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CHEMISTRY

BOOKS - CBSE COMPLEMENTARY MATERIAL CHEMISTRY (HINGLISH)

SOLUTIONS

Multiple Choice Questions

1. The molarity of 98% by wt. H_2SO_4 (d = 1.8 g/ml) is

A. 6 m

B. 18 m

C. 10 m

D. 4 m

Answer: B

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2. Which of the following does not show positive deviation from Raoult's law?

A. benzone + chlorofor

B. benzene + acetone

C. benzene + ethanol

D. benzene + CCl_4

Answer: A

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3. Which solution will have least vapour pressure?

A. 0.1 M $BaCl_2$

B. 0.1 M Uxa

C. 0.1 M Na_2SO_4

D. 0.1 M Na_3PO_4

Answer: D

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4. Which condition is not satisfied by an ideal solution?

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

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

C. $\Delta P_{\text{mix}} = 0$

D. $\Delta S_{\text{mix}} = 0$

Answer: D

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5. Azeotrope mixture are:

A. mixture of two solids

B. those will boil at different temperature

C. those which can be fractionally distilled

D. constant boiling mixtures

Answer: D

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6. If K_f value of H_2O is 1.86. The value of ΔT_f for 0.1 m solution of non-volatile solute is

A. 18.6

B. 0.186

C. 1.86

D. 0.0186

Answer: B

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7. Solute when dissolved in water:

A. increases the vapour pressure of water

B. decreases the boiling point of water

C. decrease the freezing point of water

D. All of the above

Answer: D

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8. The plant cell will shrink when placed in:

A. water

B. A hypotonic solution

C. a hypertonic solution

D. an siotonic solution

Answer: C

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9. The freezing point of 11% aquous solution of calcium nitrate will be:

A. 0° C

B. above $0^\circ C$

C. $1^\circ C$

D. below $0^{\circ} C$

Answer: D

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

A. $91.3\ \%$

B. $87\ \%$

C. $100\ \%$

D. $74\ \%$

Answer: B

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11. Which of the following solutions would have the highest osmotic pressure:

A. $\frac{M}{10} NaCl$

B. $\frac{M}{10}$ Urea

C. $\frac{M}{10} BaCl_2$

D. $\frac{M}{10}$ Glucose

Answer: C

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12. 0.5 M aquous solution of Glucose is isotonic with:

A. 0.5 M KCl solution

B. 0.5 M $CaCl_2$ solution

C. 0.5 M Urea solution

D. 1 M solution of sucrose

Answer: C

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13. Which of the following is true for Henrys constant

A. It decreases with temperature

B. It increases with temperature

C. Independent on temperature

D. It do not depend on nature of gases.

Answer: B

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14. Which one is the best colligative property for determination of molecular mass of polymer?

A. osmotic pressure

B. elevation in boiling point

C. depression in freezing point

D. osmosis

Answer: A

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15. Which of the following do not depend on temperature?

A. % W/V (weight/volume)

B. molality

C. molarity

D. normality

Answer: B

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16. Henry's law constant K of CO_2 in water at $25^\circ C$ is 3×10^{-2} mol/L atm^{-1}. Calculation the mass of CO_2 present in 100 L of soft drink bottled with a partial pressure of CO_2 of 4 atm at the same temperatrue.

A. 5.28 g

B. 12.0 g

C. 428 g

D. 528 g

Answer: D

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17. Mixing of HNO_3 and HCl is reaction:

A. endothermic reaction

B. exothermic reaction

C. both exothermic and endothermic

D. depend on entropy of reaction

Answer: B

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18. The most likely on ideal solution is:

A. $NaCl - H_2O$

B. $C_2H_5OH - C_6H_6$

C. $C_7H_{16} - H_2O$

D. $C_7H_{16} - C_8H_{18}$

Answer: D

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19. Van't Hoff factor for a dilute solution of a $K_2[HgI4]$ is :

A. 2

B. 1

C. 3

D. zero

Answer: C

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20. Benzoic acid dissolved in benzene shows a molecular weight of:

A. 122

B. 61

C. 244

D. 366

Answer: C

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21. 6% (W/V) solution of urea will be isotonic with:

A. 18% (W/V) solution of glucose

B. 0.5 M solution of NaCl

C. 1 M solution of CH_3COOH

D. 6% (W/V) solution of sucrose.

Answer: A::B::C

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22. Solution showing (+) ve deviation from Raoult's law include:

A. acetone + CS_2

B. acetone + C_2H_5OH

C. acetone + Benzene

D. acetone + aniline

Answer: A::B

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Fill In The Blanks Type

1. The property which depends on number of particles of solute is called .....

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2. Azeotrope mixture cannot be separate by .....

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3. Match the column and choose correct option

Vant'Hoff factor	Behaviour of compound
(A) i = 1	P. Impossible
(B) i > 1	Q. Association is the solution
(C) i < 1	R. Dissociation in the solution
(D) i = 0	S. No dissociation or association

A. A- S , B -R , C - P , D- Q

B. A- R , B - S , C - Q , D - P

C. A -S , B - P , C - R , D - Q

D. A-S , B - R , C- Q , D - P

Answer:

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Very Short Answer Type Questions 1 Mark

1. What is Van't Hoff factor ?

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2. What is the Van't Hoff factor in $K_4\left[Fe(CN)_6\right]$ and $BaCl_2$?

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3. Why the molecular mass becomes abnormal ?

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

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5. Positive deviation from ideal behaviour.

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6. What is van't Hoff factor ? How is it related with :

degree of dissociation

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7. What is van't Hoff factor ? How is it related with :

degree of association

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8. Why NaCl is used to clear snow from roads ?

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9. Why the boiling point of solution is higher than pure liquid ?

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10. Henry law constant for two gases are 21.5 and 49.5 atm, which gas is more soluble ?

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11. Define azeotrope. Give an example of maximum boiling azeotrope.

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12. Calculate the volume of 75% of H_2SO_4 by weight (d = 1.8 gm/ml) required to prepare 1 L of 0.2 M solution.

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13. Calculate the volume of 75% of H2SO4 by weight (d = 1.8 gm/ml) required to prepare 1 L of 0.2 M solution.

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14. Why anhydrous salts like NaCl or $CaCl_2$ are used to clear snow from roads on hills ?

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15. What is the effect on boiling and freezing point of a solution on addition of NaCl ?

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16. Why osmotic pressure is considered as colligative property ?

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17. Liquid A and B on mixing produce a warm solution. Which type of deviation does this solution show ?

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18. Give an example of a compound in which hydrogen bonding results in the formation of a dimer.

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19. What role does the molecular interaction play in solution containing chloroform and acetone ?

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Short Answer Type Questions

1. Out of the following three solutions, which has the highest freezing point and why ?

(a) 0.1 M urea (b) $0.1MBaCl_2$ (c) $0.1MNa_2SO_4$

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2. Which of the following solutions have highest boiling point and why ? (a) 1M glucose (b) 1 M KCl (c) 1 M aluminium nitriate

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3. How many grams of KCl should be added to 1 kg of water to lower its freezing point to $-8.0^{\circ}C$? ($K_f = 1.86$ K kg/mol)

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4. With the help of diagram, show the elevation in boiling point colligative properties ?

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5. What do you mean by colligative properties ? Which colligative property is used to determine molar mass of polymer and why ?

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6. Define reverse osmosis. Give one use of it.

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7. Why does an azeotropic mixture distills without any change in composition ?

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8. Under what condition Van't Hoff factor is :

equal to 1

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9. Under what condition Van't Hoff factor is :

less than 1?

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10. Under what condition Van't Hoff factor is : more than 1 ?

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

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12. Why is it advised to add ethylene glycol to water in a car radiator in hill station ?

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13. Calculate the molarity of pure water (d = 1 g mL^{-1})

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

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

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

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17. Which colligative property is preferred for the molar mass determination of macromolecules ?

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Short Answer Ii Type Questions

1. Determine the amount of $CaCl_2$ dissolved in 2.5L at $27^\circ C$ such that its osmotic pressure is 0.75 atm at $27^\circ C$. (i for $CaCl_2 = 2.47$)

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

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

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4. Suggest the most important type of intermolecular attractive interaction in

n - hexane and n-octane

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5. Suggest the most important type of intermolecular attractive interaction in I_2 and CCl_4

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6. Suggest the most important type of intermolecular attractive interaction in $NaClO_4$ and water

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

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8. 6.90M solution of KOH in water contains 30% by mass of KOH. Calculate the density of the KOH solution. (Molar mass of KOH = 56 g mol^{-1})

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

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10. What would be the molar mass of compound if 6.21 g of it is dissolved in 24.0 g

of $CHCl_3$ from a solution that has a boiling point of $68.04^\circ C$. The boiling point of pure chloroform is $61.7^\circ C$ and the boiling point elevation constant Kb for chloroform is 3.63° C/m.

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11. A solution of glycerol $(C_3H_8O_3)$ in water was prepared by dissolving some glycerol in 500 g of water. This solution has a boiling point of $100.42^\circ C$ while pure water boils at

$100^{\circ}C$. What mass of glycerol was dissolved to make the solution ? ($K_b = 0.512K$ kg mol^{-1})

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12. 18 g of glucose $(C_6H_{12}O_6)$ (molar mass = 180 g mol^{-1}) is dissolved in 1 kg of water in a sauce pan . At what temperature will this solution boil ? (Kb for water = 0.52 K kg mol^{-1} , boiling point of water = 373.1 K)

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Long Answer Type Questions 5 Marks

1. Define Raoult's law of binary solution containing non-volatile solute in it.

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2. On dissolving 3.24 g of sulphur in 40 g of benzene, boiling point of solution was higher than that of benzene by 0.81K ($K_b = 2.53$ K kg

mol^{-1}). What is molecular formula of sulphur ? (Atomic mass s = 32 g mol^{-1})

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3. Outer shells of two eggs are removed. One of the egg is placed in pure water and the other is placed in saturated solution of NaCl. What will be observed and why ?

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4. A solution prepared by dissolving 8.95 mg of a gene fragment in 35.0 ml of water has an osmotic pressure of 0.335 ton at $25^{\circ}C$. Assuming the gene fragment is a non-electrolyse, determine the molar mass.

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5. Define van't Hoff factor.

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6. Calculate the freezing point depression expected for 0.0711M aqueous solution of Na_2SO_4. If this solution actually freezes at $-0.320^\circ C$, what would be the value of van't Hoff factor ? $\left(K_f = 1.86^\circ C mol^{-1}\right)$

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7. What is the value of i when solute is associated and dissociated ?

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8. Calculate the freezing point of an aqueous solution containing 10.50 g of $MgBr_2$ in 200 g of water . (Molar mass of $MgBr_2 = 184, K_f = 1.86K$ kg mol^{-1})

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9. What is the value of i for $Al_2(SO_4)_3$ when it is completely dissociated ?

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10. Calculate the boiling point of a solution prepared by adding 15.00 g of NaCl to 250 g of water . $(K_b = 0.512$ K kg mol^{-1} and molar mass of NaCl = 58.44 g $mol^{-1})$

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