



# CHEMISTRY

## BOOKS - MBD CHEMISTRY (ODIA ENGLISH)

### SOLUTIONS

#### QUESTION BANK

1. Define the term solution.



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2. How many types of solutions are formed ?



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3. Name the types of solutions .



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4. Which law governs the dissolution of a gas  
in a liquid ?



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5. Between sea water and drinking water which will freeze at lower temperature?



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



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7. What is the effect of increase of pressure on the solubility of a gas in liquid ?



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8. In which type of liquid, an ionic solid will go into solution ?



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**9.** Name one factor which influences the solubility of a gas in a solvent .



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**10.** What is the effect of pressure on the boiling point of a liquid ?



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**11.** How does the boiling point of a liquid change with decrease in atmospheric pressure ?



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**12.** Between sea water and drinking water which will freeze at lower temperature?



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**13.** What is the melting point of ice in Kelvin scale ?



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



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15. What is Van't Hoff equation for osmotic pressure ?



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16. How  $\Delta T_f$  is related with molality ?



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17. What is molal elevation constant of a solvent ?



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18. Among 1M solution of glucose , NaCl,  $FeCl_3$ ,  $CaCl_2$ , which one has the (a) highest boiling point (b) lowest boiling point ?



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19. What is an ideal solution ?



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20. What is a colligative property?



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21. Which of the following has higher vapour pressure at the same temperature ?

$CH_3OH$  ( $BP = 64.5^\circ C$ ) and

$C_2H_5OH$  ( $BP = 78.3^\circ C$ )



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22. When temperature increases vapour pressure of liquid –



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23. Solubility of a gas in liquid, \_\_\_\_\_ with rise of temperature .



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24. At the boiling point of a liquid its vapour pressure is equal to \_\_\_\_\_.



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25. Polar solutes are \_\_\_\_\_ in non-polar solvents

.



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**26.** At the boiling point of a liquid its vapour pressure is equal to \_\_\_\_\_.



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**27.** The vapour pressure of liquid \_\_\_\_\_ with rise of temperature .



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**28.** Solutions having same osmotic pressure are called \_\_\_\_\_



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**29.** On adding a solute, freezing point of solution \_\_\_\_\_ .



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**30.** On adding a solute, boiling point of solution \_\_\_\_\_ .



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**31.** On increasing concentration of a solution, osmotic pressure \_\_\_\_\_ .



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**32.** On adding a solute, vapour pressure \_\_\_\_\_ .



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**33.** With increase of altitude, the boiling point of water \_\_\_\_\_ (increase, decreases, remains same)



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**34.** Two solutions having same osmotic pressure are called \_\_\_\_\_ solution .



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**35.** On adding a solute, freezing point of solution \_\_\_\_\_ .



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**36.** Solubility of a gas in liquid, increases with rise of temperature .



**Watch Video Solution**

**37.** How does the boiling point of a liquid change with decrease in atmospheric pressure ?



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**38.** Vapour pressure of solution decreases with \_\_\_ in temperature.



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39. On adding a solute, vapour pressure \_\_\_\_\_ .



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40. State Henry's law.



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41. Define mole fraction .



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**42.** Calculate the molarity when 73 grams of HCl is dissolved in water to make 1500 ml solution.



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**43.** What do you understand by osmotic pressure ?



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**44.** Define molality. 29.25 gms of NaCl are present in 529.25 gms of solution . Find out the molality .



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**45.** 5.85 g of NaCl is dissolved in 90 g water what is the mole fraction of NaCl ?



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**46.** Derive the relationship between elevation in boiling point and molar mass.



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**47.** Compare the osmotic pressures of the following two solution at the same temperature :

1 M Glucose solution

1M barium chloride solution .



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**48.** Arrange the following in increasing order of their vapour pressure at room temperature. (Water, salt solution in water, alcohol – water solution)



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**49.** How does the vapour pressure of a liquid change with intermolecular force of attraction ?



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50. In which type of liquid, an ionic solid will go into solution ?



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51. What type of change takes place when suger is dissolved in a cup of tea ?



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52. What is freezing point of a liquid ?



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



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54. What is Osmotic pressure ?



[Watch Video Solution](#)

**55.** Define Ebullioscopic constant.



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



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**57.** Define osmosis.



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58. 15 gm of a substance dissolved in 450 gms of water produces a depression of  $-0.34^{\circ}\text{C}$  in the freezing point . Calculation the Mol. Wt. of the solid (  $K_f$  for water is  $1.86\text{ K kg mol}^{-1}$  )



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59. What is the relationship between depression in freezing point of a solution and

molecular mass of the solute ?



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**60.** Why is the boiling point of a solution always higher than that of a pure solvent ?



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**61.** How would you justify that the relative lowering in vapour pressure is a colligative property ?





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**62.** What is Van't Hoff equation for osmotic pressure ?



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**63.** Distinguish between diffusion and osmosis.



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**64.** Define Van't Hoff factor.



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**65.** State and explain Hess's law.



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**66.** Explain the terms, .Molality, Molarity and Molfractions ..



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**67.** Derive the relationship between relative lowering of vapour pressure and molar mass of non-volatile solute.



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**68.** State Raoult's law. How is the molecular mass of a solute determined from lowering of vapour pressure measurement ?



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**69.** How can you determine the molecular mass of a non-volatile solute from depression of freezing point ?



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**70.** What is osmotic pressure? How can you explain it is a colligative property?



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**71.** What is Van't Hoff equation for osmotic pressure ?



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**72.** Discuss abnormal molecular masses in terms of Vant Hoff factor.



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**73.** Which is not an example of a solution?

A. Amalgam

B. Brass

C. Na in  $NH_3$

D. Dust in air

**Answer: B**



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**74.** The process of osmosis was discovered by:

A. Pfeffer

B. Traube

C. Berkeley

D. Nollet

**Answer: D**



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**75.** Who proposed the concept that solute particles in solution behaves like gaseous molecules?

A. Boyle

B. van't Hoff

C. Nollet

D. Charles

**Answer: B**



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**76.** Osmotic pressure of non-aqueous solution is measured by:



A. Berkeley and Hartley method

B. Pfeffer's method

C. Morse and Frazer method

D. Townend's method

**Answer: D**



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**77.** Solubility of deliquescent substances in water is generally:

A. high

B. Low

C. Moderate

D. Can not be said

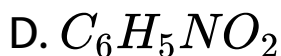
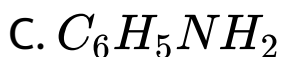
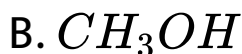
**Answer: A**



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**78.** The boiling point 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 will show highest vapour pressure at room temperature?



**Answer: B**



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79. Give one example each of solutions showing positive and negative deviation from Raoult's law, with reason.

A. Lower

B. Higher

C. Same

D. Can not be said

**Answer: B**



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**80.** A pressure cooker reduces cooking time because:

A. Heat is more evenly distributed

B. B.p of water inside the cooker is increased

C. The high pressure tenderises the food

D. All

**Answer: B**



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81. Water will boil at  $101.5^{\circ}C$  at which of the following pressures:

- A. 76 m of Hg
- B. 76 mm of Hg
- C.  $>76$  cm of Hg
- D.  $<76$  cm of Hg

**Answer: C**



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82. Pick out the combination which show positive deviations from Raoult.s law:

A. Lower

B. Higher

C. Same

D. can not be said

**Answer: A**



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83. Which solution will show the maximum vapour pressure at 300 K ?

A. 1 M NaCl

B. 1 M  $CaCl_2$

C. 1 M  $CH_3COOH$

D. 1 M  $C_{12}H_{22}O_{11}$

**Answer: D**



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**84.** The van't Hoff factor (i) for a dilute aqueous solution of glucose is:

A. Zero

B. 1

C. 1.5

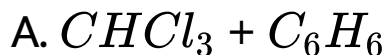
D. 2

**Answer: B**



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85. Which pair shows a contractions in volume on mixing ?



D. All

**Answer: D**



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86. If  $P_0$  and  $P_\delta$  are the vapour pressure of solvent and solution respectively and  $N_1$  and  $N_2$  are the mole of solute and solvent then:

A. 
$$\frac{P_0 - P_\delta}{P_0} = \frac{N_1}{N_1 + N_2}$$

B. 
$$\frac{P_0 - P_\delta}{P_\delta} = \frac{N_1}{N_2}$$

C. 
$$P_\delta = P_0 \cdot \frac{N_2}{N_1 + N_2}$$

D. All

**Answer: D**



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**87.** Which characterises the weak intermolecular forces of attraction in a liquid ?

- A. High boiling point
- B. High vapour pressure
- C. High critical temperature
- D. High heat of vaporisation

**Answer: B**



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**88.** The phenomenon in which cells are swelled up and then burst if placed in hypotonic solutions is called:

A. Plasmolysis

B. Haemolysis

C. Exosmosis

D. None

**Answer: B**



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89. Shrinking of the cell due to out flow of water in a hypertonic solution is called \_\_\_\_\_.

A. Plasmolysis

B. Haemolysis

C. Endosmosis

D. None

**Answer: A**



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**90.** Equimolal solutions will have the same elevation in boiling point, provided they do not show:

A. Electrolysis

B. Association

C. Dissociation

D. Association or dissociation

**Answer: D**



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91. The  $\Delta T_f$  is directly proportional to:

A. Normality

B. Molality

C. Molarity

D. None

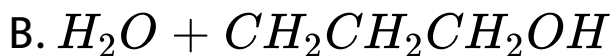
**Answer: B**



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92. Pick out the combination which show positive deviations from Raoult.s law:



D. All are correct

**Answer: D**



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**93.** If mole fraction of the solvent in a solution decreases then:

A. Vapour pressure of solution increases

B. B.pt. decreases

C. Osmotic pressure increases

D. All are correct

**Answer: C**



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94. In which of the following the van't Hoff Factor (i) is equal to one ?

A. NaCl

B.  $KNO_3$

C. Urea

D. All

**Answer: C**



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95. A maxima 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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96. When the vapour pressure of solutions of two liquids are less than those expected from ideal solutions, they are said to show:

- A. Positive deviation from ideal behaviour
- B. Negative deviation from ideal behaviour
- C. Positive deviations for lower concentrations and negative deviations for higher concentration

D. None

**Answer: B**



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**97.** The natural semipermeable membrane is:

A. Gelatinous  $Cu_2Fe(CN)_6$

B. Gelatinous  $Ca_3(PO_4)_2$

C. cell wall

D. Phenol layer

**Answer: C**



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**98.** The osmotic pressure of a solution increases if,

A. Temperature is lowered

B. Volume is increased

C. Number of solute molecules is increased

D. None

**Answer: C**



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**99.** Just after slow crystallisation the solution in contact with the crystal is:

- A. Dilute
- B. Unsaturated
- C. Saturated
- D. Super saturated



**Answer: D**



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**100.** The van't Hoff factor (i) for a dilute solution of  $K_3[Fe(CN)_6]$  is:

A. 10

B. 4

C. 5

D. 0.25

**Answer: B**



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**101.** Which of the following 0.1 M aqueous solutions will have the lowest freezing point :

A. Potassium sulphate

B. Sodium chloride

C. Urea

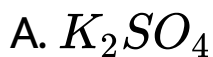
D. Glucose

**Answer: A**

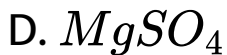


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**102.** Which compound corresponds van.t Hoff factor (i) to be equal to 2 in dilute solution?



C. Sugar



**Answer: D**



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**103.** The plant cells will shrink when placed in

- A. Water
- B. A hypotonic solution
- C. A hypertonic solution
- D. An isotonic solution

**Answer: C**



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**104.** A solution of sulphuric acid in water exhibits:

- A. Negative deviations from Raoult's law
- B. Positive deviations from Raoult's law
- C. Ideal properties
- D. The applicability of Henry's law

**Answer: A**



**105.** A substance will be deliquescent if its vapour pressure is:

- A. Equal to the atmospheric pressure
- B. Equal to that of water vapour in the air
- C. Greater than that of water vapour in the air
- D. Lesser than that of water vapour in the air

**Answer: D**



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

A. Osmosis

B. Filtration

C. Diffusion

D. Reverse Osmosis

**Answer: D**



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**107.** To form a super saturated solution of salt one must:

- A. Super saturated
- B. Unsaturated
- C. Remains saturated
- D. None



**Answer: B**



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**108.** A solution of chlorine in water contains:

- A. Is equal to the solubility of that substance in water
- B. Exceeds than its solubility
- C. Less than its solubility
- D. Continuously change

**Answer: B**



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**109.** The molal cryoscopic constant for water is:

A.  $1.86 \text{ K molality}^{-1}$

B.  $5.26 \text{ K molality}^{-1}$

C.  $55.5 \text{ K molality}^{-1}$

D.  $0.52 \text{ K molality}^{-1}$

**Answer: A**



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**110.** An aqueous solution is heated until it begins to boil. The atmospheric pressure is 760 mm of Hg. The boiling temperature will be:

A.  $100^{\circ}C$

B.  $> 100^{\circ}C$

C.  $< 100^{\circ}C$

D. None

**Answer: B**



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**111.** The spontaneous movement of solute particles from a more concentrated solution to less concentrated solution is called:

- A. Osmosis
- B. Diffusion
- C. Plasmolysis
- D. Fusion

**Answer: B**



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**112.** At a suitable pressure near the freezing point of ice, there exists:

- A. Only ice
- B. Ice and water
- C. Ice and steam

D. Ice, water and steam, all existing side by side

**Answer: D**



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**113.** A liquid is in equilibrium with its vapours at its boiling point. On the average the molecules in the two phases have equal:

A. Potential energy

B. Total energy

C. Kinetic energy

D. Intermolecular forces

**Answer: C**



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**114.** In the case of osmosis, solvent molecules move from:

A. Higher vapour pressure to lower vapour pressure

B. Higher concentration to lower concentration

C. Lower vapour pressure to higher vapour pressure

D. Higher osmotic pressure to lower osmotic pressure

**Answer: A**



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**115.** If molecular interaction between two different liquid molecules are stronger than the molecular interactions between the pure liquid molecules, the mixture is expected to show:

A. Positive deviations

B. Negative deviations

C. No Deviations

D. Positive as well as negative deviations

**Answer: B**



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**116.** The ratio of the value of any colligative property for KCl solution to that of sugar solution is:

A. 1

B. 0.5

C. 2

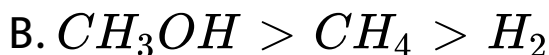
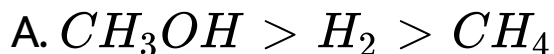
D. 4

**Answer: C**



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**117.** On the basis of intermolecular forces predict the correct order of decreasing boiling to that of sugar solution is:



**Answer: B**



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**118.** If the temperature increases from  $0^{\circ} C$  to  $50^{\circ} C$  at atmospheric pressure, which of the following processes is expected to take place more in case of liquids ?

A. Fusion

B. Vaporisation

C. Solubilization

D. None

**Answer: B**



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**119.** The reverse of fusion is freezing and it is:

A. Endothermic

B. Exothermic

C. Neither exothermic nor endothermic

D. May be exothermic or endothermic

**Answer: B**



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**120.** The most suitable method for the determination of molecular weight of oxyhaemoglobin, a compound of high molecular weight is:

- A. Osmotic pressure method
- B. Vapour pressure lowering method
- C. Elevation of boiling point method

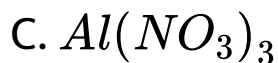
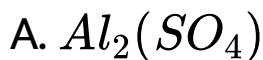
D. None

**Answer: A**



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**121.** The van't Hoff factor (i) for a dilute solution of  $K_3[Fe(CN)_6]$  is:



D.  $Na_2SO_4$

**Answer: A**



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

- A. High vapour pressure
- B. Low vapour pressure
- C. High surface tension



D. High density

**Answer: B**



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**123.** Generally those gases are soluble in water to a greater extent which:

- A. Are easily liqefied
- B. Are ionised in water
- C. React with water

D. All are correct

**Answer: D**



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**124.** The energy that favours dissolution of a solute in water is known as:

A. Hydration energy

B. Lattice energy

C. Ionisation energy

D. Exothermic energy

**Answer: A**



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**125.** The energy that opposes the dissolution of a solute in a solvent is called:

A. Solvent energy

B. Hydration energy

C. Lattice energy

## D. Ionisation energy

**Answer: C**



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**126.** For an ideal binary liquid solution with  $P_A^\circ > P_B^\circ$  which relation between  $X_A$  (mole fraction of A in liquid phase) and  $Y_A$  (mole fraction of A in vapour phase) is correct,  $X_B$  and  $Y_B$  are mole fraction of B in liquid and vapour phase respectively

A.  $X_A = Y_A$

B.  $X_A > Y_A$

C.  $\frac{X_A}{X_B} < \frac{Y_A}{Y_B}$

D.  $X_A$ ,  $Y_A$ ,  $X_B$  and  $Y_B$  cannot be correlated

**Answer: C**



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**127.** Which of the following precipitate can act as a semipermeable membrane?

A. Calcium phosphate (gelatinous)

B. Phenol layer

C. Copper ferrocyanide (gelatinous)

D. All

**Answer: D**



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**128.** In cold countries, ethylene glycol is added to water in the radiators of cars during winters. It results in:

A. Lowering in boiling point

B. Reducing viscosity

C. Reducing specific heat

D. Lowering in freezing point

**Answer: D**



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**129.** Beckmann's thermometer are used to  
measures:

- A. Boiling point of the solution
- B. Freezing point of the solution
- C. Any temperature
- D. Elevation in boiling point or depression  
in freezing point

**Answer: D**



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**130.** Equimolal solutions of A and B show depression in freezing point in the ratio 2 : 1. A remains in its normal state in solutions. B will be in solution:

A. Normal

B. Dissociated

C. Associated

D. Hydrolysed

**Answer: C**



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**131.** The vapour pressure of a solution of a non-volatile electrolyte (B) in a solvent (A) is 95 % of the vapour pressure of the solvent at the same temperature. If the molecular weight of the solvent is 0.3 times the molecular weight of solute, the weight ratio of the solvent and solute are:

A. 0.12

B. 6

C. 0.2

D. 4

**Answer: B**



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**132.** The plots of  $\frac{1}{X_A}$  vs,  $\frac{1}{Y_A}$  (where  $X_A$  and  $Y_A$  are the mole fraction of liquid A in liquid and vapour phase respectively) is linear slope and intercepts respectively:

A.  $\frac{P_A^\circ}{P_B^\circ}$  and  $\frac{P_A^\circ - P_B^\circ}{P_B^\circ}$

B.  $\frac{P_A^\circ}{P_B^\circ}$  and  $\frac{P_B^\circ - P_A^\circ}{P_B^\circ}$

C.  $\frac{P_B^\circ}{P_A^\circ}$  and  $\frac{P_A^\circ - P_B^\circ}{P_B^\circ}$

D.  $P_B^\circ / P_A^\circ$  and  $\frac{P_B^\circ - P_A^\circ}{P_B^\circ}$

**Answer: B**



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**133.** Which aqueous solution has minimum freezing point ?

A. 0.01 M NaCl

B. 0.005 M  $C_2H_5OH$

C. 0.005 M  $MgCl_2$

D. 0.005 M  $MgSO_4$

**Answer: A**



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**134.** Which solution will have the highest boiling point ?

A. 1 % glucose in water

B. 1 % sucrose in water

C. 1 % NaCl in water

D. 1 %  $CaCl_2$  in water

**Answer: C**



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**135.** Which aqueous solution has minimum freezing point ?

A. 1 molar NaCl solution

B. 1 molar KCl solution

C. 1 molar  $\text{CaCl}_2$  solution

D. 1 molar urea solution

**Answer: C**



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**136.** Which solution will have least vapour pressure ?

A. 0.1 M  $BaCl_2$

B. 0.1 M urea

C. 0.1 M  $Na_2SO_4$

D. 0.1 M  $Na_3PO_4$

**Answer: D**



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**137.** The osmotic pressure of equimolar solutions of  $BaCl_2$ , NaCl and glucose follow the order:



A.  $BaCl_2 > NaCl > \text{glucose}$

B.  $\text{Glucose} > NaCl > BaCl_2$

C.  $NaCl > BaCl_2 > \text{glucose}$

D.  $NaCl > \text{glucose} > BaCl_2$

**Answer: A**



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**138.** The lowering of vapour pressure of 0.1M aqueous solutions of  $NaCl$ ,  $CuSO_4$ , and  $K_2SO_4$  are:

A. All equal

B. In the ratio of 1 : 1 : 1.5

C. In the ratio of 3 : 2 : 1

D. In the ratio of 1.5 : 1 : 2.5

**Answer: B**



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**139.** Which has maximum freezing point ?

A. 1 molar of NaCl solution

B. 1 molar of KCl solution

C. 1 molar of  $CaCl_2$  solution

D. 1 molar of urea solution

**Answer: D**



**Watch Video Solution**

**140.** Which solution will produce maximum elevation in b.pt. ?

A. 0.1 M glucose

B. 0.1 M sucrose

C. 0.1 M  $BaCl_2$

D. 0.1 M  $MgSO_4$

**Answer: C**



**Watch Video Solution**

**141.** Which has the highest freezing point at one atmosphere ?

A. 0.1 M NaCl solution

B. 0.1 M sugar solution

C. 0.1 M  $BaCl_2$  solution

D. 0.1 M  $FeCl_3$  solution

**Answer: B**



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**142.** The ration of the value of any colligative property for KCl solution to that for sugar solution is nearly .....times

A. 1

B. 0.5

C. 2

D. 2.5

**Answer: C**



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**143.** One mole of non-volatile solute is dissolved in two moles of water. The vapour

pressure of the solution relative to that of water is:

A.  $\frac{2}{3}$

B.  $\frac{1}{3}$

C.  $\frac{1}{2}$

D.  $\frac{3}{2}$

**Answer: A**



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**144.** A solution has an osmotic pressure of 0.821 atm at 300 K. Its concentration would be:

A. 0.0033M

B. 0.66 M

C. 0.033 M

D. 0.33 M

**Answer: C**



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145. 5 % (wt./vol.) aqueous NaCl solution and 5 % (wt./vol.) aqueous KCl solution are:

- A. Isotonic
- B. Isomolar
- C. Isoequimolar
- D. None

**Answer: D**



**Watch Video Solution**

**146.** Osmotic pressure of blood is 7.65 atm at 310 K. An aqueous solution of glucose that will be isotonic with blood is .....wt./vol.

A. 5.41 %

B. 3.54 %

C. 4.53 %

D. 53.4 %

**Answer: A**



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**147.** The osmotic pressure of a 5% (wt./vol.) solution of cane sugar (mol.wt is 342) at  $15^{\circ}C$  is:

- A. 4 atm
- B. 3.4 atm
- C. 5.078 atm
- D. 2.45 atm

**Answer: C**



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**148.** The freezing points of a 0.05 molal solution of a non-electrolyte in water is: ( $K_f = 1.86 \text{ K molality}^{-1}$ )

A.  $-1.86^\circ \text{C}$

B.  $-0.093^\circ \text{C}$

C.  $-0.93^\circ \text{C}$

D.  $0.093^\circ \text{C}$

**Answer: C**



**Watch Video Solution**

**149.** The freezing point of 1 molar NaCl solution assuming NaCl to be 100% dissociated in water is: ( $K_f = 1.86 \text{ K molality}^{-1}$ )

A.  $-1.86^\circ \text{C}$

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

C.  $+1.86^\circ \text{C}$

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

**Answer: B**



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150. The molar freezing point constant of water is  $1.86 \text{ K molality}^{-1}$ . If 342 g of cane sugar ( $C_{12}H_{22}O_{11}$ ) are dissolved in 1000 g of water, the solution will freeze at:

A.  $-1.86^\circ \text{C}$

B.  $1.86^\circ \text{C}$

C.  $-3.92^\circ \text{C}$

D.  $2.42^\circ \text{C}$

**Answer: A**



**Watch Video Solution**

**151.** Osmotic pressure of a solution containing 0.1 mole of solute per litre at 273 K is:

A.  $\frac{0.1}{1} \times 0.08205 \times 273 \text{ atm}$

B.  $0.1 \times 2 \times 0.08205 \times 273 \text{ atm}$

C.  $\frac{1}{0.1} \times 0.08205 \times 273 \text{ atm}$

D.  $\frac{0.1}{1} \times \frac{273}{0.08205} \times 273 \text{ atm}$

**Answer: A**



**Watch Video Solution**

**152.** Osmotic pressure of 40 % (wt./vol.) urea solution is 1.64 atm and that of 3.42 % (wt./vol.) cane sugar is 2.46 atm. When equal volumes of the above two solutions are mixed, the osmotic pressure of the resulting solution is:

A. 1.64 atm



B. 2.46 atm

C. 4.10 atm

D. 2.05 atm

**Answer: D**



**Watch Video Solution**

**153.** Following solutions at the same temperature will be isotonic:

- A. 3.42 g of cane sugar in one litre water  
and 0.18 g of glucose in one litre water
- B. 3.42 g of cane sugar in one litre water  
and 0.18 g of glucose in 0.1 litre water
- C. 3.42 g of cane sugar in one litre water  
and 0.585 g of NaCl in one litre water
- D. 3.42 g of cane sugar in one litre water  
and 1.17 g of NaCl in one litre water

**Answer: B**



**Watch Video Solution**

**154.** Molal depression of freezing point of water is  $1.86^{\circ}C$  per 1000 g of water. 0.02 mole of urea dissolved in 100 g of water will produce a lowering of temperature of:

A.  $0.186^{\circ}$

B.  $0.372^{\circ}$

C.  $1.86^{\circ}$

D.  $3.72^{\circ}$

**Answer: B**



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**155.** Dry air was passed successively through a solution of 5 g of a solute in 180 g of water and then through pure water. The loss in weight of solution was 2.50 g and that of pure solvent 0.04 g The molecular weight of the solute is:

A. 31.25

B. 3.125

C. 312.5

D. None

**Answer: A**



**Watch Video Solution**

**156.** The osmotic pressure of decimolar solution of glucose at  $30^{\circ}C$  is:

A. 24.88 atm

B. 2.488 atm

C. 248.8 atm

D. None

**Answer: B**



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**157.** Osmotic pressure of a solution (density is 1 g/ml) containing 3 g of glucose (molecular weight =180) in 60 g of water at  $15^{\circ} C$  is:

A. 0.34 atm

B. 0.65 atm

C. 6.25 atm

D. 5.57 atm

**Answer: C**



**Watch Video Solution**

**158.** What would be the freezing point of aqueous solution containing 17 g of  $C_2H_5OH$  in 1000 g of water  $K_f = 1.86 \text{ K molality}^{-1}$ :

A.  $-0.69^\circ C$

B.  $-0.34^{\circ}C$

C.  $0.0^{\circ}C$

D.  $0.34^{\circ}C$

**Answer: A**



**Watch Video Solution**

**159.** A solution containing 8.6 g urea in one litre was found to be isotonic with a 5% (wt./vol.) 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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**160.** A solution containing 4 g of a non-volatile organic solute per 100 ml was found to have an osmotic pressure equal to 500 cm of

mercury at  $27^{\circ}C$ . The molecular weight of solute is:

A. 14.97

B. 149.7

C. 1697

D. 1.497

**Answer: B**



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**161.** A solution of 1.25 g of a non-electrolyte in 20 g of water freezing at 271.9K with its molal depression constant , then the molecular wt. of the solute is:

A. 207.8 g/mol

B. 179.79 g/mol

C. 209.6 g/mol

D. 105.68 g/mol

**Answer: D**



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**162.** The molal elevation constant of water =  $0.52 \text{ K, molality}^{-1}$ . The boiling point of 1.0 molal aqueous KCl solution (assuming complete dissociation of KCl), should be:

A.  $100.52^\circ \text{C}$

B.  $101.04^\circ \text{C}$

C.  $99.48^\circ \text{C}$

D.  $98.96^\circ \text{C}$

**Answer: B**



**Watch Video Solution**

**163.** In a solution of 7.8 g benzene ( $C_6H_6$ ) and 46.0 g toluene ( $C_6H_5CH_3$ ) the mole fraction of benzene is:

A.  $1/6$

B.  $1/5$

C.  $1/2$

D.  $1/3$

**Answer: A**



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**164.** If a 6.84% (wt/vol.) solution of 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**

**165.** The normal amount of glucose in 100 mL of blood (8-12hours after a meal) is:

A. 8 mg

B. 80 mg

C. 200 mg

D. 800 mg

**Answer: B**



**Watch Video Solution**

**166.** Osmotic pressure of a sugar solution at  $24^{\circ}C$  is 2.5 atmosphere. The concentration of the solution in mol per litre is:

A. 10.25

B. 1.025



C. 1025

D. 0.1025

**Answer: D**



**Watch Video Solution**

**167.** At  $40^{\circ}C$  the vapour pressures of pure liquids, benzene and toluene, are 160 mm Hg and 60 mm Hg respectively. At the same temperature, the vapour pressure of an

equimolar solution of the two liquids,  
assuming the ideal solution should be:

A. 140 mm Hg

B. 110 mm Hg

C. 220 mm Hg

D. 100 mm Hg

**Answer: B**



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**168.** Elevation in boiling point was  $0.52^{\circ}C$  when 6 g. of a compound X was dissolved in 100 g of water. Molecular weight of X is-

A. 120

B. 60

C. 180

D. 342

**Answer: B**



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**169.** 1 litre of a solution containing 500 g of a protein exerts an osmotic pressure of 0.82 atm at  $27^{\circ}C$ . The molecular weight of the protein is:

A. 82000

B. 50000

C. 41000

D. 15000

**Answer: D**



**Watch Video Solution**

**170.** The concentration of glucose (in g/litre) solution which is isotonic with a solution of urea containing 6 g per litre will be:

A. 6

B. 34.2

C. 18

D. 1.8

**Answer: C**



**Watch Video Solution**

**171.** A solution containing 1 mole of ethylene glycol dissolved in 1000 g of water ( $K_f = 1.86 K molality^{-1}$ ) will freeze at:

A.  $-5.2^{\circ} C$

B.  $-0.52^{\circ} C$

C.  $-18.6^{\circ} C$

D.  $-1.86^{\circ} C$

**Answer: C**



**Watch Video Solution**

**172.** Solute A is a ternary electrolyte and solute B is non-electrolyte. If 0.1 M solution of solute B produces an osmotic pressure of  $2P$ , then 0.05 M solution of A at the same temperature will produce an osmotic pressure equal to:

A.  $P$

B.  $1.5P$

C. 2P

D. 3P

**Answer: D**



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**173.** The molal elevation constant for water is  $0.52 \text{ K} \cdot \text{molality}^{-1}$ . The elevation caused in the boiling point of water by dissolving 0.25 mole of a non-volatile solute in 250 g of water will be:



A.  $52^{\circ} C$

B.  $5.2^{\circ} C$

C.  $0.52^{\circ} C$

D.  $0.052^{\circ} C$

**Answer: C**



**Watch Video Solution**

**174.** A  $3.42\%$  (wt./vol.) solution of cane sugar is isotonic with a  $5.96\%$  (wt./vol.) solution of raffinose. The molecular weight of raffinose is:

A. 59.6

B. 596

C. 5.96

D. 5960

**Answer: B**



**Watch Video Solution**

**175.** At  $27^{\circ}C$ , the osmotic pressure of a solution containing 4.0 g solute (molar mass =

246 ) per litre at  $27^{\circ}C$  is :  $R = 0.0821 \text{ atm} \cdot \text{mol}^{-1} \cdot \text{K}$

$\text{mol}^{-1} \cdot \text{K}$ )

A. 0.1 atm

B. 0.4 atm

C. 0.2 atm

D. 0.8 atm

**Answer: C**



**Watch Video Solution**

**176.** The vapour pressure of benzene at  $80^{\circ}C$  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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177. The mole fraction of water in a solution containing 50 g of water and 50 g of ethyl alcohol is:

A.  $50/(50+50)$

B.  $18/(18+46)$

C.  $1.09/(1.09+2.78)$

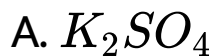
D.  $2.78/(1.09+2.78)$

**Answer: D**

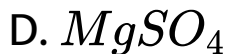


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178. Which compound corresponds van.t Hoff factor (i) to be equal to 2 in dilute solution?



C. Sugar



**Answer: D**



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**179.** 6 g urea is dissolved in 90 g water. The relative lowering of vapour pressure is equal to:

A. 0.0196

B. 0.06

C. 1.1

D. 0.02

**Answer: A**



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**180.** What is the molality of ethyl alcohol (mol. Wt. = 46) in aqueous solution which freezes at  $-10^{\circ}C$ : ( $K_f$  for water =  $1.86\text{ K molality}^{-1}$ )

A. 3.54

B. 4.567

C. 5.376

D. 6.315

**Answer: C**



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**181.** The vapour pressure of benzene at  $90^{\circ}C$  is 1020 torr. A solution of 5 g of a solute in 58.5 g benzene has vapour pressure 990 torr. The molecular weight of the solute is:

A. 78.2

B. 178.2

C. 206.2

D. 220

**Answer: D**



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**182.** The vapour pressures of ethanol and methanol are 42.0 mm and 88.5 mm Hg respectively. An ideal solution is formed at the same temperature by mixing 46.0 g of ethanol with 16.0 g 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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**183.**  $Y$  g of non-volatile organic substance of molecular mass  $M$  is dissolved in 250 g benzene. Molal elevation constant of benzene is  $K_b$ . Elevation in its boiling point is given by:

A.  $\frac{M}{K_b Y}$

B.  $\frac{4K_{By}}{M}$

C.  $\frac{K_b Y}{4M}$

D.  $\frac{K_b Y}{M}$

**Answer: B**



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**184.** The values of observed and calculated molecular weights of silver nitrate are 92.64 and 170 respectively. The degree of dissociation of silver nitrate is:

A. 60 %

B. 83.5 %

C. 46.7 %

D. 60.23 %

**Answer: B**



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**185.** One molar solution of sodium chloride will have the relative lowering of vapour pressure closest to:

- A. 5.8 % (wt//vol.) urea solution
- B. 5.8 % (wt//vol.) glucose solution
- C. 1.0 M glucose solution
- D. 2.0 M urea solution

**Answer: D**



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**186.** At  $88^{\circ}C$  benzene has a vapour pressure of 900 torr and toluene has a vapour pressure of 360 torr. What is the mole fraction of

benzene in the mixture with toluene that will boil at  $88^{\circ}\text{C}$  at 1 atm pressure, benzene toluene form an ideal solution:

A. 0.416

B. 0.588

C. 0.688

D. 0.74

**Answer: D**



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**187.** The amount of urea to be dissolved in 500mL of water ( $K=18.6 \text{ K mol}^{-1} 100 \text{ g solvent}$ ) to produce a depression of  $0.186^\circ \text{C}$  in freezing point is:

A. 0.3 g

B. 3 g

C. 6 g

D. 9 g

**Answer: B**



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**188.** The molal boiling point constant of water is  $0.53^{\circ}C$ . When 2 mole of glucose are dissolved in 4000 g of water, the solution will boil at:

A.  $100.53^{\circ}C$

B.  $101.06^{\circ}C$

C.  $100.265^{\circ}C$

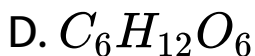
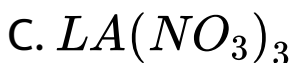
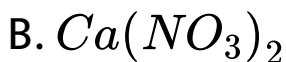
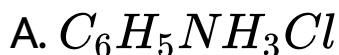
D.  $99.47^{\circ}C$

**Answer: C**



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**189.** The freezing point of equimolal aqueous solution will be highest for:



**Answer: D**



**190.** A solution containing 500 g of a protein per litre is isotonic with a solution containing 3.42 g of sucrose per litre. The molecular mass of protein is:

- A. 5
- B. 146
- C. 34200
- D. 50000

**Answer: D**



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**191.** The molecular weight of NaCl determined by studying freezing point depression of its 0.5% aqueous solution is 30. The apparent degree of dissociation of NaCl is:

A. 0.95

B. 0.5

C. 0.6

D. 0.3

**Answer: A**



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**192.** The osmotic pressure of a solution at  $0^{\circ} C$  is 2 atm. What will be its osmotic pressure at  $273^{\circ} C$  under similar conditions:

A. 0.5 atm

B.  $2 \times 273$  atm

C. 4 atm

D.  $273/2$  atm

**Answer: C**



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**193.** The relative lowering of vapour pressure produced by dissolving 71.5 g of a substance in 1000 g of water is 0.00713. The molecular weight of the substance will be:

A. 180

B. 18

C. 342

D. 60

**Answer: A**



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**194.** The vapour pressure of two pure liquids (A) and (B) are 100 and 80 torr respectively. The total pressure of solution obtained by

mixing 2 mole of (A) and 3 mole of (B) would be:

A. 120 torr

B. 36 torr

C. 88 torr

D. 180 torr

**Answer: C**



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**195.** A solution containing 4 g of polyvinyl chloride in 1 litre of dioxane was found to have an osmotic pressure of  $6 \times 10^{-4}$  atm at 300 K. The molecular mass of the polymer is:

A.  $3 \times 10^3$

B.  $1.6 \times 10^5$

C.  $5 \times 10^4$

D.  $6.4 \times 10^2$

**Answer: B**



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**196.** The depression in f.pt of 0.01 m aqueous solution of urea, sodium chloride and sodium sulphate is in the ratio:

A. 1 : 1 : 1

B. 1 : 2 : 3

C. 1 : 2 : 4

D. 2 : 2 : 3

**Answer: B**





**197.** The values of observed and calculated molecular weights of calcium nitrate are respectively 65.6 and 164 . The degree of dissociation of calcium nitrate will be:

A. 25 %

B. 50 %

C. 75 %

D. 60 %

**Answer: C**



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

- A. 5.8 % (wt/vot.) sucrose solution
- B. 5.8 % (wt/vot.) glucose solution
- C. 2 molal sucrose solution
- D. 1 molal glucose solution

**Answer: C**



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**199.** 20 g of a binary electrolyte (mol. Wt. = 100) are dissolved in 500 g of water. The freezing point of the solution is  $-0.74^{\circ}C$ ,  $K = 1.86 \text{ k molality}^{-1}$ . The degree of ionization of the electrolyte is:

A. 50 %

B. 75 %

C. 100 %

D. Zero

**Answer: D**



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**200.** The relationship between osmotic pressure at 273 K when 10 g glucose ( $P_1$ ), 10 g urea ( $P_2$ ) and 10 g sucrose ( $P_3$ ) are dissolved in 250 ml 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**



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**201.** van.t Hoff factor of very dilute solution of

$Ca(NO_3)_2$  is:

A. 1

B. 2

C. 3

D. 4

**Answer: C**



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**202.** Lowering in vapour pressure is the highest for:



A. 0.2 m Urea

B. 0.1 m Glucose

C.  $0.1mMgSO_4$

D. 0.1 m  $BaCl_2$

**Answer: D**



**Watch Video Solution**

**203.** Azeotropic mixture of HCl and water has:

A. 84 % HCl

B. 22.4 % HCl

C. 63 % HCl

D. 20.2 % HCl

**Answer: D**



**Watch Video Solution**

**204.** What will be the molality of a solution having 18g glucose (m.wt. = 180) dissolved in 500 g of water:

A. 1 m

B. 0.5 m

C. 0.2 m

D. 2 m

**Answer: C**



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**205.** Which of the following will have the highest boiling point at 1 atm pressure:

A. 0.1 M NaCl

B. 0.1 M Sucrose

C. 0.1 M  $BaCl_2$

D. 0.1 M Glucose

**Answer: C**



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**206.** An ideal solution was obtained by mixing methanol and ethanol. If the partial vapour pressure of methanol and ethanol are

$2.619K P_a$  and  $4.556K P_a$  respectively, the composition of vapour ( in terms of mole fraction) will be:

A. 0.625 MeOH, 0.365 EtOH

B. 0.365 MeOH, 0.635 EtOH

C. 0.574 MeOH, 0.326 EtOH

D. 0.173 MeOH, 0.827 EtOH

**Answer: B**



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207. An aqueous solution freezes at  $-0.186^{\circ}\text{C}$  ( $K_f = 1.86^{\circ} : K_b = 0.512^{\circ}$ ). What is the elevation in boiling point:

A. 0.186

B. 0.512

C.  $0.512/1.86$

D. 0.0512

**Answer: D**



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

A. 0.8

B. 0.6

C. 0.4

D. 0.2

**Answer: B**



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**209.** Molal depression constant for water is  $1.86^{\circ}C$ . The freezing point of a 0.05 molal solution of a non electrolyte in water is:

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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**210.** The freezing point of a solution prepared from 1.25 g of non-electrolyte and 20 g of water is 271.9 K. If molar depression constant is  $1.86 \text{ K mol}^{-1}$  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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**211.** A 5% solution of cane sugar (M. wt = 342) is isotonic with 1% solution of substance X.

The molecular weight of X is:

A. 171.2

B. 68.4

C. 34.2

D. 136.2

**Answer: B**



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**212.** The amount of ice that will separate out on cooling a solution containing 50 g of ethylene glycol in 200 g water to  $-9.3^{\circ}C$  is:

$$(K_f = 1.86Kmolality^{-1})$$

A. 38.71 g

B. 37.71 mg

C. 42 g

D. 42 mg

**Answer: A**



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**213.** A 0.2 molal aqueous solution of a weak acid (HX) is 20 percent ionised. The freezing

point of this solution is: ( $K_f = 1.86 \text{ K/m}$  for water)

A.  $-0.45^\circ \text{C}$

B.  $-0.90^\circ \text{C}$

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

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

**Answer: A**



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214. The following aqueous solution in the correct order of decreasing freezing points is:

A.  $0.2M BaCl_2$ ,  $0.2M KCl$ ,  $0.1M Na_2SO_4$

B.  $0.2M KCl$ ,  $0.1M Na_2SO_4$ ,  $0.2M BaCl_2$

C.  $0.1M Na_2SO_4$ ,  $0.2M KCl$ ,  $0.2M BaCl_2$

D.  $0.1M Na_2SO_4$ ,  $0.2M BaCl_2$ ,  $0.2M KCl$

**Answer: C**



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

A.  $4.8 \times 10^5$

B.  $9 \times 10^5$

C.  $3 \times 10^5$

D.  $5.16 \times 10^6$

**Answer: D**



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**216.** At  $40^\circ C$  the vapour pressures in torr, of methyl alcohol ethyl alcohol solutions is represented by the equation.

$P = 119X_A + 135$ , where  $X_A$  is mole-fraction of methyl alcohol, then the value of

$$\lim_{X_A \rightarrow 1} \frac{P_A}{X_A} \text{ is:}$$

A. 254 torr



B. 135 torr

C. 119 torr

D. 140 torr

**Answer: A**



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**217.** The boiling point of an aqueous solution of a nonvolatile solute is  $100.15^{\circ}C$ . What is the freezing point of an aqueous solution obtained by diluting the above solution with

an equal volume of water? The value of  $K_b$  and  $K_f$  for water are  $0.512^\circ C$  and  $1.86^\circ C$  K *molality*<sup>-1</sup>:

A.  $-0.544^\circ C$

B.  $-0.512^\circ C$

C.  $-0.272^\circ C$

D.  $-1.86^\circ C$

**Answer: C**



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**218.** The freezing point of aqueous solution that contains 5 % by mass urea, 1.0 % by mass KCl and 10 % by mass of glucose is: ( $K_f H_2O = 1.86 K molality^{-1}$ ):

A. 290.2 K

B. 285.5 K

C. 269.93 K

D. 250 K

**Answer: C**



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**219.** A solution of protein (extracted from crabs) was prepared by dissolving 0.75 g in 125  $\text{cm}^3$  of an aqueous solution. At  $4^\circ\text{C}$  an osmotic pressure rise of 2.6 mm of the solution was observed. Then molecular weight of protein is (Assume density of solution is  $1.00 \frac{\text{g}}{\text{cm}^3}$ ):

A.  $9.4 \times 10^5$

B.  $5.4 \times 10^5$

C.  $5.4 \times 10^{10}$

$$D. 9.4 \times 10^{10}$$

**Answer: B**



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**220.** A substance is completely trimerised on dissolution in a solvent. The van.t Hoff factor (i) for such change is:

A. 1

B. 2

C. 3

D.  $\frac{1}{3}$

**Answer: D**



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**221.** van.t Hoff factor for a dilute solution of sodium argento cyanide is:

A. 2

B. 0.25

C. 0.5

D. 3

**Answer: A**



**Watch Video Solution**

**222.** At  $40^{\circ}C$ , the vapour pressures (in torr) of methyl alcohol (A) and ethyl alcohol (B) solution is represented by:

$P = 120X_A + 138$ , where  $X_A$  is mole-

fraction of methyl alcohol, then the value of

$$\lim_{X_A \rightarrow 0} \frac{P_B^\circ}{X_B} \text{ and } \lim_{X_B \rightarrow 0} \frac{P_A^\circ}{X_A} \text{ are:}$$

A. 138, 258

B. 258, 138

C. 120, 138

D. 138, 125

**Answer: A**



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**223.** The use of common salts, e.g., NaCl or  $CaCl_2$  anhydrous is made to clear snow on the roads. This causes:

A. A lowering in f.pt. of water

B. A lowering in m.pt. of ice

C. Ice melts at the temperature of atmosphere present at that time

D. All

**Answer: D**





**224.** 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**



**Watch Video Solution**

225. In which of the following molecular weight determination methods, sensitivity of the measurements decreases as the molecular weight of the solute increases ?

A. Elevation of boiling point/depression in  
f.pt.

B. Viscosity

C. Osmotic pressure

D. None

**Answer: A**



**Watch Video Solution**

**226.** Who was awarded Nobel Prize for chemistry in 1901 for discovering laws of osmotic pressure for solutions ?

A. van't Hoff

B. Pauling

C. Berkeley

D. Seaberg

**Answer: A**



**Watch Video Solution**

**227.** When crystal of the solute is introduced into a super saturated solution of the solute:

- A. The solute dissolves
- B. The excess solute crystallises out
- C. The solution becomes unsaturated
- D. The solution remains super saturated

**Answer: B**



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**228.** Vapour pressure of a solution containing non-volatile solute is:

- A. More than the vapour pressure of a solvent
- B. Less than the vapour pressure of solvent
- C. Equal to the vapour pressure of solvent
- D. None

**Answer: B**



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**229.** The relative lowering of vapour pressure is equal to the mole fraction of the non-volatile solute. This statement was given by:

A. Raoult

B. Henry

C. Joule

D. Dalton

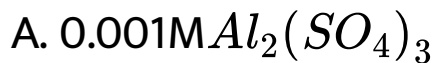
**Answer: A**



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230. which of the following will have highest osmotic pressure:



D. glucose

**Answer: A**



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**231.** When a solution is separated from a solvent by semipermeable membrane, then phenomenon taking place is called as:

- A. Osmosis
- B. Diffusion
- C. Solubility
- D. None

**Answer: A**



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**232.** When a substance is dissolved in a solvent, the vapour pressure of solvent decreases. This brings:

- A. An increase in b.pt. of the solution
- B. A decrease in b.pt. of a solution
- C. An increase in f.pt. of the solvent
- D. None

**Answer: A**



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**233.** If a thin slice of sugar beet is placed in concentrated solution of NaCl then:

- A. Sugar beet will lose water from its cells
- B. Sugar beet will absorb water from solution
- C. Sugar beet will neither absorb nor lose water
- D. Sugar beet will dissolve in solution

**Answer: A**



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234. The temperature at which vapour pressure of a solvent in its liquid and solid phase becomes same is called:

A. b.pt.

B. f.pt.

C. Krafft point

D. None

**Answer: B**



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**235.** As a result of osmosis, the volume of the concentrated solution:

- A. Gradually decreases
- B. Gradually increases
- C. Suddenly increases
- D. None

**Answer: B**



**236.** The osmotic, pressure of a solution can be accurately measure in the shortest possible time by:

- A. Berkrley and Hartley method
- B. Morse and Frazer method
- C. Pfeffer method
- D. None

**Answer: A**



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**237.** Dissolution of a solute is an exothermic process if:

A. Hydration energy  $>$  Lattice energy

B. Hydration energy  $<$  Lattice energy

C. Hydration energy = Lattice energy

D. None

**Answer: A**



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**238.** The boiling point of an azeotropic mixture of water and ethyl alcohol is less than that of theoretical value of water and alcohol mixture.

Hence the mixture shows:

- A. That solution is highly saturated
- B. Positive deviation from Raouls law
- C. Negative deviation from Raoul. law
- D. Nothing can be said

**Answer: B**



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**239.** Which solution would exhibit abnormal osmotic pressure ?

- A. Aqueous solution of urea
- B. Aqueous solution of common salt
- C. Aqueous solution of glucose
- D. Aqueous solution of sucrose

**Answer: B**



240. Van't Hoff factor(i):

A. Is Less than one in case of dissociation

B. Is more than one in case of association

C.  $i = \frac{\text{normal molecular mass}}{\text{observed molecular mass}}$

D.  $i = \frac{\text{observed molecular mass}}{\text{normal molecular mass}}$

**Answer: C**



Watch Video Solution

**241.** Acetic acid on dissolution in benzene will show:

- A. Two times of its normal molecular weight
- B. Its normal molecular weight
- C. Half of its normal molecular weight
- D. None

**Answer: A**



**Watch Video Solution**

**242.** Which salt shows maximum osmotic pressure in its 1 M solution ?

A. NaCl

B.  $Na_2SO_4$

C.  $(NH_4)_3PO_4$

D.  $MgCl_2$

**Answer: C**



**Watch Video Solution**

**243.** Solutions distilled without change in composition at a temperature are called:

- A. Atmorphous
- B. Azeotropic mixture
- C. Ideal solution
- D. Super saturated solution

**Answer: B**



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**244.** To form a super saturated solution of salt one must:

- A. Cool slowly
- B. Cool rapidly
- C. Add some salt to cold solution
- D. Use a clear vessel

**Answer: B**



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**245.** By adding water to the solution, its:

- A. Concentration remains same
- B. Concentration increase
- C. Ionisation decreases
- D. Concentration decreases

**Answer: D**





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**246.** The elevation in boiling point for one molal solution of a solute in a solvent is called:

- A. Cryoscopic constant
- B. Boiling point constant
- C. Molal Elevation constant
- D. None

**Answer: C**



247. Boiling point of a solution is independent of

- A. Amount of solution
- B. Pressure
- C. Nature of solvent
- D. Concentration of solution

**Answer: A**



248. Which solution will show maximum elevation in b.pts:

A. 0.1 M KCl

B. 0.1 M  $BaCl_2$

C. 0.1 M  $FeCl_3$

D. 0.1 M  $Fe_2(SO_4)_3$

**Answer: D**



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**249.** The solution which show positive or negative deviation from Raoult's law are called:

- A. Ideal solutions
- B. True solutions
- C. Non-ideal solutions
- D. Colloidal solutions

**Answer: C**



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**250.** Which involves osmosis ?

A. Crenation

B. Plasmolysis

C. Haemolysis

D. All

**Answer: D**



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251. On mixing 10 mL of acetone with 40 ml of chloroform, the total volume of the solution is:

A.  $< 50\text{ml}$

B.  $> 50\text{ml}$

C.  $= 50\text{mL}$

D. Cannot be predicted

**Answer: A**



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**252.** Solubility of solutes which dissolve with the liberation of heat decreases with:

- A. Decrease in temperature
- B. Increase in temperature
- C. No change in temperature
- D. None

**Answer: B**



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**253.** Two solutions have different osmotic pressures. The solution of lower osmotic pressure is called:

- A. Isotonic solution
- B. Hypertonic solution
- C. Hypotonic solution
- D. None

**Answer: C**



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**254.** At high altitudes the boiling point of water decreases because:

- A. Atmospheric pressure is low
- B. Temperature is low
- C. Atmospheric pressure is high
- D. None

**Answer: A**



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255. The vapour pressure of a solution is proportional to:

- A. Mole fraction of solute
- B.  $1/(\text{mole fraction of solute})$
- C. Mole fraction of solvent
- D. None

**Answer: C**



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**256.** The pressure under which liquid and its vapour can coexist in equilibrium is known as:

- A. Normal vapour pressure
- B. Saturated vapour pressure
- C. Read vapour pressure
- D. Limiting vapour pressure

**Answer: B**



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257. The relative lowering of vapour pressure in case of dilute solutions is directly proportional to :

A. Molality

B. Molarity

C. Mole fraction

D. All

**Answer: D**



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258. The substances whose solubility decreases with increase in temperature :

A. NaOH

B.  $Na_2CO_3$

C.  $Na_2SO_4$

D. All

**Answer: D**



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**259.** In two solution having different osmotic pressure, the solution of higher osmotic pressure is called :

- A. Isotonic solution
- B. Hypertonic solution
- C. Hypotonic solution
- D. None

**Answer: B**



**Watch Video Solution**

**260.** On mixing 10 mL of carbon tetrachloride with 10 mL of benzene the total volume of the solution is:

A.  $> 20\text{mL}$

B.  $< 20\text{mL}$

C.  $= 20\text{mL}$

D. Cannot be predicted

**Answer: C**



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261. The factor  $\frac{\Delta T_f}{K_f}$  Represents :

A. Molarity

B. Formality

C. Normality

D. Molality

**Answer: D**



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**262.** A teacher one day pointed out to his students the peculiar fact that water is unique liquid which freezes exactly at  $0^{\circ}C$  and boils exactly at  $100^{\circ}C$ . He asked the students to find the correct statement based on this fact :

A. Water dissolves anything however sparingly the dissolution may be

B. Water is a polar molecule

C. Boiling and freezing temperature of water were used to define a temperature

scale

D. Liquid water is denser than ice

**Answer: C**



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**263.** When an ideal binary solution is in equilibrium with its vapour, molar ratio of the two components in the solution and in the vapour phase is:

A. Same

B. Different

C. May or may not be same depending upon volatile nature of the two components

D. All

**Answer: C**



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**264.** The osmotic pressure of a dilute solution is directly proportional to the:

A. Diffusion rate of the solute

B. Ionic concentration

C. Boiling point

D. Flow of solvent from a concentrated solution

**Answer: B**



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**265.** If Raoult's law is obeyed, the vapour pressure of the solution is directly proportional to:

- A. Mole fraction of solvent
- B. Mole fraction of the solute
- C. Mole fraction of the solvent and solute
- D. The volume of the solution

**Answer: A**



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**266.** Boiling point of water is defined as the temperature at which:

A. Vapour pressure of water is equal to that on one atmospheric pressure

B. Bubbles are formed

C. Steam comes out

D. None

**Answer: A**



**267.** The melting points of most of the solid substances increase with an increase of pressure acting on them. However, ice melts at a temperature lower than its usual melting point, when the pressure increases. This is because:

- A. Ice is less denser than water
- B. Pressure generates heat
- C. The bonds break under pressure

D. Ice is not a true solid

**Answer: A**



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**268.** The freezing point of 1% aqueous solution of calcium nitrate will be:

A.  $0^{\circ}C$

B. Above  $0^{\circ}C$

C.  $1^{\circ}C$



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

**Answer: D**



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**269.** The solubility of a gas in liquid at a temperature is directly proportional to its:

A. Density

B. Melting point

C. Boiling point

## D. Pressure

**Answer: D**



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**270.** An example of a solution having liquid in gas is:

A. Moist air

B. Dry air

C. Au-Hg



**Answer: A**



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**271.** Camphor is used as solvent to determine molecular weight of non-volatile solute by Rast method because. For camphor:

A. Being cheap

B. High m.pt.

C. Molal depression constant is high

D. None

**Answer: C**



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**272.** The vapour pressure of water depends upon:

A. Surface area of container

B. Volume of container

C. Temperature

D. All

**Answer: C**



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**273.** A perfectly semipermeable membrane when used to separate a solution from its solvent permits through it the passage of :

A. Solute only

B. Solvent only

C. BOTH (A) AND (B)

D. None

**Answer: B**



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**274.** At low concentrations, the statement that equimolal solutions under a given set of experimental conditions have equal osmotic pressures is true for :

A. All solutions

B. Solutions of non-electrolytes which  
neither dissociates nor associates

C. Solutions of electrolytes only

D. None

**Answer: B**



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275. 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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**276.** Blood cells retain their normal shapes in solutions which are :

- A. Isotonic to blood
- B. Hypotonic to blood
- C. Hypertonic to blood
- D. Isoelectronic to blood

**Answer: A**



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277. As a result of osmosis the volume of solution:

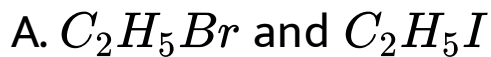
- A. Remains constant
- B. Increases
- C. Decreases
- D. Increases or decreases

**Answer: D**



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278. Each pair forms ideal solution except:



**Answer: D**



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279. The osmotic pressure (P) of a solution is given by relation:

A.  $P = \frac{RT}{C}$

B.  $P = \frac{CT}{R}$

C.  $P = \frac{RC}{T}$

D.  $\frac{P}{C} = RT$

**Answer: D**



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**280.** Which statement is incorrect about osmotic pressure (P), volume (V) and temperature (T) ?

A.  $P \propto 1/V$  if T is constant

B.  $P \propto T$ , if V is constant

C.  $P \propto V$ , if T is constant

D. PV is constant, if T is constant

**Answer: C**



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**281.** Solute when dissolved in water:

- A. Decreases the vapour pressure of water
- B. Increases the boiling point of water
- C. Decreases the freezing point of water
- D. All of the above

**Answer: D**



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**282.** The van.t Hoff factor of NaCl assuming 100 % dissociation is :

A.  $1/2$

B. 2

C. 1

D. 3

**Answer: B**



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**283.** The molal elevation/depression constant depends upon :

A. Nature of solvent

B. Nature of solute

C. Temperature

D.  $\Delta H$  solution

**Answer: A**



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**284.** An aqueous solution of methanol on water has vapour pressure:

- A. Equal to that of water
- B. Equal to that of methanol
- C. More than that of water
- D. Less than that of water

**Answer: C**



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285. The depression in freezing point is maximum if .....is used as solvent .

A. Camphor

B. Naphthalene

C. Benzene

D. Water

**Answer: A**



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**286.** When mercuric iodide is added to the aqueous solution of potassium iodide the:

- A. Freezing point is raised
- B. Freezing point is lowered
- C. Freezing point does not change
- D. Boiling point does not change

**Answer: A**



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**287.** The osmotic pressure of a dilute solution is given by :

A.  $P = P_0 \times N_1$

B.  $\pi V = nRT$

C.  $\Delta P = P_0 N_2$

D.  $\frac{\Delta P}{P_0} = \frac{P_0 - P_s}{P_o}$

**Answer: B**



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**288.** For a dilute solution , Raoult.s law states that:

- A. The lowering of vapour pressure is equal to the mole fraction of solute
- B. The relative lowering of vapour pressure is equal to the mole fraction of solute
- C. The relative lowering of vapour pressure is proportional to the amount of solute in solution

D. The vapour pressure of the solution is equal to the mole fraction of solvent

**Answer: B**



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**289.** Which of the following is not a colligative property.

A. Lowering of vapour pressure

B. Freezing point

C. Osmotic pressure

D. Elevation of boiling point

**Answer: B**



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**290.** Blood has been found to be isotonic with

:

A. Normal saline solution

B. Saturated NaCl solution

C. Saturated KCl solution

D. Saturated solution of a 1 : 1 mixture of  
NaCl and KCl

**Answer: A**



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**291.** Which condition is not satisfied by an ideal solution:

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



B.  $\Delta V$  mixing = 0

C.  $\Delta S$  mixing = 0

D. Obedience of Raoult's law

**Answer: C**



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**292.** Isotonic solutions are those which have the:

A. Same osmotic pressure

B. Same molarity

C. Same density

D. Same normality

**Answer: A**



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**293.** The correct relationship between the boiling points of very dilute solution of  $AlCl_3(t_1)$  and  $CaCl_2(t_2)$ , having the same molar concentration, as :

A.  $t_1 = t_2$

B.  $t_1 > t_2$

C.  $t_2 > t_1$

D.  $t_2 \geq t_1$

**Answer: B**



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**294.** Two solutions of  $KNO_3$  and  $CH_3COOH$  are prepared separately. Molarity of both is 0.1 M and osmotic pressures 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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**295.** What will be the molecular weight of NaCl determined experimentally following elevation in the boiling point or depression in freezing point method ?

A.  $< 58.5$

B.  $> 58.5$

C.  $= 58.5$

D. None of these

**Answer: A**



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**296.** At a given temperature if  $P$  is the vapour pressure of a solution and  $P_0$  that of its pure solvent, the relative lowering of vapour pressure of the solution is given by :

A.  $\frac{P_0 - P}{P_0}$

B.  $\frac{P - P_0}{P_0}$

C.  $\frac{P_0}{P}$

D.  $\frac{P}{P_0}$

**Answer: A**



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**297.** The lowering of vapour pressure of a solvent by the addition of a non-volatile solute to it , is directly proportional to :

- A. The strength of the solution
- B. The nature of the solute in the solution
- C. The atmospheric pressure
- D. All

**Answer: A**



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**298.** A thermometer which can be used only accurate measurement of small differences in temperature is know as a :

- A. Beckmann.s thermometer
- B. Contact thermometer
- C. Clinical thermometer
- D. Platinum resistance thermometer



**Answer: A**



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**299.** Boiling point elevation is :

- A. Additive property
- B. Constitutive property
- C. Colligative property
- D. Partly additive and partly constitutive

**Answer: C**



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**300.** The experimental molecular weight of an electrolyte will always be less than its calculated value because the value of vant Hoff factor, 'i' is :

- A. Less than one
- B. Greater than one
- C. One
- D. Zero

**Answer: B**



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**301.** An example of colligative property is :

- A. Freezing point
- B. Boiling point
- C. Vapour pressure
- D. Osmotic pressure

**Answer: D**



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**302.** A mixture of benzene and toluene forms :

- A. An ideal solution
- B. Non-ideal solution
- C. Suspension
- D. Emulsion

**Answer: A**



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**303.** The colligative properties of a solution depend on :

- A. Number of solute particles present in it
- B. Chemical nature of the solute particles present in it
- C. Nature of the solvent used
- D. None

**Answer: A**



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**304.** Which of the following methods can not be used to determine the molecular weight of non-volatile solute?

- A. Victor Meyer's method
- B. Osmotic pressure method
- C. Cryoscopic method
- D. Ebullioscopic method

**Answer: A**



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305. If  $P_0$  and  $P_s$  are the vapour pressure of solvent and solution respectively and  $N_1$  and  $N_2$  are the mole of solute and solvent then:

A.  $P_s = P_0 n_1$

B.  $P_s = P_0 n_2$

C.  $P_0 = P_s n_2$

D.  $P_s = P_0 \frac{n_1}{n_2 + n_1}$

**Answer: A**



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**306.** Osmosis is the spontaneous flow through a semipermeable membrane of :

A. A less concentrated solution into more in to more concentrated solution

B. The Solvent from a solution of lower concentration to one of higher concentration



C. Solute particles from a solution of higher concentration to one of lower concentration

D. None

**Answer: B**



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**307.** The vapour pressure of a dilute solution of a solute is not influenced by :

A. Temperature of solution

B. Melting point of solute

C. Mole fraction of solute

D. Degree of dissociation of solute

**Answer: B**



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**308.** The vapour pressure (VP) of a dilute solution of non-volatile solute is  $P$  and the VP of pure solvent is  $P_0$  the lowering of the VP is :

A.  $+ve$

B.  $-ve$

C.  $\frac{P}{P_0}$

D.  $\frac{P_0}{P}$

**Answer: A**



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**309.** The highest temperature at which vapour pressure of a liquid can be measured is :

A. B.pt. of liquid

B. Critical temperature (T)

C. Critical solution temperature

D. Inversion temperature

**Answer: B**



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**310.** 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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**311.** 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 was removed

B. Same as what would be if the glass plate was removed

C. Less than what would be if the glass plate was removed

D. Cannot be predicted

**Answer: B**



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**312.** The molecular weight of benzoic acid as determined by depression in freezing point method corresponds to :

A. Ionization of benzoic acid

B. Dimerization of benzoic acid

C. Trimerization of benzoic acid

D. Solvation of benzoic acid

**Answer: B**



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**313.** The elevation of boiling point method is used for the determination of molecular weight of :

A. Non-volatile and soluble solute



B. Non-volatile and insoluble solute

C. Volatile and soluble solute

D. Volatile and insoluble solute

**Answer: A**



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**314.** Sodium sulphate is soluble in water whereas barium sulphate is sparingly soluble because:

- A. The hydration energy of sodium sulphate is more than its lattice energy
- B. The lattice energy of barium sulphate is less than the hydration energy
- C. The lattice energy has no role to play in solubility
- D. The hydration energy of sodium sulphate is less than its lattice energy

**Answer: A**



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**315.** Which solute can form saturated solutions in water ?

A. Sodium acetate

B. Hypo

C. Glauber's salt

D. All

**Answer: D**



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**316.** Two solutions A and B are separated by semipermeable membrane . If liquid flows from A and B then :

A. A is more concentrated than B

B. A is less concentrated than B

C. Both solutions have some concentration

D. None

**Answer: B**



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**317.** Molal elevation constant of a liquid is :

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

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

C. Elevation in b.pt. which would be produced by dissolving 1 mole of solute

in 1000 g of solvent

D. None

**Answer: C**



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**318.** One mole each of urea, glucose and sodium chloride were dissolved in one litre of water . Equal osmotic pressure will be produced by solutions of :

- A. Urea and glucose
- B. Sodium chloride and urea
- C. Glucose and sodium chloride
- D. None

**Answer: A**



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**319.** The solubility of a solid in a liquid depends on :

A. Nature of solute

B. Nature of solvent

C. Temperature

D. All

**Answer: D**



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**320.** Alcohol has ..... Vapour pressure than water at the same temperature :



A. More

B. Less

C. Same

D. None

**Answer: A**



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**321.** The mixture of n-hexane and n-heptane is an example of :

A. Ideal solution

B. None-ideal solution

C. Dilute solution

D. Real solution

**Answer: A**



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**322. Define the term solution.**



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**323.** How many types of solutions are formed ?



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**324.** Name the types of solutions .



**Watch Video Solution**

**325.** Which law governs the dissolution of a gas in a liquid ?



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**326.** Between sea water and drinking water which will freeze at lower temperature?



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



[Watch Video Solution](#)

**328.** What is the effect of increase of pressure on the solubility of a gas in liquid ?



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**329.** In which type of liquid, an ionic solid will go into solution ?



**Watch Video Solution**

**330.** Name one factor which influences the solubility of a gas in a solvent .



**Watch Video Solution**

**331.** What is the effect of pressure on the boiling point of a liquid ?



**Watch Video Solution**

**332.** How does the boiling point of a liquid change with decrease in atmospheric pressure ?



**Watch Video Solution**

**333.** Between sea water and drinking water which will freeze at lower temperature?



**Watch Video Solution**

**334.** What is the melting point of ice at one atmospheric pressure in Kelvin scale ?



**Watch Video Solution**

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



**Watch Video Solution**



**336.** What is Van't Hoff equation for osmotic pressure ?



**Watch Video Solution**

**337.** How  $\Delta T_f$  is related with molality ?



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**338.** What is molal elevation constant of a solvent ?



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**339.** Among 1M solution of glucose , NaCl,  $FeCl_3$ ,  $CaCl_2$ , which one has the (a) highest boiling point (b) lowest boiling point ?



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**340.** What is an ideal solution ?



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**341.** What is a colligative property?



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**342.** Which of the following has higher vapour pressure at the same temperature ?

$CH_3OH$  ( $BP = 64.5^\circ C$ ) and

$C_2H_5OH$  ( $BP = 78.3^\circ C$ )



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**343.** When temperature increases vapour pressure of liquid –



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**344.** Solubility of a gas in liquid, \_\_\_\_\_ with rise of temperature .



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**345.** At the boiling point of a liquid its vapour pressure is equal to \_\_\_\_\_.



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**346.** Polar solutes are \_\_\_\_\_ in non-polar solvents .



**Watch Video Solution**

**347.** At the boiling point of a liquid its vapour pressure is equal to \_\_\_\_\_.



**Watch Video Solution**

**348.** The vapour pressure of liquid \_\_\_\_\_ with rise of temperature .



**Watch Video Solution**

**349.** Solutions having same osmotic pressure are called \_\_\_\_\_



**Watch Video Solution**

**350.** On adding a solute, freezing point of solution \_\_\_\_\_ .



**Watch Video Solution**

**351.** On adding a solute, boiling point of solution \_\_\_\_\_ .



**Watch Video Solution**

**352.** On adding a solute, osmotic pressure \_\_\_\_\_ .



**Watch Video Solution**

**353.** On adding a solute, vapour pressure \_\_\_\_\_ .





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**354.** With increase of altitude, the boiling point \_\_\_\_\_ of \_\_\_\_\_ water \_\_\_\_\_ (increase,decreases,remains same)



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**355.** Two solutions having same osmotic pressure are called \_\_\_\_\_ solution .



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**356.** On adding a solute, freezing point of solution \_\_\_\_\_ .



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**357.** Solubility of a gas in liquid, increases with rise of temperature .



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**358.** At the boiling point of liquid its vapour pressure is greater than atmospheric pressure . Is it true or false?



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**359.** The vapour pressure of liquid decreases with rise of temperature .(true/false)



**Watch Video Solution**

**360.** On adding a solute, vapour pressure increases .(true/false)



**Watch Video Solution**

**361.** State henry's law.



**Watch Video Solution**

**362.** Define mole fraction .



**Watch Video Solution**

**363.** Calculate the molarity when 73 grams of HCl is dissolved in water to make 1500 ml solution.



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**364.** What do you understand by osmotic pressure ?



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**365.** Define molality. 29.25 gms of NaCl are present in 529.25 gms of solution . Find out the molality .



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**366.** 5.85 g of NaCl is dissolved in 90 g water what is the mole fraction of NaCl ?



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**367.** What is the relationship between depression in freezing point of a solution and molecular mass of the solute ?



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**368.** Compare the osmotic pressures of the following two solution at the same temperature :

1 M Glucose solution

1M barium chloride solution .





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**369.** Arrange the following in increasing order of their vapour pressure at room temperature. (Water, salt solution in water, alcohol – water solution)



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**370.** How does the vapour pressure of a liquid change with intermolecular force of attraction ?





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**371.** In which type of liquid, an ionic solid will go into solution ?



[Watch Video Solution](#)

**372.** What type of change takes place when suger is dissolved in a cup of tea ?



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**373.** What is freezing point of a liquid ?



**Watch Video Solution**

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



**Watch Video Solution**

**375.** What is Osmotic pressure ?



**Watch Video Solution**

**376.** What is ebullioscopic constant ?



**Watch Video Solution**

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



**Watch Video Solution**

**378.** Define osmosis.





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**379.** 15 gm of a substance dissolved in 150 gms of water produces a depression of  $-1.2^{\circ}\text{C}$  in the freezing point . Calculation the Mol. Wt. of the solid (  $K_f$  for water is  $1.86\text{ K kg mol}^{-1}$  )



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**380.** What is the relationship between depression in freezing point of a solution and molecular mass of the solute ?



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**381.** Why is the boiling point of a solution always higher than that of a pure solvent ?



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**382.** How would you justify that the relative lowering in vapour pressure is a colligative property ?



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**383.** Define Van't Hoff laws of Osmotic pressure.



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**384.** Distinguish between diffusion and osmosis.



**Watch Video Solution**

**385.** Define Van't Hoff factor.



**Watch Video Solution**

**386.** State and explain Henry's law.



**Watch Video Solution**

**387.** Explain the terms, .Molality, Molarity and Molfractions ..



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**388.** How can you determine the molecular mass of a non-volatile solute from depression of freezing point ?



**Watch Video Solution**

**389.** How can you determine the molecular mass of a non-volatile solute from elevation of boiling point ?



**Watch Video Solution**



**390.** How can you determine the molecular mass of a non-volatile solute from depression of freezing point ?



**Watch Video Solution**

**391.** What is Osmotic pressure ? How will you determine the molecular mass of a substance by this method ?



**Watch Video Solution**

**392.** Explain Vant's Hoff's theory of dilute solution relating to osmotic pressure.



**Watch Video Solution**

**393.** Discuss abnormal molecular masses in terms of Vant Hoff factor.



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**394.** An example of solution is:

A. Amalgam

B. Brass

C. Na in  $NH_3$

D. Dust in air

**Answer: B**



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**395.** The process of osmosis was discovered by:

A. Pfeffer

B. Traube

C. Berkeley

D. Nollet

**Answer: D**



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**396.** Who proposed the concept that solute particles in solution behaves like gaseous molecules?

A. Boyle

B. van't Hoff

C. Nollet

D. Charles

**Answer: B**



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**397.** Osmotic pressure of non-aqueous solution is measured by:

A. Berkeley and Hartley method

B. Pfeffer's method

C. Morse and Frazer method

D. Townend's method

**Answer: D**



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**398.** Solubility of deliquescent substances in water is generally:

A. high

B. Low

C. Moderate

D. Can not be said

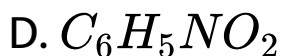
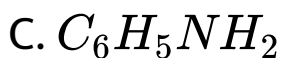
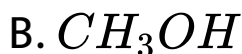
**Answer: A**



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**399.** The boiling point 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 will show highest vapour pressure at room temperature?



**Answer: B**



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400. Binary liquid solutions which exhibit positive deviations from Raoult's law boil at temperature.....than the expected boiling point.:

A. Lower

B. Higher

C. Same

D. Can not be said

**Answer: B**



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**401.** A pressure cooker reduces cooking time because:

A. Heat is more evenly distributed

B. B.pt.of water inside the cooker is increased

C. The high pressure tenderises the food

D. All

**Answer: B**



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**402.** Water will boil at  $101.5^{\circ}C$  at which of the following pressure:

- A. 76 m of Hg
- B. 76 mm of Hg
- C.  $>76$  cm of Hg
- D.  $<76$  cm of Hg

**Answer: C**



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**403.** Binary liquid solutions which exhibit positive deviations from Raoult's law boil at temperature.....than the expected boiling point.:

A. Lower

B. Higher

C. Same

D. can not be said

**Answer: A**



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**404.** Which solution will show the maximum vapour pressure at 300 K ?

A. 1 M NaCl

B. 1 M  $CaCl_2$

C. 1 M  $CH_3COOH$

D. 1 M  $C_{12}H_{22}O_{11}$

**Answer: D**



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**405.** The van't Hoff factor (i) for a dilute aqueous solution of glucose is:

A. Zero

B. 1

C. 1.5

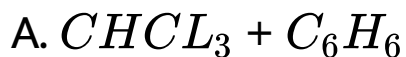
D. 2

**Answer: B**



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**406.** Which pair shows a contractions in volume on mixing ?



D. All

**Answer: D**



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**407.** If  $P_0$  and  $P_\delta$  are the vapour pressure of solvent and solution respectively and  $N_1$  and  $N_2$  are the mole of solute and solvent then:

A. 
$$\frac{P_0 - P_\delta}{P_0} = \frac{N_1}{N_1 + N_2}$$

B. 
$$\frac{P_0 - P_\delta}{P_\delta} = \frac{N_1}{N_2}$$

C. 
$$P_\delta = P_0 \cdot \frac{N_2}{N_1 + N_2}$$

D. All



**Answer: D**



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**408.** Which characterises the weak intermolecular forces of attraction in a liquid ?

- A. High boiling point
- B. High vapour pressure
- C. High critical temperature
- D. High heat of vaporisation

**Answer: B**



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**409.** The phenomenon in which cells are swelled up and then burst if placed in hypotonic solutions is called:

A. Plasmolysis

B. Haemolysis

C. Exosmosis

D. None

**Answer: B**



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**410.** The phenomenon in which cells are swelled up and then burst if placed in hypotonic solutions is called:

A. Plasmolysis

B. Haemolysis

C. Endosmosis

D. None

**Answer: A**



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**411.** Equimolal solutions will have the same elevation in boiling point, provided they do not show:

A. Electrolysis

B. Association

C. Dissociation

D. Association or dissociation

**Answer: D**



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**412.** The depression in freezing point is directly proportional to:

A. Normality

B. Molality

C. Molarity

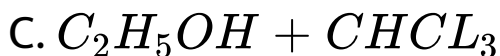
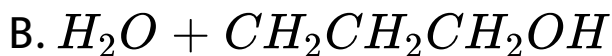
D. None

**Answer: B**



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**413.** Pick out the combination which show positive deviations from Raoult's law:



D. All are correct

**Answer: D**



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**414.** If mole fraction of the solvent in a solution decreases then:

- A. Vapour pressure of solution increases
- B. B.pt. decreases
- C. Osmotic pressure increases
- D. All are correct

**Answer: C**



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**415.** In which of the following the van.t Hoff Factor (i) is equal to one ?

A. NaCl

B.  $KNO_3$

C. Urea

D. All



**Answer: C**



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**416.** A maxima 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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**417.** When the vapour pressure of solutions of two liquids are less than those expected from ideal solutions, they are said to show:

A. Positive deviation from ideal behaviour

B. Negative deviation from ideal behaviour

C. Positive deviations for lower

concentrations and negative deviations

for higher concentration

D. None

**Answer: B**



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**418.** The natural semipermeable membrane is:

A. Gelatinous  $Cu_2Fe(CN)_6$

B. Gelatinous  $Ca_3(PO_4)_2$

C. Plant cell

D. Phenol layer

**Answer: C**



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**419.** The osmotic pressure of a solution increases if,

A. Temperature is lowered

B. Volume is increased

C. Number of solute molecules is increased

D. None

**Answer: C**



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**420.** Just after slow crystallisation the solution in contact with the crystal is:

A. Dilute

B. Unsaturated

C. Saturated

D. Super saturated

**Answer: D**



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**421.** The van't Hoff factor (i) for a dilute solution of  $K_3[Fe(CN)_6]$  is:

A. 10

B. 4

C. 5

D. 0.25

**Answer: B**



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**422.** Which of the following 0.1 M aqueous solutions will have the lowest freezing point :

A. Potassium sulphate

B. Sodium chloride

C. Urea

D. Glucose

**Answer: A**



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**423.** Which compound corresponds van.t Hoff factor (i) to be equal to 2 in dilute solution?



A.  $K_2SO_4$

B.  $NaHSO_4$

C. Sugar

D.  $MgSO_4$

**Answer: D**



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**424.** The plant cells will shrink when placed in

A. Water

B. A hypotonic solution

C. A hypertonic solution

D. An isotonic solution

**Answer: C**



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**425.** A solution of sulphuric acid in water exhibits:

A. Negative deviations from Raoult's law

B. Positive deviations from Raoult's law

C. Ideal properties

D. The applicability of Henry's law

**Answer: A**



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**426.** A substance will be deliquescent if its vapour pressure is:

A. Equal to the atmospheric pressure

B. Equal to that of water vapour in the air

C. Greater than that of water vapour in the  
air

D. Lesser than that of water vapour in the  
air

**Answer: D**



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

A. Osmosis

B. Filtration

C. Diffusion

D. Reverse Osmosis

**Answer: D**



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**428.** Saturated solution of NaCl on heating becomes:

- A. Super saturated
- B. Unsaturated
- C. Remains saturated
- D. None

**Answer: B**



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**429.** A super saturated solution is a metastable state of solution in which solute concentration:

A. Is equal to the solubility of that substance in water

B. Exceeds than its solubility

C. Less than its solubility

D. Continuously change

**Answer: B**





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**430.** The molal cryoscopic constant for water is:

A.  $1.86 \text{ K molality}^{-1}$

B.  $5.26 \text{ K molality}^{-1}$

C.  $55.5 \text{ K molality}^{-1}$

D.  $0.52 \text{ K molality}^{-1}$

**Answer: A**



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**431.** An aqueous solution is heated until it begins to boil. The atmospheric pressure is 760 mm of Hg. The boiling temperature will be:

A.  $100^{\circ}C$

B.  $> 100^{\circ}C$

C.  $< 100^{\circ}C$

D. None

**Answer: B**



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**432.** The spontaneous movement of solute particles from a more concentrated solution to less concentrated solution is called:

- A. Osmosis
- B. Diffusion
- C. Plasmolysis
- D. Fusion

**Answer: B**



**433.** At a suitable pressure near the freezing point of ice, there exists:

A. Only ice

B. Ice and water

C. Ice and steam

D. Ice, water and steam, all existing side by side

**Answer: D**



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**434.** A liquid is in equilibrium with its vapours at its boiling point. On the average the molecules in the two phases have equal:

- A. Potential energy
- B. Total energy
- C. Kinetic energy
- D. Intermolecular forces

**Answer: C**



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**435.** In the case of osmosis, solvent molecules move from:

A. Higher vapour pressure to lower vapour pressure

B. Higher concentration to lower concentration

C. Lower vapour pressure to higher vapour pressure

D. Higher osmotic pressure to lower osmotic pressure

**Answer: A**



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**436.** If molecular interaction between two different liquid molecules are stronger than the molecular interactions between the pure liquid molecules, the mixture is expected to show:

A. Positive deviations

B. Negative deviations

C. No Deviations

D. Positive as well as negative deviations

**Answer: B**



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**437.** The ratio of the value of any colligative property for KCl solution to that of sugar solution is:

A. 1

B. 0.5

C. 2

D. 4

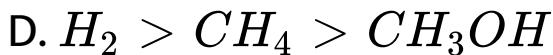
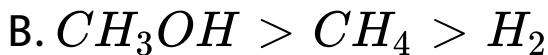
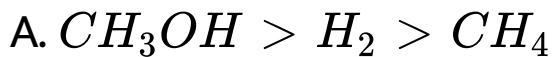
**Answer: C**



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**438.** One the basis of intermolecular forces predict the correct order of decreasing boiling to that of sugar solution is:





**Answer: B**



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**439.** If the temperature increases from  $0^\circ C$  to  $50^\circ C$  at atmospheric pressure, which of the

following processes is expected to take place more in case of liquids ?

A. Fusion

B. Vaporisation

C. Solubilization

D. None

**Answer: B**



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**440.** The reverse of fusion is freezing and it is:

A. Endothermic

B. Exothermic

C. Neither exothermic nor endothermic

D. May be exothermic or endothermic

**Answer: B**



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**441.** The most suitable method for the determination of molecular weight of oxyhaemoglobin, a compound of high molecular weight is:

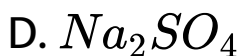
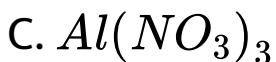
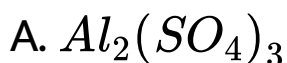
- A. Osmotic pressure method
- B. Vapour pressure lowering method
- C. Elevation of boiling point method
- D. None

**Answer: A**



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442. Which salt may show the same value of van't Hoff factor (i) as that of  $K_4Fe(CN)_6$  in very dilute solution state ?



**Answer: A**





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

- A. High vapour pressure
- B. Low vapour pressure
- C. High surface tension
- D. High density

**Answer: B**



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**444.** Generally those gases are soluble in water to a greater extent which:

- A. Are easily liquefied
- B. Are ionised in water
- C. React with water
- D. All are correct

**Answer: D**



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**445.** The energy that favours dissolution of a solute in water is known as:

- A. Hydration energy
- B. Lattice energy
- C. Ionisation energy
- D. Exothermic energy

**Answer: A**



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**446.** The energy that opposes the dissolution of a solute in a solvent is called:

- A. Solvent energy
- B. Hydration energy
- C. Lattice energy
- D. Ionisation energy

**Answer: C**



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**447.** For an ideal binary liquid solution with  $P_A^\circ > P_B^\circ$  which relation between  $X_A$  (mole fraction of A in liquid phase) and  $Y_A$  (mole fraction of A in vapour phase) is correct,  $X_B$  and  $Y_B$  are mole fraction of B in liquid and vapour phase respectively

A.  $X_A = Y_A$

B.  $X_A > Y_A$

C.  $\frac{X_A}{X_B} < \frac{Y_A}{Y_B}$

D.  $X_A, Y_A, X_B$  and  $Y_B$  cannot be correlated

**Answer: C**



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**448.** What is semipermeable membrane?

- A. Calcium phosphate (gelatinous)
- B. Phenol layer
- C. Copper ferrocyanide (gelatinous)
- D. All

**Answer: D**



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**449.** In cold countries, ethylene glycol is added to water in the radiators of cars during winters. It results in:

- A. Lowering in boiling point
- B. Reducing viscosity
- C. Reducing specific heat
- D. Lowering in freezing point

**Answer: D**



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**450.** Beckmann's thermometer are used to measures:

- A. Boiling point of the solution
- B. Freezing point of the solution
- C. Any temperature
- D. Elevation in boiling point or depression in freezing point

**Answer: D**



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**451.** Equimolal solutions of A and B show depression in freezing point in the ratio 2 : 1. A remains in its normal state in solutions. B will be in solution:

A. Normal

B. Dissociated

C. Associated

## D. Hydrolysed

**Answer: C**



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**452.** The vapour pressure of a solution of a non-volatile electrolyte (B) in a solvent (A) is 95 % of the vapour pressure of the solvent at the same temperature. If the molecular weight of the solvent is 0.3 times the molecular

weight of solute, the weight ratio of the solvent and solute are:

A. 0.12

B. 5.7

C. 0.2

D. 4

**Answer: B**



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453. The plots of  $\frac{1}{X_A}$  vs,  $\frac{1}{Y_A}$  (where  $X_A$  and  $Y_A$  are the mole fraction of liquid A in liquid and vapour phase respectively) is linear slope and intercepts respectively:

A.  $\frac{P_A^\circ}{P_B^\circ}$  and  $\frac{P_A^\circ - P_B^\circ}{P_B^\circ}$

B.  $\frac{P_A^\circ}{P_B^\circ}$  and  $\frac{P_B^\circ - P_A^\circ}{P_B^\circ}$

C.  $\frac{P_B^\circ}{P_A^\circ}$  and  $\frac{P_A^\circ - P_B^\circ}{P_B^\circ}$

D.  $P_B^\circ / P_A^\circ$  and  $\frac{P_B^\circ - P_A^\circ}{P_B^\circ}$

**Answer: B**



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454. Which aqueous solution has minimum freezing point ?

A. 01 M NaCl

B. 0.005 M  $C_2H_5OH$

C. 0.005 M  $MgCl_2$

D. 0.005 M  $MgSO_4$

**Answer: A**



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455. Which solution will have the highest boiling point ?

A. 1 % glucose in water

B. 1 % sucrose in water

C. 1 % NaCl in water

D. 1 %  $CaCl_2$  in water

**Answer: C**



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**456.** Which has maximum freezing point ?

A. 1 molar NaCl solution

B. 1 molar KCl solution

C. 1 molar  $\text{CaCl}_2$  solution

D. 1 molar urea solution

**Answer: C**



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457. Which solution will have least vapour pressure ?

A. 0.1 M  $BaCl_2$

B. 0.1 M urea

C. 0.1 M  $Na_2SO_4$

D. 0.1 M  $Na_2PO_4$

**Answer: D**



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**458.** The osmotic pressure of equimolar solutions of  $BaCl_2$ , NaCl and glucose follow the order:

A.  $BaCl_2$  gt NaCl gt glucose

B. Glucose gt NaCl gt  $BaCl_2$

C. NaCl gt  $BaCl_2$  gt glucose

D. NaCl gt glucose gt  $BaCl_2$

**Answer: A**



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**459.** The lowering of vapour pressure of 0.1M aqueous solutions of NaCl,  $CuSO_4$ , and  $K_2SO_4$  are:

- A. All equal
- B. In the ratio of 1 : 1 : 1.5
- C. In the ration of 3 : 2 : 1
- D. In the ration of 1.5 : 1 : 2.5

**Answer: B**



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**460.** Which has maximum freezing point ?

A. 1 molar of NaCl solution

B. 1 molar of KCl solution

C. 1 molar of  $\text{CaCl}_2$  solution

D. 1 molar of urea solution

**Answer: D**



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**461.** Which solution will produce maximum elevation in b.pt. ?

A. 0.1 M glucose

B. 0.1 M sucrose

C. 0.1 M  $BaCl_2$

D. 0.1 M  $MgSO_4$

**Answer: C**



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462. Which has the highest freezing point at one atmosphere ?

A. 0.1 M NaCl solution

B. 0.1 M sugar solution

C. 0.1 M BaCl<sub>2</sub> solution

D. 0.1 M FeCl<sub>3</sub> solution

**Answer: B**



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**463.** The ratio of the value of any colligative property for KCl solution to that for sugar solution is nearly .....times

A. 1

B. 0.5

C. 2

D. 2.5

**Answer: C**



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

A.  $\frac{2}{3}$

B.  $\frac{1}{3}$

C.  $\frac{1}{2}$

D.  $\frac{3}{2}$

**Answer: A**



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**465.** A solution has an osmotic pressure of 0.821 atm at 300 K. Its concentration would be:

A. 0.033 M

B. 0.66 M

C. 0.033 M

D. 0.33 M

**Answer: C**



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**466.** 5 % (wt./vol.) aqueous NaCl solution and 5 % (wt./vol.) aqueous KCl solution are:

- A. Isotonic
- B. Isomolar
- C. Isoequimolar
- D. None

**Answer: D**



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**467.** Osmotic pressure of blood is 7.65 atm at 310 K. An aqueous solution of glucose that will be isotonic with blood is .....wt./vol.

A. 5.43 %

B. 3.54 %

C. 4.53 %

D. 53.4 %

**Answer: A**



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**468.** The osmotic pressure of a 5% (wt./vol.) solution of cane sugar (mol.wt is 342) at  $15^{\circ}C$  is:

- A. 4 atm
- B. 3.4 atm
- C. 5.078 atm
- D. 2.45 atm

**Answer: C**



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**469.** The freezing points of a 0.05 molal solution of a non-electrolyte in water is: ( $K_f = 1.86 \text{ K molality}^{-1}$ )

A.  $-1.86^\circ \text{C}$

B.  $-0.93^\circ \text{C}$

C.  $-0.093^\circ \text{C}$

D.  $0.093^\circ \text{C}$

**Answer: C**



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470. The freezing point of 1 molar NaCl solution assuming NaCl to be 100% dissociated in water is: ( $K_f = 1.86 \text{ K molality}^{-1}$ )

A.  $-1.86^\circ \text{C}$

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

C.  $+1.86^\circ \text{C}$

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

**Answer: B**



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471. The molal freezing point constant of water is  $-1.86\text{Kmolality}^{-1}$ . If 171g of cane sugar ( $C_{12}H_{22}O_{11}$ ) are dissolved in 500 g of water, the solution will freeze at:

A.  $-1.86^{\circ}C$

B.  $1.86^{\circ}C$

C.  $-3.92^{\circ}C$

D.  $2.42^{\circ}C$

**Answer: A**



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**472.** Osmotic pressure of a solution containing 0.1 mole of solute per litre at 273 K is:

A.  $\frac{0.1}{1} \times 0.08205 \times 273 \text{ atm}$

B.  $0.1 \times 2 \times 0.08205 \times 273 \text{ atm}$

C.  $\frac{1}{0.1} \times 0.08205 \times 273 \text{ atm}$

D.  $\frac{0.1}{1} \times \frac{273}{0.08205} \times 273 \text{ atm}$

**Answer: A**



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**473.** Osmotic pressure of 40 % (wt./vol.) urea solution is 1.64 atm and that of 3.42 % (wt./vol.) cane sugar is 2.46 atm. When equal volumes of the above two solutions are mixed, the osmotic pressure of the resulting solution is:

A. 1.64 atm

B. 2.46 atm

C. 4.10 atm

D. 2.05 atm

**Answer: D**



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**474.** Following solutions at the same temperature will be isotonic:

- A. 3.42 g of cane sugar in one litre water  
and 0.18 g of glucose in one litre water
- B. 3.42 g of cane sugar in one litre water  
and 0.18 g of glucose in 0.1 litre water
- C. 3.42 g of cane sugar in one litre water  
and 0.585 g of NaCl in one litre water
- D. 3.42 g of cane sugar in one litre water  
and 1.17 g of NaCl in one litre water

**Answer: B**



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475. Molal depression of freezing point of water is  $1.86^{\circ}C$  per 1000 g of water. 0.02 mole of urea dissolved in 100 g of water will produce a lowering of temperature of:

A.  $0.186^{\circ}$

B.  $0.372^{\circ}$

C.  $1.86^{\circ}$

D.  $3.72^{\circ}$

**Answer: B**





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**476.** Dry air was passed successively through a solution of 5 g of a solute in 180 g of water and then through pure water. The loss in weight of solution was 2.50 g and that of pure solvent 0.04 g. The molecular weight of the solute is:

A. 31.25

B. 3.125

C. 312.5

D. None

**Answer: A**



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**477.** The osmotic pressure of decimolar solution of glucose at  $30^{\circ}C$  is:

A. 24.88 atm

B. 2.488 atm

C. 248.8 atm

D. None

**Answer: B**



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**478.** Osmotic pressure of a solution (density is 1 g/ml) containing 3 g of glucose (molecular weight =180) in 60 g of water at  $15^{\circ} C$  is:

A. 0.34 atm

B. 0.65 atm

C. 6.25 atm

D. 5.57 atm

**Answer: C**



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**479.** What would be the freezing point of aqueous solution containing 17 g of  $C_2H_5OH$  in 1000 g of water  $K_f = 1.86 \text{ K molality}^{-1}$ :

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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**480.** A solution containing 8.6 g urea in one litre was found to be isotonic with a 5% (wt./vol.) solution of an organic non-volatile solute. The molecular weight of latter is:

A. 3.48.9

B. 34.89

C. 3489

D. 861.2

**Answer: A**



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**481.** A solution containing 4 g of a non-volatile organic solute per 100 ml was found to have an osmotic pressure equal to 500 cm of

mercury at  $27^{\circ}C$ . The molecular weight of solute is:

A. 14.97

B. 149.7

C. 1697

D. 1.497

**Answer: B**



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**482.** A solution of 1.25 g of a non-electrolyte in 20 g of water freezing at 271.9K with its molal depression constant , then the molecular wt. of the solute is:

A. 207.8 g/mol

B. 179.79 g/mol

C. 209.6 g/mol

D. 109.6 g/mol

**Answer: D**



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**483.** The molal elevation constant of water =  $0.52 \text{ K, molality}^{-1}$ . The boiling point of 1.0 molal aqueous KCl solution (assuming complete dissociation of KCl), should be:

A.  $100.52^\circ \text{C}$

B.  $101.04^\circ \text{C}$

C.  $99.48^\circ \text{C}$

D.  $98.96^\circ \text{C}$

**Answer: B**



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**484.** In a solution of 7.8 g benzene ( $C_6H_6$ ) and 46.0 g toluene ( $C_6H_5CH_3$ ) the mole fraction of benzene is:

A.  $1/6$

B.  $1/5$

C.  $1/2$

D.  $1/3$

**Answer: A**



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**485.** If a 6.84% (wt/vol.) solution of 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**



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**486.** The normal amount of glucose in 100 mL of blood (8-12hours after a meal) is:

A. 8 mg

B. 80 mg

C. 200 mg

D. 800 mg

**Answer: B**



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**487.** Osmotic pressure of a sugar solution at  $24^{\circ}C$  is 2.5 atmosphere. The concentration of the solution in mol per litre is:

A. 10.25

B. 1.025

C. 1025

D. 0.1025

**Answer: D**



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**488.** At  $40^{\circ}C$  the vapour pressures of pure liquids, benzene and toluene, are 160 mm Hg and 60 mm Hg respectively. At the same temperature, the vapour pressure of an

equimolar solution of the two liquids,  
assuming the ideal solution should be:

A. 140 mm Hg

B. 110 mm Hg

C. 220 mm Hg

D. 100 mm Hg

**Answer: B**



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**489.** Elevation in boiling point was  $0.52^{\circ}C$  when 6 g. of a compound X was dissolved in 100 g of water. Molecular weight of X is-

A. 120

B. 60

C. 180

D. 342

**Answer: B**



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**490.** 1 litre of a solution containing 500 g of a protein exerts an osmotic pressure of 0.82 atm at  $27^{\circ}C$ . The molecular weight of the protein is:

A. 82000

B. 50000

C. 41000

D. 15000

**Answer: D**



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**491.** The concentration of glucose (in g/litre) solution which is isotonic with a solution of urea containing 6 g per litre will be:

A. 6

B. 34.2

C. 18

D. 1.8

**Answer: C**



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**492.** A solution containing 1 mole of ethylene glycol dissolved in 1000 g of water ( $K_f = 1.86 K molality^{-1}$ ) will freeze at:

A.  $-5.2^{\circ} C$

B.  $-0.52^{\circ} C$

C.  $-18.6^{\circ} C$

D.  $-1.86^{\circ} C$

**Answer: C**



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**493.** Solute A is a ternary electrolyte and solute B is non-electrolyte. If 0.1 M solution of solute B produces an osmotic pressure of  $2P$ , then 0.05 M solution of A at the same temperature will produce an osmotic pressure equal to:

A.  $P$

B. 1.5P

C. 2P

D. 3P

**Answer: D**



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**494.** The molal elevation constant for water is  $0.52 \text{ K} \cdot \text{molality}^{-1}$ . The elevation caused in the boiling point of water by dissolving 0.25

mole of a non-volatile solute in 250 g of water

will be:

A.  $52^{\circ} C$

B.  $5.2^{\circ} C$

C.  $0.52^{\circ} C$

D.  $0.052^{\circ} C$

**Answer: C**



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**495.** A 3.42 % (wt./vol.) solution of cane suger is isotonic with a 5.96 % (wt./vol.) solution of raffinose. The molecular weight of raffinose is:

A. 59.6

B. 596

C. 5.96

D. 5960

**Answer: B**



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496. At  $27^{\circ}C$ , the osmotic pressure of a solution containing 4.0 g solute (molar mass = 246) per litre at  $27^{\circ}C$  is :  $R = 0.0821 \text{ atm} \cdot \text{mol}^{-1} \cdot \text{K}$

A. 0.1 atm

B. 0.4 atm

C. 0.2 atm

D. 0.8 atm

**Answer: C**



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**497.** The vapour pressure of benzene at  $80^{\circ}C$  is lowered by 10mm by dissolving 2g of a non-volatile substance in 78g of benzene. The vapour pressure of benzene at  $80^{\circ}C$  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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**498.** The mole fraction of water in a solution containing 50 g of water and 50 g of ethyl alcohol is:

A.  $50/(50+50)$

B.  $18/(18+46)$

C.  $1.09/(1.09+2.78)$

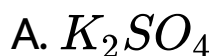
D.  $2.78/(1.09+2.78)$

**Answer: D**



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**499.** Which compound corresponds van.t Hoff factor (i) to be equal to 2 in dilute solution?



C. Sugar

D.  $MgSO_4$

**Answer: D**



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**500.** 6 g urea is dissolved in 90 g water. The relative lowering of vapour pressure is equal to:

A. 0.0196

B. 0.06

C. 1.1

D. 0.0202

**Answer: A**



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**501.** What is the molality of ethyl alcohol (mol. Wt. = 46) in aqueous solution which freezes at  $-10^{\circ}C$ : ( $K_f$  for water =  $1.86\text{ K molality}^{-1}$ )

A. 3.54

B. 4.567

C. 5.376

D. 6.315

**Answer: C**



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**502.** The vapour pressure of benzene at  $90^{\circ}C$  is 1020 torr. A solution of 5 g of a solute in 58.5

g benzene has vapour pressure 990 torr. The molecular weight of the solute is:

A. 78.2

B. 178.2

C. 206.2

D. 220

**Answer: D**



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**503.** The vapour pressures of ethanol and methanol are 42.0 mm and 88.5 mm Hg respectively. An ideal solution is formed at the same temperature by mixing 46.0 g of ethanol with 16.0 g 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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**504.**  $Y$  g of non-volatile organic substance of molecular mass  $M$  is dissolved in 250 g benzene. Molal elevation constant of benzene is  $K_b$ . Elevation in its boiling point is given by:

A.  $\frac{M}{K_b Y}$

B.  $\frac{4K_b Y}{M}$

C.  $\frac{K_b Y}{4M}$

D.  $\frac{K_b Y}{M}$

**Answer: B**



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**505.** The values of observed and calculated molecular weights of silver nitrate are 92.64 and 170 respectively. The degree of dissociation of silver nitrate is:

A. 60 %

B. 83.5 %

C. 46.7 %

D. 60.23 %

**Answer: B**



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**506.** One molar solution of sodium chloride will have the relative lowering of vapour pressure closest to:

- A. 5.8 % (wt//vol.) urea solution
- B. 5.8 % (wt//vol.) glucose solution
- C. 1.0 M glucose solution
- D. 2.0 M urea solution

**Answer: D**



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**507.** At  $88^{\circ}C$  benzene has a vapour pressure of 900 torr and toluene has a vapour pressure of 360 torr. What is the mole fraction of

benzene in the mixture with toluene that will boil at  $88^{\circ}\text{C}$  at 1 atm pressure, benzene toluene form an ideal solution:

A. 0.416

B. 0.588

C. 0.688

D. 0.74

**Answer: D**



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**508.** The amount of urea to be dissolved in 500mL of water ( $K=18.6 \text{ K mol}^{-1} 100 \text{ g solvent}$ ) to produce a depression of  $0.186^\circ \text{C}$  in freezing point is:

A. 0.3 g

B. 3 g

C. 6 g

D. 9 g

**Answer: B**



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**509.** The molal boiling point constant of water is  $0.53^{\circ}C$ . When 2 mole of glucose are dissolved in 4000 g of water, the solution will boil at:

A.  $100.53^{\circ}C$

B.  $101.06^{\circ}C$

C.  $100.265^{\circ}C$

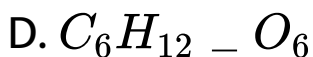
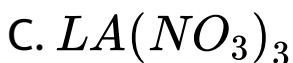
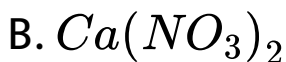
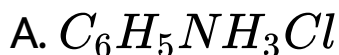
D.  $99.47^{\circ}C$

**Answer: C**



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510. The freezing point of equimolal aqueous solution will be highest for:



**Answer: D**





**511.** A solution containing 500 g of a protein per litre is isotonic with a solution containing 3.42 g of sucrose per litre. The molecular mass of protein is:

- A. 5
- B. 146
- C. 34200
- D. 50000

**Answer: D**



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**512.** The molecular weight of NaCl determined by studying freezing point depression of its 0.5% aqueous solution is 30. The apparent degree of dissociation of NaCl is:

A. 0.95

B. 0.5

C. 0.6

D. 0.3

**Answer: A**



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**513.** The osmotic pressure of a solution at  $0^{\circ} C$  is 2 atm. What will be its osmotic pressure at  $273^{\circ} C$  under similar conditions:

A. 0.5 atm

B.  $2 \times 273$  atm

C. 4 atm

D.  $273/2$  atm

**Answer: C**



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**514.** The relative lowering of vapour pressure produced by dissolving 71.5 g of a substance in 1000 g of water is 0.00713. The molecular weight of the substance will be:

A. 180

B. 18

C. 342

D. 60

**Answer: A**



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**515.** The vapour pressure of two pure liquids (A) and (B) are 100 and 80 torr respectively. The total pressure of solution obtained by

mixing 2 mole of (A) and 3 mole of (B) would be:

A. 120 torr

B. 36 torr

C. 88 torr

D. 180 torr

**Answer: C**



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**516.** A solution containing 4 g of polyvinyl chloride in 1 litre of dioxane was found to have an osmotic pressure of  $6 \times 10^{-4}$  atm at 300 K. The molecular mass of the polymer is:

A.  $3 \times 10^3$

B.  $1.6 \times 10^5$

C.  $5 \times 10^4$

D.  $6.4 \times 10^2$

**Answer: B**



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517. The depression in f.pt of 0.01 m aqueous solution of urea, sodium chloride and sodium sulphate is in the ratio:

A. 1 : 1 : 1

B. 1 : 2 : 3

C. 1 : 2 : 4

D. 2 : 2 : 3

**Answer: B**







**518.** The values of observed and calculated molecular weights of calcium nitrate are respectively 65.6 and 164 . The degree of dissociation of calcium nitrate will be:

A. 25 %

B. 50 %

C. 75 %

D. 60 %

**Answer: C**



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

- A. 5.8 % (wt/vot.) sucrose solution
- B. 5.8 % (wt/vot.) glucose solution
- C. 2 molal sucrose solution
- D. 1 molal glucose solution

**Answer: C**



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**520.** 20 g of a binary electrolyte (mol. Wt. = 100) are dissolved in 500 g of water. The freezing point of the solution is  $-0.74^{\circ}C$ ,  $K = 1.86 \text{ k molality}^{-1}$ . The degree of ionization of the electrolyte is:

A. 50 %

B. 75 %

C. 100 %

D. Zero

**Answer: D**



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**521.** The relationship between osmotic pressure at 273 K when 10 g glucose ( $P_1$ ), 10 g urea ( $P_2$ ) and 10 g sucrose ( $P_3$ ) are dissolved in 250 ml 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**



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**522.** van.t Hoff factor of very dilute solution of

$Ca(NO_3)_2$  is:

A. 1

B. 2

C. 3

D. 4

**Answer: C**



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**523.** Lowering in vapour pressure is the highest for:

A. 0.2 m Urea

B. 0.1 m Glucose

C.  $0.1mMgSO_4$

D. 0.1 m  $BaCl_2$

**Answer: D**



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**524.** Azeotropic mixture of HCl and water has:

A. 84 % HCl

B. 22.4 % HCl

C. 63 % HCl

D. 20.2 % HCl

**Answer: D**



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**525.** What will be the molality of a solution having 18g glucose (m.wt. = 180) dissolved in 500 g of water:



A. 1 m

B. 0.5 m

C. 0.2 m

D. 2 m

**Answer: C**



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**526.** Which of the following will have the highest boiling point at 1 atm pressure:

A. 0.1 M NaCl

B. 0.1 M Sucrose

C. 0.1 M  $BaCl_2$

D. 0.1 M Glucose

**Answer: C**



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**527.** An ideal solution was obtained by mixing methanol and ethanol. If the partial vapour pressure of methanol and ethanol are

$2.619K P_a$  and  $4.556K P_a$  respectively, the composition of vapour ( in terms of mole fraction) will be:

A. 0.625 MeOH, 0.365 EtOH

B. 0.365 MeOH, 0.635 EtOH

C. 0.574 MeOH, 0.326 EtOH

D. 0.173 MeOH, 0.827 EtOH

**Answer: B**



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528. An aqueous solution freezes at  $-0.186^{\circ}\text{C}$  ( $K_f = 1.86^{\circ} : K_b = 0.512^{\circ}$ ). What is the elevation in boiling point:

A. 0.186

B. 0.512

C.  $0.512/1.86$

D. 0.0512

**Answer: D**



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

A. 0.8

B. 0.6

C. 0.4

D. 0.2

**Answer: B**



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**530.** Molal depression constant for water is  $1.86^{\circ}C$ . The freezing point of a 0.05 molal solution of a non electrolyte in water is:

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

A. 105.7

B. 106.7

C. 115.3

D. 93.9

**Answer: A**



**Watch Video Solution**

**532.** A 5% solution of cane sugar (M. wt = 342) is isotonic with 1% solution of substance X.

The molecular weight of X is:

A. 171.2



B. 68.4

C. 34.2

D. 136.2

**Answer: B**



**Watch Video Solution**

**533.** The amount of ice that will separate out on cooling a solution containing 50 g of ethylene glycol in 200 g water to  $-9.3^{\circ}C$  is:

$$(K_f = 1.86Kmolality^{-1})$$

A. 38.71 g

B. 37.71 mg

C. 42 g

D. 42 mg

**Answer: A**



**Watch Video Solution**

**534.** A 0.2 molal aqueous solution of a weak acid (HX) is 20 percent ionised. The freezing

point of this solution is: ( $K_f = 1.86 \text{ K/m}$  for water)

A.  $-0.45^\circ \text{C}$

B.  $-0.90^\circ \text{C}$

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

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

**Answer: A**



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535. The following aqueous solution in the correct order of decreasing freezing points is:

A.  $0.2M BaCl_2$ ,  $0.2M KCl$ ,  $0.1M Na_2SO_4$

B.  $0.2M KCl$ ,  $0.1M Na_2SO_4$ ,  $0.2M BaCl_2$

C.  $0.1M Na_2SO_4$ ,  $0.2M KCl$ ,  $0.2M BaCl_2$

D.  $0.1M Na_2SO_4$ ,  $0.2M BaCl_2$ ,  $0.2M KCl$ ,

**Answer: C**



**Watch Video Solution**

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

A.  $4.8 \times 10^5$

B.  $9 \times 10^5$

C.  $3 \times 10^5$

D.  $5.16 \times 10^6$

**Answer: D**



**Watch Video Solution**

**537.** At  $40^\circ C$  the vapour pressures in torr, of methyl alcohol ethyl alcohol solutions is represented by the equation.

$P = 119X_A + 135$ , where  $X_A$  is mole-fraction of methyl alcohol, then the value of

$$\lim_{X_A \rightarrow 1} \frac{P_A}{X_A} \text{ is:}$$

A. 254 torr

B. 135 torr

C. 119 torr

D. 140 torr

**Answer: A**



**Watch Video Solution**

**538.** The boiling point of an aqueous solution of a nonvolatile solute is  $100.15^{\circ}\text{C}$ . What is the freezing point of an aqueous solution obtained by diluting the above solution with

an equal volume of water? The value of  $K_b$  and  $K_f$  for water are  $0.512^\circ C$  and  $1.86^\circ C$  K *molality*<sup>-1</sup>:

A.  $-0.544^\circ C$

B.  $-0.512^\circ C$

C.  $-0.272^\circ C$

D.  $-1.86^\circ C$

**Answer: C**



**Watch Video Solution**



539. The freezing point of aqueous solution that contains 5% by mass urea, 1.0% by mass KCl and 10% by mass of glucose is: ( $K_f H_2O = 1.86 K molality^{-1}$ ):

A. 290.2 K

B. 285.5 K

C. 269.93 K

D. 250 K

**Answer: C**



**Watch Video Solution**

**540.** A solution of protein (extracted from crabs) was prepared by dissolving 0.75 g in 125  $\text{cm}^3$  of an aqueous solution. At  $4^\circ\text{C}$  an osmotic pressure rise of 2.6 mm of the solution was observed. Then molecular weight of protein is (Assume density of solution is  $1.00 \frac{\text{g}}{\text{cm}^3}$ ):

A.  $9.4 \times 10^5$

B.  $5.4 \times 10^5$

C.  $5.4 \times 10^{10}$

$$D. 9.4 \times 10^{10}$$

**Answer: B**



**Watch Video Solution**

**541.** A substance is completely trimerised on dissolution in a solvent. The van.t Hoff factor (i) for such change is:

A. 1

B. 2

C. 3

D.  $\frac{1}{3}$

**Answer: D**



**Watch Video Solution**

**542.** van.t Hoff factor for a dilute solution of sodium argento cyanide is:

A. 2

B. 0.25

C. 0.5

D. 3

**Answer: A**



**Watch Video Solution**

**543.** At  $40^\circ C$ , the vapour pressures (in torr) of methyl alcohol (A) and ethyl alcohol (B) solution is represented by:

$P = 120X_A + 138$ , where  $X_A$  is mole-

fraction of methyl alcohol, then the value of

$$\lim_{X_A \rightarrow 0} \frac{P_B^\circ}{X_B} \text{ and } \lim_{X_B \rightarrow 0} \frac{P_A^\circ}{X_A} \text{ are:}$$

A. 138, 258

B. 258, 138

C. 120, 138

D. 138, 125

**Answer: A**



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544. The use of common salts, e.g., NaCl or  $CaCl_2$  anhydrous is made to clear snow on the roads. This causes:

A. A lowering in f.pt. of water

B. A lowering in m.pt. of ice

C. Ice melts at the temperature of atmosphere present at that time

D. All

**Answer: D**





**545.** 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**



**Watch Video Solution**

**546.** In which of the following molecular weight determination methods, sensitivity of the measurements decreases as the molecular weight of the solute increases ?

A. Elevation of boiling point/depression in  
f.pt.

B. Viscosity

C. Osmotic pressure

D. None

**Answer: A**



**Watch Video Solution**

547. Who was awarded Nobel Prize for chemistry in 1901 for discovering laws of osmotic pressure for solutions ?

A. van't Hoff

B. Pauling

C. Berkeley

D. Seaberg

**Answer: A**



**Watch Video Solution**

**548.** When crystal of the solute is introduced into a super saturated solution of the solute:

- A. The solute dissolves
- B. The excess solute crystallises out
- C. The solution becomes unsaturated
- D. The solution remains super saturated

**Answer: B**



**Watch Video Solution**

549. Vapour pressure of a solution containing non-volatile solute is:

- A. More than the vapour pressure of a solvent
- B. Less than the vapour pressure of solvent
- C. Equal to the vapour pressure of solvent
- D. None

**Answer: B**



**Watch Video Solution**

**550.** The relative lowering of vapour pressure is equal to the mole fraction of the non-volatile solute. This statement was given by:

A. Raoult

B. Henry

C. Joule

D. Dalton

**Answer: A**



**Watch Video Solution**

551. Assuming each salt to be 90% dissociated which of the following will have highest osmotic pressure:

A. Decinormal  $Al_2(SO_4)_3$

B.  $BaCl_2$

C. Decinormal  $Na_2SO_4$

D. A solution obtained by mixing equal volumes of (b) and (c) and filtering

**Answer: A**



**552.** When a solution is separated from a solvent by semipermeable membrane, then phenomenon taking place is called as:

- A. Osmosis
- B. Diffusion
- C. Solubility
- D. None

**Answer: A**





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**553.** When a substance is dissolved in a solvent, the vapour pressure of solvent decreases. This brings:

- A. An increase in b.pt. of the solution
- B. A decrease in b.pt. of a solution
- C. An increase in f.pt. of the solvent
- D. None

**Answer: A**



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**554.** If a thin slice of sugar beet is placed in concentrated solution of NaCl then:

- A. Sugar beet will lose water from its cells
- B. Sugar beet will absorb water from solution
- C. Sugar beet will neither absorb nor lose water
- D. Sugar beet will dissolve in solution

**Answer: A**



**Watch Video Solution**

**555.** The temperature at which vapour pressure of a solvent in its liquid and solid phase becomes same is called:

A. b.pt.

B. f.pt.

C. Krafft point

D. None

**Answer: B**



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**556.** As a result of osmosis, the volume of the concentrated solution:

- A. Gradually decreases
- B. Gradually increases
- C. Suddenly increases
- D. None

**Answer: B**



**Watch Video Solution**

**557.** The osmotic, pressure of a solution can be accurately measure in the shortest possible time by:

- A. Berkrley and Hartley method
- B. Morse and Frazer method
- C. Pfeffer method
- D. None

**Answer: A**



**Watch Video Solution**

**558.** Dissolution of a solute is an exothermic process if:

- A. Hydration energy  $>$  Lattice energy
- B. Hydration energy  $>$  Lattice energy
- C. Hydration energy = Lattice energy
- D. None

**Answer: A**



**Watch Video Solution**

**559.** The boiling point of an azeotropic mixture of water and ethyl alcohol is less than that of theoretical value of water and alcohol mixture.

Hence the mixture shows:

- A. That solution is highly saturated
- B. Positive deviation from Raoul's law
- C. Negative deviation from Raoul' law

D. Nothing can be said

**Answer: B**



**Watch Video Solution**

**560.** Which solution would exhibit abnormal osmotic pressure ?

A. Aqueous solution of urea

B. Aqueous solution of common salt

C. Aqueous solution of glucose



D. Aqueous solution of sucrose

**Answer: B**



**Watch Video Solution**

**561.** Van't Hoff factor( $i$ ):

A. Is Less than one in case of dissociation

B. Is more than one in case of association

C.  $i = \frac{\text{normal molecular mass}}{\text{observed molecular mass}}$

$D.I = \frac{\text{observed molecular mass}}{\text{normal molecular mass}}$

**Answer: C**



**Watch Video Solution**

**562.** Acetic acid on dissolution in benzene will show:

A. Two times of its normal molecular weight

B. Its normal molecular weight

C. Half of its normal molecular weight

D. None

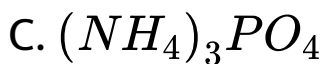
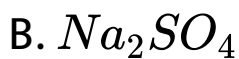
**Answer: A**



**Watch Video Solution**

**563.** Which salt shows maximum osmotic pressure in its 1 M solution ?

A.  $AgNO_3$



**Answer: C**



**Watch Video Solution**

**564.** Solutions distilled without change in composition at a temperature are called:

A. Atmorrhous

B. Azeotropic mixture

C. Ideal solution

D. Super saturated solution

**Answer: B**



**Watch Video Solution**

**565.** To form a super saturated solution of salt one must:

A. Cool slowly

B. Coll rapidly

C. Add some salt to cold solution

D. Use a clear vessel

**Answer: B**



**Watch Video Solution**

**566.** By adding water to the solution, its:

A. Concentration remains same

B. Concentration increase

C. Ionisation decreases

D. Concentration decreases

**Answer: D**



**Watch Video Solution**

**567.** The elevation in boiling point for one molal solution of a solute in a solvent is called:

A. Cryoscopic constant

B. Boiling point constant

C. Molal Ebullioscopic constant

D. None

**Answer: C**



**Watch Video Solution**

**568.** Boiling point of a solution is independent of

A. Amount of solution

B. Pressure



C. Nature of solvent

D. Concentration of solution

**Answer: A**



**Watch Video Solution**

**569.** Which solution will show maximum elevation in b.pt.s:

A. 0.1 M KCl

B. 0.1 M  $BaCl_2$

C. 0.1 M  $FeCl_3$

D. 0.1 M  $Fe_2(SO_4)_3$

**Answer: D**



**Watch Video Solution**

**570.** The solution which show positive or negative deviation from Raoult's law are called:

A. Ideal solutions

B. True solutions

C. Non-ideal solutions

D. Colloidal solutions

**Answer: C**



**Watch Video Solution**

**571. Which involves osmosis ?**

A. Crenation

B. Plasmolysis

C. Haemolysis

D. All

**Answer: D**



**Watch Video Solution**

**572.** On mixing 10 mL of acetone with 40 ml of chloroform, the total volume of the solution is:

A.  $< 50\text{ml}$

B.  $> 50ml$

C.  $= 50mL$

D. Cannot be predicted

**Answer: A**



**Watch Video Solution**

**573.** Solubility of solutes which dissolve with the liberation of heat decreases with:

A. Decrease in temperature

B. Increase in temperature

C. No change in temperature

D. None

**Answer: B**



**Watch Video Solution**

**574.** Two solutions have different osmotic pressures. The solution of lower osmotic pressure is called:

- A. Isotonic solution
- B. Hypertonic solution
- C. Hypotonic solution
- D. None

**Answer: C**



**Watch Video Solution**

**575.** At high altitudes the boiling point of water decreases because:

- A. Atmospheric pressure is low
- B. Temperature is low
- C. Atmospheric pressure is high
- D. None

**Answer: A**



**Watch Video Solution**

**576.** The vapour pressure of a solution is proportional to:



- A. Mole fraction of solute
- B.  $1/(\text{mole fraction of solute})$
- C. Mole fraction of solvent
- D. None

**Answer: C**



**Watch Video Solution**

**577.** The pressure under which liquid and its vapour can coexist in equilibrium is known as:

- A. Normal vapour pressure
- B. Saturated vapur pressure
- C. Read vapour pressure
- D. Limiting vapour pressure

**Answer: B**



**Watch Video Solution**

**578.** The relative lowering of vapour pressure in case of dilute solutions is directly proportional to :

A. Molality

B. Molarity

C. Mole fraction

D. All

**Answer: D**



**Watch Video Solution**

**579.** The substances whose solubility decreases with increase in temperature :

A. NaOH

B.  $Na_2CO_3$

C.  $Na_2SO_4$

D. All

**Answer: D**



**Watch Video Solution**

**580.** In two solution having different osmotic pressure, the solution of higher osmotic pressure is called :

- A. Isotonic solution
- B. Hypertonic solution
- C. Hypotonic solution
- D. None

**Answer: B**



**Watch Video Solution**

**581.** On mixing 10 mL of carbon tetrachloride with 10 mL of benzene the total volume of the solution is:

A.  $> 20mL$

B.  $< 20mL$

C.  $= 20mL$

D. Cannot be predicted

**Answer: C**



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582. The factor  $\frac{\Delta T_f}{K_f}$  Represents :

A. Molarity

B. Formality

C. Normality

D. Molality

**Answer: D**



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**583.** A teacher one day pointed out to his students the peculiar fact that water is unique liquid which freezes exactly at  $0^{\circ}C$  and boils

exactly at  $100^{\circ}C$ . He asked the students to find the correct statement based on this fact :

A. Water dissolves anything however sparingly the dissolution may be

B. Water is a polar molecule

C. Boiling and freezing temperature of water were used to define a temperature scale

D. Liquid water is denser than ice

**Answer: C**





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**584.** When an ideal binary solution is in equilibrium with its vapour, molar ratio of the two components in the solution and in the vapour phase is:

A. Same

B. Different

C. May or may not be same depending upon volatile nature of the two

components

D. All

**Answer: C**



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**585.** The osmotic pressure of a dilute solution is directly proportional to the:

A. Diffusion rate of the solute

B. Tonic concentration

C. Boiling point

D. Flow of solvent from a concentrated solution

**Answer: B**



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**586.** If Raoult's law is obeyed, the vapour pressure of the solution is directly proportional to:

A. Mole fraction of solvent

B. Mole fraction of the solute

C. Mole fraction of the solvent and solute

D. The volume of the solution

**Answer: A**



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**587.** Boiling point of water is defined as the temperature at which:

A. Vapour pressure of water is equal to that on one atmospheric pressure

B. Bubbles are formed

C. Steam comes out

D. None

**Answer: A**



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**588.** The melting points of most of the solid substances increase with an increase of pressure acting on them. However, ice melts at a temperature lower than its usual melting point, when the pressure increases. This is because:

- A. Ice is less denser than water
- B. Pressure generates heat
- C. The bonds break under pressure
- D. Ice is not a true solid

**Answer: A**



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**589.** The freezing point of 1% aqueous solution of calcium nitrate will be:

A.  $0^{\circ}C$

B. Above  $0^{\circ}C$

C.  $1^{\circ}C$

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

**Answer: D**



**Watch Video Solution**

**590.** The solubility of a gas in liquid at a temperature is directly proportional to its:

- A. Density
- B. Melting point
- C. Boiling point
- D. Pressure



**Answer: D**



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**591.** An example of a solution having liquid in gas is:

A. Moist air

B. Dry air

C. Au-Hg

D.  $C_2H_5OH + H_2O$

**Answer: A**



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**592.** Camphor is used as solvent to determine molecular weight of non-volatile solute by Rast method because. For camphor:

- A. Being cheap
- B. High m.pt.
- C. Molal depression constant is high
- D. None

**Answer: C**



**Watch Video Solution**

**593.** The vapour pressure of water depends upon:

- A. Surface area of container
- B. Volume of container
- C. Temperature
- D. All

**Answer: C**



**Watch Video Solution**

**594.** A perfectly semipermeable membrane when used to separate a solution from its solvent permits through it the passage of :

- A. Solute only
- B. Solvent only
- C. BOTH (A) AND (B)
- D. None

**Answer: B**



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**595.** At low concentrations, the statement that equimolal solutions under a given set of experimental conditions have equal osmotic pressures is true for :

A. All solutions

B. Solutions of non-electrolytes which  
neither dissociates nor associater

C. Solutions of electrolytes only

D. None

**Answer: B**



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**596.** Among the following substances, the lowest vapour pressure is exerted by :

A. Water

B. Mercury

C. Kerosene

D. Rectified spirit

**Answer: B**



**Watch Video Solution**

**597.** Blood cells retain their normal shapes in solutions which are :

A. Isotonic to blood

B. Hypotonic to blood

C. Hypertonic to blood

D. Equinormal to blood

**Answer: A**



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**598.** As a result of osmosis the volume of solution:

A. Remains constant

B. Increases



C. Decreases

D. Increases or decreases

**Answer: D**



**Watch Video Solution**

**599.** Each pair forms ideal solution except:

A.  $C_2H_5Br$  and  $C_2H_5I$

B.  $C_6H_5Cl$  and  $C_6H_5Br$

C.  $C_6H_6$  and  $C_6H_5CH_3$

D.  $C_2H_5I$  and  $C_2H_5OH$

**Answer: D**



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**600.** The osmotic pressure ( $P$ ) of a solution is given by relation:

A.  $P = \frac{RT}{C}$

B.  $P = \frac{CT}{R}$

C.  $P = \frac{RC}{T}$

$$D. \frac{P}{C} = RT$$

**Answer: D**



**Watch Video Solution**

**601.** Which statement is incorrect about osmotic pressure (P), volume (V) and temperature (T) ?

A.  $P \propto (1)/(V)$  if T is constant

B.  $P \propto T$ , if V is constant

C.  $P \propto V$ , if T is constant

D. PV is constant, if T is constant

**Answer: C**



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**602.** Solute when dissolved in water:

A. Decreases the vapour pressure of water

B. Increases the boiling point of water

C. Decreases the freezing point of water

D. All of the above

**Answer: D**



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**603.** The van.t Hoff factor of NaCl assuming 100 % dissociation is :

A.  $1/2$

B. 2

C. 1

D. 3

**Answer: B**



**Watch Video Solution**

**604.** The molal elevation/depression constant depends upon :

A. Nature of solvent

B. Nature of solute

C. Temperature

D.  $\Delta H$  solution

**Answer: A**



**Watch Video Solution**

**605.** An aqueous solution of methanol on water has vapour pressure:

- A. Equal to that of water
- B. Equal to that of methanol
- C. More than that of water

D. Less than that of water

**Answer: C**



**Watch Video Solution**

**606.** The depression in freezing point is maximum if .....is used as solvent .

A. Camphor

B. Naphthalene

C. Benzene



D. Water

**Answer: A**



**Watch Video Solution**

**607.** When mercuric iodide is added to the aqueous solution of potassium iodide the:

- A. Freezing point is raised
- B. Freezing point is lowered
- C. Freezing point does not change

D. Boiling point does not change

**Answer: A**



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**608.** The osmotic pressure of a dilute solution is given by :

A.  $P = P_0 \times N_1$

B.  $\pi V = nST$

C.  $\Delta P = P_0 N_2$

$$D. \frac{\Delta P}{P_0} = \frac{P_0 - P_s}{P_0}$$

**Answer: B**



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**609.** For a dilute solution , Raoult.s law states that:

A. The lowering of vapour pressure is equle  
to the mole fraction of solute

- B. The relative lowering of vapour pressure is equal to the mole fraction of solute
- C. The relative lowering of vapour pressure is proportional to the amount of solute in solution
- D. The vapour pressure of the solution is equal to the mole fraction of solvent

**Answer: B**



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**610.** Which of the following is not a colligative property.

A. Lowering of vapour pressure

B. Freezing point

C. Osmotic pressure

D. Elevation of boiling point

**Answer: B**



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**611.** Blood has been found to be isotonic with :

A. Normal saline solution

B. Saturated NaCl solution

C. Saturated KCl solution

D. Saturated solution of a 1 : 1 mixture of  
NaCl and KCl

**Answer: A**



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612. Which condition is not satisfied by an ideal solution:

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

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

C.  $\Delta S_{\text{mixing}} = 0$

D. Obedience of Raoult's law

**Answer: C**



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**613.** Isotonic solutions are those which have the:

- A. Same osmotic pressure
- B. Same molarity
- C. Same density
- D. Same normality

**Answer: A**



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**614.** The correct relationship between the boiling points of very dilute solution of  $AlCl_3(t_1)$  and  $CaCl_2(t_2)$ , having the same molar concentration, as :

A.  $t_1 = t_2$

B.  $t_1 > t_2$

C.  $t_2 > t_1$

D.  $t_2 \geq t_1$

**Answer: B**



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**615.** Two solutions of  $KNO_3$  and  $CH_3COOH$  are prepared separately. Molarity of both is 0.1 M and osmotic pressures 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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**616.** What will be the molecular weight of NaCl determined experimentally following elevation in the boiling point or depression in freezing point method ?

A.  $< 58.5$

B.  $> 58.5$

C.  $= 58.5$

D. None of these

**Answer: A**



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**617.** At a given temperature if  $P$  is the vapour pressure of a solution and  $P_0$  that of its pure solvent , the relative lowering of vapour pressure of the solution is given by :

A.  $\frac{P_0 - P}{P_0}$  )

B.  $\frac{P - P_0}{P_0}$

C.  $\frac{P_0}{P}$

D.  $\frac{P}{P_0}$

**Answer: A**



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**618.** The lowering of vapour pressure of a solvent by the addition of a non-volatile solute to it , is directly proportional to :

- A. The strength of the solution
- B. The nature of the solute in the solution
- C. The atmospheric pressure
- D. All

**Answer: A**



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**619.** A thermometer which can be used only accurate measurement of small differences in temperature is know as a :

A. Beckmann's thermometer

B. Contact thermometer

C. Clinical thermometer

D. Platinum resistance thermometer

**Answer: A**



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**620.** Boiling point elevation is :

A. Additive property

B. Constitutive property

C. Colligative property

D. Partly additive and partly constitutive

**Answer: C**



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**621.** The experimental molecular weight of an electrolyte will always be less than its calculated value because the value of vant Hoff factor, 'i' is :



A. Less than one

B. Greater than one

C. One

D. Zero

**Answer: B**



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**622.** An example of colligative property is :

A. Freezing point

B. Boiling point

C. Vapour pressure

D. Osmotic pressure

**Answer: D**



**Watch Video Solution**

**623.** A mixture of benzene and toluene forms :

A. An ideal solution

B. Non-ideal solution

C. Suspension

D. Emulsion

**Answer: A**



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**624.** The colligative properties of a solution depend on :

A. Number of solute particles present in it

B. Chemical nature of the solute particles

present in it

C. Nature of the solvent used

D. None

**Answer: A**



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**625.** Which of the following methods can not be used to determine the molecular weight of non-volatile solute?

- A. Victor Meyer's method
- B. Osmotic pressure method
- C. Cryoscopic method
- D. Ebullioscopic method

**Answer: A**



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**626.** If  $P_0$  and  $P_\delta$  are the vapour pressure of solvent and solution respectively and  $N_1$  and  $N_2$  are the mole of solute and solvent then:

A.  $P_s = P_0 n_1$

B.  $P_s = P_0 n_2$

C.  $P_0 = P_s n_2$

D.  $P_s = P_0 \left( \frac{n_1}{n_2} \right)$

**Answer: A**



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**627.** Osmosis is the spontaneous flow through a semipermeable membrane of :

A. A less concentrated solution into more  
in to more concentrated solution

B. The Solvent from a solution of lower  
concentration to one of higher  
concentration

C. Solute particles from a solution of  
higher concentration to one of lower  
concentration

D. None

**Answer: B**



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**628.** The vapour pressure of a dilute solution of a solute is not influenced by :

- A. Temperature of solution
- B. Melting point of solute
- C. Mole fraction of solute
- D. Degree of dissociation of solute

**Answer: B**





629. The vapour pressure (VP) of a dilute solution of non-volatile solute is  $P$  and the VP of pure solvent is  $P_0$  the lowering of the VP is :

A.  $+ve$

B.  $-ve$

C.  $\frac{P}{P_0}$

D.  $\frac{P_0}{P}$

**Answer: A**



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**630.** The highest temperature at which vapour pressure of a liquid can be measured is :

- A. B.pt. of liquid
- B. Critical temperature (T)
- C. Critical solution temperature
- D. Inversion temperature

**Answer: B**



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631. 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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**632.** 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 was removed

B. Same as what would be if the glass plate was removed

C. Less than what would be if the glass plate was removed

D. Cannot be predicted

**Answer: B**



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**633.** The molecular weight of benzoic acid as determined by depression in freezing point method corresponds to :

A. Ionization of benzoic acid

B. Dimerization of benzoic acid

C. Trimerization of benzoic acid

D. Solvation of benzoic acid

**Answer: B**



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**634.** The elevation of boiling point method is used for the determination of molecular weight of :

A. Non-volatile and soluble solute

B. Non-volatile and insoluble solute

C. Volatile and soluble solute

D. Volatile and insoluble solute

**Answer: A**



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**635.** Sodium sulphate is soluble in water whereas barium sulphate is sparingly soluble because:

- A. The hydration energy of sodium sulphate is more than its lattice energy
- B. The lattice energy of barium sulphate is less than the hydration energy
- C. The lattice energy has no role to play in solubility
- D. The hydration energy of sodium sulphate is less than its lattice energy

**Answer: A**



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**636.** Which solute can form saturated solutions in water ?

A. Sodium acetate

B. Hypo

C. Glauber's salt

D. All

**Answer: D**



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**637.** Two solutions A and B are separated by semipermeable membrane . If liquid flows from A and B then :

A. A is more concentrated than B

B. A is less concentrated than B

C. Both solutions have some concentration

D. None

**Answer: B**



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**638.** Molal elevation constant of a liquid is :

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

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

C. Elevation in b.pt. which would be produced by dissolving 1 mole of solute

in 1000 g of solvent

D. None

**Answer: C**



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**639.** One mole each of urea, glucose and sodium chloride were dissolved in one litre of water . Equal osmotic pressure will be produced by solutions of :

- A. Urea and glucose
- B. Sodium chloride and urea
- C. Glucose and sodium chloride
- D. None

**Answer: A**



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**640.** The solubility of a solid in a liquid depends on :

A. Nature of solute

B. Nature of solvent

C. Temperature

D. All

**Answer: D**



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**641.** Alcohol has ..... Vapour pressure than water at the same temperature :

A. More

B. Less

C. Same

D. None

**Answer: A**



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**642.** The mixture of n-hexane and n-heptane is an example of :

A. Ideal solution

B. None-ideal solution

C. Dilute solution

D. Real solution

**Answer: A**



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