0.1 N monobasic acid requires of sodium hydroxide solution whose normality is | | | | | | | |
|  | a) | 1.5 N | b) | 0.15 N | c) | 0.066 N | d) | 0.66 N |
| 228. | Density of a 2.05 M solution of acetic acid in water is 1.02 g/mL. The molality of the solution is | | | | | | | |
|  | a) | 1.14 mol | b) | 3.28 mol | c) | 2.28 mol | d) | 0.44 mol |
| 229. | x gram of water is mixed in 69 g of ethanol. Mole fraction of ethanol in the resultant solution is 0.6. What is the value of x in grams? | | | | | | | |
|  | a) | 54 | b) | 36 | c) | 180 | d) | 18 |
| 230. | Dissolution of a solute is an exothermic process if : | | | | | | | |
|  | a) | Hydration energy > lattice energy | | | | | | |
|  | b) | Hydration energy < lattice energy | | | | | | |
|  | c) | Hydration energy = lattice energy | | | | | | |
|  | d) | None of the above | | | | | | |
| 231. | Molarity is expressed as | | | | | | | |
|  | a) | L/mol | b) | Mol/L | c) | Mol/1000 g | d) | g/L |
| 232. | The amount of anhydrous present in 250 of 0.25 M solution is | | | | | | | |
|  | a) | 6.0 g | b) | 6.625 g | c) | 66.25 g | d) | 6.225 g |
| 233. | Which of the following compounds correspond to maximum van’thoff factor for dilute solution? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 234. | Solute is a ternary electrolyte and solute is non-electrolyte. If solution of solute produces an osmotic pressure of 2, then 0.05 solution of at the same temperature will produce an osmotic pressure equal to : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 235. | A solution of sucrose (molar mass 342 g ) has been produced by dissolving 68.5 g sucrose in 1000 g water. The freezing point of the solution obtained will be : ( | | | | | | | |
|  | a) |  | b) |  | c) | + 0.372 | d) |  |
| 236. | A mixture of ethyl alcohol and propyl alcohol has a vapour pressure of 290 mm at 300 K. the vapour pressure of propyl alcohol is 200 mm. If the mole fraction of ethyl alcohol is 0.6, its vapour pressure (in mm) at the same temperature will be | | | | | | | |
|  | a) | 350 | b) | 300 | c) | 700 | d) | 360 |
| 237. | How many grams of sulphuric acid is to be dissolved to prepare 200 mL aqueous solution having concentration of ions 1 M at 25 temperature. | | | | | | | |
|  | a) | 4.9g | b) | 19.6g | c) | 9.8g | d) | 0.98g |
| 238. | What is the molarity of solution if 25 mL is exactly neutralised with 32.63 mL of 0.164 M NaOH? | | | | | | | |
|  | a) | 0.107 M | b) | 0.126 M | c) | 0.214 M | d) | -0.428 M |
| 239. | What is the molality of ethyl alcohol (mol. wt. = 416) in aqueous solution which freezes at ?. | | | | | | | |
|  | a) | 3.540 | b) | 4.567 | c) | 5.376 | d) | 6.315 |
| 240. | The solubility order for the following gases is : | | | | | | | |
|  | a) |  | | | | | | |
|  | b) |  | | | | | | |
|  | c) |  | | | | | | |
|  | d) |  | | | | | | |
| 241. | A 5.2 molal aqueous solution of methyl alcohol, , is supplied. What is the mole fraction of methyl alcohol in the solution? | | | | | | | |
|  | a) | 1.100 | b) | 0.190 | c) | 0.086 | d) | 0.050 |
| 242. | Equal masses of methane and oxygen are mixed in an empty container at The fraction of the total pressure exerted by oxygen is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 243. | Two liquids *X* and *Y* form an ideal solution. The mixture has a vapour pressure of 400 mm at 300 K when mixed in the molar ratio of 1:1 and a vapour pressure of 350 mm when mixed in the molar ratio of 1:2 at the same temperature. The vapour pressures of the two pure liquids *X* and *Y* respectively are | | | | | | | |
|  | a) | 250 mm, 550 mm | b) | 350 mm, 450 mm | c) | 350 mm, 700 mm | d) | 550 mm, 250 mm |
| 244. | The van’t Hoff factor for a dilute aqueous solution of is : | | | | | | | |
|  | a) | 1 + | b) |  | c) |  | d) |  |
| 245. | and are the vapour pressure of pure liquid components respectively of an ideal binary solution. If represents the mole fraction of component the total pressure of the solution will be : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 246. | Formation of a solution from two components can be considered as  (1) pure solvent separated solvent molecules,  (2) pure solute separated solvent molecules,  (3) separated solvent and solute molecules solution,  Solution so formed will be ideal if | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 247. | Azeotropic mixture of HCl and water has | | | | | | | |
|  | a) | 48% HCl | b) | 22.2% HCl | c) | 36% HCl | d) | 20.2% HCl |
| 248. | What is the molarity of solution that has a density 1.84 g/cc at and contains 98% solute by weight? | | | | | | | |
|  | a) | 4.18 M | b) | 1.84 M | c) | 8.41 M | d) | 18.4 M |
| 249. | The osmotic pressure of 0.2 molar solution of urea at (R=0.082 L atm )is | | | | | | | |
|  | a) | 4.92 atm | b) | 1 atm | c) | 0.2 atm | d) | 27 atm |
| 250. | In which ratio of volume 0.4 M HCl and 0.9 M HCl are to be mixed such that the concentration of the resultant solution becomes 0.7 M ? | | | | | | | |
|  | a) | 4 : 9 | b) | 2 : 3 | c) | 3 : 2 | d) | 1 : 1 |
| 251. | The empirical formula of a nonelectrolyte is A solution containing 3 g of the compound exerts the same osmotic pressure as that of 0.05 M glucose solution. The molecular formula of the compound is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 252. | Which of the following can be measured by the Ostwald-Walker dynamic method? | | | | | | | |
|  | a) | Relative lowering of vapour pressure | | | b) | Lowering of vapour pressure | | |
|  | c) | Vapour pressure of the solvent | | | d) | All of the above | | |
| 253. | On shaking 10 mL of 0.1 molar solution of an organic compound in water with 10 mL of til equilibrium is attained, concentration of the organic compound in water would be in molar units : | | | | | | | |
|  | a) | 0.01 | b) | 0.09 | c) | 0.001 | d) | 0.009 |
| 254. | A solution containing 1.8 g of a compound (empirical formula ) in 40 g of water is observed to freeze at The molecular formula of the compound is  () | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 255. | For dilute solution Raoult’s law states that | | | | | | | |
|  | a) | The relative lowering of vapour pressure is equal to mole fraction of solute | | | | | | |
|  | b) | The lowering of vapour pressure is equal to the mole fraction of solute | | | | | | |
|  | c) | The vapour pressure of the solution is equal to mole fraction of the solvent | | | | | | |
|  | d) | The relative lowering of vapour pressure is proportional to amount of solute in solution | | | | | | |
| 256. | For an ideal binary liquid solution with which relation between (mole fraction of in liquid phase) and (mole fraction of in vapour phase) is correct, and are mole fraction of in liquid and vapour phase respectively : | | | | | | | |
|  | a) |  | | | | | | |
|  | b) |  | | | | | | |
|  | c) |  | | | | | | |
|  | d) | and cannot be corelated | | | | | | |
| 257. | The normality of 2.3 M solution is | | | | | | | |
|  | a) | 4.6 N | b) | 5.6 N | c) | 6.6 N | d) | 7.6 N |
| 258. | The molecular weight of determined by studying freezing point depression of its 0.5% aqueous solution is 30. The apparent degree of dissociation of NaCl is | | | | | | | |
|  | a) | 0.60 | b) | 0.50 | c) | 0.30 | d) | 0.95 |
| 259. | A 5 molar solution of is diluted from 1 L to 10 L. What is the normality of the solution? | | | | | | | |
|  | a) | 0.25 N | b) | 1 N | c) | 2 N | d) | 7 N |
| 260. | 100 mL of water and 50 mL ether mixture is shaken with succinic acid. At equilibrium ether layer contains 0.127 g and water layer contains 1.843 g of succinic acid. The partition coefficient of succinic acid in favour of water is : | | | | | | | |
|  | a) | 7.26 | b) | 10 | c) | 2 | d) | 4.5 |
| 261. | The lubricating action of an oil is more if it possess : | | | | | | | |
|  | a) | High vapour pressure | | | | | | |
|  | b) | Low vapour pressure | | | | | | |
|  | c) | High surface tension | | | | | | |
|  | d) | High density | | | | | | |
| 262. | Maximum lowering of vapour pressure is observed in the case of | | | | | | | |
|  | a) | 0.1 M glucose | b) | 0.1 M | c) | 0.1 M | d) | 0.1 NaCl |
| 263. | The solubility of a gas in liquid at a temperature is directly proportional to its : | | | | | | | |
|  | a) | Density | b) | Melting point | c) | Boiling point | d) | Pressure |
| 264. | A solution of sucrose (Molar mass = 342 g/mol) is prepared by dissolving 68.4 g of it per litre of solution, what is its osmotic pressure (R=0.082 L atm) at 273 K? | | | | | | | |
|  | a) | 3.92 atm | b) | 4.48 atm | c) | 5.92 atm | d) | 29.4 atm |
| 265. | Which of the following concentration factors is affected by change in temperature? | | | | | | | |
|  | a) | Molarity | b) | Molality | c) | Mole fraction | d) | Weight fraction |
| 266. | Which of the following mixture does not show positive deviation from the Raoult’s law? | | | | | | | |
|  | a) | Benzene + acetone | | | b) | Acetone + ethanol | | |
|  | c) | Acetone + chloroform | | | d) | Water + ethanol | | |
| 267. | The ratio of vapour pressure over solution phase on mixing two immiscible liquids is equal to : | | | | | | | |
|  | a) | Ratio of their weights in mixture | | | | | | |
|  | b) | Ratio of their mol. weights | | | | | | |
|  | c) | Ratio of their moles in liquid phase | | | | | | |
|  | d) | Ration of their moles in vapour phase | | | | | | |
| 268. | The vapour pressure of benzene at is lowered by 10 mm by dissolving 2g of a non-volatile substance in 78 g of benzene. The vapour pressure of pure benzene at 80 is 750 mm. The molecular weight of the substance will be : | | | | | | | |
|  | a) | 15 | b) | 150 | c) | 1500 | d) | 148 |
| 269. | is added to a system of and . The concentration of in water and is found to be respectively. The ratio of will be constant only if : | | | | | | | |
|  | a) | The solutions are dilute | | | | | | |
|  | b) | The temperature remains constant | | | | | | |
|  | c) | The solute neither changing the immiscibility of solvents nor itself changing in molecular state | | | | | | |
|  | d) | All of the above | | | | | | |
| 270. | The boiling point of an aqueous solution of a non-volatile solute is 100.15. What is the freezing point of an aqueous solution obtained by diluting the above solution with an equal volume of water? The values of for water are 0.512 and 1.86 K | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 271. | A solution has an osmotic pressure of 0.821 atom at 300 K. its concentration would be : | | | | | | | |
|  | a) | 0.066 | b) | 0.66 | c) |  | d) |  |
| 272. | Density of a 2.05 M solution of acetic acid in water is 1.02 g/mL. The molality of the solution is | | | | | | | |
|  | a) | 9 L | b) | 1.8 L | c) | 8 L | d) | 0.9 L |
| 273. | On adding 1 g arsenic to 80 g benzene, the freezing point of benzene is lowered by The formula of arsenic is | | | | | | | |
|  | a) | As | b) |  | c) |  | d) |  |
| 274. | The process of getting fresh water from sea water is known as : | | | | | | | |
|  | a) | Osmosis | | | | | | |
|  | b) | Filtration | | | | | | |
|  | c) | Diffusion | | | | | | |
|  | d) | Reverse osmosis | | | | | | |
| 275. | The statement “the relative lowering of the vapour pressure is equal to th ratio ot moles of the solute to the total number of the moles in the solution” refers to | | | | | | | |
|  | a) | Decrease the freezing point of water in the winter and increase the boiling point of water in the 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 | | | | | | |
| 276. | *X* is dissolved in water. Maximum boiling point is observed when *X* is ….(0.1 M each) | | | | | | | |
|  | a) |  | b) |  | c) | NaCl | d) | Urea |
| 277. | What is molarity of in aqueous solution that contains 17.4 ppm of ()? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 278. | Which of the following statement is true? | | | | | | | |
|  | a) | The relative lowering of vapour pressure of a solution is equal to the mole fraction of the solute present in the solution. | | | | | | |
|  | b) | Passage of solute molecules towards solution side through semipermeable membrane is osmosis. | | | | | | |
|  | c) | The boiling point of solution is always lower than the solvent. | | | | | | |
|  | d) | The boiling point of a liquid is the temperature at which its vapour pressure becomes equal to 260 mm. | | | | | | |
| 279. | Calculate the molarity of 1 L solution of 93% (weight/volume). The density of the solution is 1.84 g/mL | | | | | | | |
|  | a) | 11.05 | b) | 12.05 | c) | 13.05 | d) | 14.05 |
| 280. | If 0.15 g of a solute dissolved in 15 g of solvent is boiled at a temperature higher by than that of the pure solvent, the molecular weight of the substance is (molal elevation constant for the solvent is ) | | | | | | | |
|  | a) | 100 | b) | 102 | c) | 104 | d) | 1.02 |
| 281. | The vapour pressure of a liquid in a closed container depends upon | | | | | | | |
|  | a) | Amount of liquid | | | b) | Surface area of the container | | |
|  | c) | Temperature | | | d) | None of the above | | |
| 282. | The vapour pressure of a solution is proportional to : | | | | | | | |
|  | a) | Mole fraction of solute | | | | | | |
|  | b) | 1/(mole fraction of solute) | | | | | | |
|  | c) | Mole fraction of solvent | | | | | | |
|  | d) | None of the above | | | | | | |
| 283. | At a 5% aqueous solution of glucose (molecular weight = 180 g ) is isotonic with 2% aqueous solution containing an unknown solute. What is the molecular weight of the unknown solute. | | | | | | | |
|  | a) | 60 | b) | 80 | c) | 72 | d) | 63 |
| 284. | The spontaneous movement of solute particles from a more concentrated solution to less concentrated solution is called : | | | | | | | |
|  | a) | Osmosis | b) | Diffusion | c) | Plasmolysis | d) | Fusion |
| 285. | How many grams of a sucrose () should be dissolved in 100 g water in order to produce a solution with a difference between the freezing point and boiling temperature? | | | | | | | |
|  | a) | 34.2 g | b) | 72 g | c) | 342 g | d) | 460 g |
| 286. | A solution of urea (mol. mass 56) boils at 100.18 at atmospheric pressure. If for water are 1.86 and 0.512 K respectively, the above solution will freeze at : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 287. | 19.85 mL of 0.1 N reacts with 20 mL of HCl solution for complete neutralization. The molarity of HCl solution is | | | | | | | |
|  | a) | 9.9 | b) | 0.99 | c) | 0.099 | d) | 0.0099 |
| 288. | The vapour pressure will be lowest of | | | | | | | |
|  | a) | 0.1 M sugar solution | | | b) | 0.1 M KCl solution | | |
|  | c) | 0.1 M solution | | | d) | 0.1 M soution | | |
| 289. | Which one is correct? | | | | | | | |
|  | a) | Molality changes with temperature. | | | b) | Molality does not change with temperature. | | |
|  | c) | Molarity does not change with temperature. | | | d) | Normality does not change with temperature. | | |
| 290. | What is molality of a solution in which  (18 g glucose mol. wt. = 180) is dissolved in 500 g of water? | | | | | | | |
|  | a) | 1 m | b) | 0.5 m | c) | 0.2 m | d) | 2 m |
| 291. | Which of the following solution in water possesses the lowest vapour pressure? | | | | | | | |
|  | a) |  | b) | 0.1 (M) | c) | 0.1 (M) | d) | None of these |
| 292. | A 5.25% solution of a substance is isotonic with a 1.5% solution of urea (molar mass =60 g) in the same solvent. If the densities of both the solutions are assumed to be equal to 1.0 g mass of the substance will be | | | | | | | |
|  | a) | 90.0 g | b) | 115.0 g | c) | 105.0 g | d) | 210.0 g |
| 293. | Which of the following solutions will have highest boiling point | | | | | | | |
|  | a) | 0.1 M | | | b) | 0.1 M | | |
|  | c) | 0.1 M | | | d) | 0.1 M urea () | | |
| 294. | At , the highest osmotic pressure is exhibited by 0.1 M solution of | | | | | | | |
|  | a) | Decinormalaluminiumsulphate | | | | | | |
|  | b) | Decinormal barium chloride | | | | | | |
|  | c) | Decinormal sodium chloride | | | | | | |
|  | d) | A solution obtained by mixing equal volumes of (b) and (c) and filtering | | | | | | |
| 295. | Molarity of 0.2 N is | | | | | | | |
|  | a) | 0.1 | b) | 0.2 | c) | 0.3 | d) | 0.4 |
| 296. | The ionic strength of solution containing 0.1 mol/kg of KCl and 0.2 mol/kg of is | | | | | | | |
|  | a) | 0.3 | b) | 0.6 | c) | 0.9 | d) | 0.2 |
| 297. | 25 mL of a solution of barium hydroxide on titration with 0.1 molar solution of hydrochloric acid gave a titre value of 35 mL. The molarity of barium hydroxide solution was | | | | | | | |
|  | a) | 0.07 | b) | 0.14 | c) | 0.28 | d) | 0.35 |
| 298. | The freezing point of equimolal aqueous solution will be highest for | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 299. | The normality of a 100 mL solution of sodium hydroxide which contains 4 g of , is | | | | | | | |
|  | a) | 0.5 | b) | 1.0 | c) | 1.5 | d) | 2.0 |
| 300. | For determination of molecular weights, Raoult’s law is applicable only to | | | | | | | |
|  | a) | Dilute solutions of electrolytes | | | b) | Concentration solution of electrolytes | | |
|  | c) | Dilute solutions of non electrolytes | | | d) | Concentration solution of non electrolytes | | |
| 301. | Osmotic pressure of a solution at a given temperature | | | | | | | |
|  | a) | Increases with concentration | | | b) | Decreases with concentration | | |
|  | c) | Remains same | | | d) | Initially increases and then decreases | | |
| 302. | A solution has a 1 : 4 mole ratio of pentane to hexane. The vapour pressures of pure hydrocarbons at are 440 mm Hg for pentane and 120 mm Hg for hexane. The mole fraction of pentane in vapour phase would be : | | | | | | | |
|  | a) | 0.786 | b) | 0.549 | c) | 0.478 | d) | 0.200 |
| 303. | Distribution law cannot be applied for the system in which is distributed between : | | | | | | | |
|  | a) |  | | | | | | |
|  | b) |  | | | | | | |
|  | c) |  | | | | | | |
|  | d) |  | | | | | | |
| 304. | The vapour pressure of pure liquid *A* is 0.80 atm. When a non-volatile *B* is added to *A* its vapour pressure drops to 0.60 atm. The mole fraction of *B* in the solution is | | | | | | | |
|  | a) | 0.125 | b) | 0.25 | c) | 0.5 | d) | 0.75 |
| 305. | When a non-volatile solute is dissolved in a solvent, the relative lowering of vapour pressure is equal to | | | | | | | |
|  | a) | Mole fraction of solute | | | | | | |
|  | b) | Mole fraction of solvent | | | | | | |
|  | c) | Concentration of the solute in gram per litre | | | | | | |
|  | d) | Concentration of the solute in gram per 100 mL | | | | | | |
| 306. | The freezing point of one modal solution assuming NaCl to be 100 % dissociated in water is (modal depression constant=1.86) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 307. | On mixing, heptane and octane form an ideal solution. At 373 K, the vapour pressures of the two liquid components (heptanes and octane) are 105 kPa and 45kPa respectively. Vapour pressure of the solution obtained by mixing 25 g of heptanes and 35 g of octane will be (molar mass of heptanes = 100 g and of octane = 114 g). | | | | | | | |
|  | a) | 72.0 kPa | b) | 36.1 kPa | c) | 96.2 kPa | d) | 144.5 kPa |
| 308. | The van’t Hoff factor of at 0.01 M concentration is 1.98. The percentage of dissociation of at this concentration is | | | | | | | |
|  | a) | 49 | b) | 69 | c) | 89 | d) | 98 |
| 309. | The relative lowering of vapour pressure of an aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is | | | | | | | |
|  | a) | 0.70 | b) | 0.50 | c) | 0.60 | d) | 0.80 |
| 310. | An aqueous solution of glucose was prepared by dissolving 18 g of glucose in 90 g of water. The relative lowering in vapour pressure is | | | | | | | |
|  | a) | 0.01 | b) | 0.02 | c) | 1 | d) | 20 |
| 311. | In a 0.2 molal aqueous solution of a weak acid H*X*, the degree of ionisation is 0.3 Taking for water as 1.85, the freezing point of the solution will be nearest to | | | | | | | |
|  | a) | MeV | b) | Cal | c) | Cm/s | d) | Atm |
| 312. | The unit of molality is | | | | | | | |
|  | a) | mol | b) | mol | c) |  | d) | mol L |
| 313. | An azeotropic solution of two liquids has boiling point lower than either when it | | | | | | | |
|  | a) | Shows a negative deviation from Raoult’s law | | | b) | Shows a positive deviation from Raoult’s law | | |
|  | c) | Shows no deviation from Raoult’s law | | | d) | Is saturated | | |
| 314. | The statement, “The mass of a gas dissolved in a given mass of a solvent at any temperature is proportional to the pressure of the gas above the solvent” is | | | | | | | |
|  | a) | Henry’s law | b) | Law of mass action | c) | Dalton’s law | d) | None of these |
| 315. | The freezing point of water is depressed by in a 0.01 mol NaCl solution. The freezing point of 0.02 molal solution of urea is depressed by | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 316. | A solution of protein (extracted from crabs) was prepared by dissolving 0.75 g in 125 of an aqueous solution. At an osmotic pressure rise of 2.6 mm of the solution was observed. Then molecular weight of protein is : (Assume density of solution is 1.00 g/) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 317. | 2 N HCl solution will have same molar concentration as a | | | | | | | |
|  | a) | 4.0 N | b) | 0.5 N | c) | 1 N | d) | 2 N |
| 318. | Molarity of a given orthophosphoric acid solution is 3 M. It’s normality is | | | | | | | |
|  | a) | 9N | b) | 0.3 N | c) | 3 N | d) | 1 N |
| 319. | Which of the following is a colligative property? | | | | | | | |
|  | a) | Boiling point | b) | Freezing point | c) | Osmotic pressure | d) | Vapour pressure |
| 320. | A liquid is in equilibrium with its vapours at its boiling point. On the average the molecules in the two phases have equal : | | | | | | | |
|  | a) | Potential energy | | | | | | |
|  | b) | Total energy | | | | | | |
|  | c) | Kinetic energy | | | | | | |
|  | d) | Intermolecular forces | | | | | | |
| 321. | You are given 100 mL of to extract iodine from 200 mL of its aqueous solution. For extracting maximum amount of iodine, which one of the following processes would you use? | | | | | | | |
|  | a) | Use all 100 mL of at one time | | | | | | |
|  | b) | Use 50 mL of twice | | | | | | |
|  | c) | Use 10 mL of 10 times | | | | | | |
|  | d) | Use 25 mL of 4 times | | | | | | |
| 322. | Normality of 2 M sulphuric acid is | | | | | | | |
|  | a) | 2N | b) | 4N | c) |  | d) |  |
| 323. | The elevation in boiling point of a solution of13.44 g of in 1 kg of water using the following information will be (molecular weight of and | | | | | | | |
|  | a) | 0.16 | b) | 0.05 | c) | 0.1 | d) | 0.2 |
| 324. | The degree of dissociation ( of a weak electrolyte , is related to van’t Hoff factor (i) by the expression | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 325. | On adding a solute to a solvent having vapour pressure 0.80 atmvapour pressure reduces to 0.60 atm. Mole fraction of solute is | | | | | | | |
|  | a) | 0.25 | b) | 0.75 | c) | 0.50 | d) | 0.33 |
| 326. | Generally those gases are soluble in water to a greater extent which : | | | | | | | |
|  | a) | Are easily liquefied | | | | | | |
|  | b) | Are ionized in water | | | | | | |
|  | c) | React with water | | | | | | |
|  | d) | All are correct | | | | | | |
| 327. | Two solutions containing and containing are separated by semipermeable membrane as shown below. If on reaction with , produces blue colour of , the blue colour will be noticed in :<br /><img src="327\_Q.gif" > | | | | | | | |
|  | a) |  | | | | | | |
|  | b) |  | | | | | | |
|  | c) | In both and | | | | | | |
|  | d) | Neither in nor in | | | | | | |
| 328. | The difference between the boiling point and freezing point of an aqueous solution containing sucrose (mol wt. = 342 g) in 100 g of water is If of water are 1.86 and 0.51 K kg respectively, the weight of sucrose in the solution is about | | | | | | | |
|  | a) | 34.2 g | b) | 342 g | c) | 7.2 g | d) | 72 g |
| 329. | Pressure cooker reduces cooking time for food because | | | | | | | |
|  | a) | Boiling point of water involved in cooking is increased | | | | | | |
|  | b) | Heat is more evenly distributed in the cooking space | | | | | | |
|  | c) | The higher pressure inside the cooker crushes the food material | | | | | | |
|  | d) | Cooking involves chemical changes helped by a rise in temperature | | | | | | |
| 330. | 9.8 g of is present in 2 L of a solution. The molarity of the solution is | | | | | | | |
|  | a) | 0.05 M | b) | 0.01 M | c) | 0.03 M | d) | 0.02 M |
| 331. | At , an aqueous solution of iodine containing 0.0156 g/litre is in equilibrium with a solution containing 4.412 g/litre. If the solubility of in water at is 0.34 g/litre, then its solubility in is : | | | | | | | |
|  | a) |  | | | | | | |
|  | b) |  | | | | | | |
|  | c) |  | | | | | | |
|  | d) |  | | | | | | |
| 332. | Calculate the normality of 250 mL aqueous solution of having pH = 0.00. | | | | | | | |
|  | a) | 0.25 N | b) | 0.50 N | c) | 1 N | d) | 2 N |
| 333. | Van’thoff factor of is | | | | | | | |
|  | a) | Benzoic acid is an organic solute | | | | | | |
|  | b) | Benzoic acid has higher molar mass than benzene | | | | | | |
|  | c) | Benzoic acid gets associated in benzene | | | | | | |
|  | d) | Benzoic acid gets dissociated in benzene | | | | | | |
| 334. | A solution of 5 g of iodine in was shaken with the same volume of water. The amount of iodine in water is : | | | | | | | |
|  | a) | 0.119 g | b) | 0.0119 g | c) | 0.00119 g | d) | 1.19 g |
| 335. | From the colligative properties of solution which one is the best method for the determination of molecular weight of proteins and polymers : | | | | | | | |
|  | a) | Osmotic pressure | | | | | | |
|  | b) | Lowering in vapour pressure | | | | | | |
|  | c) | Lower in freezing point | | | | | | |
|  | d) | Elevation in boiling point | | | | | | |
| 336. | Observe the following abbrevations  observed colligative property  theoretical colligative property assuming normal behaviour of  solute.  Van’t Hoff factors (*i*) is given by | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 337. | The vapour pressure of two pure liquid and are 100 torr and 80 torr respectively. The total pressure of solution obtained by mixing 2 mole of and 3 mole of would be : | | | | | | | |
|  | a) | 120 torr | b) | 36 torr | c) | 88 torr | d) | 180 torr |
| 338. | On the basis of intermolecular forces predict the correct order of decreasing boiling points of the compounds: | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 339. | Which has the highest freezing point at one atmosphere? | | | | | | | |
|  | a) | solution | b) | sugar solution | c) | solution | d) | solution |
| 340. | Binary liquid mixtures which exhibit positive deviations from Raoult’s law boil at…. temperature than the expected b. p.: | | | | | | | |
|  | a) | lower | b) | Higher | c) | Same | d) | Cannot be said |
| 341. | Which has minimum osmotic pressure? | | | | | | | |
|  | a) | 200 mL of 2 M NaCl solution | | | b) | 200 mL of 2 M glucose solution | | |
|  | c) | 200 mL of 2 M urea solution | | | d) | All have same osmotic pressure | | |
| 342. | Which of the following solutions will have the highest boiling point? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | 0.1 M urea |
| 343. | Solubility of solutes which dissolve with the liberation of heat decreases with : | | | | | | | |
|  | a) | Decrease in temperature | | | | | | |
|  | b) | Increase in temperature | | | | | | |
|  | c) | No change in temperature | | | | | | |
|  | d) | None of the above | | | | | | |
| 344. | A binary liquid solution ois prepared by mixing *n*-heptane and ethanol. Which one of the following statements is correct regarding the behaviour of the solution? | | | | | | | |
|  | a) | The solution formed is an ideal solution | | | | | | |
|  | b) | The solution is non-ideal, showing positive deviation from Raoult’s law | | | | | | |
|  | c) | The solution is non-ideal, showing negative deviation from Raoult’s law | | | | | | |
|  | d) | *n*-heptane shows positive deviation while ethanol show negative deviation from Raoult’s law | | | | | | |
| 345. | A 0.0020 m aqueous solution of an ionic compound freezes at . Number of moles of ions which 1 mol of ionic compound produces on being dissolved in water will be : | | | | | | | |
|  | a) | 1 | b) | 2 | c) | 3 | d) | 4 |
| 346. | Solutions *A, B, C* and *D* are respectively 0.1 M glucose, 0.05 M NaCl, 0.05 M and 0.1 M. Which one of the following pairs is isotonic? | | | | | | | |
|  | a) | *A* and *B* | b) | *B* and *C* | c) | *A* and *D* | d) | *A* and *C* |
| 347. | Colligative properties of a solution depends upon | | | | | | | |
|  | a) | Nature of both solvent and solute | | | | | | |
|  | b) | Nature of solute only | | | | | | |
|  | c) | Nature of solvent only | | | | | | |
|  | d) | The relative number of solute and solvent particles | | | | | | |
| 348. | A solution of sucrose (molar mass=342 g/mol) is prepared by dissolving 68.4 g of it per litre of the solution, what is its osmotic pressure () at 273 K? | | | | | | | |
|  | a) | 3.92 atm | b) | 4.48 atm | c) | 5.92 atm | d) | 29.4 atm |
| 349. | The values of observed and calculated molecular weights of silver nitrate are 92.64 and 170 respectively. The degree of dissociation of silver nitrate is : | | | | | | | |
|  | a) | 60% | b) | 83.5% | c) | 46.7% | d) | 60.23% |
| 350. | Saturated solution of NaCl on heating becomes : | | | | | | | |
|  | a) | Super saturated | b) | Unsaturated | c) | Remains saturated | d) | None of these |
| 351. | 20 g of hydrogen is present in a 5 L vessel. The molar concentration of hydrogen is | | | | | | | |
|  | a) | 1 | b) | 2 | c) | 3 | d) | 4 |
| 352. | The molarity of pure water is | | | | | | | |
|  | a) | 55.6 | b) | 5.56 | c) | 6.55 | d) | 65.5 |
| 353. | Assuming that sea water is a 3.50 weight per cent aqueous solution of NaCl. What is the molality of sea water? | | | | | | | |
|  | a) | 0.062 m | b) | 0.0062 m | c) | 0.62 m | d) | 6.2 m |
| 354. | The condition under which Nernst distribution law will not hold true is : | | | | | | | |
|  | a) | Temperature is constant | | | | | | |
|  | b) | The molecular state of the solute is the same in both solvents | | | | | | |
|  | c) | The solute does not cause any change in the mutual solubility of the two solvents | | | | | | |
|  | d) | None of the above | | | | | | |
| 355. | An ideal solution is that which | | | | | | | |
|  | a) | Obey Raoult’s law | | | b) | Shows positive deviation from Raoult’s law | | |
|  | c) | Shows negaitive deviation from Raoult’s law | | | d) | Has no connection with Raoult’s law | | |
| 356. | The relative lowering of vapour pressure of an aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is | | | | | | | |
|  | a) | 0.1 M NaCl | b) | 0.1 M | c) | 0.1 M sucrose | d) | 0.1 M KCl |
| 357. | Among the following substances, the lowest vapour pressure is exerted by : | | | | | | | |
|  | a) | Water | b) | Mercury | c) | Kerosene | d) | Rectified spirit |
| 358. | If 5.85 g (molecular weight 58.5) is dissolved in water and the solution is made up to 0.5 L, the molarity of the solution will be | | | | | | | |
|  | a) | 0.1 | b) | 0.2 | c) | 0.3 | d) | 0.4 |
| 359. | The sum of mole fractions of *A, B* and *C* in an aqueous solution containing 0.2 moles of each *A, B* and *C* is | | | | | | | |
|  | a) | 0.6 | b) | 0.2 | c) | 1.0 | d) | 1.2 |
| 360. | To neutralise completely 20 mL of 0.1 M aqueous solution of phosphorous acid the volume of 0.1 M aqueous KOH solution required is | | | | | | | |
|  | a) | 10 mL | b) | 20 mL | c) | 40 mL | d) | 60 mL |
| 361. | At temperature and concentration *C* osmotic pressure of a solution is *p*, the same solutions at concentration *C*/2 and a temperature shows osmotic pressure 2 atm, value of *p* will be | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 362. | Molarity of a solution prepared by dissolving 75.5 g of pure KOH in 540 mL solution is | | | | | | | |
|  | a) | 1.50 M | b) | 2.50 M | c) | 3.50 M | d) | 5.01 M |
| 363. | The relationship between the values of osmotic pressure of 0.1 M solution of and is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 364. | At 40 the vapour pressures of pure liquids, benzene and toluene, are 75 torr and 22 torr respectively. At the same temperature, the partial vapour pressure of benzene in a mixture of 78 g benzene and 46 g toluene in torr assuming the ideal solution should be : | | | | | | | |
|  | a) | 50 | b) | 25 | c) | 375 | d) | 53.5 |
| 365. | The reverse of fusion is freezing and it is : | | | | | | | |
|  | a) | Endothermic | | | | | | |
|  | b) | Exothermic | | | | | | |
|  | c) | Neither exothermic nor endothermic | | | | | | |
|  | d) | May be exothermic or endothermic | | | | | | |
| 366. | 50 g of an acid is dissolved in one litre aqueous solution. Distribution coefficient in favour of ether is 3. Acid left in aqueous layer when solution is shaken with one litre ether : | | | | | | | |
|  | a) | 25 g | b) | 12.5 g | c) | 6.25 g | d) | None of these |
| 367. | When the vapour pressure of solutions of two liquids are less than those expected from ideal solutions, they are said to show : | | | | | | | |
|  | a) | Positive deviations from ideal behaviour | | | | | | |
|  | b) | Negative deviations from ideal behaviour | | | | | | |
|  | c) | Positive deviations for lower concentrations and negative deviations for higher concentration | | | | | | |
|  | d) | None of the above | | | | | | |
| 368. | Which method cannot be used to find out the molecular weight of non-volatile solute? | | | | | | | |
|  | a) | Victor Meyer’s method | | | | | | |
|  | b) | Osmotic pressure method | | | | | | |
|  | c) | Cryoscopic method | | | | | | |
|  | d) | Ebullioscopic method | | | | | | |
| 369. | The equilibrium in a heterogeneous system can be studied by : | | | | | | | |
|  | a) | Distribution law | b) | Phase rule | c) | Both (a) and (b) | d) | None of these |
| 370. | At Abu mountains water boils at 96 What amount of NaCl be added in 1 kg water so that it boils at 100. = | | | | | | | |
|  | a) | 225 g | b) | 450 g | c) | 200 g | d) | 125 g |
| 371. | The normality of 0.3 M phosphorous acid is | | | | | | | |
|  | a) | 0.2 | b) | 0.4 | c) | 0.6 | d) | 0.8 |
| 372. | If the various terms in the below given expressions have usual meanings, the van’t Hoff factor (i) cannot be calculated by which one of the expressions? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 373. | Which of the following liquid pairs shows a positive deviation from Raoult’s law? | | | | | | | |
|  | a) | Water-hydrochloric acid | | | b) | Benzene-methanol | | |
|  | c) | Water-nitric acid | | | d) | Acetone-chloroform | | |
| 374. | How much (Mol. wt. = 294.19) is required to prepare one litre of 0.1 N solution? | | | | | | | |
|  | a) | 9.8063 g | b) | 7.3548 g | c) | 3.6774 g | d) | 4.903 g |
| 375. | The boiling point of are 80 respectively. Which will show highest vapour pressure at room temperature? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 376. | In a pair of immiscible liquids, a common solute dissolves in both and the equilibrium is reached. The concentration of solute in upper layer is : | | | | | | | |
|  | a) | Same as in lower layer | | | | | | |
|  | b) | Lower than the lower layer | | | | | | |
|  | c) | Higher than the lower layer | | | | | | |
|  | d) | In fixed ratio with that in the lower layer | | | | | | |
| 377. | Insulin is dissolved in a suitable solvent and the osmotic pressure of solutions of various concentrations is measured at the slope of a plot of π against is formed to be . The molecular weight of the insulin is : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 378. | Volume of 0.6 M NaOH required to neutralise of 0.4 M HCl is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 379. | The freezing point of the 0.05 molal solution of non-electrolyte in water is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 380. | A molar solution of has a density of. The molarity of this solution is | | | | | | | |
|  | a) | 2.35 | b) | 1.143 | c) | 2.95 | d) | 1.356 |
| 381. | Osmotic pressure of blood is 7.65 atm at 310 K. An aqueous solution of glucose that will be isotonic with blood is ……….wt./vol. | | | | | | | |
|  | a) | 5.41% | b) | 3.54% | c) | 4.53% | d) | 53.4% |
| 382. | A substance is completely trimerised on dissolution in a solvent. The van’t Hoff factor for such change is : | | | | | | | |
|  | a) | 1 | b) | 2 | c) | 3 | d) | 1/3 |
| 383. | A liquid is kept in a closed vessel. If a glass plate (negligible mass) with a small hole is kept on top of the liquid surface, then the vapour pressure of the liquid in the vessel is : | | | | | | | |
|  | a) | More than what would be if the glass plate were removed | | | | | | |
|  | b) | Same as what would be if the glass plate were removed | | | | | | |
|  | c) | Less than what would be if the glass plate were removed | | | | | | |
|  | d) | Cannot be predicted | | | | | | |
| 384. | The amount of ice that will separate out on cooling a solution containing 50 g of ethylene glycol in 200 g water to is : ( | | | | | | | |
|  | a) | 38.71 g | b) | 38.71 mg | c) | 42 g | d) | 42 mg |
| 385. | The number of moles of a solute in its solution is 20 and total number of moles are 80. The mole fraction of solute is | | | | | | | |
|  | a) | 0.25 | b) | 0.50 | c) | 1.00 | d) | 1.25 |
| 386. | The order of osmotic pressure of isomolar solution of , NaCl and sucrose is | | | | | | | |
|  | a) | >NaCl>sucrose | | | b) | NaCl>> sucrose | | |
|  | c) | Sucrose>NaCl> | | | d) | >sucrose>NaCl | | |
| 387. | At STP, a container has 1 mole of Ar, 2 molesof , 3 moles of and 4 moles of . Without changing the total pressure if one mole of is removed, the partial pressure of is | | | | | | | |
|  | a) | Changed by about 16% | | | b) | Halved | | |
|  | c) | Changed by 26% | | | d) | Unchanged | | |
| 388. | A solute is soluble in two immiscible liquids which are present in a mixture. The concentration of the solute in the upper layer will be : | | | | | | | |
|  | a) | Same as in the lower layer | | | | | | |
|  | b) | Less than in the lower layer | | | | | | |
|  | c) | More than in the lower layer | | | | | | |
|  | d) | In fixed ratio with that in the lower layer | | | | | | |
| 389. | During osmosis, flow of water through a semipermeable membrane is : | | | | | | | |
|  | a) | From both sides of semipermeable membrane with unequal flow rates | | | | | | |
|  | b) | From solution having lower concentration only | | | | | | |
|  | c) | From solution having higher concentration only | | | | | | |
|  | d) | From both sides of semipermeable membrane with equal flow rates | | | | | | |
| 390. | According to distribution law, the distribution of solute in two phases is given by the expression, <br />  the numerical Value of constant depends upon : | | | | | | | |
|  | a) | The temperature of the system | | | | | | |
|  | b) | The nature of solute distributed | | | | | | |
|  | c) | The nature of two immiscible solvents used | | | | | | |
|  | d) | All of the above | | | | | | |
| 391. | The experimental molecular weight of an electrolyte will always be less than its calculated value because the value of van’t Hoff factor, ‘’ is : | | | | | | | |
|  | a) | Less than one | b) | Greater than one | c) | One | d) | Zero |
| 392. | The freezing point of 1% solution of lead nitrate in water will be | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | Below |
| 393. | The osmotic pressure of a solution at is 2 atm. What will be its osmotic pressure at under similar conditions? | | | | | | | |
|  | a) | 0.5 atm | b) |  | c) | 4 atm | d) | 273/2 atm |
| 394. | Which of the following statements is false? | | | | | | | |
|  | a) | Two sucrose solution of same molality prepared in different solvent will have the same freezing point depression | | | | | | |
|  | b) | Osmotic pressure (π) of a solution is given by where is molarity of the solution | | | | | | |
|  | c) | The correct order of osmotic pressure for aqueous solution of each compound is | | | | | | |
|  | d) | Raoult’s law states that the vapour pressure of a component over a solution is proportional to its mole fraction | | | | | | |
| 395. | When 25 g of a non-volatile solute is dissolved in 100 g of water, the vapour pressure is lowered by If the vapour pressure of water at is 17.5 mm, what is the molecular weight of the solute? | | | | | | | |
|  | a) | 206 | b) | 302 | c) | 350 | d) | 276 |
| 396. | The volume of water to be added to HCl to prepare of solution is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 397. | Lowering of vapour pressure is highest for | | | | | | | |
|  | a) |  | b) | 0.1 M glucose | c) |  | d) | Urea |
| 398. | One component of a solution follows Raoult’s law over the entire range 0 . The second component must follow Raoult’s law in the range when is | | | | | | | |
|  | a) | Close to zero | b) | Close to 1 | c) |  | d) |  |
| 399. | The mole fraction of water in 20% aqueous solution of is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 400. | What will be the molality of a solution having 18 g of glucose (mol.wt. = 180) dissolved in 500 g of water? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 401. | The empirical formula of a non-electrolyte is . A solution containing 6g of the compound exerts the same osmotic pressure as that of 0.05 M glucose solution at the same temperature. The molecular formula of the compound is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 402. | <img src="402\_Q.gif" > | | | | | | | |
|  | a) | 138, 258 | b) | 258, 138 | c) | 120, 138 | d) | 138, 125 |
| 403. | Freezing point of an aqueous solution is . Elevation of boiling point of same solution would be:  ) | | | | | | | |
|  | a) | 0.186 | b) | 0.0512 | c) | 0.092 | d) | 0.237 |
| 404. | What is the amount of urea dissolved per litre if its aqueous solution is isotonic with 10% cane sugar solution? (mol.wt.of urea =60) | | | | | | | |
|  | a) | 200 g/L | b) | 19.2 g/L | c) | 17.54 g/L | d) | 16.7 g/L |
| 405. | Distribution law holds good for the distribution of a dissolved substance between : | | | | | | | |
|  | a) | Liquid-liquid phases | | | | | | |
|  | b) | Liquid-liquid and liquid-gas phases | | | | | | |
|  | c) | Liquid-liquid and liquid-solid phases | | | | | | |
|  | d) | Liquid-gas, liquid-liquid and liquid-solid phases | | | | | | |
| 406. | 0.004 M is isotonic with 0.01 M glucose.Degree of dissociation of is | | | | | | | |
|  | a) | 75% | b) | 50% | c) | 25% | d) | 85% |
| 407. | 10 g of iodine is allowed to distribute between and . If the partition coefficient is 85 in favour of the ratio between volumes of and such that 5 g of iodine will be present in aqueous layer is : | | | | | | | |
|  | a) | 1 : 85 | b) | 85 : 1 | c) | 170 : 1 | d) | 1 : 170 |
| 408. | What happens when an egg is kept in saturated solution of after removing its hard shell in dilHCl? | | | | | | | |
|  | a) | Egg will swell | | | b) | Egg will shrink | | |
|  | c) | Egg will remain same | | | d) | Egg will first shrink and then swell | | |
| 409. | Vapour pressure of chloroform and dichloromethane at 25 are 200 mm Hg and 41.5 mm Hg respectively. Vapour pressure of the solution obtained by mixing 25.5 g of and 40 g of at the same temperature will be :  (Molecular mass of and molecular mass of | | | | | | | |
|  | a) | 173.9 mm Hg | | | | | | |
|  | b) | 615.0 mm Hg | | | | | | |
|  | c) | 347.9 mm Hg | | | | | | |
|  | d) | mm Hg | | | | | | |
| 410. | If the elevation in boiling point of a solution of 10 g of solute (mol. wt. = 100 g of water is the ebullioscopic constant of water is | | | | | | | |
|  | a) | 10 | b) |  | c) |  | d) |  |
| 411. | A 0.001 molal solution of in water has a freezing point depression of 0.0054. If for water is 1.80, the correct formulation of the above molecule is : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 412. | The weight of required to pressure 500 mL of 0.2 N solution is | | | | | | | |
|  | a) | 63 g | b) | 6.3 g | c) | 0.63 g | d) | 126 g |
| 413. | Equimolar solutions of two non-electrolytes in the same solvent should have : | | | | | | | |
|  | a) | Same b.p but different f.p | | | | | | |
|  | b) | Same f.p. but different b.p. | | | | | | |
|  | c) | Same b. p. and same f. p. | | | | | | |
|  | d) | Different b. p. and different f. p. | | | | | | |
| 414. | The vapour pressure of a solution of a non-volatile electrolyte () in a solvent () is 95% of the vapour pressure of the solvent at the same temperature. If where and are molecular weights of respectively, the weight ratio of the solvent and solute are : | | | | | | | |
|  | a) | 0.15 | b) | 5.7 | c) | 0.2 | d) | 4.0 |
| 415. | g of non-volatile organic substance of molecular mass is dissolved in 250 g benzene. Molal elevation constant of benzene of . Elevation in its boiling point is given by : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 416. | If of water is introduced into a 1.0 flask at 300 K, how many moles of water are in the vapour phase when equilibrium is established?  (Given : Vapour pressure of at 300 K is 3170 Pa ; ) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 417. | Two liquids *X* and *Y* form an ideal solution at 300K,vapour pressure of the solution containing 1 mol of *X* and 3, mol of *Y* is 550 mmHg. At the same temperature, if 1 mol of *Y* is further added to this solution, vapour pressure of the solution increases by 10 mmHg. Vapour pressure (in mmHg)of *X*and*Y* in their pure states will be, respectively | | | | | | | |
|  | a) | 200 and 300 | b) | 300 and 400 | c) | 400 and 600 | d) | 500 and 600 |
| 418. | By dissolving 5g substance in 50 g of water, the decrease in freezing point is The gram molal depression is. The molecular weight of substance is | | | | | | | |
|  | a) | 105.4 | b) | 118.2 | c) | 137.2 | d) | 154.2 |
| 419. | Which characterises the weak intermolecular forces of attraction in a liquid? | | | | | | | |
|  | a) | High boiling point | | | | | | |
|  | b) | High vapour pressure | | | | | | |
|  | c) | High critical temperature | | | | | | |
|  | d) | High heat of vaporization | | | | | | |
| 420. | What is the freezing point of a solution containing 8.1 g HBr in 100 g water assuming the acid to be 90% ionised?  () | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 421. | Consider the following aqueous solutions and assume 100% ionisation in electrolytes <br />I. 0.1 m urea <br /> II. 0.04 m 0.05 m 0.005 m NaCl The correct statement regarding the above solution is | | | | | | | |
|  | a) | Freezing point will be lowest for solution I | | | b) | Freezing point will be highest for solution IV | | |
|  | c) | Boiling point will be highest for solution IV | | | d) | Vapour pressure will be highest for solution II | | |
| 422. | A certain substance ‘’ tetramerises in water to the extent of 80%. A solution of 2.5 g of in 100 g of water lowers the freezing point by . The molar mass of is | | | | | | | |
|  | a) | 31 | b) | 62 | c) | 122 | d) | 244 |
| 423. | The average osmotic pressure of human blood is 7.8 bar at . What is the concentration of an aqueous NaCl solution that could be used in the blood steam? | | | | | | | |
|  | a) | 0.16 mol/L | b) | 0.31 mol/L | c) | 0.60 mol/L | d) | 0.45 mol/L |
| 424. | Which is correct representation for relation? | | | | | | | |
|  | a) | The distribution coefficient is in favour of phase I | | | | | | |
|  | b) | The distribution coefficient is in favour of phase II | | | | | | |
|  | c) | The distribution coefficient is | | | | | | |
|  | d) | None of the above | | | | | | |
| 425. | The relationship between osmotic pressure at 273 K when 10 g glucose , 10 g urea and 10 g sucrose are dissolved in 250 mL of water is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 426. | The molarity of a solution made by mixing 50 of (36 N) with 50 mL of water is | | | | | | | |
|  | a) | 9 m | b) | 10 m | c) | 11 m | d) | 12 m |
| 427. | Equimolar solution in the same solvent have | | | | | | | |
|  | a) | Different boiling and different freezing points | | | b) | Same boiling and same freezing points | | |
|  | c) | Same freezing point but different boiling point | | | d) | Same boiling point but different freezing point | | |
| 428. | Blood cells retain their normal shapes in solutions which are : | | | | | | | |
|  | a) | Isotonic to blood | | | | | | |
|  | b) | Hypotonic to blood | | | | | | |
|  | c) | Hypertonic to blood | | | | | | |
|  | d) | Equinormal to blood | | | | | | |
| 429. | Volume of water needed to mix with 10 mL N HCl to get 0.1 N HCl is | | | | | | | |
|  | a) | 900 mL | b) | 9 mL | c) | 90 mL | d) | 100 mL |
| 430. | A 0.025 M solution of monobasic acid had a freezing point of . The for the acid is | | | | | | | |
|  | a) | 1.2 | b) | 2 | c) | 2.5 | d) | 5.7 |
| 431. | The solubility of a solid in a liquid depends on : | | | | | | | |
|  | a) | Nature of solute | b) | Nature of solvent | c) | Temperature | d) | All of these |
| 432. | Temperature coefficient is the variation in the : | | | | | | | |
|  | a) | Distribution coefficient for rise in the temperature | b) | Concentration of solution for 10 rise in the temperature | c) | Concentration of solution for rise in the temperature | d) | Distribution coefficient for 10 rise in the temperature |
| 433. | At low concentrations, the statements that equimolal solutions under a given set of experimental conditions have equal osmotic pressure is true for | | | | | | | |
|  | a) | Solutions of non-electrolytes only | | | b) | Solutions of electrolytes only | | |
|  | c) | All solutions | | | d) | None of the above | | |
| 434. | The van’t Hoff factor for a dilute solution of is : | | | | | | | |
|  | a) | 10 | b) | 4 | c) | 5 | d) | 0.25 |
| 435. | Van’t Hoff factor of aq at infinite dillution has value equal to | | | | | | | |
|  | a) | 1 | b) | 2 | c) | 3 | d) | Between 2 and 3 |
| 436. | A solution containing 500 g of a protein per litre is isotonic with a solution containing 3.42 g of sucrose per litre. The molecular mass of protein is : | | | | | | | |
|  | a) | 5 | b) | 146 | c) | 34200 | d) | 50000 |
| 437. | Two solutions of substance (non-electrolyte) are mixed in the following manner.  480 mL of 1.5 M first solution +520 mL of 1.2 M second solution.  What is the molarity of the final mixture ? | | | | | | | |
|  | a) | 2.70M | b) | 1.344 M | c) | 1.50 M | d) | 1.20M |
| 438. | Osmotic pressure of 0.4% urea solution is 1.60 atm and that of 3.42% cane sugar is 2.46 atm. When the above two solutions are mixed, the osmotic pressure of the resulting solution is | | | | | | | |
|  | a) | 0.82 atm | b) | 2.46 atm | c) | 1.64 atm | d) | 4.10 atm |
| 439. | Dissolving 120 g of urea (mol. Wt. 60) in1000 g of water gave a solution of density 1.15 g/mL. The molarity of the solution is | | | | | | | |
|  | a) | 1.78M | b) | 2.00M | c) | 2.05M | d) | 2.22M |
| 440. | The relative lowering of vapour pressure of an aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is | | | | | | | |
|  | a) | Vapour pressure | b) | Osmotic pressure | c) | Boiling point | d) | Freezing point |
| 441. | Volume of water needed to mix with 10 mL 10 N HN to get 0.1 N is | | | | | | | |
|  | a) | 1000 mL | b) | 990 mL | c) | 1010 mL | d) | 10 mL |
| 442. | Volume of 0.6 M NaOH required to neutralise of 0.4 M HCl is | | | | | | | |
|  | a) | 3 : 4 | b) | 1 : 2 | c) | 1 : 4 | d) | 1 : 1 |
| 443. | At the vapour pressure in torr, of methyl alcohol-ethyl alcohol solutions is represented by the equation. ; where is mole-fraction of methyl alcohol, then the value of is : | | | | | | | |
|  | a) | 254 torr | b) | 135 torr | c) | 119 torr | d) | 140 torr |
| 444. | An 1% solution of KCl (I), NaCl (II), (III) and urea (IV) have their osmotic pressure at the same temperature in the ascending order (molar masses of NaCl, KCl, and urea are respectively 58.5, 74.5, 208.4 and 60 g ). Assume 100% ionisation of the electrolytes at this temperature | | | | | | | |
|  | a) | I< III< II< IV | b) | III< I <II< IV | c) | I <II <III <IV | d) | III< IV< I <II |
| 445. | The vant’s Hoff factor for 0.1 M solution is 2.74. The degree of dissociation is | | | | | | | |
|  | a) | 91.3% | b) | 87% | c) | 100% | d) | 74% |
| 446. | The vapour pressure of water at is 19.8 mm. 0.1 mole of glucose is dissolved in 178.2 g of water. What is the vapour pressure (in mm) of the resultant solution? | | | | | | | |
|  | a) | 19.0 | b) | 19.602 | c) | 19.402 | d) | 19.202 |
| 447. | To form a super saturated solution of salt one must : | | | | | | | |
|  | a) | Cool slowly | b) | Cool rapidly | c) | Add some salt to cold solution | d) | Use a clear vessel |
| 448. | An aqueous solution of glucose is 10% in strength. The volume in which 1 g-mole of it is dissolved will be | | | | | | | |
|  | a) | 0.18 L | b) | 1.8 L | c) | 0.9 L | d) | 9.0 L |
| 449. | Molal depression of freezing point of water is 1.86 ͦ per 1000 g of water. 0.02 mole of urea dissolved in 100 g of water will produce a lowering of temperature of : | | | | | | | |
|  | a) | 0.186 | b) | 0.372 | c) | 1.86 | d) | 3.72 |
| 450. | The process of extracting a solute from its solution by an immiscible solvent can be more fruitful only if : | | | | | | | |
|  | a) | A large quantity of the solvent is used at once | | | | | | |
|  | b) | The number of extractions is increased, using small quantities of the solvent | | | | | | |
|  | c) | The process is carried out at a high temperature | | | | | | |
|  | d) | Small quantities of the solution are added to the extracting solvent in several instalments | | | | | | |
| 451. | If a solution containing 0.072 g atm of sulphur in 100 g of a solvent () gave a freezing point depression of the molecular formula of sulphur in the solution is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 452. | The osmotic pressure of a solution can be accurately measured in the shortest possible time by : | | | | | | | |
|  | a) | Berkeley and Hartley method | | | | | | |
|  | b) | Morse and Frazer method | | | | | | |
|  | c) | Pfeffer method | | | | | | |
|  | d) | None of the above | | | | | | |
| 453. | A solution contains hydrochloric acid molecules in 1 of the solution. The strength of the solution is | | | | | | | |
|  | a) | 6 N | b) | 2 N | c) | 4 N | d) | 8 N |
| 454. | Acetic acid on dissolution in benzene will show : | | | | | | | |
|  | a) | Two times of its normal molecular weight | | | | | | |
|  | b) | Its normal molecular weight | | | | | | |
|  | c) | Half of its normal molecular weight | | | | | | |
|  | d) | None of the above | | | | | | |
| 455. | Who gave the phase rule? | | | | | | | |
|  | a) | Nernst | | | | | | |
|  | b) | Willard Gibbs | | | | | | |
|  | c) | Ostwald | | | | | | |
|  | d) | Raoult | | | | | | |
| 456. | The volume of water to added to of 0.5 N to get decinormal concentration is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 457. | In which ratio of volume 0.4 M HCl and 0.9 M HCl are to be mixed such that the concentration of the resultant solution becomes 0.7 M ? | | | | | | | |
|  | a) | Air | b) | Brass | c) | Amalgam | d) | Benzene in water |
| 458. | In a mixture of *A* and *B*, components show negative deviation when | | | | | | | |
|  | a) | *A—B* interaction is stronger than *A—A* and *B—B* interaction | | | | | | |
|  | b) | *A—B* interaction is weaker than *A—A* and *B—B* interaction | | | | | | |
|  | c) |  | | | | | | |
|  | d) |  | | | | | | |
| 459. | When a substance is distributed between two immiscible solvents and remains in the same state in the solvent I, while, dissociates in the solvent II. If the concentration of solute are in phase I and II respectively then : | | | | | | | |
|  | a) |  | | | | | | |
|  | b) |  | | | | | | |
|  | c) |  | | | | | | |
|  | d) |  | | | | | | |
| 460. | A non-ideal solution was prepared by mixing 30 mL chloroform and 50 mL acetone. The volume of mixture will be | | | | | | | |
|  | a) | 80 mL | b) | 80 mL | c) | =80 mL | d) | ≥80 mL |
| 461. | The values of observed and calculated molecular weights of calcium nitrate are respectively 65.6 and 164. The degree of dissociation of calcium nitrate will be : | | | | | | | |
|  | a) | 25% | b) | 50% | c) | 75% | d) | 60% |
| 462. | After adding a solute freezing point of solution decreases to -0.186. Calculate | | | | | | | |
|  | a) | 0.512 | b) | 0.0512 | c) | 1.86 | d) | 0.0186 |
| 463. | At 27 the osmotic pressure of a solution containing 4.0 g solute (molar mass = 246) per litre at is : () | | | | | | | |
|  | a) | 0.1 atm | b) | 0.4 atm | c) | 0.2 atm | d) | 0.8 atm |
| 464. | When 50 g of lactic acid was mixed with a mixture of equal volume of water and chloroform, the concentration of lactic acid in water was found to be 49.03 g and in chloroform 0.97 g . The distribution coefficient of lactic acid in favour of water is: | | | | | | | |
|  | a) | 50.55 | b) | 55.55 | c) | 60.55 | d) | 45.55 |
| 465. | At a constant temperature, which of the following aqueous solutions will have the maximum vapour pressure?  (Mol. wt NaCl =58.5, ) | | | | | | | |
|  | a) | 1 molalNaCl (*aq*) | | | b) | 1 molar NaCl (*aq*) | | |
|  | c) | 1 molal | | | d) | 1 molar | | |
| 466. | A solution containing 10 g per of urea (mol. mass = 60) is isotonic with a 5% (wt.by vol.) solution of a non-volatile solute. The molecular mass (in g ) of non-volatile solute is : | | | | | | | |
|  | a) | 350 | b) | 200 | c) | 250 | d) | 300 |
| 467. | Non- volatile solute when dissolved in water : | | | | | | | |
|  | a) | Decreases the vapour pressure of water | | | | | | |
|  | b) | Increases the boiling point of water | | | | | | |
|  | c) | Decreases the freezing point of water | | | | | | |
|  | d) | All of the above | | | | | | |
| 468. | The solubility of in water increases in the presence of : | | | | | | | |
|  | a) | Alcohol | b) | KI | c) |  | d) | NaOH |
| 469. | Normality of 2 M is | | | | | | | |
|  | a) | 2 N | b) | 4 N | c) |  | d) |  |
| 470. | The solubility of a gas increases in a liquid with | | | | | | | |
|  | a) | Decrease in temperature | | | b) | Increases in temperature | | |
|  | c) | Reduction of gas pressure | | | d) | Amount of liquid taken | | |
| 471. | The energy that favours dissolution of a solute in water is known as : | | | | | | | |
|  | a) | Hydration energy | | | | | | |
|  | b) | Lattice energy | | | | | | |
|  | c) | Ionization energy | | | | | | |
|  | d) | Exothermic energy | | | | | | |
| 472. | Aqueous solution of 0.004 and 0.01 glucose are isotonic. The degree of dissociation of is : | | | | | | | |
|  | a) | 25% | b) | 60% | c) | 75% | d) | 85% |
| 473. | The most suitable method for the determination of molecular weight of oxyhaemoglobin, a compound of high molecular weight is : | | | | | | | |
|  | a) | Osmotic pressure method | | | | | | |
|  | b) | Vapour pressure lowering method | | | | | | |
|  | c) | Elevation of boiling point method | | | | | | |
|  | d) | None of the above | | | | | | |
| 474. | The difference between the boiling point and freezing point of an aqueous solution containing sucrose (mol wt. = 342 g) in 100 g of water is If of water are 1.86 and 0.51 K kg respectively, the weight of sucrose in the solution is about | | | | | | | |
|  | a) | 1 M solution of glucose | | | b) | 0.05 M solution of glucose | | |
|  | c) | 6% solution of glucose | | | d) | 25% solution of glucose | | |
| 475. | In a mixture and components show negative deviation as : | | | | | | | |
|  | a) |  | | | | | | |
|  | b) |  | | | | | | |
|  | c) | interaction is weaker than and interaction | | | | | | |
|  | d) | None of the above reason in correct | | | | | | |
| 476. | Which statement is not correct if two immiscible liquids of mol. wt. and respectively are mixed in equal amount to have a mixture? | | | | | | | |
|  | a) | <img src="476\_A1.gif" > | | | | | | |
|  | b) | <img src="476\_A2.gif" > | | | | | | |
|  | c) | <img src="476\_A3.gif" > | | | | | | |
|  | d) | <img src="476\_A4.gif" > | | | | | | |
| 477. | During depression of freezing point in a solution the following are in equilibrium : | | | | | | | |
|  | a) | Liquid solvent, solid solvent | | | | | | |
|  | b) | Liquid solvent, solid solute | | | | | | |
|  | c) | Liquid solute, solid solute | | | | | | |
|  | d) | Liquid solute, solid solvent | | | | | | |
| 478. | The molar freezing point constant for water is . If 342 g of cane sugar is dissolved in 1000 g of water, the solution will freeze at | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 479. | Two bottles *A* and *B* contains 1M and 1 m aqueous solution of sulphuric acid respectively | | | | | | | |
|  | a) | *A* is more concentrated than *B* | | | | | | |
|  | b) | *B* is more concentrated than *A* | | | | | | |
|  | c) | Concentration of *A* is equal to concentration of *B* | | | | | | |
|  | d) | It is not possible to compare the concentrations | | | | | | |
| 480. | 18 g of glucose () is added to 178.2g of water. the vapour pressure of water for this aqueous solution at is | | | | | | | |
|  | a) | 759.00 torr | b) | 7.60 torr | c) | 76.00 torr | d) | 752.40 torr |
| 481. | Benzene and toluene form nearly ideal solutions. At the vapour pressure of benzene is 75 torr and that of toluene is 22 torr. The partial vapour pressure of benzene at for a solution containing 78 g of benzene and 46 g of toluene in torr is | | | | | | | |
|  | a) | 53.5 | b) | 37.5 | c) | 25 | d) | 50 |
| 482. | The amount of urea dissolved in 500 cc of water () to produce a depression of in the freezing point is | | | | | | | |
|  | a) | 9 g | b) | 6 g | c) | 3 g | d) | 0.3 g |
| 483. | Distribution law is a special application of ….and | | | | | | | |
|  | a) | Raoult’s law | | | | | | |
|  | b) | Henry’s law | | | | | | |
|  | c) | Dalton’s law | | | | | | |
|  | d) | None of these | | | | | | |
| 484. | In a 0.2 molal aqueous solution of a weak acid H*X*, the degree of ionisation is 0.3 Taking for water as 1.85, the freezing point of the solution will be nearest to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 485. | The molality of a urea solution in which 0.0100 g of urea, is added to of water at STP is | | | | | | | |
|  | a) | 0.555m | b) | m | c) | 33.3m | d) | m |
| 486. | Iodine was added to a system of water and. The concentration of in water and were found to be respectively. The ratio of will change if : | | | | | | | |
|  | a) | More is added | | | | | | |
|  | b) | More is added | | | | | | |
|  | c) | More water is added | | | | | | |
|  | d) | Temperature is changed | | | | | | |
| 487. | A solution of sucrose (Molar mass = 342 g/mol) is prepared by dissolving 68.4 g of it per litre of solution, what is its osmotic pressure (R=0.082 L atm) at 273 K? | | | | | | | |
|  | a) | 0.01 M | b) | 0.01 M | c) | 0.015 M urea | d) | 0.015 M glucose |
| 488. | At the total pressure of an ideal solution obtained by mixing 3 moles of ‘*A*’ and 2 moles of ‘*B*’, is 184 torr. What is the vapour pressure (in torr) of pure ‘*B*’ at the same temperature? (Vapour pressure of pure ‘*A*’ at is 200 torr) | | | | | | | |
|  | a) | 180 | b) | 160 | c) | 16 | d) | 100 |
| 489. | If 20 mL of 0.4 N solution completely neutralizes 40 mL of a dibasic acid, the molarity of the acid solution is | | | | | | | |
|  | a) | 0.1 M | b) | 0.3 M | c) | 0.5 M | d) | 0.7 M |
| 490. | 25 mL of a solution of barium hydroxide on titration with 0.1 molar solution of hydrochloric acid gave a titre value of 35 mL. The molarity of barium hydroxide solution was | | | | | | | |
|  | a) | ppm | b) | Mg/100 cc | c) | g/L | d) | g/100 cc |
| 491. | Which of the following solutions will have the highest boiling point ? | | | | | | | |
|  | a) | 0.1 M | b) | 0.1 M | c) | 0.1 M NaVl | d) | 0.1 M urea |
| 492. | The relative lowering of vapour pressure of a dilute aqueous solution containing non-volatile solute is 0.0125. The molality of the solution is about | | | | | | | |
|  | a) | 0.70 | b) | 0.50 | c) | 0.90 | d) | 0.80 |
| 493. | The vapour pressure of pure liquid is 1.2 atm. When a non-volatile substance *B* is mixed in *A*, then its vapour pressure becomes 0.6 atm. The mole fraction of *B* in the solution is | | | | | | | |
|  | a) | 0.15 | b) | 0.25 | c) | 0.50 | d) | 0.75 |
| 494. | If liquids *A* and *B* form an ideal solution, the | | | | | | | |
|  | a) | Enthalpy of mixing is zero | | | | | | |
|  | b) | Entropy of mixing is zero | | | | | | |
|  | c) | Free energy of mixing is zero | | | | | | |
|  | d) | Free energy as well as the entropy of mixing are each zero | | | | | | |
| 495. | Which has the minimum freezing point? | | | | | | | |
|  | a) | One molalNaCl aqueous solution | | | b) | One molal aqueous solution | | |
|  | c) | One molalKCl aqueous solution | | | d) | One molal urea aqueous solution | | |
| 496. | The depression in f.p. is directly proportional to : | | | | | | | |
|  | a) | Normality | b) | Molality | c) | Molarity | d) | None of these |
| 497. | The vapour pressure will be lowest of | | | | | | | |
|  | a) | Hypertonic solution | | | b) | Hypotonic solution | | |
|  | c) | Isotonic solution | | | d) | None of the above | | |
| 498. | In countries nearer to polar region, the roads are sprinkled with . This is | | | | | | | |
|  | a) | To minimise the wear and tear of the roads | | | | | | |
|  | b) | To minimise the snow fall | | | | | | |
|  | c) | To minimise pollution | | | | | | |
|  | d) | To minimise the accumulation of dust on the road | | | | | | |
| 499. | What is the molarity of 0.2 N solution? | | | | | | | |
|  | a) | 0.1 M | b) | 0 M | c) | 0.4 M | d) | 0.2 M |
| 500. | Solubility of deliquescent substances in water is generally : | | | | | | | |
|  | a) | High | b) | Low | c) | Moderate | d) | Cannot be said |
| 501. | An aqueous solution is 1.0 molal in KI. Which change will cause the vapour pressure of solution to increase : | | | | | | | |
|  | a) | Addition of NaCl | | | | | | |
|  | b) | Addition of | | | | | | |
|  | c) | Addition of 1.0 molal KI | | | | | | |
|  | d) | Addition of water | | | | | | |
| 502. | Which one of the following is not correct for an ideal solution? | | | | | | | |
|  | a) | It must obey Raoult’s law | | | b) | △H = 0 | | |
|  | c) | △V = 0 | | | d) | △ H = V ≠0 | | |
| 503. | A solution containing 4 g of polyvinyl chloride in 1 litre of dioxane was found to have an osmotic pressure of atm at 300 K. The molecular mass of the polymer is : | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 504. | The normality of mixture obtained by mixing 100 mL of 0.2 M +  100 mL of 0.2 M NaOH is | | | | | | | |
|  | a) | 0.2 | b) | 0.01 | c) | 0.1 | d) | 0.3 |
| 505. | For a dilute solution, Raoult’s law states that | | | | | | | |
|  | a) | The lowering of vapour pressure is equal to mole fraction of solute | | | | | | |
|  | b) | The relative lowering of vapour pressure is equal to mole fraction of solute | | | | | | |
|  | c) | The relative lowering of vapour pressure is proportional to the amount of solute in solution | | | | | | |
|  | d) | The vapour pressure of the solution is equal to the mole fraction of solvent | | | | | | |
| 506. | 1 kg of NaOH solution contains 4 g of NaOH. The approximate concentration of the solution is | | | | | | | |
|  | a) | About 0.1 N | b) | Decinormal | c) | 0.1 molal | d) | 0.1 molar |
| 507. | 6 g urea is dissolved in 90 g water. The relative lowering of vapour pressure is equal to : | | | | | | | |
|  | a) | 0.0196 | b) | 0.06 | c) | 1.10 | d) | 0.0202 |
| 508. | The molar freezing point constant for water is /mol. If 342 g of cane sugar () is dissolved in 1000 g of water, the solution will freeze at | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 509. | Which is correct about Henry’s law? | | | | | | | |
|  | a) | There should not be any chemical interaction between the gas and liquid | | | | | | |
|  | b) | The gas in contact with the liquid should behave as an ideal gas | | | | | | |
|  | c) | The pressure applied should be high | | | | | | |
|  | d) | All of the above | | | | | | |
| 510. | The mass of glucose that should be dissolved in 50 g of water in order to produce the same lowering of vapour pressure as is produced by dissolving 1 g of urea in the same quantity of water is | | | | | | | |
|  | a) | 1 g | b) | 3 g | c) | 6 g | d) | 18 g |
| 511. | The volume of 10 N and 4 N HCl required to make 1L of 7 N HCl are | | | | | | | |
|  | a) | 0.50 L of 10 N HCl and 0.05 L of 4 N HCl | | | b) | 0.60 L of 10 N HCl and 0.40 L of 4 N HCl | | |
|  | c) | 0.80 L of 10 N HCl and 0.20 L of 4 N HCl | | | d) | 0.75 L of 10 N HCl and 0.25 L of 4 N HCl | | |
| 512. | A solution of sulphuric acid in water exhibits : | | | | | | | |
|  | a) | Negative deviations from Raoult’s law | | | | | | |
|  | b) | Positive deviations from Raoult’s law | | | | | | |
|  | c) | Ideal properties | | | | | | |
|  | d) | The applicability of Henry’s law | | | | | | |
| 513. | The molarity of the solution obtained by dissolving 2.5g of NaCl in 100 mL of water is | | | | | | | |
|  | a) | 0.00428 moles | b) | 428 moles | c) | 0.428 moles | d) | 0.0428 moles |
| 514. | Which one is a colligative property? | | | | | | | |
|  | a) | Boiling point | b) | Vapour pressure | c) | Osmotic pressure | d) | Freezing point |
| 515. | A solution contains non-volatile solute of molecular mass . Which of the following can be used to calculate the molecular mass of solute in terms of osmotic pressure? | | | | | | | |
|  | a) | <img src="515\_A1.gif" > | | | | | | |
|  | b) | <img src="515\_A2.gif" > | | | | | | |
|  | c) | <img src="515\_A3.gif" > | | | | | | |
|  | d) | <img src="515\_A4.gif" > | | | | | | |

**ACTIVE SITE TUTORIALS**

**Date :**23-07-2019 **TEST ID: 161**

**Time :** 08:35:00 **CHEMISTRY**

**Marks :** 2060

2.SOLUTIONS

|  |
| --- |
| **: ANSWER KEY :** |

|  |
| --- |
| **1) b 2) d 3) a 4) d**  **5) d 6) d 7) a 8) c**  **9) a 10) c 11) a 12) b**  **13) a 14) a 15) c 16) a**  **17) c 18) a 19) a 20) a**  **21) d 22) c 23) a 24) a**  **25) b 26) c 27) c 28) d**  **29) a 30) c 31) b 32) b**  **33) b 34) b 35) c 36) d**  **37) d 38) a 39) b 40) d**  **41) b 42) b 43) b 44) d**  **45) a 46) c 47) c 48) c**  **49) c 50) a 51) b 52) c**  **53) a 54) c 55) d 56) b**  **57) b 58) b 59) d 60) a**  **61) d 62) a 63) d 64) d**  **65) b 66) d 67) a 68) b**  **69) a 70) b 71) b 72) c**  **73) d 74) a 75) b 76) c**  **77) a 78) c 79) b 80) b**  **81) a 82) d 83) b 84) b**  **85) c 86) a 87) c 88) b**  **89) c 90) b 91) d 92) a**  **93) c 94) d 95) d 96) b**  **97) a 98) a 99) a 100) d**  **101) c 102) d 103) b 104) c**  **105) a 106) c 107) b 108) c**  **109) a 110) c 111) b 112) a**  **113) d 114) b 115) c 116) d**  **117) c 118) b 119) d 120) a**  **121) a 122) b 123) a 124) a**  **125) d 126) c 127) a 128) c**  **129) b 130) d 131) c 132) b**  **133) b 134) a 135) c 136) c**  **137) b 138) c 139) a 140) b**  **141) b 142) c 143) a 144) d**  **145) b 146) b 147) a 148) a**  **149) d 150) b 151) b 152) d**  **153) a 154) b 155) c 156) b**  **157) a 158) d 159) b 160) a**  **161) a 162) c 163) b 164) d**  **165) a 166) c 167) c 168) c**  **169) c 170) d 171) a 172) a**  **173) a 174) a 175) a 176) d**  **177) b 178) b 179) b 180) a**  **181) d 182) c 183) a 184) a**  **185) d 186) b 187) c 188) c**  **189) d 190) d 191) d 192) a**  **193) b 194) d 195) c 196) d**  **197) a 198) b 199) d 200) a**  **201) a 202) d 203) c 204) b**  **205) d 206) c 207) d 208) b**  **209) b 210) c 211) b 212) d**  **213) d 214) a 215) c 216) b**  **217) c 218) a 219) a 220) d**  **221) c 222) a 223) c 224) b**  **225) a 226) d 227) c 228) c**  **229) d 230) a 231) b 232) b**  **233) d 234) d 235) a 236) a**  **237) c 238) a 239) c 240) a**  **241) c 242) c 243) d 244) c**  **245) b 246) c 247) d 248) d**  **249) a 250) b 251) b 252) d**  **253) a 254) d 255) a 256) c**  **257) a 258) d 259) b 260) a**  **261) b 262) b 263) d 264) b**  **265) a 266) c 267) d 268) d**  **269) d 270) c 271) c 272) d**  **273) d 274) d 275) a 276) b**  **277) d 278) a 279) d 280) a**  **281) c 282) c 283) c 284) b**  **285) b 286) c 287) c 288) c**  **289) b 290) c 291) a 292) d**  **293) a 294) a 295) a 296) a**  **297) a 298) c 299) b 300) c**  **301) a 302) c 303) d 304) b**  **305) a 306) b 307) a 308) a**  **309) a 310) b 311) d 312) b**  **313) b 314) a 315) a 316) b**  **317) a 318) a 319) c 320) c**  **321) c 322) b 323) a 324) a**  **325) a 326) d 327) d 328) d**  **329) a 330) a 331) c 332) b**  **333) c 334) b 335) a 336) d**  **337) c 338) b 339) b 340) a**  **341) b 342) b 343) b 344) b**  **345) b 346) a 347) d 348) b**  **349) b 350) b 351) b 352) a**  **353) c 354) d 355) a 356) b**  **357) b 358) b 359) c 360) c**  **361) b 362) b 363) b 364) a**  **365) b 366) b 367) b 368) a**  **369) c 370) a 371) c 372) a**  **373) b 374) d 375) b 376) d**  **377) d 378) a 379) a 380) b**  **381) a 382) d 383) b 384) a**  **385) a 386) a 387) c 388) d**  **389) a 390) d 391) b 392) d**  **393) c 394) a 395) c 396) d**  **397) a 398) d 399) c 400) c**  **401) d 402) a 403) b 404) c**  **405) d 406) a 407) b 408) b**  **409) d 410) c 411) b 412) b**  **413) c 414) b 415) b 416) a**  **417) c 418) d 419) b 420) b**  **421) b 422) b 423) b 424) a**  **425) c 426) a 427) b 428) a**  **429) c 430) c 431) d 432) d**  **433) a 434) b 435) c 436) d**  **437) b 438) d 439) c 440) b**  **441) b 442) a 443) a 444) d**  **445) b 446) b 447) b 448) b**  **449) b 450) b 451) a 452) a**  **453) b 454) a 455) b 456) a**  **457) d 458) a 459) a 460) b**  **461) c 462) b 463) b 464) a**  **465) a 466) d 467) d 468) b**  **469) b 470) a 471) a 472) c**  **473) a 474) a 475) b 476) c**  **477) a 478) a 479) a 480) d**  **481) d 482) c 483) b 484) a**  **485) b 486) b 487) a 488) b**  **489) a 490) a 491) a 492) a**  **493) c 494) a 495) b 496) b**  **497) c 498) a 499) a 500) a**  **501) d 502) d 503) b 504) c**  **505) b 506) c 507) a 508) a**  **509) b 510) b 511) a 512) a**  **513) c 514) c 515) b** |

**ACTIVE SITE TUTORIALS**

**Date :**23-07-2019 **TEST ID: 161**

**Time :** 08:35:00 **CHEMISTRY**

**Marks :** 2060

2.SOLUTIONS

|  |
| --- |
| **: HINTS AND SOLUTIONS :** |

|  |  |
| --- | --- |
| 1 | **(b)**  It is the characteristic of super saturated solution, the meta stable state leading to saturated solution after few time. |
| 2 | **(d)**  The properties of solution which depend only on the number of solute particles but not on the nature of the solute taken are called colligative properties. |
| 3 | **(a)**  ∴ |
| 4 | **(d)**   1. *i*=[1+(y-1)x]   y= number of ions,  x = degree of ionization,  i=3 for =1(strong electrolyte)  i=(1+x) for  i=1for sucrose (non-electrolyte)  i(for>KCl>  Thus ,(c) is also true.  is dependent on solvent  Thus, freezing points [=T(solution)- are different.  Thus, (d) is false. |
| 5 | **(d)**  Osmotic pressure is a colligative property *i.e.*, depends only upon the number of particles or ions in solution. More the number of ions in solution, more will be the osmotic pressure of solution  (i) 0.1 M urea and 0.1 M glucose will have same number of molecules in solution as they do not ionise.  (ii)  produces maximum number of ions.  It will have highest osmotic pressure. |
| 6 | **(d)**  Mole of *X*,  Moles of *Y*, |
| 8 | **(c)**  Osmotic pressure is a colligative property . More the number of particles (or ions) in solution, more will be osmotic pressure.  **Nacl solution**  Given , mass of NaCl =7 g V=1L  Concentration  =  NaCl dissociates as follows  NaCl (2 ions)  Concentration of ions in solution  =2  =0.0238 M  **MgCl solution**  Given, mass of=7g, V=1L  Concentration=  dissociates as follows  MgC (3 ions)  Concentration of ions in solution =30.074 M  =0.222 M  Number of particles in solution *B*(NaCl)are more than in solution *A*. Osmotic pressure of solution *B*(NaCl) will be more than solution*A*. |
| 9 | **(a)**  Elevation in boiling point is a colligative property which depends upon the number of solute particles. Greater the number of solute particle in a solution higher the extent of elevation in boiling point. , gives maximum ions hence, it exhibits highest boiling point |
| 10 | **(c)** |
| 11 | **(a)**  Molality, *m*=  =  = 0.05  []  Given,  or 0.05 = |
| 12 | **(b)**  This relation is equation for Gibbs phase rule for heterogeneous systems. |
| 13 | **(a)**  Molarity =  where, *M* = molecular weight of the solute  Molarity = …(i)  Molarity = …(ii)  From Eqs. (i)and(ii)  Weight of solute = 480 g |
| 14 | **(a)**  0.74=  m=100  Actual molecular mass =100  The degree of ionisation of the electrolyte is 0% . |
| 15 | **(c)**  Molality is defined as the number of moles per 1000 g of solvent. Molality of water = = 55.5m |
| 16 | **(a)**  For a given amount of solute in two solvents, |
| 17 | **(c)**  The solutions having the same osmatic pressure are called isotonic solution. They have same weight concentrations |
| 18 | **(a)**  Total no. of particles furnished by  ,  Now  ∴  = |
| 19 | **(a)**  mole-fraction  In 10 mole solubility is |
| 20 | **(a)**  van’t Hoff factor greater than 1 means observed value is greater than calculated value which is so when the solute dissociates . |
| 21 | **(d)**  All are conditions for Henry’s law. |
| 22 | **(c)**  2 % acetic acid solution  = M acetic acid  =0.33 M acetic acid  As the solution of compound “*X*” is isotonic to acetic acid solution, the molarity of solution of “*X*” will also be equal to 0.33 M. This is 5% solution. Hence  Mol.wt. of “*X*”= |
| 23 | **(a)**  Osmotic pressure is a colligative property. |
| 24 | **(a)**  ∴ |
| 25 | **(b)**  Addition of non-volatile solute always lowers the vapour pressure. |
| 26 | **(c)**  Both the molecules are polar and possess dipole. |
| 27 | **(c)**  Vapour pressure is independent of surface area and volume of container. |
| 28 | **(d)**  Elevation in boiling point is a colligative property, which depends upon the nmber of particles in solution. give maximum ions (4 ions) in solution, hence , its elevation in boiling point will be the highest. Hence, boiling point of 0.1 M solution will be the highest. |
| 29 | **(a)**  “Solutions having same osmotic pressure are called isotonic solutions.” The osmotic pressure is given as  (cane sugar)= (unknown solute)  M=  =60 |
| 30 | **(c)**  *p*V = *n*RT  1  mol  The no. of moles of ethane = *x*  so no. of moles of ethane = (0.998 - *x*)  **Reaction of ethane and ethene with**  (i)  (ii)  According to (i) reactions  2 mole ethane reacts with =7 mole  *x* mole ethane react with = mole  According to (ii) reactions  1 mole ethene reacts with = 3 mole  (0.998 -*x*)mole ethene reacts =3 (0.998-*x*)mole of  +[3 (0.998-x)]=mole of  3.5x + 2.994 -3x= mole of  0.5x = 3.333 - 2.994 = 0.3393  x= 0.678 mole of ethane  moles of ethene = 0.998 – 0.678 =0.32 |
| 31 | **(b)**  van’t Hoff factor for =3  =3  =0.0558 K |
| 32 | **(b)**  Molarity  molarity = =2M |
| 33 | **(b)**  Elevation in boiling point is a colligative property as it depends upon the number of particles  For sucrose  For |
| 34 | **(b)**  In a pair of two solution, the one having higher osmotic pressure is called hypertonic and the other having lower osmotic pressure is called hypotonic. |
| 36 | **(d)**  where , *P* = vapour pressure  *X* = mole fraction  Total moles of *A* and *B* = 5  Mole fraction of compound *A*=  Mole fraction of compound *B*=  then  = 88 torr |
| 37 | **(d)**  According to Raoult’s law the relative lowering of vapour pressure of a dilute solution is equal to the mole fraction of the solute present in the solution, *i.e*., |
| 38 | **(a)**  If = *x* mol = 18x g  Then urea = *x* mol = 60x g  Total mass of the solution  =18x + 60x=78xg  Mass % of urea = 100  =23.077% |
| 40 | **(d)**  molality (1 ⎯ 𝛂 + 𝑥𝛂 + y𝛂)  The value of is maximum for |
| 41 | **(b)**  Mole of urea mol  Conc. of solution (in molarity) |
| 42 | **(b)**  M=  Here, w=6 g T=300 K,  R=0.080 L-atm mo V =200 mL =0.2 L  M |
| 43 | **(b)**  Normality of the mixed solution  =  =  =  =  =0.4 N |
| 45 | **(a)**  Colligative properties certain properties of dilute solution containing non-volatile solute do not depend upon the nature of the solute dissolved but depend only upon the number of particles of the solute present, are called colligative properties. Some colligative properties are boiling point elevation, freezing point depression, lowering of vapour pressure, |
| 46 | **(c)** |
| 47 | **(c)**  In a pair of two solution, the one having higher osmotic pressure is called hypertonic and the other having lower osmotic pressure is called hypotonic. |
| 49 | **(c)**  Two solutions are isotonic if their osmotic pressure are equal.  ()  At a given temperature,  ()  Cane sugar unkown  =68.4 g |
| 50 | **(a)**  The two solvents in which a solute is to be distributed shows only when two liquids are immiscible, No. of phase ≥ 2 or heterogeneous systems. |
| 51 | **(b)**  dissociates completely while dissociates to a small extent hence, |
| 52 | **(c)**  for glucose = for KCl + for urea  = 3.069  ∴ |
| 53 | **(a)** |
| 54 | **(c)** |
| 55 | **(d)**  This is the mathematically modified form of distribution law when solute undergoes association in either of the solvent. |
| 56 | **(b)**  Common salt dissociates to furnish ions. |
| 57 | **(b)**  van’t Hoff factor *i*=[1+(y-1)]  where*y* is the number of ions from one mole solute, (in this case =3), the degree of dissociation.  i=(1+2 |
| 58 | **(b)**  It is definition of freezing point. |
| 59 | **(d)**  According to Raoult’s law,  or  = |
| 60 | **(a)**  Depression in freezing point is a colligative property. It depends on number of particles. More the number of particles, more will be depression in freezing point.  It gives 3 particles.  It gives 2 particles.   1. UreaNo dissociation 2. Glucose No dissociation.   produces maximum number of particles  hasmaximum depression in freezing point. |
| 61 | **(d)**  All get dissolved with evolution of heat. |
| 62 | **(a)** |
| 63 | **(d)**  Moles =  Given, mass of = 50 g  molecular mass of = 342  Moles of mol |
| 64 | **(d)**  We have, *i*=1-  where, x = degree of association  Here, *i*=0.54  0.54=1-  x= 0.92 |
| 65 | **(b)**  Benzoic acid dimerises in beneze.  Mol. wt. of benzoic acid  =78+12+32=122  Hence , moleculer weight of benzoic acid in benzene is  =122+122=244 |
| 66 | **(d)** |
| 67 | **(a)**  On increasing the concentration of a salt solution, the boiling point of salt solution increases while vapour pressure of the solution decreases. |
| 68 | **(b)**  (ii) 0.1 M glucose,  (iii) 0.6 g urea in 100 mL solution  (iv)1.0 g of non electrolyte solute is 50 mL solution  Hence, option (ii), (iii), (iv) have some osmotic pressure, osmotic pressure of 0.1 M is higher than (ii), (iii), (iv) because it dissociates to give maximum number |
| 69 | **(a)**  Osmosis is explained in terms of vapour pressure theory, ., movement of solvent particles from higher vapour pressure to lower vapour pressure. Note that a solution of high osmotic pressure is concentrated in comparison to other having low osmotic pressure. |
| 70 | **(b)**  An increase in temperature favours evaporation due to increase in average kinetic energy of molecules. |
| 72 | **(c)**  Due to higher of camphor (40 K ) about 20 times more than (1.86) of water, the depression is 20 times more in case of camphor used as solvent than water. |
| 73 | **(d)**  On dissociation, number of particles increases, thus > 1 On association, number of particles decreases thus < 1. |
| 74 | **(a)**  and thus, increase in pressure favours forward reaction. |
| 75 | **(b)**  ∴  ∴ Concentration of acid = |
| 76 | **(c)**  Molarity =  Molar solution means 1 mole of solute is present in 1 L of solution. |
| 77 | **(a)** |
| 78 | **(c)**  ;  Molality = 1, |
| 79 | **(b)**  When 0.1 n NaOH is used,  (For HCl) (For KOH)  When 0.5 N KOH is used,  (For remaining HCl) (for KOH) |
| 80 | **(b)**  1 mole urea gives 1 mole  1 mole NaCl gives 2 mole  1 mole gives 3 mole  ratio 1 : 2 : 3 |
| 81 | **(a)**  Colligative properties are used for the determination of molar mass |
| 82 | **(d)**  Mole fraction of |
| 83 | **(b)**  ∴  ∴  or  or  ∴ |
| 84 | **(b)**  =0.028atm  =  = 0.977-0.028 =0.949 atm |
| 85 | **(c)**  A natural semipermeable membrane is one which exist in nature. |
| 87 | **(c)**  More is the lattice energy of an ionic solute, lesser is its solubility. |
| 88 | **(b)**  The tendency to evaporation will decrease and this will lead to lower value of experimental vapour pressure than those calculated from Raoult’s law. |
| 90 | **(b)**  although insoluble in water but shows complex formation with KI and therefore, freezing point decreases |
| 91 | **(d)**  Solutions should be dilute to hold distribution law correct. |
| 92 | **(a)**  For complete neutralisation,  m. wq of = m. eq. of NaOH  *V* = 50mL |
| 93 | **(c)**  Given |
| 94 | **(d)**  M |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 95 | **(d)**  According to Raoult’s law   |  |  | | --- | --- | | or or |  |   Also, we can derive from   |  |  | | --- | --- | | or or |  | |

|  |  |
| --- | --- |
| 96 | **(b)**  Given, w = 24.5 g  *V* = 1L = 100 mL  *M* =?  Mol. wt. of NaOH = 23+16+1=40  We know that,  M= =  Molarity of solution = 0.6125 M |
| 97 | **(a)**  Relative lowering of vapour pressure = mole fraction of solute  (Raoult,s law)  where, *w*=wt. of solute  *M*=mol. wt. of solvent  *m*= mol. wt. of solute  *W* = wt. of solvent  0.0125=  or  Hence, molality  = |
| 98 | **(a)**  Van’t Hoff’s factor (i)=4 {  Molality =  -  (As freezing point of water is ) |
| 99 | **(a)**  *w* =0.15 g, *W*=15 g,  =0.216  = 2.16  M= |
| 100 | **(d)**  Normality of acid = molaritybasicity  Molarity =  = =0.1M |
| 101 | **(c)**  Vapour phase composition over liquid phases of mixture may have any value.  Recall that |
| 102 | **(d)**  1 mole 0 0 initial  after dissociation  Total moles |
| 103 | **(b)**  It is therefore also known as Nernst distribution law. |
| 104 | **(c)**  Sucrose, urea and glucose are non-electrolytes. They do not dissociate but ethanol dissociates into and ions, so, it has highest number of ions among given choices. (Colligative property number of ions of solute.) |
| 105 | **(a)**  Actual molecular weight of naphthoic acid ()=172  Molecular mass (calculated)  ==344  van’t Hoff factor (*i*) = |
| 106 | **(c)** |
| 107 | **(b)**  Liquid phase does not exist above |
| 108 | **(c)**  According to Raoult’s law  weight of solute  =  =102 g |
| 110 | **(c)**  According to Raoult’ law, |
| 111 | **(b)**  M=  Given,  *w*= mass of solute = 6 g  *W*=mass of solvent =100 g  elevation in boiling point = 0.52  *M*= molecular weight =?  M = |
| 113 | **(d)**  Azerotropic mixture has constant boiling mixture, it is not possible to separate the components of azeotropic mixture by boiling |
| 114 | **(b)**  For isotonic solutions, |
| 115 | **(c)**  It furnishes 3 ions per formula unit.  So, its van’t Hoff factor is 3. |
| 116 | **(d)**  According to Raoult’s law, the relative lowering in vapour pressure of a dilute solution is equal to mole fraction of the solute present in the solution |
| 117 | **(c)**  Nernst’s distribution law at constant temperature, when different quantities of a solute are allowed to distribute between two immiscible solvents in contact with each other then at equilibrium the ratio of the concentration of the solute in two layers is constant for similar species which may be present.  Distribution coefficient |
| 118 | **(b)**  or |
| 119 | **(d)**  Each has different molarity. |
| 121 | **(a)**  It is the definition of boiling point. |
| 122 | **(b)** |
| 123 | **(a)**  for dilute solution  molarity=molality=2(given)  and  Now ,  boiling point of solution – boiling point of solvent  (*i.e.,*)  boiling point of solution =  =1.04+100 =101.04 |
| 124 | **(a)**  It is a characteristic of given solvent. |
| 125 | **(d)** |
| 126 | **(c)** |
| 127 | **(a)**  Beckmann thermometers do not read actual b.p. or f.p., but they give b.p., f.p. values on their scale. |
| 128 | **(c)**  The one whose boiling point is more than that of either of the two pure components is known as azeotropic mixture with maximum boiling point. This is formed by non-ideal solutions showing negative derivation |
| 129 | **(b)**  and  and  or  or  or  or  and intercept |
| 131 | **(c)**  Number of moles = MolarityVolume (in L)  Number of moles of  = 10 moles |
| 132 | **(b)**  At t=0 0.1 M 0 0  At equilibrium (0.1-x)M xM 2xM  i=  2.74=  0.1+2x=0.274  2x=0.274-0.1=0.174  x==0.087  Degree of dissociation = |
| 133 | **(b)**  ∴ |
| 134 | **(a)**  = =0.4N  = 40 mL |
| 135 | **(c)**  Concentration of Ag in 10 Zn=x  Concentration of Ag in 100 Pb=  Concentration of Ag in 10 Pb=  300=  Concentration of Ag in zinc =1 -0.967=0.033  =3.3% |
| 136 | **(c)**  Water boils at higher temperature than its b. p. if atmosphere pressure is more than 1 atm. |
| 137 | **(b)**  6=2 |
| 138 | **(c)**  Molarity =  density = = 1.21  % by weight of solute density |
| 139 | **(a)**  Lowering is always positive. |
| 140 | **(b)**  [ molecular weight of and weight=densityvolume] |
| 141 | **(b)**  Given, in 100 g of solution NaOH present  = 10 g  In 500 g of solution NaOH present  = =50 g  So, 50 go NaOH will be required to prepare 500 g 10% NaOH solution. |
| 142 | **(c)**  Strength of |
| 143 | **(a)**  The exosmosis occurs from cell to solution (hypertonic or high osmotic pressure or high concentration). |
| 144 | **(d)**  Beckmann thermometer does not read actual b.p. or f.p. of solution but gives their value on its scale. This leads to evaluation of upto a least count of 0.01 |
| 145 | **(b)**  Avogadro’s number  =1 mol  molecules = 0.001 Mol in 100 mL (0.1 L) solution  Molar concentration =  ==0.01 M |
| 146 | **(b)**  Super saturated state is a meta stable state. |
| 147 | **(a)** |
| 148 | **(a)**  The molal depression constant ( for camphor is maximum. Hence depression of freezing point () will be maximum for camphor. |
| 150 | **(b)**  When interactions are greater less vapour are formed , solution shows negative deviation |
| 151 | **(b)**  Given, weight of PVC, *w*= 4g  Volume of solution, *V* = 1 L  Osmotic pressure,  Temperature, T==27+273=300K  V=nRT  Or V=(M=moleclular weight )  M=  M=2.4 |
| 152 | **(d)**  These are facts. |
| 153 | **(a)**  Colligative properties depends only upon the number of solute particles. Since, optical activity depends upon the nature of substance  (through which plane polarised light is passed), it is not a colligative property. |
| 154 | **(b)**  molecular formula of the compound is |
| 155 | **(c)**  Given, vapour pressure of benzene,  =640 mm Hg  Vapour pressure of solution,  *p*=600 mm Hg  Weight of solute, *w*= 2.175 g  Weight of benzene, *W*= 39.08 g  Molecular weight of benzene,  M=78 g  Molecular weight of solute, *m*=?  According to Raoult’s law,  *m*=  *m*=69.60 |
| 156 | **(b)**  =0.0512 |
| 157 | **(a)** |
| 158 | **(d)** |
| 159 | **(b)** |
| 160 | **(a)**  According to Raoult’s law  Mole fraction of solute = |
| 161 | **(a)**  ∴ 0.00713 = |
| 162 | **(c)**  ppm =  = = 5 |
| 163 | **(b)**  Liquid mixtures showing negative deviations from Raoult’s law possess higher b. p. |
| 164 | **(d)**  Higher vapour pressure of in atmosphere will derive vapours to solute particles. |
| 165 | **(a)** |
| 166 | **(c)**  = 0.4 K |
| 167 | **(c)**  Mole fraction and molality does not involve volume therefore they are independent of temperature. |
| 168 | **(c)**  (i)Azeotropic mixtures having boiling point less than either of the two pure components show positive deviation from Raoult’s law.  (ii) Azeotropic mixtures having boiling point more than either of two pure components show negative deviation from Raoult’s law. |
| 169 | **(c)** |
| 170 | **(d)**  because solution boils at 88.  Now,  Where is mole fraction of |
| 171 | **(a)**  Due to addition of nitric acid in water, the vapour pressure of pure water decreases |
| 172 | **(a)**  Moist air contains vapours in air. |
| 173 | **(a)** |
| 174 | **(a)**  The boiling occurs at lower temperature if atmospheric pressure is lower than 76 cm Hg. |
| 175 | **(a)**  For two non-electrolytic solution if isotonic  ∴ |
| 176 | **(d)**  will furnish more ions. More is vapour pressure lowering, lesser is vapour pressure. |
| 177 | **(b)**  The endosmosis occurs from solution (hypotonic or low osmotic pressure or low concentration) to cells. |
| 178 | **(b)**  The number of moles or gram molecules of solute dissolved in 1000 g of solvent = molality  117 g NaCl = 2 mol  Hence, concentration of solution = 2 molal |
| 179 | **(b)**  For |
| 180 | **(a)**  An increases in temperature increase the volume of the solution and thus, decreases its molarity |
| 181 | **(d)**  = 48 + 24 = 72 torr |
| 182 | **(c)** |
| 183 | **(a)**  Thus, |
| 184 | **(a)**  ∴  Where, is amount of in . Thus, it aqueous layer |
| 185 | **(d)**  Normality =  Given, basicity = 2, mol. wt. = 200,  *V* = 100 mL = 100/1000L  Normality = 0.1  Eq. wt. = = 100  N=  or 0.1 =  or 0.1 =  or mass = 0.1 0.1 100= 1.0 g |
| 186 | **(b)**  Vapour pressure of a solution increases with temperature, decreases with increase in mole fraction of solute and decreases with degree of dissociation of solute. |
| 187 | **(c)**  We know that 1 g equivalent weight of NaOH = 40 g  40 g of NaOH = 1 g eq. Of NaOH  0.275 g of NaOH =0.275 eq.  =6.88 meq  (HCl) (NAOH)  (meq = *NV*) |
| 188 | **(c)**  . |
| 189 | **(d)**  All are desired condition for Henry’s law. |
| 190 | **(d)**  According to Raoult’s law the relative lowering in vapour pressure of an ideal solution containing the non-volatile solute is equal to the mole fraction of the solute.  Relative lowering of vapour pressure =0.2  Mole fraction of the solute =0.2 |
| 191 | **(d)**  Elevation in boiling point is a colligative property, i.e., depends upon the number of particles. Hence, the electrolyte which give largest number of particles in the solution, has the highest boiling point.  Since gives largest number of particles, *i.e*., 5, hence it has the highest boiling point. |
| 192 | **(a)**  Mol wt. ratio of *A* and *B* =1:4  Mole ratio of *A* and *B,* if equal weight of *A* and *B* are taken = 4:1  Partial pressure of *B* = |
| 193 | **(b)**   1. Amount of water to be added   = total volume – volume of NaOH  Given, normality of NaOH = =0.1 N  Volume of NaOH ==?  Normality of HCl()= 0.2 N  Volume Of HCl = = 50mL  100mL  *V* of NaOH = 40 mL  Amount of water to be added =100-40=60 mL |
| 194 | **(d)**  Total water =200 g  Hence, ice separated |
| 195 | **(c)** |
| 196 | **(d)**  =  Mixture solution boil at 1 atm = 760 mm = total pressure.  0.5, mol% of *A* =50% |
| 197 | **(a)**  To show colligative properties solute should be non-volatile and soluble in given solvent. |
| 198 | **(b)**  *i* for HBr=1 +  where, =degree of dissociation  *i*=1+0.9=1.9  1.9 1.86  =3.534  Freezing point =-3.534 |
| 199 | **(d)**  The formula neither dissociates nor associate. In case of dissociation :  (1 ⎯ 𝛂 + 𝑥𝛂 + y𝛂). In case of association  (1 ⎯ 𝛂 + 𝛂 /). In case of association |
| 200 | **(a)**  Hence, 1 mol of = 6 moles of  = 29.2 mL |
| 202 | **(d)**  84=56+  = |
| 203 | **(c)**  As the colligative properties depend only upon the number of particles of solute, so if the non-volatile solute dissociate or associates in the solution, the value of colligative properties deviates, *i.e.,* abnormal colligative properties are obtained. |
| 204 | **(b)**  Osmosis a slow process occurs from dilute to concentrated solution. |
| 205 | **(d)**  At triple point, all the three phase exist together. |
| 206 | **(c)**  Molality depends only upon weights, not on volumes whereas other given concentration terms depend upon the volume of solution. Volume of solution increases with rise in temperature but temperature does not affect the weights, therefore molality is independent of temperature . |
| 207 | **(d)**  Addition of glycol lowers the freezing point of water and thus, glycol water mixture is used as antifreeze in radiators of cars. |
| 208 | **(b)**  Given,  R=8.314 J |
| 209 | **(b)**  =  Freezing point of solution =273.15K-2.2 K  =270.95 K |
| 210 | **(c)**  The phenomenon in which, when two solutions of different concentration (one may be solvent) are kept separated by semipermeable membrane, the solvent molecules start flowing from dilute solution to concentrate solution. This is called osmosis. Osmosis is a slow process and keeps on happening until the concentration of both solutions become equal. |
| 211 | **(b)**  Methanol has low boiling point than , lower is boiling point of solvent more is vapour pressure |
| 212 | **(d)**  Each system is non-ideal and shows |
| 213 | **(d)**  Moles of glucose =  Moles of  According to Raoult’s law  so, |
| 214 | **(a)** |
| 215 | **(c)**  Put colligative properties |
| 216 | **(b)**  For isotonic solutions, (and for non-electrolytes also |
| 217 | **(c)** |
| 218 | **(a)**  6= |
| 219 | **(a)**  Let molality of solution = *x*  Moles of solute in 1000 g benzene  = =12.82  Mole fraction of solute =  0.2=  or 0.2(x+12.82)=x  or 0.2x+2.564 = x  2.564 = x - 0.2x  = 3.2 |
| 220 | **(d)**  This is the mathematically modified form of distribution law when solute undergoes association in either of the solvent. |
| 221 | **(c)**  Rest all are applications of distribution law. |
| 222 | **(a)**  According to Raoult’s law, for non volatile solute, the relative lowering of vapour pressure of a solution is equal to the mole fraction of the solute |
| 224 | **(b)**  Where molar mass of solute |
| 225 | **(a)**  An ionic compound having is insoluble in water. |
| 226 | **(d)**  These are conditions for the validity of distribution law. |
| 227 | **(c)**  Volume of monobasic acid =  Normality of monobasic acid = 0.1 N  Volume of NaOH solution=  Normality of NaOH solution =?  (for monobasic acid) (for NaOH) |
| 228 | **(c)**  Molality (*m*) =  M = Molarity  = Molecular mass  d = density  =100  =2.28 mol |
| 229 | **(d)**  According to question,  We know that,  or 0.4=  0.4  or 2x+54=5x  or 3x=54,x=18 g |
| 230 | **(a)** |
| 231 | **(b)**  **Molarity**Molarity of a solution is the number of moles of the solute per litre of solution. Unit of molarity is mol/L. |
| 232 | **(b)** |
| 233 | **(d)**  furnishes maximum ions (, 5) thus, it has maximum value of van’t Hoff factor |
| 234 | **(d)**  For ternary electrolyte;  For  ∴ |
| 235 | **(a)**  = 0.372 |
| 236 | **(a)**  According to Raoult’s law |
| 237 | **(c)**  Molarity, *M* = where mass of in g, is the molar mass of  But according to equation 1 mole of gives 2 mole of [] ions. So, the amount of to prepare 200 mL solution having the 1 M concentration o ions is 19.6/2 = 9.8 g. |
| 238 | **(a)**  0.164 M NaOH 0.164 N NOH  = ?, = 25 mL, = 0.164, =32.63 mL  or  =  = 0.214 N  0.214 N  0.107 M |
| 239 | **(c)**  ∴ 10 = 1.86  or |
| 240 | **(a)**  A gas is more soluble if (i) More are forces of attractions among molecules of gases,  ii) More being the tendency of ionization in a solvent and  iii) More is H-bonding . |
| 241 | **(c)**  Molality =  = 5.20 + 55.56 = 60.76 mol |
| 242 | **(c)**  Suppose the equal mass of methane and oxygen = *w*= 1g  Mole fraction of oxygen =  =  Let the total pressure = *p*  Pressure exerted by oxygen (partial pressure)  = |
| 243 | **(d)**  In Ist case,  When two liquids *X* and *Y* are mixed in the molar ratio 1:1.  Moles of *X* = 1  Moles of *Y* =1  Mole fraction of *X* ()=  Mole fraction of *Y* ()=  We know that  p= (*p*=total pressure of mixture)  …(i)  For case IInd ,  When liquids are mixed in the molar ratio of 1:2,  Mole fraction of *X* =1  Mole fraction of *Y* = 2  Mole fraction of *X* () =  Mole fraction of *Y* () =  …(ii)  From Eqs (i) and (ii) , we get |
| 244 | **(c)**  Where is degree of dissociation |
| 245 | **(b)**  =  = |
| 246 | **(c)**  For ideal solution, |
| 247 | **(d)**  Azeotropic mixture of HCl and water has 20.24% of HCl. It boils at under a pressure of one atmosphere. |
| 248 | **(d)**  Molarity |
| 249 | **(a)**  =CRT  Hence, C =0.2 M  R =0.082 L atm  T =27+273 = 300 K  =0.2  =4.92 atm. |
| 250 | **(b)**  Let the volume of 0.4 M HCl is and that of 0.9 M HCl is  We know that,  (Mixture) (for 0.4 M HCl) ( for 0.9 M HCl)  [1m HCl = 1N HCl] |
| 251 | **(b)**  () glucose =() unknown compound  0.05=  *n*==2 (e.f.m. for )  so, molecular formula= |
| 252 | **(d)**  By Ostwald-walker dynamic method, the relative lowering of vapour pressure, lowering of vapour pressure and vapour pressure of the solvent, all can be measured.  In this method, the apparatus used, contains two bulbs: bulb *A* contains solution and bulb *B* contains solvent. The loss of weight in bulb *B* gives the lowering vapour pressure and total loss of weight in both the tubes gives the vapour pressure of the solvent and  Relative lowering of vapour pressure |
| 253 | **(a)**  Where is the molarity of organic compound in at equilibrium  Thus, molarity of organic compound left in water  = 0.1 ⎯ 0.09  = 0.01 |
| 254 | **(d)**  =180  *n*=  Molecular formula of the compound is . |
| 255 | **(a)**  According to Raoult’s law in a solution of a non-volatile solute, the the relative lowering in vapour pressure is always equal to the mole fraction of the solute. |
| 256 | **(c)**  ∴  ∵ |
| 257 | **(a)** |
| 258 | **(d)** |
| 259 | **(b)**  Molarity of =5 M  Normality of = 2 5 =10 N  10 1 = or =1 N |
| 260 | **(a)**  = 7.26 |
| 261 | **(b)**  Substances of high vapour pressure ( gasoline) evaporates more quickly than substances of low vapour pressure ( motor oil). |
| 262 | **(b)**  Lowering of vapour pressure is a colligative property, *i.e.,* depends only upon the number of particles of solute and not on the nature of solute. 0.1 M Glucose remains undissociated  0.1 m  0.1 m  0.1 M NaCl  0.1 m gives maximum number of particles, hence it exhibits maximum lowering of vapour pressure. |
| 263 | **(d)**  Amount of gas dissolved per unit volume of gas; this is Henry’s law. |
| 264 | **(b)**  Osmotic pressure ()=CRT  Here, C = concentration of solution  C=  n=  V=1L  C=  =  =4.48 atm |
| 265 | **(a)**  Molarity gets affected as it is the number of moles per unit volume (volume increases with increase of temperature). |
| 266 | **(c)**  The solution of acetone and chloroform shows negative deviation from Raoult’s law because acetone and chloroform make the hydrogen bond.  So |
| 267 | **(d)**  and |
| 268 | **(d)**  ∴  comes 150 if formula is used. But this is only for dilute solutions. |
| 269 | **(d)**  —do— |
| 270 | **(c)**  For same solution  or  Now on diluting the solution to double  ∴ |
| 271 | **(c)**  or  ∴ |
| 272 | **(d)**  20 g glucose is dissolved in 100 mL solution  1 g glucose is dissolved in =  180 g (g-mole) glucose is dissolved in  = = 900 mL  = 0.9L |
| 273 | **(d)**  ; 5.08 kg , w=1g, W=80g  M=  = = 334.21  Atomic weight of As =74.92  Hence, number of atoms =  Hence, the formula of arsenic is |
| 274 | **(d)**  Reverse osmosis involves movement of solvent particles through semipermeable membrane from concentrated solution to dilute solution under pressure. |
| 275 | **(a)**  When ethylene glycol is added to as antifreeze, it decreases the freezing point of in winter and increase the boiling point of water in the summer. |
| 276 | **(b)**  Elevation in boiling point is colligative property and depends upon number of ions of molecules or particles.  2 ions  3 ions  NaCl 2 ions  urea no dissociation 1 molecule  furnishes maximum ions.  will have maximum boiling point. |
| 277 | **(d)**  is 17.4 ppm*i.e*.   g (mL)has = 17.4 g  mL has = 0.0174 g / L  = mol/L |
| 278 | **(a)**  (mole fraction of solute ) |
| 280 | **(a)** |
| 281 | **(c)**  Vapour pressure of a liquid in a closed container increases with increase in temperature |
| 282 | **(c)**  From Raoult’s law :  or |
| 283 | **(c)**  Solutions having same osmotic pressure are called isotonic solutions. |
| 284 | **(b)**  Follow definition of diffusion. |
| 285 | **(b)**  Boiling point  Freezing point  Weight of sucrose to be dissolved in 100 g water |
| 286 | **(c)**  = 0.654 |
| 287 | **(c)** |
| 288 | **(c)**  Vapour pressure of a solvent is lowered by the presence of solute in it. Lowering in vapour pressure is a Colligative property. *i.e*., it depends on the number of particles present in the solution. give the maximum number of ions (*i.e*., 3)so, it causes the greatest lowering in vapour pressure of water. |
| 289 | **(b)**  In the molarity and normality the volume of the solution is considered while in molality the mass of the solvent is considered. Molarity and normality change with temperature because of expansion of contraction of the liquid with temperature. However, molality does not change with temperature because mass of the solvent does not change with temperature. |
| 290 | **(c)**  Molality =  =0.2 m |
| 291 | **(a)**  gives maximum ion hence, it shows lowest vapour pressure |
| 292 | **(d)**  Solution is isotonic.  Density of both the solutions are assumed to be equal to  1.0 g .  5.25% solution of a substance means 100g solution contains  5.25 g solute and 1000g solution contain 52.5g solute.  Hence,  M= molecular mass of the substance  M= =210 |
| 293 | **(a)**  Elevation in boiling point is a colligative property, *i.e*., depends only on number of particles of ions. 0.1 M gives maximum number of ions, thus has highest boiling point. |
| 294 | **(a)**  produces maximum number of ions so, it will have highest osmotic pressure. |
| 295 | **(a)**  Normality of acid=molarity basicity |
| 296 | **(a)**  In solution the KCl and produces same number of ions in solution.  Both produced two ions in solution.  So, ionic strength of a solution is combined ionic strength of both of the salt.  =0.1+.02=0.3 mol/kg |
| 297 | **(a)**  Let molarity o  Normality = 2  Molarity of HCl = 0.1 M = 0.1 N  =0.07 M |
| 298 | **(c)**  Glucose ( ) is a non-electrolyte, hence *i*=1, while others are electrolyte, hence*i*> 1.  The value of is lowest for glucose, hence its freezing point is maximum. |
| 299 | **(b)** |
| 301 | **(a)**  According to the Boyle-van’t Hoff law, at constant temperature the osmotic pressure of a solution is directly proportional to its concentration and inversely proportional to its dilution. (where, C= concentration).  Hence, the osmotic pressure of a solution at a given temperature increases with concentration. |
| 302 | **(c)**  Thus,  Now,  ∴ |
| 303 | **(d)**  and ethanol are miscible. |
| 304 | **(b)**  According to the Raoult’s law the relative lowering vapour pressure which is produced by dissolving a non-volatile solute in a solvent is equal to mole fraction of the solute.  where, p= vapour pressure of solvent  Given, P=0.80 atm  0.60 atm |
| 306 | **(b)**  For |
| 307 | **(a)** |
| 308 | **(a)**  Initial 0.01 M  At equilibrium (0.01-x) M xM 2xM  *i*=  =  x=0.0049  % |
| 309 | **(a)**  According to Raoult’s law relative lowering of vapour pressure mole fraction of solute  Thus, mole fraction of solute = 0.0125  Mole fraction of a solute is related to the molality by the following expression.  where, X = mole fraction of solute  = moleular weight of solvent  *m* = molality  m= |
| 310 | **(b)** |
| 311 | **(d)**  Osmotic pressure ()=CRT  Unit of osmotic pressure is atm. |
| 312 | **(b)**  Unit of molality mole per kilogram (mol k). |
| 313 | **(b)**  Azeotropic mixture which boils at a lower temperature than either of two components is formed by non-ideal solution showing positive deviation |
| 315 | **(a)**  i=van,t Hoff factor  *m*= molality and  and = freezing point depression constant  For 0.01 molalNaCl solution  -----(i)  For 0.02 molal urea solution  -----(ii)  From Eqs (i) and (ii) |
| 316 | **(b)**  Given,  ∴  Also |
| 317 | **(a)**  Relationship between normality and molar concentration is  Normality = *n* molarity (*M*)  Where, *n* = the number of moles of per mole of the compound that solute is capable of releasing [acid] on reacting with base.  In case of HCl,  *n* = 1  Hence, 2 N HCl solution 2 M solution.  In case of  *n*= 2  Hence, 4.0 solution 2 M solution. |
| 318 | **(a)**  Orthophosphoric acid () is a tribasic acid.  Normality = molarity basicity  Normality = 3 M 3 = 9 N |
| 320 | **(c)**  Kinetic energy in liquid and vapour phase = |
| 321 | **(c)**  The extraction is more efficient when little volume of extracting liquid is used for large number of operations. |
| 322 | **(b)**  Normality of acid |
| 323 | **(a)**  At t=0 1 mole 0 0  After ionisation  Thus, number of particles after ionisation  =1-+  van,t Hoff factor (*i*)  The elevation in boiling point (when colligative property is abnormal)  molality of solution  Molality of solution  Thus, |
| 324 | **(a)**  After dissociation (1-  *i*=n(+n((  =2-+ |
| 325 | **(a)**  According to Raoult’s law  Where, p= vapour pressure of pure solvent =0.80 atm  vapour pressure of solute =0.60 atm  mole fraction of solute  or |
| 326 | **(d)**  These are characteristics which reflect for high solubility of gases in water. It is therefore and having lower critical temperature or easily liquefied, HCl which ionises in water and which reacts with water are more soluble. |
| 327 | **(d)**  In osmosis only solvent particles move. |
| 328 | **(d)**  Given,  (m =molality)  5= |
| 329 | **(a)**  Due to higher pressure inside the boiling point elevated |
| 330 | **(a)** |
| 331 | **(c)**  ∴ |
| 332 | **(b)**  []=antilog(0.00)  []= 1.0 M  Normality of 250mL solution =  =0.50 N |
| 333 | **(c)**  Benzoic acid in benzene exists as a dimer. So, number of molecules decreases and hence, osmotic pressure decreases. |
| 334 | **(b)**  ∴ |
| 335 | **(a)**  If mol. wt. is high, and will be too small to read out accurately. |
| 336 | **(d)**  Van’t Hoff factor (*i*) is given by  The normal value of colligative property is the theoretically calculated value assuming no association or dissociation. |
| 337 | **(c)** |
| 338 | **(b)**  Alcohol involves H-bonding; also mol. wt. of of . Greater is molecular weight of covalent compound, higher is its b.p. |
| 339 | **(b)**  Lesser is more is freezing point. |
| 340 | **(a)**  Liquid mixtures showing positive deviations from Raoult’s law posses lower b. p. |
| 341 | **(b)**  Osmotic pressure number of particles.  Solution with least number of particles will have minimum osmotic pressure.  (i) NaCl  Concentration of particles in  NaCl=22M =4M  (ii) Glucose does not dissociate  Concentration of particles  = 11M= 1M   1. Urea does not dissociate   Concentration of particles 12M=2M  Glucose solution will have minimum osmotic pressure. |
| 342 | **(b)**  As concentration of particles is maximumin solution so deviation in boiling point will be maximum. Hence, actual boiling point will be highest |
| 343 | **(b)**  An increase in temperature favours backward reaction if,  Solute + Solvent ⟶ Solution; |
| 344 | **(b)**  *n*-heptane and ethanol forms non-ideal solution. In pure ethanol, Molecules are hydrogen bonded. On adding *n*-heptane, its molecules get in between the host molecules and break sme of the hydrogen bonds between them. Due to weaking of interactions, the solution shows positive deviation from Raoult’s law. |
| 345 | **(b)**  0.00732 =  ∴ |
| 346 | **(a)**  Isotonic solutions have same molar concentration of solute particles in solution. Molar concentration of particles in solution are 0.1 M in glucose, 20.05 M in NaCl, 30.05 in and 40.1 in Therefore, 0.1 M glucose and 0.05 in M NaCl solutions are isotonic. |
| 348 | **(b)** |
| 349 | **(b)**  ∴ |
| 350 | **(b)**  On heating solubility of NaCl increases. |
| 351 | **(b)**  Molar concentration |
| 352 | **(a)**  Molarity of pure water |
| 353 | **(c)**  3.50 wt% of aqueous solution of NaCl means 100 g of sea water contains 3.50 g NaCl.  Water in sea water = 100-3.5 = 96.5 g  =0.0965 kg  Molality =  = 0.62 m |
| 354 | **(d)**  In the choices reflect for the validity of law. |
| 356 | **(b)**  Colligative properties depend upon number of particles in solution and concentration of solution. Larger the number of particles in solution, higher is the colligative properties.  Hence, highest boiling point is found in 0.1 M |
| 357 | **(b)**  Hg has higher attractive forces among molecules. |
| 358 | **(b)**  (a)6g of  (b)0.5 M  (c) phosphoric acid Normality=1  (d) |
| 360 | **(c)**  is a dibasic acid (containing two ionisable protons attached to O directly).  and 0.1 M KOH = 0.1N KOH  (KOH) (  = 40mL |
| 361 | **(b)**  =600 K, = 700 K  p= |
| 362 | **(b)** |
| 363 | **(b)**  KN is a strong binary electrolyte. Its van’t Hoff factor is 2. is a very eak electrolyte . Its van’t Hoff factor is less than that for Hence osmotic pressure of 0.1 M (Colligativemolarity =0.1 M 2)  >O.P. of 0.1 M  (Colligativemolarity is 0.1 M) |
| 364 | **(a)**  = 50 + 7.3 = 57.3  Also |
| 365 | **(b)**  Fusion requires heat ( endothermic), thus freezing is exothermic. |
| 366 | **(b)**  acid in water = 12.5 g |
| 367 | **(b)**  Liquid mixtures showing positive deviations possess higher value of experimental vapour pressure than those obtained from Raoult’s law. |
| 368 | **(a)**  Victor Meyer’s method is used for volatile solutes. Rest all are used for non-volatile solute. |
| 369 | **(c)**  Both phase rule and distribution law are applied to heterogeneous systems. |
| 370 | **(a)** |
| 372 | **(a)**   1. Van’t Hoff equation is 2. For depression in freezing point, 3. For elevation in boiling point, 4. For lowering of vapour pressure, |
| 373 | **(b)**  Water and hydrochloric acid; and water and nitric acid form miscible solutions. They show negative deviation.  In case of CO and CHC, there is interaction between them, thus force of attraction between .. is larger than between or COand thus vapour pressure is less than expected. –a negative deviation.  In case of there is association by intermolecular h-bonding. When benzene is added to , H-bonding breaks and thus force of attraction between OH and benzene molecules is smaller than between or benzene molecules (in pure state).  Vapour pressure of mixture is greater than expected—a positive deviation. |
| 374 | **(d)**  Equivalent weight of  Oxidation number of Cr in  2[+1]+2(x)+7(-2)= 0  2+2x-14 = 0  2x=12  x=6  Equivalent weight =  = 4.903 g |
| 375 | **(b)**  Lower is the b. p. of solvent more is its vapour pressure. |
| 376 | **(d)** |
| 377 | **(d)**  .)  The plots of ) have slope = |
| 378 | **(a)**  According to molarity equation  NaOH = HCl |
| 379 | **(a)**  For non-electrolyte  Given, m =0.05,  Freezing point of solution  =0-0.093=-0.093 |
| 380 | **(b)** |
| 381 | **(a)**  for glucose and blood; If isotonic ;  Thus,  or 5.41% |
| 382 | **(d)**  Van’t Hoff factor for association  Given and |
| 383 | **(b)**  Vapour pressure is characteristic property of a solvent at a temperature. |
| 384 | **(a)**  ∴  ∴  ∴ Ice separated = |
| 386 | **(a)**  The order of osmotic pressure of , NaCl and sucrose is  >NaCl>sucrose  Since, Ba gives maximum ion (3 ions) in the solution. |
| 387 | **(c)**  Mole fraction of *A* =  Given,  moles of Ar = 1, moles of = 2,  moles of = 3, moles of = 4,  moles of removed = 1  Mole fraction of at initial stage  =100=  Mole fraction of at final stage  =  =  % change |
| 388 | **(d)** |
| 389 | **(a)**  Osmosis is a bilateral movement of solvent particles through semipermeable membrane and only net flow (more from dilute solution to concentrate solution) is noticed. |
| 390 | **(d)**  These are conditions for the validity of distribution law. |
| 391 | **(b)** |
| 392 | **(d)**  Aqueous solution of any substance (non-volatile) freezes below 0 because the vapour pressure of the solution becomes lower than that of pure solvent. |
| 393 | **(c)** |
| 394 | **(a)**  depends upon of solvent. |
| 395 | **(c)**  Given,  Weight of non-volatile solute,  w= 25 g  Weight of solvent, W=100 g  Lowering of vapour pressure,  Vapour pressure of pure solvent,  Molecular weight of solvent (), *M* =18 g  Molecular weight of solute, *m*=?  According to Raoult’s law |
| 396 | **(d)**  Let *x*mL of HCl are taken , then  *x* = 100mL  Hence, water needed to add  = 500-100= 400mL |
| 397 | **(a)**  The value of is maximum for |
| 398 | **(d)**  Ideal solution obeys Raoult’s law at every range of concentration. So, the second component must follow.  Raoult’s law in the range. When is |
| 399 | **(c)**  Mole fraction of |
| 400 | **(c)**  Molality = |
| 401 | **(d)**  Solutions having same osmotic pressure, at a given temperature, have same concentration.  Concentration of compound = concentration of glucose  M  Empirical formula mass ()= 12+2+16  =30  Hence, molecular formula = ( = |
| 402 | **(a)**  If then pure  If then pure |
| 403 | **(b)** |
| 404 | **(c)**  for isotonic solutions, osmotic pressure () is same |
| 405 | **(d)**  Distribution law can be used for any heterogeneous system. |
| 406 | **(a)**  When 0.004 M solution is isotonic with 0.01 M solution of glucose, so their osmotic pressures are equal to each other.  Osmotic pressure of 0.01 M glucose ( =CST  C= concentration of solution =0.01 M  S= solution constant =0.0821 L atm/K/mol  T= absolute temperature  ---(i)  is present in ionic state in solution  So,  At t=0 1 0 0  At equilibrium  (where, is the degree of dissociation of  (= 0.004 0.0821 T ---(ii)  By van’t Hoff facter  Or or 10=4+8  %of= 75% |
| 407 | **(b)**  Where is volume of and is volume of water,  Thus, |
| 408 | **(b)**  When an egg is kept in saturated solution of after removing its hard shell in dil, its shrinks. This is due to the fact that water comes out of the egg as salt solution is more concentrated than the egg fluid |
| 409 | **(d)** |
| 410 | **(c)**  m  = |
| 411 | **(b)**  Gives moles of ions on complete ionization,  0.0054 = 1.80  ∴  Thus, |
| 412 | **(b)**  Eq. wt. of |
| 413 | **(c)** |
| 414 | **(b)**  or  or |
| 415 | **(b)** |
| 416 | **(a)**  3170 |
| 417 | **(c)**  Thus, …(i)  When, 1 mol of *Y* is further added to the solution  Thus, …(ii)  On subtraction II-I  =2800-2200  = 600  Putting the value of in Eq. (i)  = 2200-1800=400. |
| 418 | **(d)**  We know that *m*=  Hence,  *w*=5 g, *W* =50 g  m= |
| 419 | **(b)**  Weaker are the intermolecular forces of attractions, more is the tendency for evaporation, more is vapour pressure, lower is b.p. |
| 420 | **(b)**  Ions at equilibrium 1-  Given,  Mass of HBr = 8.1 g  Mass of =100 g  () = degree of ionization = 90%  m(molality) =  =1+90/100  =1.9  = 1.9 1.86  = 3.53  (depression in freezing point) = freezing point of water - freezing point of solution 3.534 = 0 – freezing point of solution.  Freezing point of solution = -3.53 |
| 421 | **(b)**  According to colligative property, freezing point will be highest for IV solution due to lower concentration of NaCl. |
| 422 | **(b)** |
| 423 | **(b)** |
| 424 | **(a)**  If is in favour of phase I;  If is in favour of phase II; |
| 425 | **(c)**  , Since, are constant thus, |
| 426 | **(a)** |
| 427 | **(b)**  Boiling point and freezing point depend on (molal elevation constant) and (molal depression constant) of the solvent. Thus, equimolar solution (of the non-electrolyte) will have same boiling point and also same freezing point.  **Note** In this question nature of salute has not been mentioned. Hence, we have assumed that solute is non-electrolyte. |
| 428 | **(a)**  Osmosis does not take place if two solutions are isotonic. |
| 429 | **(c)**  Hence, water needed to mix  = 100-10=90 mL |
| 430 | **(c)**  , 0.032 = total particle  The number of |
| 431 | **(d)**  These are factors on which solubility depends. |
| 432 | **(d)**  Temperature coefficient = |
| 433 | **(a)**  Equal osmatic pressure only applicable to non-electrolytes solution at low concentration |
| 434 | **(b)**   |  |  |  |  | | --- | --- | --- | --- | | 1 | 0 | 0 | (Before dissociation) | | 1 ⎯ 𝛂 | 3𝛂 | 𝛂 | (After dissociation) |   van’t Hoff factor() = 1⎯ 𝛂 +3𝛂 + 𝛂 = 1 + 3𝛂  In very dilute state 𝛂 = 1; Thus, = 4 |
| 435 | **(c)**  It given 3 ions, hence , the van’t Hoff factor = 3. |
| 436 | **(d)**  For two non-electrolyte solutions to be isotonic;  ∴ |
| 437 | **(b)**  Total molarity =  =  = 1.344 m |
| 438 | **(d)**  Osmotic pressure of two solutions will be added.  Hence, osmotic pressure of resulting solution  =1.64+2.46  =4.10 atm. |
| 439 | **(c)**  Molarity =  moles of urea =  weight of solution =weight of solution + weight of solute  =1000 + 120 =1120 g  =0.974 K  Molarity = = 2.05 M |
| 441 | **(b)**  Given, = 10 N = 0.1 N  = 10 mL, =?  = 1000mL  10 mL water is already there in solution.  Water to be added =1000-10  =990mL |
| 442 | **(a)**  Number of moles of ethyl alcohol = = 3  Number of moles of water = =4  = |
| 443 | **(a)** |
| 444 | **(d)**  1% solution means 1 g solute is present in 100 mL of water.  Osmotic pressure,  =20.134 RT  Since, temperature is same in all cases, the ascending order of osmotic pressure is |
| 445 | **(b)**  1 mole 0 0 initial  after dissociation  Total moles  α |
| 446 | **(b)**  Given =19.8 mm  According to Raoult’s law  or 198-10 *p* = 19.8 0.1  10 *p* = 198-1.98  10 *p* =196.02  *p* = 19.602 mm |
| 447 | **(b)**  On rapid cooling, temperature falls rapidly, crystallization occurs but slowly. Thus, meta stable state or super saturated solution state exist for a short while. |
| 448 | **(b)**  10% glucose solution means mol glucose is present in 100 cc. , 0.1 L  Hence, 1 mol will be present in |
| 449 | **(b)** |
| 451 | **(a)**  Given, mass of solvent (w) =100 g  Depression in freezing point (  0.84 =  n=6  S is in form in solution. |
| 452 | **(a)**  It is more precise and takes minimum time. |
| 453 | **(b)**  molecules of HCl 1mole HCl  Hence, molecules of  HCl 2 moles HCl  Thus, two moles (= two gram-equivalents) of HCl are dissolved in one (one litre) solution.  Therefore the solution will be 2N. |
| 454 | **(a)**  Acetic acid dimerises in benzene. |
| 455 | **(b)**  Gibbs gave phase rule for heterogeneous systems. |
| 456 | **(a)**  Water to be added to solution  =500-100= 400 |
| 458 | **(a)**  In a mixture *A* and *B* components show negative deviation when *A—B* interaction is stronger than *A—A* and *B—B* interaction. |
| 459 | **(a)**  This is the mathematically modified form of distribution law when solute undergoes association in either of solvent. |
| 460 | **(b)**  Chloroform and acetone form a non-ideal solution, in which A…B type interaction are more than A…A and B…B type interactions due to H-bonding. Hence, the solution shows negative deviation formRaoult’s law. *i.e.,*  =-ve,  =-ve,  Total volume of solution = less than (30+50)mL  or <80mL |
| 461 | **(c)**  For  = 1 + 2;  ∴  ∴ |
| 462 | **(b)**  Given ,  We know ,  0.186=1.86  so,  =0.0521 |
| 463 | **(b)** |
| 464 | **(a)** |
| 465 | **(a)**  One molar (1 M) aqueous solution is more concentrated than one molal aqueous solution of the same solute. In solution, provides three ions. While NaCl provides two ions. Hence, vapour pressure of solution of NaCl is higher (as it gives less ions). Therefore, 1 molalNaCl will have the maximum vapour pressure. |
| 466 | **(d)**  For isotonic solutions of two non-electrolytes |
| 467 | **(d)**  Addition of solute to a solvent lowers the vapour pressure and freezing point but increase the boiling point of solution. |
| 468 | **(b)**  Due to complex formation |
| 469 | **(b)**  Basicity of = 2  Normality = molarity basicity of acid  =22=4 |
| 471 | **(a)**  More is the hydration energy of an ionic solute, more is its solubility. |
| 472 | **(c)**  For two solutions to be isotonic |
| 473 | **(a)**  All are methods to determine mol. wt. of non-volatile solute but elevation and depression methods may bring in changes in haemoglobin molecule. Also a little error in measurement may show higher abnormality in mol. mass. |
| 474 | **(a)**  Molarity of urea =  Hence, 1 M solution of glucose is isotonic with 6% urea solution. |
| 475 | **(b)**  For negative deviation = ⎯ve, = ⎯ve |
| 476 | **(c)**  Raoult’s law is not valid for immiscible liquid mixtures. |
| 477 | **(a)**  During freezing of a solution only solvent freezes out and the equilibrium exists between solid and liquid forms of solvent. |
| 478 | **(a)** |
| 479 | **(a)**  1M means 1 mole in 1000 cc of solution whereas 1m means 1 mole in 1000 g of water (=1000 cc of water). Total volume of 1 m solution will be > 1000cc due to extra 1 mol . Hence, number of moles per 1000 cc will be less. Thus 1 m is less concentrated than 1 M. |
| 480 | **(d)**  =  760- |
| 481 | **(d)**  Mixture contains 78 g benzene = 1 mole benzene and 46 g toluene = 0.5 mole toluene  Total mole of benzene and toluene=1.5 mol  Mole fraction of benzene in mixture  =  VP of benzene =75 torr  Partial vapour pressure of benzene = |
| 482 | **(c)**  We know that,  *w*(mass of solute) =  m= mol. wt. of urea (60)  =1.86, *W* =500 g  =  =3g |
| 483 | **(b)**  Henry’s law involves two immiscible phases as gas-liquid; Distribution law involves two immiscible phases as liquid-liquid. |
| 484 | **(a)**  Given, m=0.2  i=1+=1.3  =0.2  =0.481  freezing point =-0.481 |
| 485 | **(b)**  Molality =  Moles of urea = mol  Water at STP () = = 0.3 kg |
| 486 | **(b)**  is constant for a particular solute in a given solvent-solvent system at constant temperature. |
| 487 | **(a)**  Boiling point  =(Elevation in b.p.)  where, *m* is the molality  *i.e.,* the van’t Hoff factor (*i*)  =[1+(y-1)*x*]  elevation constant.  Thus,  Assume 100% ionisation  (a)  (b)  (c) *mi*(urea)=0.015  (d) *mi*(glucose)=0.015 |
| 488 | **(b)**  184=200+  64=  = =160 torr |
| 489 | **(a)**  or |
| 490 | **(a)**  The concentration is expressed in parts per million (ppm) when one part of solute is dissolved in one million parts of solvent. |
| 491 | **(a)**  0.1 M will give the maximum number of particles (*i.e.,*ions) in the solution. Hence, its elevation in boiling point is maximum and therefore, it has highest boiling point. |
| 492 | **(a)**  Relative lowering of vapour pressure = mole fraction of solute (**Raoult’s law** )  =  Or  Hence, molality = |
| 493 | **(c)**  According to Raoult’s law  (mole fraction of solute)  =0.5 |
| 494 | **(a)**  Ideal solution H =0  =0  = = |
| 495 | **(b)**  Depression in freezing point is colligative property. The solute which produces highest number of ions will have minimum freezing point .   1. One molalNaCl aqueous solution   2 ions/molecule   1. One molal solution   3 ions/molecule   1. One molalKCl aqueous solution   KCl  2 ions/molecule   1. One molal urea aqueous solution no dissociation   CaC solution has highest number of ions  It has lowest freezing point. |
| 496 | **(b)** |
| 497 | **(c)**  Living cells shrinks in hypertonic solution (plasmolysis) while bursts in hypotonic solutions (endosmosis). There is no effect when living cells are kept in isotonic solution. |
| 498 | **(a)**  In countries nearer to polar region, the roads are sprinkled with because decreases the freezing point of ice and therefore, minimise the wear and tear of the roads. |
| 499 | **(a)**  Molarity = normality  Given, normality of solution =0.2 N  Equivalent weight = *M*  Molecular weight 2 M ()  Molarity |
| 500 | **(a)**  A deliquescent solid is one which absorbs so much amount of water that it forms a saturated solution of it. |
| 501 | **(d)**  mole fraction of solvent. |
| 502 | **(d)**  The ideal solution must  (i) Obey Raoult’s law at all temperatures and pressures  (ii) H=0  (iii)V=0  (d) statement△H =△V≠0 is wrong. |
| 503 | **(b)**  ∴ |
| 504 | **(c)**  Given  - V=100mL, N=0.2 M  NaOH - V=100mL, N=0.2 M  Milliequivalent of  ()  Milliequivalent of NaOH =  Moilliequivalent Of left =40-20=20  Total volume = 100mL+100mL=200mL  Normality of (left0)= =0.1 N |
| 506 | **(c)**  Molecular mass of NaOH = 23+17=40  Hence, molality (*m*)==0.1 |
| 507 | **(a)** |
| 508 | **(a)**  Molality of cane sugar solution  We know that  =1.86 1  =1.86  Hence , freezing point of solution  =0.00-(1.86)=-1.86 |
| 509 | **(b)**  According to Henry’s law, the gas in contact with the liquid should behave as an ideal gas |
| 510 | **(b)**  =  To produce same lowering of vapour pressure, will be same for both cases.  So, =  =weight of glucose  =weight of urea  or  =3 |
| 511 | **(a)**  Let *V*litre of 10 N HCl be mixed with (1 - *V*) litre of 4 N HCl to give (*V*+1-*V*) = 1L of 7 N HCl.  10*V* + 4 (1-*V*)=  10*V* + 4 - 4*V* =7  6*V* = 7- 4  *V*= = 0.50L  Volume of 10 N HCl = 0.50L  Volume of 4N HCl = 1- 0.50=0.50 L |
| 512 | **(a)**  The interaction between and is more than interaction. |
| 513 | **(c)**  Molarity (M)  =  = 0.428 mol |
| 514 | **(c)**  Osmotic pressure is a colligative property because it depends upon the number of solute particles but not on the nature of the solute. |
| 515 | **(b)** |