CHEMISTRY

BOOKS - SHARAM PUBLICATION

SOLUTIONS

Exercise

1. An unripe mango placed in a concentrated salt solution to prepare pickle, shrinks because

A. it gains water due to osmosis.

B. It gains water due to reverse osmosis

C. it loses water due to reverse osmosis

D. it loses water due to osmosis.

Answer:

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2. At a given temperature, osmosis pressure of
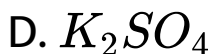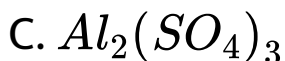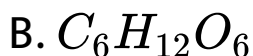
a concentrated solution of a substance

A. is higher than that of a dilute solution

B. is lower than that of a dilute solution

C. is same as that of a dilute solution

D. can not be compared with osmotic pressure of dilute solution.

Answer:

3. Of the following 0.1 g aqueous solution, which one will exhibit the largest freezing point depression.

A. KCl

B. $C_6H_{12}O_6$

C. $Al_2(SO_4)_3$

D. K_2SO_4

Answer:

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4. Colligative properties depend upon

    A. nature of solute particles dissolved in solution.

    B. number of solute particles present in solution.

    C. physical properties of solute particles

    D. the nature of solvent particles

Answer:

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5. Low concentration of oxygen in the blood and tissues of people living at high altitude is due to

A. low temperature

B. low atmospheric pressure

C. high atmospheric pressure

D. low temperature and high atmospheric pressure

Answer:

6. On dissolving sugar in water at room temperature , solution feels cool to touch. Under which of the following cases dissolution of sugar will be most rapid ?

A. sugar crystals in cold water

B. sugar crystals in hot water

C. powdered sugar in cold water

D. powdered sugar in hot water

Answer:

7. The maximum amount of a solid solute that can be dissolved in a specified amount of a given liquid solvent does not depend upon

    A. temperature

    B. nature of solute

    C. pressure

    D. nature of solvent

Answer:

8. In comparison to a 0.01 M solution of glucose, the depression in freezing point of 0.01M $MgCl_2$ solution is

A. the same

B. about twice

C. about three times

D. about six times

Answer:

9. Name the substance whose solubility decreses with increase of temperature.

A. $NaOH$

B. Na_2CO_3

C. Na_2SO_3

D. All are correct

Answer:

10. The solubility of a substance is defined as the amount of solute in grams.

   A. present in 100 g of saturated solution

   B. dissolved in 100 g of solvent to give saturated solution.

C. dissolved in 100 ml of solvent to give a

saturated solution.

D. present in 1 litre of saturated solution.

Answer:

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11. Which of the following solution will have highest osmotic pressure ?

A. $M/10NaCl$

B. $M/10\ urea$

C. $M/10\ BaCl_2$

D. $M/10\ glu\cos e$

Answer:

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12. Osmotic pressure of sugar solution at $24°C$ is $2.5 atm$. The concentration of the solution in gm / litre is :

A. 10.25

B. 1.025

C. 1025

D. 0.1025

Answer:

13. A $0.6\,\%$ solution of urea (Mol.mass = 60) would be isotonic with:

A. $0.1m$ glucose

B. $0.1MKCl$

C. 0.6% glucose solution

D. 0.6% KCl solution

Answer:

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14. Mango is placed in aqueous solution of

HCl. It

A. shrinks

B. swells

C. bursts

D. nothing happens

Answer:

15. According to Raoult 's law the relative lowering of vapour pressure of the solution is equal to

A. mole fraction of the solute

B. number of moles of solute

C. mole fraction of solvent

D. number of moles of solvent

Answer:

16. The process of getting freshwater from sea water is known as:

A. osmosis

B. filtration

C. sedimentation

D. Reverse osmosis

Answer:

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17. Lowering of vapour is highest for

A. $0.2M$ urea

B. $0.1 M$ glucose

C. $0.1 M MgSO_4$

D. $0.1 M BaCl_2$

Answer:

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18. What is the value of vapour pressure of the liquid at its boiling point ?

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19. What is an ideal solution ?

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20. What is the value of ΔH_{mix} and ΔV_{mix} for a non ideal solution ?

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21. Why is osmotic pressure considered as a colligative property ?

22. For which factor water rises to the upper part of the tree from soil ?

23. The vapour pressure of liquid _____ with rise of temperature .

24. What happens to boiling point of water at 740 mm pressure ?

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25. Give one example of solid in gas and liquid in gas solution?

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26. Write two factors which influence the solubility of solid in a liquid .

27. What is the freezing point of water at 1 atmospheric pressure in kelvin scales ?

28. What is the relation between relative lowering of vapour pressure of the solution and mole fraction of solute ?

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29. What is the relation between elevation in boiling point and molar mass of the solute ?

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30. Define osmotic pressure ? How is the osmotic pressure related to the concentration of a solute in a solution?

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31. What is the relation between depression in freezing point and molality of solute in the solution ?

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32. What are isonotic solutions ?

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33. What is de- icing agent ?

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34. What will happen to the boiling point of a

solution if the weight of the solute dissolved

is doubled and the weight of solvent taken is halved ?

35. Two liquids A and B boil at $145°C$ and $190°C$ respectively.Which of them will have higher vapour pressure at $80°C$?

36. What type of liquids form ideal solutions ?

37. What is molal elevation constant of a solvent ?

38. Define cryoscopic constant.

39. Fill in the blanks : Out of $0.1M$ fructose and $0.1M AlCl_3$ solution .... Will boil at higher temperature.

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40. Colligative property depends upon –

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41. A pressure cooker reduces cooking time because:

42. Fill in the blanks : On mixing 20 ml $CHCl_3$ with 30 ml acetone, the total volume of solution is .... than 50 ml.

43. Fill in the blanks : The b.p of a solution is

.... Than that of pure solvent.

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44. Fill in the blanks : Ideal solutions are those

which obey ....

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45. Fill in the blanks : Additions of water to sulphuric acid shows .... deviation from Roult 's law.

46. The relative lowering of vapour pressure is equal to mole fraction of the solute. This is known as

47. Fill in the blanks : During osmosis .... passes through the semipermeable membrane in the solution.

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48. Fill in the blanks : Addition of solute to the solvent gives rise to .... Of b.p and .... In F.P.

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49. Fill in the blanks : Solutions having same osmotic pressure are called .... solution.

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50. Fill in the blanks : Reverse osmosis is used to separate non- volatile solute from .... water.

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51. Fill in the blanks : For $\Delta H_{mix} = 0$ and $\Delta V_{mix} = 0$ the solution is called .... Solution.

52. Fill in the blanks : Sea divers for breathing inside sea use a mixture of O_2 and inert gas ....

53. Calculate the molal elevation constant of water , it being given that 0.1 molal aqueous solution of substance boiled at $100.052° C$.

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54. What is the effect of temperature on molarity of a solution ?

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

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56. How is the solubility of gases in water related with their Henry's constants at the same pressure and temperature ?

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57. Why is liquid ammonia bottle first cooled in ice before opening it ?

58. Why does a solution of ethanol and cyclohexane show positive deviation from Raoult 's law ?

59. What will happen to the boiling point of a solution if the weight of the solute dissolved is doubled and the weight of solvent taken is halved ?

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60. Why boiling point of water is increased on adding of sodium chloride into it ?

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61. Why is freezing point depression of $0.01M$ sodium chloride solution nearly twice that of $0.01M$ glucose solution ?

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62. Out of 1 m urea solution and $1mNaCl$ solution which has higher freezing point ?

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63. What is reverse osmosis ?

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64. What will happen to the freezing point of a solution when mercuric iodide is added to an aqueous solution of potassium iodide ?

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65. Between sea water and pure water, which boils at a higher temperature ?

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66. $10ml$ of liquid A were mixed with 10 ml of liquid B. The volume of the solution was found to be $19.9ml.$ What do you conclude ?

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67. What do you expect when Red Blood Corpuscles (RBC) is placed in

$1\% \ NaCl$ solution.

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68. What do you expect when Red Blood Corpuscles (RBC) is placed in

$0.5\% \ NaCl$ solution.

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69. Why does the use of pressure cooker reduce the cooking time ?

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70. Explain why equimolar aqueous solution of $NaCl$ and $NaSO_4$ are not isotonic ?

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71. A solution containing 18 g of non - volatile solute in 200g water freeezes as $272.07K$. Calculate the molecular mass of the solute. ($F.Pofwater = 273K_f = 1.86Kkgmol^{-1}$

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72. A solution containing 30 g of protein per litre exerts an osmotic pressure of 9.4 mm Hg at $25°C$. What is the molecular mass of protein ?

73. 1g of a non-electrolyte when dissolved in 50g benzene, the freezing point of solvent is lowered by 0.40K. Find molecular mass of solute. (K_f for benzene is 5.12 K kg mol^{-1})

74. The boiling point of benzene is $353.2K$ .When 1.8 g of a non - volatile solute was dissolved in 90 g benzene the boiling point

was raised to $354.1K$. Calculate the molecular mass of the solute. (K_b of benzene = 2.53 K kg mol^{-1})

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75. The vapour pressure of pure benzene at a certain temperature is 0.850 bar. A non- volatile non electrolyte solid weighing 0.5 g when added to 39.0 g of benzene (mol mass 78 g mol^{-1}) the vapour pressure of solution was

reduced to 0.845 bar. Calculate the molar mass of the solid substance.

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76. Why do electrolytes show abnormal molecular masses ?

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77. A 5% solution (by mass) of cane sugar in water has freezing point of 271 K. Calculate the

freezing point of 5% solution (by mass) of glucose in water of the freezing point of pure water is 273.15 K. [Molecular masses glucose $C_6H_{12}O_6 = 180$ amu, cane sugar $C_{12}H_{22}O_{11} = 342$ amu]

78. The freezing point depression of 0.1 molal solution of acetic acid in benzene is $0.256 K kgmol^{-1}$.Kf for benzene is 5.12 $KkgMol^{-1}$. What conclusion can you draw

about the molecular state of acetic acid in benzene.

79. The freezing point of a solution containing 0.3 g of acetic acid in 30 g of benzene is lowered by $0.45°c$. Calculate the Vant's hoff factor $\left(K_f\right.$ for benzene $= 5.12Kkgmol^{-1}\right)$.

80. On a certain hill station, pure water is found to boil at $95° C$. How many grams of $NaCl$ must be added to 2 kg of water so that the water boils at $100° C$.

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81. Calculate osmotic pressure at 273 K of a 5% solution of urea (Molecular mass = 60).

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82. What is elevation in boiling point of a liquid ? derive a relationship between molecular mass of a non-volatile solute and elevation in boiling point in a solution.

83. What do you mean by elevation in boiling point and molal elevation constant ? B.P of water at 750 mm Hg is $99.63°C$. How much sucrose is to be added to 500 g of water such

that it boils at $100°C$? Molal elevation constant of water is $0.52 Kkgmol^{-1}$

84. What do you mean by depression in freezing point of a solution ? How will you calculate the molecular mass of solute from depression in freezing point ? A solution containing 34.2 g cane sugar $(C_{12}H_{22}O_{11})$ dissolved in 500 g of water froze at - $0.374°C$.

Calculate the freezing point depression constant of water.

85. Define 'osmosis' and 'osmotic pressure'. Show that osmotic pressure is a colligative property. A 4% solution of sucrose $(C_{12}H_{22}O_{11})$ is isotonic with 3% solution of an unknown organic substance. Calculate the molecular mass of the unknown substance.

86. Define the following terms.

Molal elevation constant

87. Define the following terms.

Molal depression constant

88. Define Van't Hoff factor.

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89. Latent heat of fusion of ice is $1436.3 cal mol^{-1}$. Calculate the molal depression constant of water.

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