Chemistry Study Materials for Class 12
(NCERT Based Notes of Chapter -02)

Ganesh Kumar Date:- 01/05/2021

Key Learning of Chapter -2 (Solution)

1. Solutions are the homogeneous mixtures of two or more than two components.
2. Binary solution: A solution having two components is called a binary solution. Components of a binary solution are solute and solvent.
   (i) When the solvent is in solid state, solution is called solid solution.
   (ii)When the solvent is in liquid state, solution is called liquid solution.
   (iii)When the solvent is in gaseous state, solution is called gaseous solution.
3. Concentration is the amount of solute in given amount of solution.
4. Mass by volume percentage (w/v): Mass of the solute dissolved in 100 mL of solution.
5. Molality (m) is the number of moles of solute present in 1kg of solvent.
6. Molarity (M) is the number of moles of solute present in 1L of solution.
7. Normality is the number of gram equivalent of solute dissolved per litre of solution.
8. Solubility is its maximum amount that can be dissolved in a specified amount of solvent at a specified temperature.
9. A solution in which no more solute can be dissolved at the same temperature and pressure is called a saturated solution.
10. In a nearly saturated solution if dissolution process is an endothermic process, solubility increases with increase in temperature.
11. In a nearly saturated solution if dissolution process is an exothermic process, solubility decreases with increase in temperature.
12. Henry's Law: The law states at a constant temperature the solubility of gas in a liquid is directly proportional to the pressure of gas. Henry's law can also be stated as the partial pressure of gas in vapour phase is proportional to the mole fraction of the gas in the solution. $P = K_H x$
13. When a non-volatile solute is dissolved in a volatile solvent, the vapour pressure of solution is less than that of pure solvent.
14. According to Raoult's law for a solution of volatile liquids the partial vapour pressure of each component in the solution is directly proportional to its mole fraction. $p_1 = p^o_1 x_1$; $p_2 = p^o_2 x_2$
15. Using Dalton's law of partial pressure the total pressure of solution is calculated. $P_{total} = P_1^0 + (P_2^0 - P_1^0) x_2$

16. On comparison of Raoult' law and Henry's law, it is observed that the partial pressure of volatile component or gas is directly proportional to its mole fraction in solution. In case of Henry's Law the proportionality constant is K_H and it is different from p_1^0 which is partial pressure of pure component. Raoult's Law becomes a special case of Henry's Law when K_H becomes equal to p_2^0 in Henry's law.

17. Liquid –liquid solutions can be classified into ideal and non-ideal solutions on basis of Raoult's Law.

Ideal solutions	Non- ideal solutions
The solutions that obey Raoult's Law over the entire range of concentrations are known as ideal solutions.	When a solution does not obey Raoult's Law over the entire range of concentration, then it is called non-ideal solution.
Δ_{mix} H=0 and Δ_{mix} V=0	Δ_{mix} H $\neq$ 0 and Δ_{mix} V $\neq$ 0
The intermolecular attractive forces between solute molecules and solvent molecules are nearly equal to those present between solute and solvent molecules i.e. A-A and B-B interactions are nearly equal to those between A-B	The intermolecular attractive forces between solute molecules and solvent molecules are not equal to those present between solute and solvent molecules i.e. A-A and B-B interactions are not equal to those between A-B

18. Non- ideal solutions are of two types:

Non ideal solution showing positive deviation	Non ideal solution showing negative deviation
The vapour pressure of a solution is higher than that predicted by Raoult's Law	The vapour pressure of a solution is lower than that predicted by Raoult's Law
The intermolecular attractive forces between solute-solvent molecules are weaker than those between solute-solute and solvent-solvent molecules i.e.A-B < A-A and B-B interactions	The intermolecular attractive forces between solute-solvent molecules are stronger than those between solute-solute and solvent-solvent molecules i.e. A-B > A-A and B-B interactions

19. Azeotropes are binary mixtures having same composition in liquid and vapour phase and boil at constant temperature. Liquids forming azeotrope cannot be separated by fractional distillation.

20. There are two types of azeotropes called minimum boiling azeotrope and maximum boiling azeotrope.

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