CHEMISTRY

BOOKS - A2Z CHEMISTRY (HINGLISH)

SOLUTIONS

Method Of Expressing Concentration Of Solutions

1. Which of the following concentration factors is affected by changing in volume or volume dependent ?

A. weight fraction

B. Mole fraction

C. Molality

D. Molarity

Answer: D

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2. Calculates the masses of cane sugar and water required to prepare 250 grams of $25\ \%$ cane sugar solution-

A. 187.5 grams, 62.5 grams

B. 62.5 grams, 187.5 grams

C. 162.5 grams, 87.5 grams

D. None of these

Answer: B

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3. A solution of $Al_2(SO_4)_3\{d = 1.253gm/ml\}$ contain $22\ \%$ salt by weight. The molarity, normality and molality of the solution is

A. $0.825M$, $48.3N$, 0.805 m

B. $0.805M$, $4.83N$, 0.825 m

C. $4.83M$, $4.83N$, 4.83 m

D. None

Answer: B

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4. 6.02×10^{20} molecules of urea are present in $200mL$ of its solution. The concentration of urea solution is $\left(N_0 = 6.02 \times 10^{23} mol^{-1}\right)$

A. $0.001M$

B. $0.01M$

C. $0.02M$

D. $0.10M$

Answer: C

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5. Calculates the molarity and normality of a solution containing 0.5 g of $NaOH$ dissolved in $500ml$ solution

A. $0.0025M, 0.025N$

B. $0.025M, 0.025N$

C. $0.25M, 0.25N$

D. $0.025M, 0.0025N$

Answer: B

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6. If $25ml$ of $NaCl$ solution is diluted with water to a volume of $500ml$ the new concentration of the solution is

A. $0.0125M$

B. $0.167M$

C. $0.833M$

D. $0.0167M$

Answer: A

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7. An X molal solution of a compound in benzene has mole fraction of solute $= 0.2$. The value of X is

A. 14.0

B. 3.2

C. 1.4

D. 2.0

Answer: B

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8. Hardness of a water sample is 100ppm $CaCO_3$. Thus molarity of $CaCO_3$ is

A. $2 \times 10^{-3} M$

B. $1 \times 10^{-3} M$

C. $2 \times 10^{-2} M$

D. $2 \times 10^{-4} M$

Answer: B

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9. Molarity and molality of a solution of caustic soda are respectively $11.12M$ and $94.12m$. The density of the solution is

A. $0.556 gmL^{-1}$

B. $5.56 gmL^{-1}$

C. $55.6 gmL^{-1}$

D. none of these

Answer: A

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10. $5ml$ of HCl, $20ml$ of $N/2$ of H_2SO_4 and $30ml$ of $N/3HNO_3$ are mixed together and volume made to one litre.

A. $\frac{N}{40}$

B. $\frac{N}{10}$

C. $\frac{N}{20}$

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

Answer: A

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11. At $25^{\circ}C$, the density of $15MH_2SO_4$ is $1.8gcm^{-3}$. Thus mass percentage of H_2SO_4 in aqueous solution is

A. 2%

B. 81.6%

C. 18%

D. 1.8%

Answer: B

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12. Which of the following aqueous solutions has the highest concentration of Na^+ ?

A. $0.304MNa_2SO_4$

B. A solution containing $2.06gNaCl/100mL$

C. A solution having $15.4mgNa^+/mL$

D. All have equal $\left[Na^{+}\right]$

Answer: C

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13. Mole fraction of $C_3H_5(OH)_3$ in a solution of $36g$ of water and $46g$ of glycerine is :

A. 0.46

B. 0.36

C. 0.20

D. 0.40

Answer: C

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14. In what ratio should a $6.5NHNO_3$ be diluted with water to get $3.5NHNO_3$?

A. $6:7$

B. $7:6$

C. $5:6$

D. $6:5$

Answer: B

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

A. $0.555m$

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

C. $33.3m$

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

Answer: B

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16. 15 grams of methyl alcohol is dissolved in 35 grams of water. What is the mass percentage of methyl alcohol in solution ?

A. $30\ \%$

B. $50\ \%$

C. $70\ \%$

D. $75\ \%$

Answer: A

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17. A 3.5 molal aqueous solution of methyl alcohol (CH_3OH) is supplied. What is the mole fraction of methyl alcohol in the solution ?

A. 0.100

B. 0.059

C. 0.086

D. 0.050

Answer: B

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

A. Molarity

B. Normality

C. formality

D. Molality

Answer: D

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19. The density of a solution containing 13% by mass of sulphuric acid is $1.09g/mL$. Calculate the molarity and normality of the solution

A. $1.445M$

B. $14.45M$

C. $144.5M$

D. $0.1445M$

Answer: A

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20. Calculate the molarity of pure water$(d = 1g/L)$

A. $555M$

B. $5.55M$

C. $55.5M$

D. None

Answer: C

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21. Calculate the quantity of sodium carbonates(anhydrous) required to prepare $250ml$ solution

A. $2.65grams$

B. $4.95grams$

C. $6.25grams$

D. None of these

Answer: A

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22. $20ml$ of $0.02MKMnO_4$ was required to completely oxidise $10ml$ of oxalic acid solution. What is the molarity of the oxalic acid solution ?

A. $0.1M$

B. $0.4M$

C. $1.0M$

D. $4.0M$

Answer: A

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23. Find the molality of H_2SO_4 solution whose specific gravity is $1.98gml^{-1}$ and $95\ \%$ by volume H_2SO_4

A. 7.412

B. 8.412

C. 9.412

D. 10.412

Answer: C

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24. Calculate the molality of $1L$ solution of $93\ \%\ H_2SO_4$ (Weight/volume)

The density of the solution is $1.84g$.

A. 9.42

B. 10.42

C. 11.42

D. 12.42

Answer: B

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25. Suppose $5g$ of acetic acid are dissolved in one litre of ethanol. Assume no reaction in between them. Calculate molality of resulting solution if density of ethanol is $0.789/mL$.

A. 0.0856

B. 0.0956

C. 0.1056

D. 0.1156

Answer: C

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26. Calculate the molarity and mole fraction of the solute in aqueous solution containing $3.0g$ of urea per $250gm$ of water (Mol. Wt. of urea = 60)

A. $0.2m, 0.00357$

B. $0.4m, 0.00357$

C. $0.5m, 0.00357$

D. $0.7m, 0.00357$

Answer: A

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27. A solution has 25% of water,25% ethanol and 50% acetic acid by mass. Calculate the mol e fraction of each component.

A. $0.50, 0.3, 0.19$

B. $0.19, 0.3, 0.50$

C. $0.3, 0.19, 0.50$

D. $0.50, 0.19, 0.3$

Answer: D

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28. Calculate normality of the mixture obtained by mixing $100ml$ of $0.1NHCl$ and $50ml$ of $0.25NNaOH$ solution

A. $0.0467N$

B. $0.0367N$

C. $0.0267N$

D. $0.0167N$

Answer: D

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29. 300 ml 0.1 M HCl and 200ml of $0.03MH_2SO_4$ are mixed. Calculate the normality of the resulting mixture

A. $0.084N$

B. $0.84N$

C. $2.04N$

D. $2.84N$

Answer: A

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30. How many kilograms of wet $NaOH$ containing 12% water are required to prepare 60 litre of 0.50 N solution ?

A. $1.36Kg$

B. $1.50Kg$

C. $2.40Kg$

D. 4.16

Answer: A

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31. 250 mL of a Na_2CO_3 solution contains $2.65g$ of Na_2CO_3. $10mL$ of this solution is added to xml of water is obtain $0.001MNa_2CO_3$ solution. The value of x is :

A. 1000

B. 990

C. 9990

D. 90

Answer: B

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32. The volumes of two HCl solution A $(0.5M)$ and B $(0.1M)$ to be mixed for preparing $2\ L$ of $0.2\ M\ HCl$ are

A. $0.5L$ of $A + 1.5L$ of B

B. $1.5L$ of $A + 0.5L$ of B

C. $1L$ of $A + 1L$ of B

D. $0.75L$ of $A + 1.25L$ of B

Answer: A

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33. Molality of a solution in aqueous medium is 0.8. Calculate its more fraction and the percentage by mass of solute if molar mass of solute is 60

A. $4.5\,\%$

B. $4.6\,\%$

C. $4.7\,\%$

D. $4.8\,\%$

Answer: A

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34. Two bottles A and B contain 2M and 2m aqueous solution of sulphuric acid respectively , then

A. A is more concentrated than B

B. B is more concentrated than A

C. Conc. Of A and B are equal.

D. it is important to compare the concentrations

Answer: A

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35. What weight of oxalic acid $(H_2C_2O_4.2H_2O)$ is required to prepare $1000mL$ of $N/10$solution?

A. $9.0g$

B. $12.6g$

C. $6.3g$

D. $4.5g$

Answer: C

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36. A solution contain 1.2046×10^{24} hydrochloric acid molecules in one dm^3 of the solution . The strength of the solution is

A. $6N$

B. $2N$

C. $4N$

D. $8N$

Answer: B

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Relative Lowering Of Vapour Pressure

1. Define molal elevation constant or ebullioscopic constant.

A. the elevation in b.p. which would be produced by dissolving one mole of solute in 100g of solvent

B. the elevation in b.p. which would be produced by dissolving 1 mole of solute in 10g of solvent

C. the elevation in b.p. which would be produced by dissolving 1 mole of solute in 1000g of solvent

D. None of these

Answer: C

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2. Mixture of volatile components A and B has a total vapour pressure (in torr)p=$254 - 119x_A$is where$x_A$mole fraction of A in mixture .HenceP_A° and P_B° are(in torr)

A. $254, 119$

B. $119, 254$

C. $135, 254$

D. $119, 373$

Answer: C

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3. The vapour pressure of pure liquid solvent 0.50 atm. When a non-volatile solute B is added to the solvent, its vapour pressure drops to 0.30 atm. Thus, mole fraction of the component B is

A. 0.6

B. 0.25

C. 0.45

D. 0.75

Answer: A

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4. The vapour pressure of pure liquid A is 10 torr and at the same temperature when 1 g solid B is dissolved in 20g of A , its vapour pressure is reduced to9.0torr . If the molecular mass of A is 200amu , then the molecular mass of B is

A. 100amu

B. 90amu

C. 75amu

D. 120amu

Answer: B

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5. Calculate the mass of a non-volatile solute (molecular mass 40) which should be dissolved in $114g$ octane to reduce its vapour pressure to $80\ \%$.

A. $20g$

B. $30g$

C. $10g$

D. $40g$

Answer: C

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6. Vapour pressure of CCL_4 at $25^\circ C$ is 143 mmHg 0.05g of a non-volatile solute (mol.wt.=65)is dissolved in $100mlCCL_4$. find the vapour pressure of the solution (density of $CCL_4 = 158g/cm^2$)

A. 143.99mm

B. 94.39mm

C. 199.34mm

D. 14.197mm

Answer: D

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7. Aqueous tension is the vapour pressure of ..... And depends only upon .....

A. Surface of area container

B. Volume of container

C. Temperature

D. All of the above

Answer: C

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8. Among the following substances, the lowest vapour pressure is exerted by

A. Water

B. Mercury

C. Kerosene

D. Rectified spirit

Answer: B

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9. The vapour pressure of pure liquid solvent A is 0.80atm.When a non volatile substances B is added to the solvent, its vapour pressure drops to 0.60atm. Mole fraction of the components B in the solution is:

A. 0.50

B. 0.25

C. 0.75

D. 0.40

Answer: B

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10. 18g of glucose $(C_6H_{12}O_6)$is added to 178.2 g of water. The vapour pressure of water for this aqueous solution at $100^\circ C$is :

A. 752.40torr

B. 759.00torr

C. 7.60torr

D. 76.00torr

Answer: A

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

A. 200and300

B. 300 and 400

C. 400 and 600

D. 500 and 600

Answer: C

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12. An ideal solution has equal mol-fraction f two volatile components A and B .in the vapour above the solutions, the mol -fractions of A and B :

A. Are equal both 0.50

B. Are equal but necessarily0.50

C. Are not very likely to be equal

D. Are 1.00 and 0.00resepctively

Answer: B

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13. The vapour pressure of pure water at 75° is 296torr the vapour pressure lowering due to 0.1m solute is

A. 0.533torr

B. 0.296torr

C. 0.333 torr

D. 0.428 torr

Answer: A

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14. A sample of 20.0g of a compound (molecular weight 120)which is non electrolyte is dissolved in 10.0grams of ethanol(C_2H_5OH). If the vapour pressure of pure ethanol at the temperature used is 0.250atm ,what is the vapour pressure of ethanol above the solution

A. 0.250atm

B. 0.83atm

C. 0.125atm

D. 0.141atm

Answer: D

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15. At $120^\circ C$, the vapour pressure of pure cholorobenzene $(C_6H(5)Cl)$is 0.736atm. What is the vapour pressure of a solution of 5.00g of naphthalene $(C_{10}H_8$in 50.0g of chlorobenzene? (assume that naphthalene is not volatile)

A. 0.736atm

B. 0.091atm

C. 0.677atm

D. 1.00atm

Answer: C

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16. Calculate the vapour pressure of a solution at $100^{\circ}C$ containing 3g of cane sugar in 33g of water.(Atwt.C =12,h=1,O=16)

A. $760mm$

B. $756.90mm$

C. $758.30mm$

D. None of these

Answer: B

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17. Lowering of vapour pressure due to a solute in 1 molal aqueous solution at $100^{\circ}C$ is

a.$13.44mmHg$,b. $14.14mmHg$,c.$13.2mmHg$,d. $35.2mmHg$

A. 13.44mmHg

B. 14.12mmHg

C. 31.2mmHg

D. 35.2mmHg

Answer: A

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18. The vapour pressure of a dilute aqueous solution of glucose is 750 mmHg at 373K. The mole fraction of the solute is

A. $\frac{1}{76}$

B. $\frac{1}{7.6}$

C. $\frac{1}{38}$

D. $\frac{1}{10}$

Answer: A

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19. When $3g$ of a novolatile solute is dissolved in 50 g of water , the relative lowering of vapour pressure observed is $0.018Nm^{-2}$. Molecular weight of the substances is

A. 60

B. 30

C. 40

D. 120

Answer: A

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20. One mole of non-volatile solute is dissolved in two moles of water. The vapour pressure of the solution relative to that water of

A. $2/3$

B. $1/3$

C. $1/2$

D. $3/2$

Answer: A

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21. Dry air was passed successively through a solution of 5g of a solute in 180g water and then through pure water. The loss in weight of solutionwas 250g and that of pure solvent 0.04g . The molecular weight of the solute is

A. 31.25

B. 3.125

C. 312.5

D. None of these

Answer: A

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22. The vapour pressure of solvent is 20 torr, while that of its dilute solution is 17 torr, the mole-fraction of the solvent is

A. 0.6

B. 0.85

C. 0.5

D. 0.7

Answer: B

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23. Relative decrease in vapour pressure of an aqueous solution conataining 2mol $\left[Cu(NH_3)_3Cl\right]$Cl in 3mol $H_2$is $\frac{1}{2}$. When the given solution reation with excess fo $AgNO_3$solution the number moles of $AgCl$produced is

A. $1 mol AgCl$

B. $0.25 mol AgCl$

C. $2 mol AgCl$

D. $0.40 mol AgCl$

Answer: A

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24. The degree of dissociation of $Ca(NO_3)_2$ in a dilute aqueous solution containing $7g$ of salt per $100g$ of water at $100^\circ C$ is 70%. Calculate the vapour pressure of solution.

A. 748.2 mmHg

B. 1492.6 mmHg

C. 373.2 mmHg

D. 74.03 mmHg

Answer: A

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Elevation Of Boiling Point

1. Normal boiling point (T_N) is defined as the temperature when V.P. of liquid become equal to 1atm and standard boiling point (T_S) is defind becomes equal to 1bar . Which one is not correct .if water is considered?

A. $T_N = 100^\circ C$

B. $T_S > 100^\circ C$

C. $T_S < 100^\circ C$

D. $T_S < T_N$

Answer: B

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2. A solution containing 28g of phosphorus in 315g $CS_2(b.\ p.46.3^\circ C$boils at $47.98^\circ C$. If $k_b$for $CS_2$is 2.34K kg mol^{-1}. The formula of phosphorus is (at .massof P=31).

A. P_6

B. P_4

C. P_3

D. P_2

Answer: B

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3. Elevation in boiling point of an aqueous solution of a non-electroluyte solute is 2.01° . What is the depression in freezing point of the solution ?

$K_b(H_2O) = 0.52^\circ mol^{-1}kg$

$K_f(H_2O) = 1.86^\circ mol^{-1}kg$

A. 7.17°

B. 0.52°

C. 3.57°

D. 0.93°

Answer: A

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4. Yg of non-volatile organic substance of molecular mass M is dissolved in $250g$ benzene. Molal elevation constant of benzene is K_b. Elevation in its boiling point is given by:s

A. $1.34K_b$

B. $0.98K_b$

C. $2.40K_b$

D. K_b

Answer: B

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5. Elevation in boiling point of a molar $(1M)$glucose solution $(d = 1.2gml_{-1})$ is

A. $1.34K_b$

B. $0.98K_b$

C. $2.40K_b$

D. K_b

Answer: B

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6. 0.15g of a subatance dissolved in 15g of solvent boiled at a temperature higher at 0.216° than that of the pure solvent. Calculate the

molecular weight of the substance. Molal elecation constant for the solvent is $2.16^{\circ}C$

A. 216

B. 100

C. 178

D. None of these

Answer: B

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7. $H_2O(1) \Leftrightarrow H_2O(g)$ at $373K, \Delta H^{\circ} = 8.31 kcal mol^{-1}$ Thus, boiling point of 0.1 molal sucrose solution is

A. $373.52K$

B. $373.052K$

C. $373.06K$

D. $374.52K$

Answer: C

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8. A solution of 0.450 g of urea (mol wt. 60)in $22.5g$of water showed $0.170^\circ C$ of elecation in boiling point. Calculate the molal elevation constant of water

A. $0.17^\circ C$

B. $0.45^\circ C$

C. $0.51^\circ C$

D. $0.30^\circ C$

Answer: C

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9. At the higher altitudes the boiling point of water lowers because

A. temperature of higher altitudes is low

B. atmosphere pressure is low

C. the proportion pressure is low

D. atmospheric pressure becomes more.

Answer: B

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10. The elevation in boiling point of a solution of 13.44g of $CuCl_2$ (molecular weight =134.4, $k_b = 0.52K\text{molality}^{-1}$) in 1 kg water using the following information will be:

A. 0.16

B. 0.05

C. 0.1

D. 0.2

Answer: A

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11. Which aqueous will have the highest boiling point?

A. $0.015M$glucose

B. $0.01MKNO_3$

C. $0.015M$urea

D. $0.01MNa_2SO_4$

Answer: D

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12. A solution containing 28g of phosphorus in 315g $CS_2(b.\ p.46.3^\circ C$ boils at $47.98^\circ C$. If $k_b$for $CS_2$is 2.34K kg mol^{-1}. The formula of phosphorus is (at .massof P=31).

A. P_4

B. P_8

C. P_2

D. None of these

Answer: B

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13. A solution of urea in water has boiling point of $100.15^\circ C$. Calculate the freezing point of the same solution if K_f and K_b for water are $1.87Kkgmol^{-1}$ and $0.52Kkgmol^{-1}$, respectively.

A. $-0.54^\circ C$

B. $-0.44^\circ C$

C. $-0.64^\circ C$

D. $-0.34^\circ C$

Answer: A

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14. Calculate the normal boiling point of a sample of sea water found to contain$3.5\ \%$ of $NaCl$ and $0.13\ \%$ of $MgCl_2$ by mass. The normal boiling of point of water is $100^\circ C$ and $K_b(\text{water}) = 0.51 Kkgmol^{-1}$. Assume that both the salts are completely ionised.

A. $100.655^\circ C$

B. $99.655^\circ C$

C. $101.655^\circ C$

D. $102.655^\circ C$

Answer: A

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15. Which will have largest ΔT_b?

A. 180g glucose in 1kg water

B. 342g sucrose in $1,000$kg water

C. 18g glucose in 100kg water

D. 65g urea in 1kg water

Answer: D

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16. An aqueous solution of glucose boils at $100.01^\circ C$.The molal elevation constant for water is $0.5kmol^{-1}kg$. The number of molecules of glucose in the solution containing $100g$ of water is

A. 6.023×10^{23}

B. 6.023×10^{22}

C. 12.046×10^{20}

D. 12.046×10^{23}

Answer: C

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17. The latent heat of vaporisation of water is $9700 \mathrm{Cal/mole}$ and if the b.p.is $100^{\circ} C$, ebullioscopic constant of water is

A. $0.513^{\circ} C$

B. $1.026^{\circ} C$

C. $10.26^{\circ} C$

D. $1.832^{\circ} C$

Answer: A

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18. If for the sucrose solution elevation in boiling point is $0.1^\circ C$then what will be the boiling point of NaCl solution for same molal concentration

A. $0.1^\circ C$

B. $0.2^\circ C$

C. $0.08^\circ C$

D. $0.01^\circ C$

Answer: B

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19. The molal boiling point constant for water is$0.513^\circ Ckgmol^{-1}$. When 0.1mole of sugar is dissolved in 200ml of water , the solution boils under a pressure of one atmosphere at

A. $100.513^\circ C$

B. $100.0513^\circ C$

C. $100.256^\circ C$

D. $101.025^\circ C$

Answer: C

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20. $0.01(M)$ solution an acid HA freezes at $-0.0205^\circ C$. If K_f for water is $1.86 K kgmol^{-1}$, the ionization constant of the conjugate base of the acid will be (consider molarity) $\cong$ molarity)

A. 1.1×10^{-4}

B. 1.1×10^{-3}

C. 9×10^{-11}

D. 9×10^{-12}

Answer: C

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21. The boiling point of $0.1mK_4\left[Fe(CN)_6\right]$ is expected to be (K_b for water = $0.52Kkgmol^{-1}$)

A. $100.52^\circ C$

B. $100.10^\circ C$

C. $100.26^\circ C$

D. $102.6^\circ C$

Answer: C

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Depression Of Freezing Point

1. The value of K_f for water is 1.86°, calculated from glucose solution, The value of K_f for water calculated for NaCl solution will be,

A. $= 1.86$

B. < 1.86

C. > 1.86

D. zero

Answer: A

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2. A solution of x moles of sucrose in 100grams of water freeze at $-0.2^\circ C$ As. Ice separates the freezing point goes down to $0.25^\circ C$. How many grams of ice would have separated ?

A. 18grams

B. 20grams

C. 25grams

D. 23grams

Answer: B

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3. The freezing point of the dilute solution of acetamide in glacial acetic acid is $298K$. This is the value when crystals of

A. Acetamide first appears

B. Acetic acid from appears

C. Both appear together

D. Ice first appears

Answer: B

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4. A solution of a non-volatile solute in water freezes at $-0.40^{\circ}C$. The vapour pressure of pure water at $298K$ is 23.51 torr. For water, $K_f = 1.86kmol^{-1}kg$.Thus ,vapour pressure of the solution (in torr)

A. 23.44

B. 19.64

C. 20.41

D. 22.47

Answer: B

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5. In which case depression freezing point is equal to cryscopic for water:

A. $6\ \%$ by mass of urea in aqueous solution

B. 100gof sucrose in 100mL solution

C. 9g of urea in 59g aqueous solution

D. 1M KCl solution

Answer: C

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6. What frezing point depression would be predicted for 0.2molal solution of benzoic acid in benzene if latent heat of fusion is $40.00calg^{-1}$ at (freezing point)for benzene ?(assume no change in molecular state)

A. 0.52°

B. 5.2°

C. 0.0052°

D. 0.78°

Answer: D

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7. How much ethyl alcohol must be added to $1.00L$ of water so that the solution will not freeze at $-4^{\circ}F$?

A. $122g$

B. $512g$

C. $670g$

D. $495g$

Answer: C

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8. The amount of urea to be dissolved in 500 cc of water $\left(K_f = 1.86\right)$ to produce a depresssion of $0.186^{\circ}C$ in the freezing point is :

A. $9g$

B. $6g$

C. $3g$

D. $0.3g$

Answer: C

Watch Video Solution

9. Freezing point of an aqueous solution is $-0.186^{\circ}C$. Elevation of boiling point of the same solution is .....if $K_b = 0.512K\text{molality}^{-1}$and $K_f = 1.86K\text{molality}^{-1}$:

A. $0.186^{\circ}C$

B. $0.0512^{\circ}C$

C. $0.092^{\circ}C$

D. $0.237^{\circ}C$

Answer: B

Watch Video Solution

10. Equimolar solutions of two non-electroytes in the same solvent have:

A. same b.pt. but different f.pt.

B. same f.pt. but different p.pt.

C. same b.pt. but same f.pt.

D. Different b.pt. but different f.pt.

Answer: C

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11. What should be the freezing point of aqueous solution containing $17g$ of $C_2H(5)OH$ is $1000g$ of water (K_f for water =$1.86degkgmol^{-1}$)?

A. $-0.69^\circ C$

B. $0.34^\circ C$

C. $0.0^\circ C$

D. $-0.34^\circ C$

Answer: A

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12. Ethylene glycol is used as an antifreeze in a cold cliamate Mass of ethylene glycol which should be added to 4 kg for water to prevent it from freezing at $-6^{\circ}C$ will be (K_f for water =$1.86 K kg mol^{-1}$ and molar mass of ethylene glycol =$62 g mol^{-1}$)

A. 800g

B. 204.30g

C. 400.00g

D. 304.60g

Answer: A

Watch Video Solution

13. $0.48g$ of a substance is dissolved in 10.6 g of C_6H_6.The freezing point of benzene is lowered by $108^\circ C$. What will be the mol.wt. of the (K_f for benzene =5)

A. 250.2

B. 90.8

C. 125.79

D. 102.5

Answer: C

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14. The freezing point of equimolal soution will be highest for :

A. $C_6H_5NH_3Cl$

B. $Ca(No_3)_2$

C. $La(NO_3)_3$

D. $C_6H_{12}O_6$

Answer: D

Watch Video Solution

15. The freezing point of 0.2molal $K_2SO_4$is $-1.1^\circ C$. Calculate van't Hoff factor and percentage degree of dissociation of K_2SO_4. $K_f$for water is 1.86°

A. 97.5

B. 90.75

C. 105.5

D. 85.75

Answer: A

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16. A certain substance A tetramerizes in water to the extent of 80%. A solution of $2.5g$ of A in $100g$ of water lowers the freezing point by $0.3^{\circ}C$. The molar mass of A is

a.120 , b.61 ,c.60 ,d.62

A. 122

B. 31

C. 244

D. 62

Answer: D

Watch Video Solution

17. The freezing point of a solution containing $50cm^3$ of ethylene glycol in $50g$ of water is found to be $-34^{\circ}C$. Assuming ideal behaviour, Calculate the density of ethylene glycol $\left(K_f \text{ for water} = 1.86Kkgmol^{-1}\right)$.

A. $1.13g/cm_3$

B. $2.00g/cm_3$

C. $1.8g/cm_3$

D. $2.25g/cm_3$

Answer: A

Watch Video Solution

18. Cryoscopic constant of a liquid

A. is the decrease in freezing point when 1g of solute is dissolved per kg of the solvent

B. is the decrease in the freezing point when 1mole of solute of dissolved per kg of the solvent

C. is the elevation for 1 molar solution

D. is a factor used for calculation of depression in freezing point

Answer: B

View Text Solution

19. Addition of 0.643g of compound to 50ml of benzene (density $= 0.879 mol^{-1}$) lower the freezing point from$50.51^{\circ} C$. If k_f for benzene is 5.12 the molecule of the compound is

A. 156.00

B. 312.00

C. 78.00

D. 468.000

Answer: A

Watch Video Solution

20. Which of the following solution will have highest freezing point?

A. $2MNaCl$ Solution

B. $1.5MAlCl_3$ Solution

C. $1MAl_2(SO_3)_4$ Solution

D. $3MUrea$ Solution

Answer: D

Watch Video Solution

21. $0.48$of a substance is dissolved in 10.6g of C_6H_6.The freezing point of benzene is lowered by $1.8^\circ C$what will be the mol.wt.of the substance (K_f for benzene =5)

A. 250.2

B. 90.8

C. 125.79

D. 102.5

Answer: C

Watch Video Solution

22. What is the freezing point of a solution containing $8.1gBr$ in $100g$ water assuming the acid to be $90\ \%$ ionised(K_f for water =$1.8K\text{mole}^{-1}$)

A. $0.85^\circ C$

B. $-3.53^\circ C$

C. $0^\circ C$

D. $-0.35^\circ C$

Answer: B

Watch Video Solution

23. The freezing point of one molal $NaCl$ solution assuming $NaCl$ to be $100\ \%$ dissociated in water is (molal depression constant=1.86)

A. $-1.86^\circ C$

B. $-3.72^{\circ}C$

C. $+1.8^{\circ}C$

D. $+3.72^{\circ}C$

Answer: B

Watch Video Solution

24. Which of the following aqueous molal solution have highest freezing point

A. Urea

B. Barium chloride

C. Potassium bromide

D. Alluminimum sulphate

Answer: A

Watch Video Solution

25. When a solution w g of urea in 1Kg of water is cooled to $-0.372^{\circ}C$, $200g$of ice is separated .If $K_f$for water is $1.86KKgmol^{-1}$,w is

A. $4.8g$

B. $12.0g$

C. $9.6g$

D. $6.0g$

Answer: C

Watch Video Solution

26. $NaCl$ is added to1 litre water to such an extent that $\Delta T_f / K_f$ becomes to $\frac{1}{500}$,wt.of $NaCl$ added to

A. $5.85g$

B. $0.585g$

C. $0.0585g$

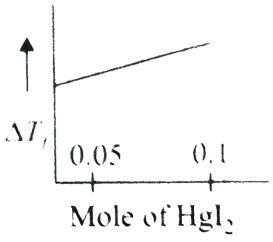
D. $0.0855g$

Answer: C

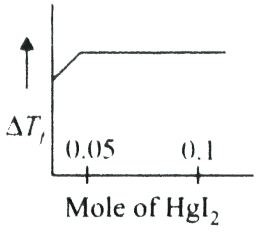
Watch Video Solution

27. Increasing amoutn of $HgI_2$is added to 1 litre of an aqueous solution containing0.1mole of KI.Which of the following graphs does represent the variation of depression in freezing point of the resulting solution with the amount of HgI_2added?

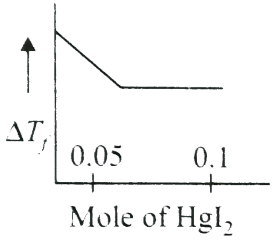
A.



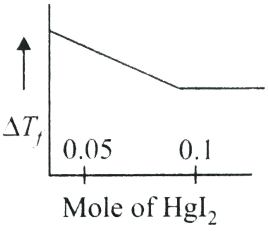
B.



C.



D.



Answer: C

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28. $3.24gHg(NO_3)_2$(molecules mass324)dissolved in 1000 g of water constitutes a solution having a freezing point $-0.0558^\circ C$ while $21.68g$ of $HgCl_2$ (Molecular mass271 in $2000g$ of water constitutes a solution with a freezing point of $-0.0744^\circ C$.The K_f of water is $1.86KKgmol^1$ .About the state of ionisation of the two solids in water can be inferred that.

A. $Hg(NO_3)_2$is fully ionised but $HgCl_2$is fully unionised

B. $Hg(NO_3)_2$ and $HgCl_2$both are completely ionised

C. $Hg(NO_3)_2$is fully unionised but $HgCl_2$is fully ionised

D. Both$Hg(NO_3)_2$ and $HgCl_2$ are completely unionised

Answer: A

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Osmotic Pressure

1. A living cell contains a solution which is isotonic with 0.3(M) sugar solution .What osmotic pressure develops when the cell is placed in $0.1(M)KCl$ solution at body temperature?

A. 5.08 atm

B. 2.54 atm

C. 4.92 atm

D. 2.46 atm

Answer: B

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2. Two solution (A)containing $Fecl_3(aq)$ and(B) semipermeable membrance as shown below.If $FeCl_3$ on reaction with $K_4\left[Fe(CN)_6\right]$,produces blue colour of $Fe_4\left[Fe(CN)_6\right]$, the clue colour will be noticed in :

$$\begin{vmatrix} (A) & (B) \\ FeCl_3 & K_4\left[Fe(CN)_6\right] \end{vmatrix}$$

A. (A)

B. (B)

C. in Both (A)and(B)

D. neither in (A)nor in(B)

Answer: D

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3. Osmotic pressure of 30% solution of glucose is 1.20 atm and that of 3.42% solutin of cane sugar is 2.5 atm, The osmotic pressure of the mixture containing equal volumes of the two solutions will be

A. 2.5 atm

B. 3.7 atm

C. 1.85 atm

D. 1.3 atm

Answer: C

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4. Osmosis is involved in one or more processes.

(I) Interchange of nutrients and waste products between tissue cells and their surroundings.

(II)Reverse osmosis

(III)Excrection of urine

(IV) Evaporation

Select the correct processes.

A. (I) and (III)

B. $(I), (II)$ and (III)

C. $(I), (II)$ and (IV)

D. All of these

Answer: B

Watch Video Solution

5. The osmotic pressure of blood is 7.65atm.at$310K$An aqueous solution of glucose which is isotonic with blood has the percentage (wt./volume)

A. 5.41

B. 3.54

C. 4.53

D. 53.4

Answer: A

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6. If 'A' contains 2% NaCl and is separated by a semipermeable membrance from 'B' which contain 10 % NaCl ,which event will occur ?

A. $NaCl$ will flow from $'A'$ and $'B'$

B. $NaCl$ will flow from $'B'$ and $'A'$

C. water will flow from $'A'$ and $'B'$

D. water will flow from $'B'$ and $'A'$

Answer: C

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7. Which has maximum osmotic pressure at temperatureTK?

A. 150ml of 1.0M urea solution

B. 210ml of 1.0M urea solution

C. Mixture of 150ml of 1.0M urea solution and 210 mL of 1.0M glucose solution

D. Allof the above are isotonic solutions

Answer: D

Watch Video Solution

8. What is osmolarity of$0.20MKCl$ solution?

A. 0.10 osmol

B. 0.20 osmol

C. 0.30 osmol

D. 0.40 osmol

Answer: D

Watch Video Solution

9. Osmotic pressure of blood is 7.40 atm at $27^{\circ}C$. Number of mol of glucose to be used per L for an intravenous injection that is to have the same osmotic pressure as blood is :

A. 0.3

B. 0.2

C. 0.1

D. 0.4

Answer: A

Watch Video Solution

10. A solution of glucose $(C_6H_{12}O_6)$is isotonic with $4g$ of urea $(NH_2 - CO - NH_2)$ per litre of solution .The concentration of glucose is :

A. $4g/L$

B. $8g/L$

C. $12g/L$

D. $14g/L$

Answer: C

Watch Video Solution

11. A solution containing$0.5g$ of a non-volatile solute in $0.2dm^3$ of the solution exerts an osmotic pressure of $44.44kPa$ at $300K$. Thus, molar mass of the solute is

A. $150gmol^{-1}$

B. $300 gmol^{-1}$

C. $140 gmol^{-1}$

D. $168 gmol^{-1}$

Answer: C

Watch Video Solution

12. Which statement is false?

A. Two sucrose solutions of same molality prepare different solvents have same ΔT_f

B. Osmotic pressure ,$\Pi = MRT$

C. Osmotic pressure for 0.01M aqueous solutions: $BaCl_2 > KCl > Ch_3COOH >$ Sucrose

D. The vapour pressure of a component over a solution proportional to its mole fraction.

Answer: A

Watch Video Solution

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

A. $90.0 g\text{mol}^{-1}$

B. $115.0 g\text{mol}^{-1}$

C. $105.0 g\text{mol}^{-1}$

D. $210.0 g\text{mol}^{-1}$

Answer: D

Watch Video Solution

14. Consider the separate solution of $0.500MC_2H_5OH(aq.)0.100MMg_3(PO_4)_2(aq.), 0.250MKBr(aq)$ and 0.1 .What is statement is true about these solutions,assuming all salts to be strong electrolytes?

A. They all have same osmotic pressure

B. $0.100MMg_3(PO_4)_2(aq)$ has thehighest osmotic pressure.

C. $0.125MNa_3(PO_4)_2(aq)$has the highest osmotic pressure

D. $0.5000MC_2H_5OH(aq)$ has the highest osmotic pressure.

Answer: A

Watch Video Solution

15. A 5% solution of cane sugar (molar mass =342)is isotonic with 1% of a solution of an known solute.The molar mass of unknown solute in g/mol is

A. 136.2

B. 171.2

C. 68.4

D. 34.2

Answer: C

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16. Two solutions of KNO_3 and CH_3COOH are prepared separately. Molarity of both is $0.1M$ and osmotic pressure are P_1 and P_2 respectively. The correct relationship between the osmotic pressure is :

A. $P_2 > P_1$

B. $P_1 = P_2$

C. $P_1 > P_2$

D. $\frac{P_1}{P_1 + P_2} = \frac{P_2}{P_1 + P_2}$

Answer: C

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17. The process of getting fresh water from sea water is known as

A. Osmosis

B. Filtration

C. Desaltation

D. Reverse osmosis

Answer: D

Watch Video Solution

18. The wt.of urea dissolved in $100ml$ solution which produce an osmotic pressure of 20.4atm,will be

A. $5g$

B. $4g$

C. $3g$

D. $6g$

Answer: A

Watch Video Solution

19. In the phenomenon fo osmosis, the membrance allow passage of :

A. Solute only

B. Solvent only

C. Soth solute and solvent

D. None of these

Answer: B

Watch Video Solution

20. A 5.8% (wt./vol.)NaCl solution will exert an osmotic pressure closest to which one of the following

A. $5.8\%\ (wt.\ /vol.\ )$sucrose solution

B. $5.8\%\ (wt.\ /vol.\ )$glucose solution

C. 2molal sucrose solution

D. 1molal sucrose solution

Answer: C

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21. Osmotic pressure of a sugar solution at $24^{\circ}C$ is 2.5 atmosphere .Determine the concentration of the solution in gram mole per litre.

A. $0.0821 \text{moles/litre}$

B. 1.082moles/litre

C. $0.1025 \text{moles/litre}$

D. $0.0827 \text{moles/litre}$

Answer: C

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22. Blood plasma has the following composition (milliequivalent per litre.). Calculate its osmotic pressure at $37^\circ C$

$Na^+ = 138, Ca^{2+} = 5.2, K^+ = 4.5, Mg^{2+} = 2.0, Cl^- = 105, HCO_3^- =$

,Proteins =16, Other =1.0

A. 7.47 atm

B. 7.30 atm

C. 7.29 atm

D. 7.40 atm

Answer: A

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23. Sea water is $3.5\ \%$ by mass of a salt and has a density $1.04gcm^{-3}$ at $293K$.Assuming the salt to be sodium chloride ,calculate the osmotic pressure of sea water.Assume complete ionisation of the salt-

A. 26.93 atm

B. 29.93 atm

C. 28.93 atm

D. 27.93 atm

Answer: B

Watch Video Solution

24. xg of non-electrolytic compound (molar mass =200) is dissolved in $1.0L$ of $0.05MNaCl$ solution. The osmotic pressure of this solution is

found to be $4.92atm$ at $27^\circ C$. Calculate the value of x. Assume complete dissociation of $NaCl$ and ideal behaviour of this solution.

A. $16.52g$

B. $24.032g$

C. $19.959g$

D. $12.35g$

Answer: C

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25. Insulin $(C_2H_{10}O_5)_n$ is dissolved in a suitable solvent and the osmotic pressure (π) of solutions of various concentrations $(g/cm^3)C$ is measured at $20^\circ C$. The slope of a plot of π against C is found to be 4.65×10^{-3}. The molecular weight of insulin is:

A. 4.8×10^5

B. 9×10^5

C. 3×10^5

D. 5.17×10^6

Answer: D

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26. After removing the hard shell of an egg by dissolving in diluteHCla semipermeable membrance can be visible .If such an egg is kept in a saturated solution of common salt, the size of egg will

A. Shrink

B. Grow

C. Remain unchanged

D. First shrink ,then grow

Answer: A

Watch Video Solution

27. 0.5normal sugar solution is isotonic with

A. 1.0normal glucose solution

B. 1.2normal potassium chloride solution

C. 0.5normal urea solution

D. `5% urea solution

Answer: C

Watch Video Solution

28. If a $6.84\ \%$ (wt,vol.)solutionof cane sugar(mol.Wt.=342)is isotonic with $1.52\ \%\ (wt.\ /vol.\ )$solution of thiocarbamide ,then the molecular weight of thiocarbamide is

A. 152

B. 76

C. 60

D. 180

Answer: B

Watch Video Solution

29. What is the freezing point of a solution contains $10.0g$of glucose $C_6H_{12}O_6$, in $100g$ of H_2O ? $K_f = 1.86^\circ C/m$

A. $-0.186^\circ C$

B. $+0.186^\circ C$

C. $-0.10^\circ C$

D. $-1.03^\circ C$

Answer: D

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30. The order of osmotic prssure of equimolar solutions of $BaCl_2, NaCl$ and glucose will be:

A. $BaCl_2 > NaCl >$ glucose

B. $NaCl > BaCl_2 >$ glucose

C. glucose $> BaCl_2 > NaCl$

D. glucose $> NaCl > BaCl_2$

Answer: A

Watch Video Solution

31. The osmotic pressure of blood is 7.65atm.at$310K$An aqueous solution of glucose which is isotonic with blood has the percentage (wt./volume)

A. $5.41\ \%$

B. $3.54\ \%$

C. $4.53\ \%$

D. 53.4%

Answer: A

Watch Video Solution

32. A solution containing$8,6$ urea in one litre was found to be isotonic with a 5% (wt./vot.)solution of an organic non-volatile solute. The molecular weight of latter is:

A. 348.9

B. 34.89

C. 3489

D. 861.2

Answer: A

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33. Solute A is a ternary electrolyte and solute B is non-elctrolyte ,if0.1M solution of solute$B$ produces an osmotic pressure of $2P$,then $0.05M$ solution of Aat the same temperature will produce on osmotic pressure equal to

A. P

B. $1.5P$

C. $2P$

D. $3P$

Answer: D

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34. Equimolal solutions A and B show depression in freezing point in the ratio $2:1$. A remains in the normal state in solution. B will be

A. Normal

B. Dissociated

C. Associated

D. Hydrolysis

Answer: C

Watch Video Solution

35. The wt. of urea dissolved in 100 ml solution which produce an osmotic pressure of 20.4 atm,will be

A. $5g$

B. $4g$

C. $3g$

D. $6g$

Answer: A

Watch Video Solution

36. The relationship between osmotic pressure at $273K$ when $10g$ glucose (P_1), $10g$ urea (P_2) and $10g$ sucrose (P_3) are dissolved in $250mL$ of water is:

A. $P_1 > P_2 > P_3$

B. $P_3 > P_1 > P_2$

C. $P_2 > P_1 > P_3$

D. $P_2 > P_3 > P_1$

Answer: C

Watch Video Solution

37. Osmotic pressure of a urea solution at $10^\circ C$ is 500 mm. Osmotic pressure of the solution become 105.3 mm. When it is diluted and temperature raised to $25^\circ C$.The extent of dilution is

A. 6 times

B. 5 times

C. 7 times

D. 4 times

Answer: B

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38. The solution containing $4.0gm$ of a polyvinyl chloride polymer in 1 litre dioxane was found to have an osmotic pressure 6.0×10^{-4} atmosphere at $300K$,the value of R used is 0.082litre atmosphere $\text{mole}^{-1}K^{-1}$.The molecular mass of the polymer was found to be

A. 3.0×10^2

B. 1.6×10^5

C. 5.6×10^4

D. 6.4×10^2

Answer: B

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39. pH of $0.1(M)BOH$ (weal base)is found to be 12 .The solution at temperature T K will display an osmotic pressure equal to

A. $0.01RT$

B. $0.01(RT)^2$

C. $0.11RT$

D. $1.1RT$

Answer: C

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40. A 2% solution of cane sugar is isotonic with 0.5% $x$solution.The molecular weight of substance $'x'$is [Assume that x does not undergo

association or dissociation]

A. 34.2

B. 85.5

C. 95.58

D. 126.98

Answer: B

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Section B Assertion Reasoning

1. Assertion:The boiling and melting point of amides are higher than corresponding acids.

Reason:It si due to strong intermolecular hydrogen bonding in their molecules.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: A

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2. Assertion :Molar heat of vaporisation of water is greater than benzene.

Reason:Molar heat of vaporisation is the amount of heat required to vaporise one mole of liquid at constant temperature.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: B

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3. Assertion :Molecular mass of benzoic acid when determine by colligative properties is found high.

Reason: Dimerisationof benzoic acid.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: A

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4. A pressure cooker reduces cooking time because

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: A

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5. Assertion: $CCl_4$and $H_2O$are immiscible .

Reason : CCl_4 is a polar solvent.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: C

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6. Assertion:isotonic solution do not show the phenomenon of osmosis.

Reason: Isotonic solution have equal osmotic pressure

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: B

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7. Assertion:Osmosis is one sided movement of solvent particles.

Reason :In Osmosis , the net movement of solvent particles from dil.to conc.solution and from conc.to dil. Solution takes place through semipermeable membrance,showing finally the direction of dil.to conc.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: D

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8. Assertion : Boiling point of water tis $100^\circ C$although water boils below $100^\circ C$ on mountains.

Reason:Boiling point of a liquid is th e temperature at which V.P.of liquids become equal to 1atm.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: A

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9. Assertion: Ebullioscopy or cryoscopy cannot be used for the determination of molar mass of polymers.

Reason:High molar mass solute leads to very low value of ΔT_b or ΔT_f

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: A

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10. Assertion:For isotonic solution $C_1 = C_2$

Reason:For isotonic solution $\pi_1 = \pi_2$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: D

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11. Assertion:Osmotic pressure of non-aqueous solution can be determine by Berkeley-Hartley method.

Reason: the semipermeable membrance used in Berkeley-Hartley method is $Cu_2\left[Fe(CN)_6\right]$.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: D

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12. Assertion:Addition of solvent to a solution always lowers the V.P.

Reason: The increase in relativer surface area given rise to an increases

inV.P. for a given solution.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: D

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13. Assertion:A cook cries more in cutting onion rather than cutting an onion taken out from refrigerator .

Reason:The cold onion has lower vapour pressure of its volatile content.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: A

Watch Video Solution

14. Assertion: A mixture of cyclohexane and ethanol shows -ve deviation from Raoult's law.

Reason:Cyclohexane reduces the intermolecular attraction between ethanol molecules.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: D

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15. Assertion (A): $0.1M$ solution of glucose has same increment in freezing point than has $0.1M$ solution of urea.

Reason (R): K_f for both has different value.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: B

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16. Assertion:If red blood cells were removed from the body and placed in pure water,pressure inside the cells increases.

Reason:The concentration of salt content in the cell increases.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: C

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Aipt Neet Questions

1. A solution contains non-volatile solute of molecular mass M_2 which of the following can be used to calculate the molecular mass of solute in terms of osmotic pressure?

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

A. $M_2 = \left(\frac{m_2}{\pi}\right) VRT$

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

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

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

Answer: B

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

A. 0.786

B. 0.478

C. 0.549

D. 0.200

Answer: B

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

A. $-6.54^\circ C$

B. $6.54^{\circ} C$

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

D. $0.654^{\circ} C$

Answer: C

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4. The vapour pressure of two liquid P and Q are 80 torr and 60 torr respectively. The total vapour pressure obtained by mixing 3 moles of P and 2 mole of Q would be

A. 68 torr

B. 20 torr

C. 140 torr

D. 72 torr

Answer: D

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5. 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 concentrated only

C. from solution having higher concentrated only

D. from both sides of semipermeable membrance with equal flow rates

Answer: A

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

A. 350

B. 300

C. 250

D. 200

Answer: B

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7. $1.0g$of a non-electrolyte solute (molar mass$250gmol^{-1}$ was dissolved in 51.2 g of benzene. If the freezing point depression constant of benzene is $5.12Kkgmol^{-1}$ the lowering in freezing point will be

A. $0.5K$

B. $0.4K$

C. $0.2K$

D. $0.3K$

Answer: B

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

A. $1.12K$

B. $-0.56K$

C. $0.56K$

D. $-1.12K$

Answer: A

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

A. 1

B. 4

C. 3

D. 2

Answer: D

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10. A solution of sucrose (molar mass $342gmol^{-1}$has been produced by dissolving$68.5g$sucrose in $1000g$water .The freezing point of the solution obtained will be $\left(K_f \text{ for } H_2O = 1.86kgmol^{-1}\right)$

A. $-0.372^{\circ}C$

B. $-0.520^{\circ}C$

C. $+0.372^{\circ}C$

D. $-0.570^{\circ}C$

Answer: A

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

A. greater than one 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

Answer: D

Watch Video Solution

12. The freezing point depression constant for water is $-1.86^{\circ}Cm^{-1}$. if $5.00gNa_2SO_4$is dissolved in $45.0gH_2O$,the freezing point is changed by $-3.82^{\circ}C$,Calculate the van't Hoff factor for Na_2SO_4

A. 0.381

B. 2.63

C. 2.05

D. 3.11

Answer: B

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

A. $P_B + x_A(P_B - P_A)$

B. $P_A + x_A(P_A - P_B)$

C. $P_A + x_A(P_B - P_A)$

D. $P_B + x_A(P_A - P_B)$

Answer: D

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14. Which of following compounds can be used as antifreeze in automobile radiators?

A. Methyl alcohol

B. Glycol

C. Nitrophenol

D. Ethyl alcohol

Answer: B

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15. 6.02×10^{20} molecules of urea are present in $100mL$ solution. The concentration of urea solution is:

A. $0.1M$

B. $0.001M$

C. $0.01M$

D. $0.02M$

Answer: C

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

A. K_2SO_4

B. $Nal_2(SO_4)_3$

C. $C_6H_{12}O_6$

D. KCl

Answer: B

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

A. $Al(NO_3)_3$

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

C. K_2SO_4

D. $K_3\left[Fe(CN)_6\right]$

Answer: B

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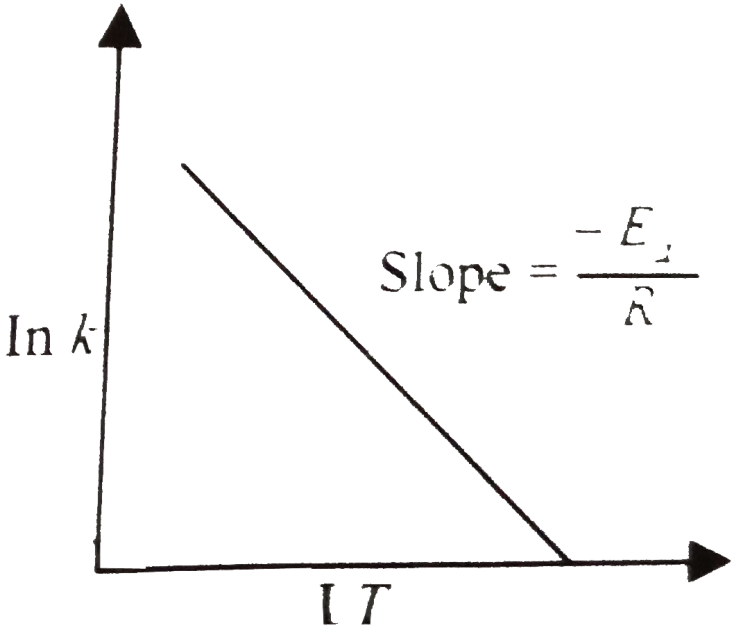
18. The boiling point of $0.2molkg^{-1}$solution of X in water is greater than equimolal solution of Y in water.Which one of the following statement is true in the case?



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

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

C. X is undergoes dissociation in water.

D. Molecular mass of X is greater then the molecular mass of Y.

Answer: C

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

A. 0.0354

B. 0.0177

C. 0.177

D. 1.770

Answer: B

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

A. $103^\circ C$

B. $101^\circ C$

C. $100^\circ C$

D. $102^\circ C$

Answer: B

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21. Which of the following statements about the composition of the vapour over an ideal $1:1$ mol mixture of benzene and toluene is correct? Assume that the temperature is constant at $25^\circ C$. (Given: vapour pressure Date at $25^\circ C$, benzene=12.8 kP, toluene=3.85 kPa)

A. Not enough information is given to make a prediction.

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

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

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

Answer: B

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22. If molarity of the dilute solutions is doubled ,the value of molal depression constant $\left(K_f\right)$ will be:

A. halved

B. triple

C. unchanged

D. doubled

Answer: C

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23. Which of the following is dependent on temperature?

A. Molarity

B. Mole fraction

C. Weight percentage

D. Molality

Answer: A

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Aiims Questions

1. If 5.85g of $NaCl$are dissolved in$90g$ of water,the moles fraction of$NaCl$ is

A. 0.1

B. 0.2

C. 0.3

D. 0.0196

Answer: D

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2. What will be the molarity of a solution containing 5g of sodium hydroxide in$250ml$ solution?

A. 0.5

B. 1.0

C. 2.0

D. 0.1

Answer: A

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3. If 5.85g of $NaCl$(molecular weight58.5)is dissolved in water and the solution is made up to 0.5litre , the molarity of the solution will be

A. 0.2

B. 0.4

C. 1.0

D. 0.1

Answer: A

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4. To prepare a solution of concentrated of $0.03g/ml$of $AgNO_3$,what amount of $AgNO_3$ should be added in $60ml$ of solution

A. 1.8

B. 0.8

C. 0.18

D. None of these

Answer: A

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5. How many g of dibasic acid (mol.wt.200) should be present in $100ml$of its aqueous solution to give decinormal strength?

A. $1g$

B. $2g$

C. $10g$

D. $20g$

Answer: A

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6. The molarity of a solution of Na_2O_3having$10.6g/500ml$of solution is

A. $0.2M$

B. $2M$

C. $20M$

D. $0.02M$

Answer: A

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7. Molecular weight of glucose is 180. A solution of glucose which contains $18g$per litre is

A. 2 molal

B. 1 molal

C. 0.1 molal

D. 18 molal

Answer: C

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8. 0.5 M of H_2SO_4 is diluted from 1 litre to 10 litre, normality of resulting solution is

A. $1N$

B. $0.1N$

C. $10N$

D. $11N$

Answer: B

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9. An aqueous solution of glucose is 10% in strength ,The volume in which 1g mole of it dissolved will be

A. 18 litre

B. 9 litre

C. 0.9 litre

D. 1.8 litre

Answer: D

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10. When $1.80g$ glucose dissolved in $90gofH_2O$,the mole fraction of glucose is

A. 0.00399

B. 0.00199

C. 0.0199

D. 0.998

Answer: B

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11. A5 molar solution of $H_2SO_4$is diluted from 1litre to 10litres. What is the normality of the solution?

A. $0.25N$

B. $1N$

C. $2N$

D. $7N$

Answer: B

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12. Normality of 2M sulphuric acid is

A. $2N$

B. $4N$

C. $N/2$

D. $N/4$

Answer: B

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13. What is the molarity of H_2SO_4 solution that has a density 1.84 g/c c at 35° C and contains 98% by weight?

A. $4.18M$

B. $8.14M$

C. 18.4

D. $18M$

Answer: C

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14. Which of the following is a colligative property?

A. Osmotic pressure

B. Boiling pressure

C. Vapour pressur

D. Freezing point

Answer: A

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15. The vapour pressure of benzene at a certain temperature is $640mm$ of Hg A non-volatile and non-electrolyte solid weighing $2.175g$ is added to $39.08g$ of benzene .the vapour pressure of the solution is $600mm$ of Hg. What is the molecular weight of solid substance ?

A. 49.50

B. 59.6

C. 69.5

D. 79.8

Answer: C

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16. The average osmotic pressure of human blood is 7.8 bar at $37^{\circ}C$. What is the concentration of an aqueous $NaCl$ solution that could be used in the blood stream ?

A. $0.16 mol / L$

B. $0.32 mol / L$

C. $0.60 mol / L$

D. $0.45 mol / L$

Answer: B

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17. The osmotic pressure in atmosphere of 10% solution of cane sugar at $69^\circ C$is

A. 724

B. 824

C. $8.21q$

D. 7.21

Answer: C

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18. The molal boiling point constant for water is$0.513^\circ Ckgmol^{-1}$. When 0.1mole of sugar is dissolved in 200ml of water , the solution boils under a pressure of one atmosphere at

A. $100.513^\circ C$

B. $100.0513^\circ C$

C. $100.256^{\circ}C$

D. $101.025^{\circ}C$

Answer: C

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19. The freezing point of a solution prepared from $1.25g$ of non-electrolyte and $20g$ of water is $271.9K$. If the molar depression constant is $1.86Kmol^{-1}$, then molar mass of the solute will be

A. 105.7

B. 106.7

C. 115.3

D. 93.9

Answer: A

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20. Osmotic pressure of $0.1M$ solution of $NaCl$and $NaSO_4$will be

A. same

B. osmotic pressure of$NaCl$solution will be more thanNa_2SO_4 solution

C. osmotic pressure ofNa_2SO_4solution will be more than$NaCl$

D. osmotic pressure ofNa_2SO_4will be less than that of $NaCl$ solution

Answer: C

Watch Video Solution

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

A. $CaCl_2$

B. KCl

C. Glucose

D. Urea

Answer: A

Watch Video Solution

22. An azeotropic mixture of HCl and water has

A. $84\ \%\ HCl$

B. $22.2\ \%\ HCl$

C. $63\ \%\ HCl$

D. $20.2\ \%\ HCl$

Answer: D

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23. The boiling point fo water $(100^\circ C$ become $100.52^\circ C$, if 3 grams of a nonvolatile solute is dissolved in $200ml$ of water. The molecular weight of solute is

(K_b for water is 0.6K.kg mol^{-1})

A. 12.2g mol^{-1}

B. 15.4g mol

C. 17.3g mol^{-1}

D. 20.4g mol

Answer: C

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24. The depression in freezing point of $0.1M$aqueous solution of $HCL, CuSO_4$ and $K_2SO_4$are in the ratio.

A. $1:1:1.5$

B. $1:2:3$

C. $1:1:1$

D. $2:4:3$

Answer: A

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25. When $45gm$ solution is dissolved in $600gm$water freezing point lower by $2.2K$,calcuate molar mass of solute $\left(K_f = 1.86\text{kg mol}^{-1}\right)$

A. 63.4

B. $80gm$

C. $90gm$

D. $21gm$

Answer: A

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26. Assertion : Molecular mass of bezxoic acid when determined by colligative properties is found high.

Reason : Dimerisation of benzene acid.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: A

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27. Assertion : A mixture of cyclohexane and ethanol shows -ve deviation from Raoult's law .

Reason : Cyclohexane reduces the intermolcular attraction between ethanol molecules.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: D

View Text Solution

28. A pressure cooker reduces cooking time because

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: A

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29. Assertion: $CCl_4$and $H_2O$are immiscible .

Reason : CCl_4 is a polar solvent.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: C

Watch Video Solution

30. Assertion : isotonic solution do not show the phenomenon of osmosis.

Reason : Isotonic solution have equal osmotic pressure

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: B

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31. Assertion : Azeotropic mixtures are formed only by non-ideal solution and they may have boiling points either greater than both the components or lesser than both the components.

Reason : The composition of the vapour phase is same as that of the liquid phase of an azeotropic mixtures.

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: A

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32. Assertion : When one solvent mixed with other solvent vapour pressure of one increases and other decreases.

Reason : When any solute added into solvent ,vapour pressure of solvent decreases

A. If both the assertion and reason are true and reason is a true explanation of the assertion.

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is false but reason is true.

Answer: B

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Section D Chapter End Test

1. On adding solute to a solvent having vapour pressure $0.80atm$,vapour pressure reduces to $0.60atm$.Mole fraction of solute is

A. 0.25

B. 0.75

C. 0.50

D. 0.33

Answer: A

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2. A solution containing $30g$ of a non-volatile solute in exactly $90g$ of water has a vapour pressure of $21.85mm$ of $25^\circ C$. Further $18g$ of water is then added to the solution, the new vapour pressure becomes $22.15mm$ of Hg at $25C$. Calculate the (a) molecular mass of the solute and (b) vapour pressure of water at $25^\circ C$.

A. 74.2

B. 75.6

C. 67.83

D. 78.7

Answer: C

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3. Vapour pressure of a solution of $5g$of non-electrolyte in $100g$water at a particular temperature is$2985N/m^2$.The vapour pressure of pure water is$3000N/m^2$.The molecular weight of the solute is

A. 60

B. 120

C. 180

D. 380

Answer: C

Watch Video Solution

4. An azeotropic mixture of HCl and water has

A. $84\ \%\ HCl$

B. $22.2\ \%\ HCl$

C. $63\ \%\ HCl$

D. $20.2\ \%\ HCl$

Answer: D

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5. The osmotic pressure at $17^\circ C$ of aqueous solution containing $1.75g$ of sucrose per $150mlsolution$ is

A. 0.8 atm

B. 0.08 atm

C. 8.1 atm

D. 9.1 atm

Answer: A

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6. 1.2of solution of $NaCl$is isotonic with 7.2 of solution of glucose .Calculate the van't Hoff factor of $NaCl$solution?

A. 2.36

B. 1.50

C. 1.95

D. 1.00

Answer: C

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7. $0.6g$of a solute is dissolved in 0.1litre of a solvent which develops an osmotic pressure of 1.23 at m at $27^\circ C$.The molecular mass of the substance is

A. 149.5g mol^{-1}

B. 120g mol^{-1}

C. 430g mol^{-1}

D. None of these

Answer: B

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8. The boiling point of a solution of $0.1050g$ of a substance in $15.84g$ of ether was found to be $0,1^\circ C$higher than that of pure ether.What is the molecular weight of the substance [Molecular elevation constant of ether is 2.16]`

A. 144.50

B. 143.18

C. 140.28

D. 146.66

Answer: B

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9. Boiling point fo chloroform was raised by $0.323K$,when$0.5143g$ of anthrance was dissolved in $35g$of chloroform .Molecular mass of anthracene is

$\left(K_bf \text{ or } CHCl_3 = 3.9\text{K.kg mol}^{-1}\right)$

A. $79.42g/mol$

B. $132.32g/mol$

C. $177.42g/mol$

D. $242.32g/mol$

Answer: C

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10. The boiling point fo water $(100^\circ C$ become $100.52^\circ C$, if 3 grams of a nonvolatile solute is dissolved in $200ml$ of water. The molecular weight of solute is

(K_b for water is 0.6K.kg mol^{-1})

A. 12.2g mol^{-1}

B. 15.4g mol

C. 17.3g mol^{-1}

D. 20.4g mol

Answer: C

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11. Normal boiling point of water is $373K$. Vapour pressure of water at $298K$ is $23mm$ enthalpy of vaporisation is $40.656kJmol^{-1}$ if atmopheric pressure becomes $23mm$, the water will boil at:

A. $250K$

B. $294K$

C. 51.6

D. $12.5K$

Answer: B

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12. A0.2 molal aqueous solution of a week acid (HX) is 20 % ionised,The frrezing point of this solution is (Given $k_f = 1.86^\circ Ckgmol^{-1}$ for water) :

A. $-0.31^\circ C$

B. $-0.45^\circ C$

C. $-0.53^\circ C$

D. $-0.90^\circ C$

Answer: B

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13. A 0.001 molal solution of $\left[Pt(NH_3)_4Cl_4\right]$ in water had freezing point depression of $0.0054^\circ C$. If K_f for water is 1.80, calculating the number f Cl^- ions furnished.

A. $\left[Pt(NH_3)_4Cl_3\right]Cl$

B. $\left[Pt(NH_3)_4Cl_3\right]Cl_2$

C. $\left[Pt(NH_3)_4Cl_3\right]Cl_3$

D. $\left[Pt(NH_3)_4Cl_3\right]Cl_4\right]$

Answer: B

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14. An aqueous solution of a weak monobasic acid containing $0.1g$in 21.7 g of water freezes at$272.813K$.If the value of $K_f$for water is $1.86K/m$,what is the molecular mass of the monobasic acid

A. $50g/mol$

B. $46g/mol$

C. $55g/mol$

D. $60g/mol$

Answer: D

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15. $K_fof1,4-\text{dioxane is}4.9mol^{-1}$ for $1000g$.The depression in freezing point for a$0.001m$ solution in dioxane is

A. 0.0049

B. $4.9 + 0.001$

C. 4.9

D. 0.49

Answer: A

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16. How many litres of CO_2 at STP will be formed when $100 ml$ of $0.1 M H_2SO_4$ reacts with excess of Na_2SO_3 ?

A. 22.4

B. 2.24

C. 0.224

D. 5.6

Answer: C

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17. A solution is obtained by dissolving $12g$of urea(mol.wt.60)in a litre of water.Another solution is obtained by dissolving $68.4g$ of cane sugar (mol.wt.342)`in a litre of water at are the same temperature .The lowering of vapour pressure in the first solution is

A. same as that of 2^{nd}solution

B. Nearly one-fifth of the 2^{nd}solution

C. Double that of 2^{nd}solution

D. Nearly five times that of 2^{nd}solution

Answer: A

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18. The vapour pressures of ethanol and methanol are $42.0mm$and $88.0mmHg$respectively .An ideal solution is formed at the same

temperature by mixing $46.0g$of ethanol with $16.0g$of methanol. The mole fraction of methanol in the vapour is:

A. 0.467

B. 0.502

C. 0.513

D. 0.556

Answer: C

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19. Which of the following plots represent the behaviour of an ideal binary liquid solutions?

A. Plot of$P_{\text{total}} vs Y_A$(mol fraction of$A$in vapour phase)

B. Plot of$P_{\text{total}} vs Y_B$is linear

C. Plot of$\frac{1}{P_{\text{total}}} vs Y_A$is linear

D. Plot of $\frac{1}{P_{\text{total}}} vs Y_B$ is non- linear

Answer: C

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20. For a binary ideal lqiuid solutions,the total pressure of the solution is given as

A. $P_{\text{Total}} = P_A^* + \left(P_A^* - P_B^*\right) X_A$

B. $P_{\text{Total}} = P_B^* + \left(P_A^* - P_B^*\right) X_A$

C. $P_{\text{Total}} = P_A^* + \left(P_B^* - P_A^*\right) X_A$

D. $P_{\text{Total}} = P_B^* + \left(P_B^* - P_A^*\right) X_A$

Answer: B

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21. The relationship between the values of osmotic pressures of $0.1M$ solutions of $KNO_3(P_1)$ and $CH_3COOH(P_2)$ is

A. $P_1 > P_2$

B. $P_2 > P_1$

C. $P_1 = P_2$

D. $P_1/(P_1 + P_2) = P_2/((P_1 + P_2)$

Answer: A

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22. The vapour pressure of solvent is 20 torr, while that of its dilute solution is 17 torr , the mole-fraction of the solvent is

A. 0.6

B. 0.4

C. 0.5

D. 0.7

Answer: B

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23. $NaCl$ is added to1 litre water to such an extent that $\Delta T_f / K_f$ becomes to $\frac{1}{500}$,wt.of $NaCl$ added to

A. $5.85g$

B. 0.585

C. $0.0585g$

D. None of these

Answer: C

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24. If the total vapour presure of the liquid mixture A and B is given by the equation: $P = 180X_A + 90$ then the ratio of the vapour pressure of the pure liquids A and B is given by :

A. $3:2$

B. $4:1$

C. $3:1$

D. $6:2$

Answer: C

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25. The vapour pressure of ethanol and methanol are $44.0mmHg$ and $88.0mmHg$, respectively. An ideal solution is formed at the same temperature by mixing $60g$ of ethanol with $40g$ of methanol. Calculate the total vapour pressure of the solution and the mole fraction of methanol in the vapour.

A. 0.66

B. 0.55

C. 0.11

D. 0.33

Answer: A

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26. The molality of a urea solution in which $0.0200g$ of urea, $(NH_2)CONH_2$ is added to $0.400dm_3$of water at STP is

A. 0.555molal

B. 5.55×10^{-4}molal

C. 8.33×10^{-2}molal

D. 33.3molal

Answer: C

Watch Video Solution

27. The vapour pressure of benzene at $80^{\circ}C$ is lowered by 10 mm by dissoving 2 g of a non-volatile substance in 78 g of benzene. The vapour pressure of pure benzene at 80° C is 750 mm. The molecular weight of the substance will be :

A. 15

B. 150

C. 1500

D. 148

Answer: D

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28. Asssertion : Azeotropic mixtures are formed only by non-ideal solutions and they may have boiling points either greater than both the

components or less than both the compounds.

Reason : The composition of the vapour phase is same as that of the liquid phase of an azeotropic mixture.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is reason both are false.

Answer: B

View Text Solution

29. Assertion :Molar heat of vaporisation of water is greater than benzene.

Reason:Molar heat of vaporisation is the amount of heat required to vaporise one mole of liquid at constant temperature.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is reason both are false.

Answer: B

Watch Video Solution

30. Assertion : Isotonic solution do not show the phenomenon of osmosis.

Reason : Isotonic solution have equal osmotic pressure.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both the assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false

D. If assertion is reason both are false.

Answer: B

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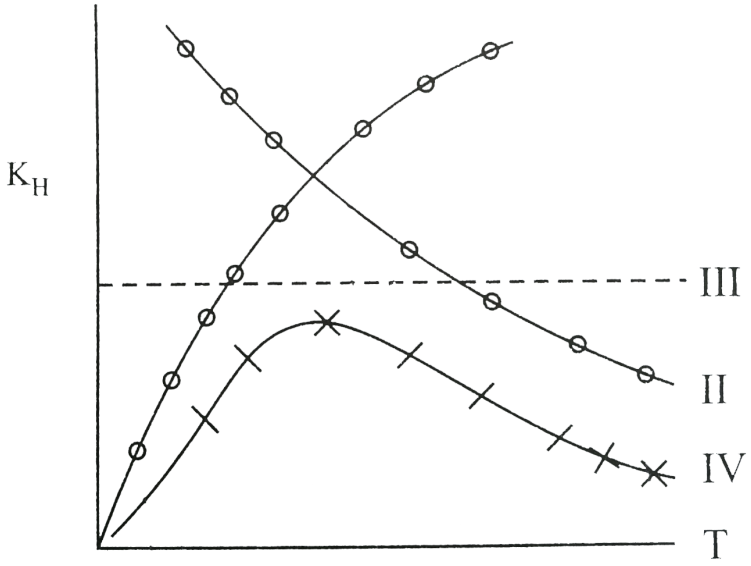
Others

1. Variation of K_H (Henry's law constant) with temperature T is shown by following graphs $I - IV$



correct representation is

A. IV

B. III

C. I

D. II

Answer: C

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2. Which of the following units is useful in relating concentration of solution with its vapour pressure?

A. Mole fraction

B. Parts per million

C. Mass percentage

D. Molarity

Answer: A

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3. An unopened soda has an aqueous concentration of CO_2at25°equal to 0.0408molal.Thus ,pressure of CO_2gas in the can is $(K_H = 0.034 mol/kgbar)$

A. 0.671bar

B. 1.49bar

C. 1.41bar

D. 1.71 bar

Answer: C

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4. Relation between the volume of gas (2) that dissolves in a fixed volume of solvent (1) and the partial pressure of gas(2) is (n_t = total moles, K_1 and K_2 are Henry's constants)

A. $n_1 RT / n_2$

B. $n_2 RT / K_2 p_2$

C. $n_t RT / K_2$

D. None of these

Answer: C

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5. The pressure under which liquid and vapour can co-exist at equilibrium is called the

A. Limiting vapour pressure

B. Real vapour pressure

C. Normal vapour pressure

D. Saturated vapour pressure

Answer: B

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6. What is the concentration of O_2 in a freshwater stream in equilibrium with air at $30^\circ C$ and 2.0 bar ? Given, K_H (Henry's law constant) of $O_2 = 2.0 \times 10^{-3} mol/kg$ bar at $30^\circ C$.

A. $8.736 \times 10^{-3} g/kg$

B. $1.344 \times 10^{-3} g / kg$

C. $24.04 g / kg$

D. $114.5 g / kg$

Answer: B

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7. $CO(g)$ is dissolved in H_2O at 30° C and 0.020 atm. Henry's law constant for this system is 6.20×10^4 atm. Thus mole fraction $CO(g)$ is

A. 1.72×10^{-7}

B. 3.22×10^{-7}

C. 0.99

D. 0.01

Answer: B

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8. The solubility of $N_2(g)$ in water exposed to the atmosphere, when the partial pressure is 593mm is 5.3×10^{-4} M. Its solubility at 760 mm and at the same temperature is

A. $4.1 \times 10^{-4} M$

B. $6.8 \times 10^{-4} M$

C. $1500 M$

D. $2400 M$

Answer: B

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9. 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 these

Answer: C

Watch Video Solution

10. A sample of air saturated with benzene (vapour pressure = 100 mm Hg at 298 K , 750 mm Hg pressure . If it is isothermally compressed to one third of its initial volume , the final pressure of the system is :

A. 2250 torr

B. 2150 torr

C. 2050 torr

D. 1950 torr

Answer: C

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11. H_2S gas is used in qualitative analysis of inorganic cations. Its solubility in water at STP is $0.195 molKg^{-1}$. Thus, Henry's law constant (in atm molal^{-1}) for H_2S is

A. 2.628×10^{-4}

B. 5.128

C. 0.185

D. 3.826×10^{3}

Answer: B

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

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 involve chemical changes helped by a rise in temperature

Answer: A

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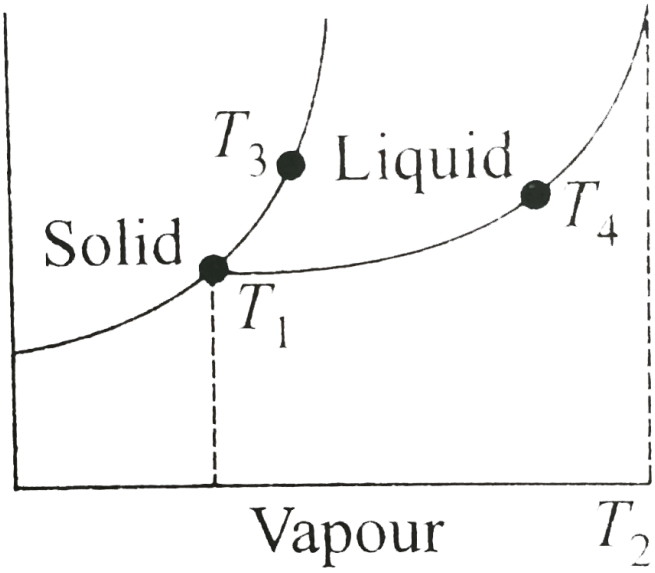
13. Observe the P-T phase diagrams for a given substance A. Then melting point of A(s), boiling point of $A(l)$, critical point of A and triple point of A (at their respective pressure) are respectively-



A. T_1, T_2, T_3, T_4

B. T_4, T_3, T_1, T_2

C. T_3, T_4, T_2, T_1

D. T_2, T_1, T_3, T_4

Answer: C

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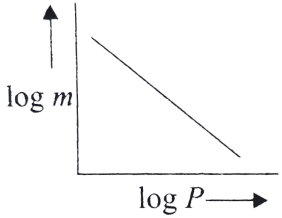
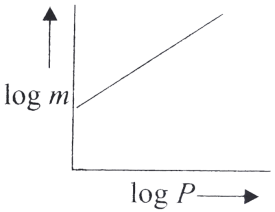
14. According to William Henry, the solubility of a gas in liquid depends on the pressure of the gas. If 'm' is the molality of the gas and 'P' is its pressure then which of the following plot is in accordance with the law:

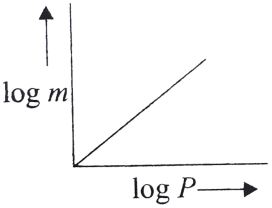
A.



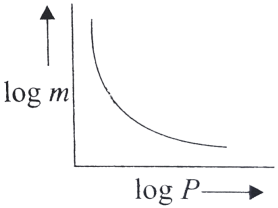
B.



C.



D.



Answer: B

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15. A solid dissolves in water if

A. Lattice energy is greater than hydration energy

B. Lattice energy is less than hydration energy.

C. Lattice energy is equal to hydration energy.

D. Dissolution is endothermic

Answer: B

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16. The boiling points of C_6H_6, CH_3OH, $C_6H_5NH_2$ and $C_6H_5NO_2$ are $80^\circ C$, $65^\circ C$, $184^\circ C$, and $212^\circ C$ respectively. Which of the following will have highest vapour pressure at room temperature ?

A. C_6H_6

B. CH_3OH

C. $C_6H_5NH_2$

D. $C_6H_5NO_2$

Answer: B

Watch Video Solution

17. During the evaporation of liquid

A. The Temperature of the liquid will rise

B. The temperature of the liquid will fall

C. May rise or fall depending on the nature

D. The temperature remains unaffectd

Answer: B

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18. At the higher altitudes the boiling point of water lowers because

A. Atmospheric pressure is low

B. Temperature is low

C. Atmospheric pressure is high

D. none of these

Answer: A

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19. An ideal solution has two components A and B. If A is more volatile than B and also $P_A^\circ > P_T$, then the correct relation between mole fraction of A in liquid (X) and vapour (Y) phase is :

A. $X_A = Y_A$

B. $X_A > Y_A$

C. $X_A < Y_A$

D. Nothing can be said

Answer: C

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

A. 0.786

B. 0.549

C. 0.478

D. 0.200

Answer: C

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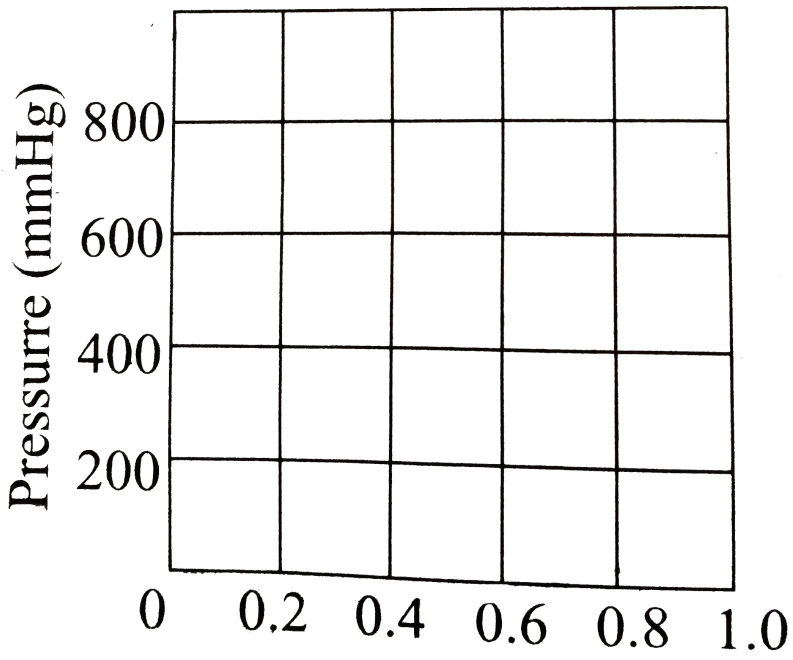
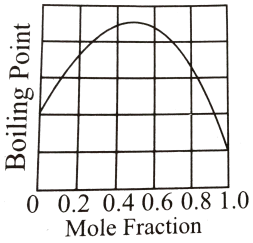
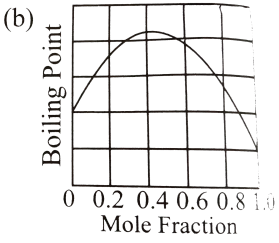
21. Given $P-x$ curve for a non ideal liquid mixture (fig.) Identify the correct $T-x$ curve for the same mixture.

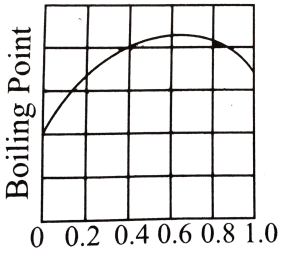

Pressurre (mmHg)
800
600
400
200
0
0.2
0.4
0.6
0.8
1.0

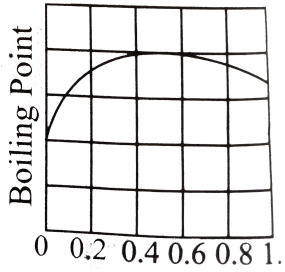
A.


Boiling Point
0 0.2 0.4 0.6 0.8 1.0
Mole Fraction

B.


(b)
Boiling Point
0 0.2 0.4 0.6 0.8
Mole Fraction

C. 

D. 

Answer: B

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22. The vapour pressure of two liquid P and Q are 80 torr and 60 torr respectively. The total vapour pressure obtained by mixing 3 moles of P and 2 mole of Q would be

A. 68 torr

B. 20 torr

C. 140 torr

D. 72 torr

Answer: D

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23. Consider a binary mixture of volatile liquides. If at $X_A = 0.4$, the vapour pressure of solution is 580 torr then the mixture could be $\left(p_A^\circ = 300\text{torr}, P_B^\circ = 800\text{torr}\right)$:

A. $CHCl_3 - CH_3COCH_3$

B. $C_6H_5CI - C_6H_5Br$

C. $C_6H_6 - C_6H_5CH_3$

D. $nC_6H_{14} - nC_7H_{16}$

Answer: A

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24. The lubricating action of an oil is more if it possess:

A. high vapour pressure

B. low power pressure

C. high surface tension

D. high destiny

Answer: B

Watch Video Solution

25. Which of the following plots does not represent the behaviour of an ideal binary liquid solutions?

A. plot of p_A versus x_A(mole fraction of A in liquid phase) is linear

B. plot of p_B versus x_B is linear

C. Plot of p_{total} versus is (orx_B) linear

D. Plot of p_{total} versus x_A is non-linear

Answer: D

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26. Which of the following is correct for a solution showing positive deviations from Raoult's law?

A. $\Delta V = +ve, \Delta H = +ve$

B. $\Delta V = -ve, \Delta H = -ve$

C. $\Delta V = +ve, \Delta H = -ve$

D. $\Delta V = -ve, \Delta H = +ve$

Answer: A

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27. If liquids A and B from an ideal solution

A. The entropy of mixing is zero

B. The Gibbs free energy is zero

C. The Gibbs free energy as well as the entropy of mixing are each zero

D. The enthalpy of mixing of zero

Answer: D

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28. Water and ethanol from non-ideal solution with positive deviation Raoult's law. This solution will have vapour pressure

A. equal to vapour pressure of pure water

B. less than vapour pressure of pure water

C. more than vapour pressure of pure water

D. less than vapour pressure of pure ethanol

Answer: C

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29. Mole fraction of toluene in the vapour which is in equilibrium with a solution containing benzene and toluene having 2 moles each is Given : Saturation vapour pressure of benzene = 120 torr Saturation vapour pressure of toluene = 80 torr

A. 0.5

B. 0.25

C. 0.6

D. 0.4

Answer: D

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30. For an ideal binary liquid solution with $P_A^\circ > P_B^\circ$ $x_A$and y_A represent the mole fraction of A in liquid phase and vapour phase respectively whereas x_B and y_B represent the mole fraction of B in liquid phase and vapour phase respectively, therefore which of the following relation is correct?

A. $x_A = y_A$

B. $x_A > y_A$

C. $\frac{x_A}{x_B} < \frac{y_A}{y_B}$

D. $\frac{x_A}{x_B} > \frac{y_A}{y_B}$

Answer: C

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31. Total Vapour pressure of mixture of 1molA$\left(p_A^0 = 150\text{torr}\right)$and 2molB $\left(p_B^0 = 240\text{torr}\right)$is 200torr. In this case

A. There is positive deviation from Raoult's law

B. there is negative deviation from Raoult's law

C. there is no deviation from Raoult's law

D. molecular masses of A and B are also required for calculating the deviation

Answer: B

Watch Video Solution

32. Which of the following is less than zero for ideal solutions ?

A. ΔH_{mix}

B. ΔV_{mix}

C. ΔG_{mix}

D. ΔS_{mix}

Answer: C

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33. If Vapour pressure of pure liquids 'A' & 'B' are 300 and 800 torr respectively at $25^{\circ}C$. When these two liquids are mixed at this temperature to from a solution in which mole percentage of 'B' is 92, then the total vapour pressure is observed to be 0.95 atm. Which of the following is true for this solution.

A. $\Delta V_{\text{mix}} > 0$

B. $\Delta H_{\text{mix}} < 0$

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

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

Answer: B

Watch Video Solution

34. Which of the following shows negative deviation from Raoult's law?

A. $CHCl_3$ and CH_3COCH_3

B. $CHCl_3$ and C_2H_5OH

C. $C_6H_5CH_3$ and C_6H_6

D. C_6H_6 and CCl_4

Answer: A

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35. A maximum or minima obtained in the temperature, composition curve of a mixture of two liquids indicates:

A. an azeotropic mixture

B. an eutectic formation

C. that the liquids are immiscible with one another

D. that the liquids are partially miscible at the maximum or minimum

Answer: A

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36. 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

Answer: B

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37. Given at $350K$, $p_A^\circ = 300\text{torr}$ and $p_B^\circ = 800\text{torr}$ the composition of the mixture having a normal boiling point of $350K$ is

A. $X_A = 0.08$

B. $X_A = 0.06$

C. $X_A = 0.04$

D. $X_A = 0.02$

Answer: A

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38. The vapour pressure of the solution of two liquids A$(P^\circ = 80mm)$ and B$(P^\circ = 120mm)$ is found to $100mm$ when $x_A = 0.4$. The result shows that

A. solution exhibits ideal behaviour

B. solution shows positive deviations

C. solution shows negative deviations

D. solution will show positive deviations for lower concentration and negative deviations for higher concentrations.

Answer: C

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39. In mixture A and B ,components show -ve deviations as:

A. ΔV_{mix} is +ve

B. A-B interation is weaker than A-A and B-B interation

C. ΔH_{mix} is +ve

D. A-B interation is stronger than A-A and B-B interation

Answer: D

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40. If liquids A and B from an ideal solution, than :

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

B. $\Delta H_{\text{mixing}} = 0$

C. $\Delta G_{\text{mix}} = 0, \Delta S_{\text{mix}} = 0$

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

Answer: B

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41. Which liquids pair shows a positive deviation from Raoult's law?

A. Acetone -chloroform

B. Benzene -methanol

C. Water-nitric acid

D. Water-hydrochloric acid

Answer: B

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42. Benzene and toluene form nearly ideal solutions.At $20^\circ C$, the vapour pressure of benzene is 75 torr. The partial vapour pressure of benzene at $20^\circ C$ for a solution containing $78g$benzene and $46g$touene is torr is

A. 50

B. 25

C. 375

D. 53.5

Answer: A

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43. A mixture of ethyl alcohol and propyl alcohol has a vapour pressure of $290mm$at $300K$ .The vapour pressure of propyl alcohol is $200mm$ .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

Answer: A

Watch Video Solution

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

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

A. 52mol percent

B. 34mol percent

C. 48mol percent

D. 50mol percent

Answer: D

Watch Video Solution

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

A. $17.675 mm Hg$

B. $15.750 mm Hg$

C. $16.500 mm Hg$

D. $17.325 mm Hg$

Answer: D

Watch Video Solution

46. For A and B to form an ideal solution which of the following conditions should be satisfied?

A. $\Delta H_{mi\xi ng} = 0$

B. $\Delta V_{mi\xi ng} = 0$

C. $\Delta S_{mi\xi ng} = 0$

D. All three conditions mentioned above.

Answer: D

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47. A binary liquid solution of n-heptane and ethyl alcohol is prepared which of the following statements correctly represents the behaviour of this liquid solution?

A. The solution formed is an ideal solution

B. The solution formed is a non - ideal solution with positive deviations from Raoult's law.

C. The solution formed is a non- ideal solution with negative deviations from Raoult's law

D. Normal-heptane exhibits postive deviations , whereas ethyl alcohol exhibits negative deviations from Raoult's law

Answer: B

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48. The mole fraction of toluene in vapour phase which is in equlibrium with a solution of benzene and toluene having a mole fraction of toluene 0.500 is (vapour pressure of pure benzene and pure toluene are 119 torr and 37.0 torr respectively at the same temperature).

A. 0.5

B. 0.763

C. 0.237

D. 1

Answer: C

Watch Video Solution

49. Two liquids are mixed together to from a mixture which boils at same temperature and their boiling point is higher than the boiling point of either of them so they shows .

A. no deviation from Raoult's law

B. positive deviation from Raoult's law

C. Negative deviation from Raoult's law

D. positive and negative deviation from Raoult's law depends upon the composition

Answer: C

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50. At$35^\circ C$ the vapour of pure chlorofrom si 0.359atm and that of pure acetone is 0.453atm.Asolution containing 1mole of chloroform and 4mole of acetone has a vapoor pressure of (in atm)

A. 0.400

B. 0.812

C. 0.094

D. 0.434

Answer: D

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51. When a solution of $CHCI_3$ is mixed with a solution of acetone,ΔV_{mix} is

A. Positive

B. Negative

C. Zero

D. Cannot be predicted

Answer: D

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52. The vapour pressure of hexane (C_6H_{14}) and heptane (C_7H_{16}) at $50^\circ C$ are 408 torr and 141 torr, respectively. The composition of the vapour above a binary solution composition a mole fraction of 0.300 hexane is $(y_6 =$ mol fraction of hexane and $y_7 =$ mol fraction of heptane)

A. $Y_6 = 0.8, Y_7 = 0.2$

B. $Y_6 = 0.554, Y_7 = 0.446$

C. $Y_6 = 0.300, Y_7 = 0.700$

D. $Y_6 = 0.871, Y_7 = 0.129$

Answer: B

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53. Benzene $(C_6H_6, 78g/mol)$and toluene $(C_7H_8, 92g/mol)$from an ideal solution. At $60^\circ C$the vapour pressure of pure benzene and pure toluene are0.575atm and0.184,respectively . The mole fraction of benzene in solution of these two chemicals that has a vapour pressure of 0.350 atm at$60^\circ C$

A. 0.154

B. 0.690

C. 0.486

D. 0.190

Answer: A

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54. At $25^\circ C$the vapour prssure of benzene ,$C_6H_6(78g/mole)$,is 93.2 torr and that of toluene ,$C_7H_8(92g/mol)$,is 28.2torr .A solution of 1.0mole fo $C_6H_6$and 1.0 mol of C_7H_8id prepared. Calculate the mole fraction of C_6H_6in the vapour above this solution (assume the solution is ideal.)

A. 0.607

B. 0.768

C. 0.232

D. 0.393

Answer: B

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55. At $334K$ the vapour pressure of benzene(C_6H_6)is0.526atm and that of toluene(C_7H_8)is0.188atm. In a solution containing0.500mole of

benzene and 0.500 mole of toluene , what is the vapour pressure of toluene above the solution at $334K$?

A. 0.188 atm

B. 0.10 atm

C. 0.357 atm

D. 0.094

Answer: D

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56. The van't Hoff factory i for a compound which undergo dissociationin one solvent and association in other solvent is respectively:

A. greater than one and greater than one

B. less than one greater than one

C. less than one and less than one

D. greater than one and less than one

Answer: D

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57. A compound MX_2has observed and normal molar masses $65.6 \text{ and } 164$respectively .Calculated the apparent degree of ionization of MX_2:

A. $75\ \%$

B. $85\ \%$

C. $65\ \%$

D. $25\ \%$

Answer: A

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58. The freezing point of 0.2molal $K_2SO_4$is $-1.1^\circ C$. Calculate van't Hoff factor and percentage degree of dissociation of K_2SO_4. $K_f$for water is 1.86°

A. 97.5

B. 90.75

C. 105.5

D. 85.75

Answer: A

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

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

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

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

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

Answer: C

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60. $PtCl_4.6H_2O$ can exist as hydrated complex 1 molal aq.solution has depression in freezing point of $3.72^\circ C$ Assume $100\,\%$ ionisation and $K_f\left(H_2O = 1.86^\circ mol^{-1}\right) kg$ then complex is

A. $\left[Pt(H_2O)_6\right]Cl_4$

B. $\left[Pt(H_2O)_4Cl_2\right]Cl_2.2H_2O$

C. $\left[Pt(H_2O)_3Cl_3\right]Cl.3H_2O$

D. $\left[Pt(H_2O)_2Cl_4\right].4H_2O$

Answer: C

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61. When $30g$ of this acid $C_{11}H_8O_2$ is dissolved in 60g benzene ,a freezing point depression of $2K$ is observed $K_f(\text{benzene}) = 1.72\text{K mol}^{-1}kg$. The van't Hoff factor

A. 1

B. 0.4

C. 2

D. 3

Answer: B

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62. Osmolarity of 0.02M potassium ferrocyanide solution $300K$ si (assuem solute is $100\ \%$ ionized)

A. 0.10 osmol

B. 0.20 osmol

C. 0.02 osmol

D. 0.004 osmol

Answer: A

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63. When only a little quantity of $HgCl_2$ is added to excess $Kl(aq)$ to obtain a clear solution ,which of the following is true for this solution? (no.volume change on mixing)

A. Its boiling and freezing poins remain same

B. Its boiling point is lowered

C. Its vapour pressure become lower

D. Its boiling point is raised

Answer: B

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64. which of the following has been arranged in order of decreasing freezing point?

A. $0.05MKNO_3 > 0.04MCaCl_2 > 0.140Msugar > 0.075MCuSO_4$

B.

$0.04MBaCl_2 > 0.140Msucrose > 0.075MCuSO_4 > 0.05MKNO_3$

C.

$0.075MCuSO_4 > 0.140Msucrose > 0.04MBaCl_2 > 0.05MKNO_3$

D.

$0.075MCuSO_4 > 0.05MNaNO_3 > 0.140Msucrose > 0.04MBaCl_2$

Answer: A

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65. The freezing point depression of $0.001mK_x\left[Fe(CN)_6\right]$ is $7.10 \times 10^{-3}K$.Determine the value of x .Given ,$K_f = 1.86Kkgmol^{-1}$for water

A. 3

B. 4

C. 2

D. 5

Answer: A

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66. π_1, π_2, π_3 and $\pi_4$are the osmotic pressure of $5\,\%$ $\left(\frac{W}{V}\right)$solution of ure ,frutose ,sucrose andKCl respectively at certain temperatures.The correct order of their magnitude is

A. $\pi_1 > \pi_4 > \pi_2 > \pi_3$

B. $\pi_1 > \pi_4 > \pi_2 > \pi_3$

C. $\pi_4 > \pi_1 > \pi_2 > \pi_3$

D. $\pi_4 > \pi_1 > \pi_3 > \pi_2$

Answer: C

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67. Moles of K_2SO_4 to be dissolved in 12 moles of water of lower its vapour pressure by 10mm Hg at a temperature at which vapour pressure of pure water is 50mm Hg is

A. 3 mol

B. 2 mol

C. 1 mol

D. 0.5 mol

Answer: C

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68. If for the sucrose solution elevation in boiling point is $0.1^{\circ}C$then what will be the boiling point of NaCl solution for same molal concentration

A. $0.1^{\circ}C$

B. $0.08^{\circ}C$

C. $0.2^{\circ}C$

D. $0.01^{\circ}C$

Answer: C

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69. For $0.1M$ solution ,the colligative property will follow the order

A. $NaCl > Na_2SO_4 > Na_3PO_4$

B. $NaCl > Na_2SO_4 \approx Na_3PO_4$

C. $NaCl < Na_2SO_4 < Na_3PO_4$

D. $NaCl < Na_2SO_4 = Na_3PO_4$

Answer: C

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70. If $\alpha$is the degree of dissociation of N_2SO_4, the van'tHoff factor (i) used for calculating the molecular mass is

A. $1 + \alpha$

B. $1 + 2\alpha$

C. $1 - \alpha$

D. $1 - 2\alpha$

Answer: B

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71. pH of a $0.1M$ monobasic acid is found to be 2,Hence its osmotic pressure at a given temp.TK is-

A. $0.1RT$

B. $0.11RT$

C. $1.1RT$

D. $0.01RT$

Answer: B

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72. Which has the highest boiling point?

A. $0.1mN_2SO_4$

B. $0.1mAl(NO_3)_3$

C. $0.1mMgCl_2$

D. $0.1mC_6H_{12}O_6(\text{glucose})$

Answer: C

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73. The van't Hoff factory i for an infinitely dilute solution of $NaSO_4$is :

A. $1/2$

B. $1/3$

C. 3

D. 2

Answer: C

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74. 1mol each of the following solutes are taken in 5mol water,

(a)$NaCl$ (b)K_2SO_4(C)$Na(3)PO_4$(d) glucose

Assuming $100\,\%$ ionisation of the electrolyte ,relative decrease in vapour pressure will be in order

A. $A < B < C < D$

B. $D < C < B < A$

C. $D < A < B < C$

D. equal

Answer: C

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75. Aluminium phosphate is $100\,\%$ ionised in 0.01molal aqueous solution,Hence,$\Delta T_b / K_b$is :

A. 0.01

B. 0.015

C. 0.0175

D. 0.02

Answer: D

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76. 1.0 molal aqueous solution of an electrolyte X_3Y_2 is 25 % ionized. The boilling point of solution is (K_b for $H_2O = 0.52Kkg/mol$)

A. $375.5K$

B. $374.04K$

C. $377.12K$

D. $373.25K$

Answer: B

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77. Aqueous solution of barium phosphate which is $100\,\%$ ionised has $\Delta T_f / K_f$ as 0.05.Hence ,given solution is

A. 0.01 molal

B. 0.02 molal

C. 0.04 molal

D. 0.05 molal

Answer: A

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78. A0.2 molal aqueous solution of a week acid (HX) is 20 $\%$ ionised,The frrezing point of this solution is (Given $k_f = 1.86^\circ C kgmol^{-1}$ for water) :

A. $-0.45^\circ C$

B. $-0.90^\circ C$

C. $-0.31^{\circ}C$

D. $-0.53^{\circ}C$

Answer: A

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79. Phenol associates in benzene to certain extent to form a dimer. A solution containing $20 \times 10^{-3}kg$ of phenol in $1.0kg$ of benzene hs its freezing point depressed by $0.69K$. Calculate the fraction of phenol that has dimerized. (K_f for benzene is $5.12Kkgmol^{-1}$).

A. 746.24

B. 646.24

C. 846.24

D. 546.23

Answer: A

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80. A solution of crab haemovyanin, a pigmented protein extracted from crabs,was prepared by dissolving $0.750 g in 125 cm^3$ of aqueous medium.AT $4^\circ C$ an osmotic pressure rise of 2.6mm of the solution was observed. The solution has a density of $1.00 g / cm^3$.Determine the molecular weight of the protein.

A. $53.14 \times 10^5 g / mol$

B. $52.14 \times 10^5 g / mol$

C. $51.14 \times 10^5 g / mol$

D. $54.14 \times 10^5 g / mol$

Answer: A

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81. A complex of iron and cyanide ions is $100\,\%$ ionised ar 1m (molal). If its elevation in b.p.is 2.08 then the complex is $\left(K_b = 0.52^\circ mol^{-1}kg\right)$,

A. $K_3\left[Fe(CN)_6\right]$

B. $Fe(CN)_2$

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

D. $Fe(CN)_4$

Answer: A

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82. The fraction of phenol dimerised in benzene if 20g of phenol in 1kg benzene exhibits a freezing point depression of $0.69K\left(K_f\right.$ benzene =5.12),(Mw phenol=94).What is the value of Van't Hoff for (i) in this reaction ?

A. 0.63

B. 0.37

C. 0.46

D. 064

Answer: A

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83. A solution containing $2.675g$ of $COCl_3.6NH_3$ (molar mass $= 267.5gmol^{-1}$) is passed through a cation exchanger, The chloride ions obtined in solution were treated with excess of $AgNO_3$ to give$4.78g$ of $AgCl$(molar mass $= 143.5gmol^{-1}$.The formula of the complex is (Atomic mass of $Ag = 108u$)

A. $\left[Co(NH_3)_6\right]Cl_3$

B. $\left[CoCl_2(NH_3)_4\right]Cl$

C. $\left[CoCl_3(NH_3)_3\right]$

D. $\left[CoCl(NH_3)_5\right]Cl_2$

Answer: A

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84. If sodium sulphate is considered to be completely dissociated into cations and anions in aqueous solution,the change in freezing point of water $\left(\Delta T_f\right)$,when 0.01mole of sodium sulphate is dissoved in 1 kg of water,is $\left(K_f = 1.86 K kgmol^{-1}\right)$

A. $0.0372K$

B. $0.0558K$

C. $0.0744K$

D. $0.0186K$

Answer: B

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85. Which salt may show the same value of vant Hoff factor (i)as that of $K_4Fe(CN)_6$in very dilute solution state?

A. $Al_2(SO_4)_3$

B. $NaCl$

C. $Al(NO_3)_3$

D. Na_2SO_4

Answer: A

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86. The freezing point of a 0.05 molal solution of a non-electrolyte in water is:

$(K_f = 1.86 \text{molality}^{-1})$

A. $-1.86^\circ C$

B. $-0.93^\circ C$

C. $-0.093^\circ C$

D. $0.93^\circ C$

Answer: C

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87. Which of the following aqueous solution shas osmotic presseure nearest to that of an equimolar solution of $K_4\left[Fe(CN)_6\right]$

A. Na_2SO_4

B. $BaCl_2$

C. $Al_2(SO_4)_3$

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

Answer: C

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88. Which aqueous solution would process the lowest boiling point?

A. $1\ \%\ NaCl$solution

B. 1 % urea solution

C. 1% Glucose solution

D. 1 % sucrose solution

Answer: D

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89. An aqueous solution boils at $100.50^\circ C$.The freezing point of the solution would be $(K_b$ for water $= 0.51^\circ C/m)$, $(K_f$ for water $= 1.86^\circ C/m)$ [no association or dissociation]

A. $0^\circ C$

B. $-1.86^\circ C$

C. $-1.82^\circ C$

D. $+1.82^{\circ} C$

Answer: B

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90. For an ideal solution containing a non-volatille solute, which of the following expression is correct represented?

where m is the molality of the solution and K_b is molal elevation constant.

A. $\Delta T_b = K_b \times m$

B. $\Delta T_b = K_b \times M$

C. $\Delta T_b = K_b \times 2m$

D. $\Delta T_b = K_b \times 2M$

Answer: A

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91. 20g of a binary electrolyte(mol.wt.=100)are dissolved in 500g of water.The freezing point of the solution is $-0.74^{\circ} C K_f = 1.86 K \text{molality}^{-1}$.the degree of ionization of the electrolyte is

A. $50\ \%$

B. $75\ \%$

C. $10\ \%$

D. $0\ \%$

Answer: D

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92. The ratio of the value of any collogative property for $K_4\left[Fe(CN)_6\right]$ solution to that of $Fe_4\left[Fe(CN)_6\right]_3$(prussian blue,)solution is nearly

A. 1

B. 0.71

C. 1.4

D. Less than 1

Answer: B