



CHEMISTRY

BOOKS - CHEMISTRY

SOLUTIONS

Solutions

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

A. Mole fraction

B. Parts per million

C. Mass percentage

D. Molality

Answer: A

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

- A. Sugar crystals cold water
- B. Sugar crystals in hot water
- C. Powdered sugar in cold water
- D. Powdered sugar in hot water

Answer: D



3. At equibirium the rate of dissolutiono of a solid solute in a valatile

liquid slvent is

A. less then the rate of crystallisation

B. greater than the rate of crystallisation

C. equal to the rate of crystallisation

D. zero

Answer: C

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4. A beaker contains a solution of substance'A' precipitation of substance 'A' takes place when small amount of 'A' is added to the solution. The solution is......

A. saturated

B. supersaturated

C. unsturated

D. concentrated

Answer: B

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5. Maximum amount of a solid aolute that can be dissolved in a specified

amount of a given liquid solvent does not depend upon......

A. temperature

B. nature of solute

C. pressure

D. nature of solvent

Answer: C

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

A. low temperature

- B. low atmospheric pressure
- C. high atmospheric pressure
- D. Both low temperature and high atmospheric pressure

Answer: B

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7. Considering the formation, breaking and stregth of hydrogen bond, pradict which of the following mixture will show a positive devition from Raoult's law?

- A. Methonl acetone
- B. Choloroform and acetone

C. Nitric acid and water

D. Phenol and aniline

Answer: A

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8. Colligative propeties depend on......

A. the nature of the solute particles dissolved in solution

B. the number of solute particles in solution

C. the physical properties of the solute particles dissolved in

solution

D. the nature of solvent particles

Answer: B

9. Which of the following aqueous solution should have the highest boiling point ?

A. 1.0 M NaOH

B. $1.0MNa_2SO_4$

C. $1.0MNH_4NO_3$

D. $1.0MKNO_3$

Answer: B

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10. The unit of ebillioscopic constant is

A. K kg mol^{-1} or (molality)⁻¹

B. mol kg K^{-1} or K^{-1} (molality)

C. kg $mol^{-1}K^{-1}$ or K^{-1} (molality)⁻¹

D. K $molkg^{-1}$ or K(molality)

Answer: A



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

A. the same

B. about twice

C. about three times

D. about six times

Answer: C

12. An unpire mango placed in a concentrated salt solution to prepare

pickle shrivels because.....

A. it gains water due to osmosis

B. it loses water due to reverse osmosis

C. it gains water due to reverse osmosis

D. it loses water due to osmosis

Answer: D

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13. At a given temperature, osmotic pressure of a concentrated solution

of a substance __

A. is higher than that of a dilute solution

B. is lower then that of a dilute solution

C. is same as that of a dilute solution

D. cannot be compared with osmotic pressure of dilute solution.

Answer: A

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14. Which of the following statements is FALSE ?

A. Two different solutions of sucrose of same molality prepared in

different solvents will have the same deperssion in freezing point.

B. The osmotic pressure of a solution is given by the equalition π

=CRT (where, C is the molarity of the solution)

C. Decreasing order of osmotic pressure for 0.01 M aqueous solutions of barium chloride, patassium chloride, acetic acid and sucrose is

$$BaCl_2 > KCl > CH_3COOH >$$
sucrose

D. According to Raoult's law, the vapour pressure exerted by a

valatiloe component of a solution is directly proportional to its

mole fraction in the solution

Answer: A

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15. The values of van't Hoff factors for KCl, NaCl and K_2SO_4 , respectively , are ___

A. 2,2 and 2

B. 2,2 and 3

C. 1,1 and 2

D. 1,1 and 1

Answer: B

16. Which of the following statements is false?

- A. Units of atmospheric pressure and osmotic pressure are the same
- B. In reverse osmosis, solvent molecules move through a

semipermeable membrane from a region of lower concentration

of solute to a region of higher concentration

- C. The value of mole depression constant depends on nature of solvent
- D. Relataive lowering of vapour pressure, is a dimesionless quantity

Answer: B



17. Value of Henry's constant K_{H} ...

A. increase with increase in temperature

B. decrease with increase in temperature

C. remains constant

D. first increases then decreases

Answer: A

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18. The value of Henry's constant K_H .

A. greater for gases with higher solubility

B. hreater for gases with lower solubility

C. constant for all gases

D. not related to the solubility of gases

Answer: B

19. Consider the figure and mark the correct option.



- A. Water will move from side (A) to side (B) id a pressure lower osmitic pressure is applied on piston(B)
- B. Water will move from side (B) to side (A) if a pressure greater than

osmotic pressure is applied on postion (B)

C. Water will move from side (B) to side (A) if a pressure equal to

osmotic pressure is applied on pistion (B)

D. Water will more from side (A) to side (B) if pressure equal to

osmotic pressure is applied on piston (A)

Answer: B

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20. We have three aqueous solutions of NaCl labelled as A, B and C with concentration 0.1M, 0.01 and 0.001 M , respectively . The value of van't Hoff factor for these solutions will be in the order :

A.
$$i_A < i_B < i_C$$

B. $i_A > i_B > i_C$

C.
$$i_A = i_B = i_C$$

D.
$$i_A < i_B > i_C$$

Answer: B

21. On the basic of information given below mark the Correct option .Information:

(P)In bromoethane and choroethane mixture intermolar interactions of A.A and B.B tupesare nearly same as A .B type intersections.

(Q) In ethanol and acetone mixture A.A or B.B type inetermolecular interaction are stronger than A.B type interactions.

(R) In chloroform and acetone mixture A.A or B.B type intermolecular interactions are weaker than A. B type interactions.

A. Solution (ii) and (iii) will follow Raoult's law

B. Solution (i) will follow Raoult's law

C. Solution (ii) will show negative deviation from Raoult's law

D. Solution (iii) will show positive deviation from Raoult's law

Answer: B

22. Two beakers of capacity 500 mL were taken. One of these beakers, labelled as "A" was filled with 400 mL water whereas the beaker labelled "B" was filled with 400 mL of 2M solution of NaCl. At the same temperature both the beakers ware placed in containers os same material and same capacity as shown in figure.



A. Vapour pressure in container (A) is more than that of container (B)

B. Vapour pressure in container (A) is less than that in container (B)

C. Vapour pressur is equal in both the containers

D. Vapour pressure in container (B) is twice the vapour pressure in

container (A)

Answer: A

23. If two liquids A and B from minimum boiling azeotrope at some specific composition then

- A. A-B interactions are stringer then those A-A or B-B
- B. vapour pressure of solution increases because more number of

molecules of liquids A and B can escape from the solution

C. vapour pressure of solution decreases because less number of

molecules of only one of the liquids escape from the solution

D. A-B interactions are weaker than those between A-A or B-B

Answer: A



24. 4 L of 0.02 M aqueous solution of NaCl was diluted by adding 1 L of water. The molality of the resultant solution is......

 $\textbf{A.}\,0.004$

B.0.008

 $\mathsf{C.}\,0.012$

 $D.\,0.016$

Answer: D



25. On the basis of information given below mark the correct option.

Information : On adding acetone to methanol some of the hydrogen bonds between methanol molecules breaks.

A. At specific composition methanol-acetone mixture will from minimu boiling azeotrope and will show positive deviationfrom Raoult'a law

- B. At specific composition methonal-acetone mixture will from maximum boiling azerotrope and will show positive deviation from Raoult's law
- C. At specific composition methanol-acetone mixture will from minmum boiling azerotrope and will show negative deviation from Raoult's law
- D. At specific composition methanol-acetone mixture will from maximum boiling azeotrope and will show negative deviation from Raoult's law

Answer: A



26. K_H value for $Ar(g), CO_2(g), HCHO(g)$ and $CH_4(g)$ are 40.39, 1.67, 1.83×10^{-5} and 0.413 respectively.

Arrange these gases in the order of their increasing solubility.

A. $HCHO < CH_4 < CO_2 < Ar$

 $\mathsf{B.}\,HCHO < CO_2 < CH_4 < Ar$

 $\mathsf{C.}\,Ar < CO_2 < CH_4 < HCHO$

D. $Ar < CH_4 < CO_2 < HCHO$

Answer: C

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27. Which of the following factor (s) affect the solubility of a gaseous

solution in the fixed volume of liquid solvent?

(i) Nature of solute

- (ii) Temperatute
- (iii) Pressure

A. (i) and (iii) at constant T

B. (i) and (ii) at constant p

C. (ii) and (iii)

D. Only (iii)

Answer: A::B

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28. Intermolecular forces between two benzene molecules are nearly of same strength as those between two toluene molecules. For a mixture of benzene and toluene, which of the following are not true?

A. Δ_{mix} H = zero

B. Δ_{mix} V= zero

C. These will from minimum boilng azeotrope

D. These will not from ideal solution



29. Relative lowering of vapour pressure is a colligative property because

- A. it depends on the concentration of non-electrolyte solute in solution and does not depend on the nature of the solute molecules
- B. it depends on number of particle of electrolyte solute insolution and does not depend on the nature of the solute molecules
- C. it depends on the concentration of non-electrolyte solute in

solution as well as on the nature of the solute molecules

D. depends on the concentration of an electrolyte or non-electrolyte

solute in in solution as well as on the nature of solute molecules

Answer: A::B



30. van't Hoff factor (i) is given by the expression

$$\begin{array}{l} \mathsf{A}.\,i = \frac{\text{normal malar mass}}{\text{abnormal molar mass}} \\ \mathsf{B}.\,i = \frac{\text{abnormal molar mass}}{\text{normal molar mass}} \\ \mathsf{C}.\,i = \frac{\text{observed colligative property}}{\text{calculated colligative property}} \\ \mathsf{D}.\,i = \frac{\text{calculated colligative property}}{\text{observed colligative property}} \end{array}$$

Answer: A::C



31. Isotonic solutions must have the same......

A. solute

B. density

- C. elevation in boiling point
- D. depression in freezing point

Answer: C::D

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32. Which of the following binary mixture will have same composition in

liquid and vapour phase?

A. Benzene-toluene

- B. Water-nitric acid
- C. Water-ethanol
- D. n-hexane-n-heptane

Answer: B::C



33. In istonic solutions.....

A. solute and solvent both are same

B. osmotic pressure is same

C. solute and solvent may or may not be same

D. solute is always same solvent may be different

Answer: B::C

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34. For a binary ideal liquid solution, the variation total vapour pressure versus composition of solution is given by which of the curves?













Answer: A::D



35. Colligative properties are observed when......

A. a non-volatile solid is dissolved in a volatile liquid

B. a non-volatile liquid is dissolved in another volatile liquid

C. a gas is dissolved in non-voltatil liquid

D. a volatile liquid is dissolved inanother volatial liquid

Answer: A::B

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36. Components of a binarey mixture of two liquids A and B were being separted by distillation. After some time separation of components stopped and composition of vapour phase vecame same as that of liquid phase. Both the components stated coming in the distillate. Explain why this happened ?

37. Explain in why on addition of 1 moe of NaCl to 1L of water, the boiling point of water increases, while addition of 1 mole of methyl alcohol to 1L of water decreases its boilbing point .

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38. Explain the solubility rule "like dissolves like" in terms of intermolecular forces that exist in solutions,

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39. Concentration terms such as mass percentage, ppm, mole fraciton and molality are independent of temperature, however molarity is a function of temperature. Explain.





- 42. (a) Explain the following phenomena with the help of Henry's law.
- (i) Painful condition known as bends.
- (ii) Feeling of weakness and discomfort in breathing at high altitude.
- (b) Why soda water bottle kept at room temperature fizzes on opening?



43. Why is the vapous pressure of an aqueous solution of gulucose

lower than that of water ?

44. How does sprinking of salt help in clearing the snow covered roads

in hilly areas? Explain the phenomenon involved in the process.

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45. What is "esmipermeble membrane"?

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46. Give an example of a material used for makin gsemipermeable

membrance for carrying out reverse osmosis.



47. Match the following Columns

Column I					
Δ	Caturated - Lui		Column II		
Λ.	Saturated solution	1.	Solution having same osmotic pressure at a given temperature as that of given solution.		
В.	Binary solution	2.	A solution whose osmotic pressure is less than that of another.		
C.	Isotonic solution	3.	Solution with two components.		
D.	Hypotonic solution	4.	A solution which contains maximum amount of solute that can be dissolved in a given amount of solvent at a given temperature.		
E.	Solid solution	5.	A solution whose osmotic pressure is more than that of another.		
F.	Hypertonic solution	6.	A solution in solid phase.		
			·		



48. Match the following Columns

	Column I		Column II
A.	Soda water	1.	A solution of gas in solid
В.	Sugar solution	2.	A solution of gas in gas
C.	German silver	3.	A solution of solid in liquid
D.	Air	4.	A solution of solid in solid
E.	Hydrogen gas in palladium	5.	A solution of gas in liquid
		6.	A solution of liquid in solid







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51. Assertion (A) Molarity of a solution in liquid state changes with temperature.

Reason (R) The volume of a solution charges with change in temperature.

correcft explanation for assertion.

B. Assertion and reason both are correct statements but reason is

not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion and reason both are incorrect statements.

Answer: A

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52. Assertion (A) When methyl alcohol is added to water, boiling point of water increases.

Reason (R) When a volatile solute is added to a volatile solvent evevation in boiling point is observed.

correcft explanation for assertion.

B. Assertion and reason both are correct statements but reason is

not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion and reason both are incorrect statements.

Answer: d

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53. Assertion (A) When NaCl is added to water a depression in freezing point is observed.

Reason (R) The lowering of vapour pressure of a solution causes depression in the freezing point.

correcft explanation for assertion.

B. Assertion and reason both are correct statements but reason is

not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion and reason both are incorrect statements.

Answer: a

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54. Assertion (A) When solution is separated from the pure solved by a semipermeable membrane, the solvent molecules pass through it from pure solvent side to the solution side.

Reason (R) Diffusion of solvent occurs from a region of high concentration solution to a region of low concentration solution

correcft explanation for assertion.

B. Assertion and reason both are correct statements but reason is

not correct explanation for assertion.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion and reason both are incorrect statements.

Answer: b

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55. Diffine the following mofes of expressing the concentration of a solution? Which of which of these modes are independent of temperature and why? (a) w/w(mass percentage) (b) V/V(volume percentage) w/V(mass by volume percentage)(c)

- (e) X(mole fraction)(f)
- m(molality)(g)

- (d) ppm(part per million)
 - M(molarity)

56. Using Raoult's Law explain how the total vapour pressure over the solution is related to mole fraction of components in the following solution.

 $CHCl_3$ (l) and $CH_2Cl_2(l)$ (b)NaCl(s) and $H_2O(l)$



57. Explain the terms ideal and non-idealsolution in the light of forces of interactions operating between molecules in liquid solutions.

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58. Why is it not possible to obtain pure ethanol by fractional distillation ? What general name is given to binary mixture which show deviation from Raoult's law and whose omponents cannot be separted by fractional distillation. How many types of such mixture are there?

59. When kept in water, raisin swells in size. Name and explain the phenomenon involved with the help of a diagram. Give thre applications of the phenomenon.

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60. Discuss biological and industrial applications of osmosis.



61. How can you remove the hard calcium carbonate layer of the egg without damaging its semipermeable numbrane? Can this egg be inserted into a bottel with a narrow neck without distorting its shape? Explain the process involved.

62. Why is the mass determined by measuring a colligative property in case of some solutes abnormal? Discuss it with the help of van't Hoff factor.