

osmotic pressure is a colligative property because it is depend upon number of solute particle not upon its identity and nature.

Experimentally it has found that colligative properties is directly proportional to molar concentration. i.e. molarity.

$\pi \propto M$ , where  $M$  is molarity.

$\pi = MRT$  Where  $R$  is solution constant and  $T$  is absolute temperature.

$\pi = \frac{n}{V} RT$ ,  $n$  = number of moles of solute and  $V$  is volume of solution in litre

$\pi \times V = \frac{WRT}{M}$ ,  $W$  = mass of solute and  $M$  is molar mass of solute.

or, 
$$M = \frac{WRT}{\pi V}$$

Isotonic solution:  $\rightarrow$

Solution having same osmotic pressure at constant temperature are called isotonic solution.

When two solutions are separated by SPM no osmosis occur. At constant temperature isotonic solution have same molar concentration.

$$M_1 = M_2$$

$$\frac{n_1}{V_1} = \frac{n_2}{V_2} \quad \text{or} \quad \frac{W_1}{M_1 V_1} = \frac{W_2}{M_2 V_2}$$

osmosis and osmotic pressure:

The flow of solvent from a solution of lower molar concentration to a solution of higher molar concentration through SPM is called osmosis.

SPM:- Neither liquid solvent nor solution nor ~~solvent~~ solute molecules pass through SPM only vapour pass through SPM. When an aqueous solution and water are separated by SPM, vapours of water molecules from water pass into solution through SPM. It is because water has higher vapour pressure than the solution and osmosis takes place from a solution of higher vapour pressure to lower vapour pressure.

The solution of lower molar concentration has higher vapour pressure.

Goat's bladder, egg membrane wall of living cells parchment, cellophane etc. are common SPM. But these are not perfectly SPM and are weak too. Artificially prepared cupric ferrocyanide  $Cu_2[Fe(CN)_6]$  is the best SPM.

Osmotic pressure: →

The external pressure applied on the solution to prevent the flow of solvent into solution through SPM is called osmotic pressure and it is determined by  $\pi$ .

