

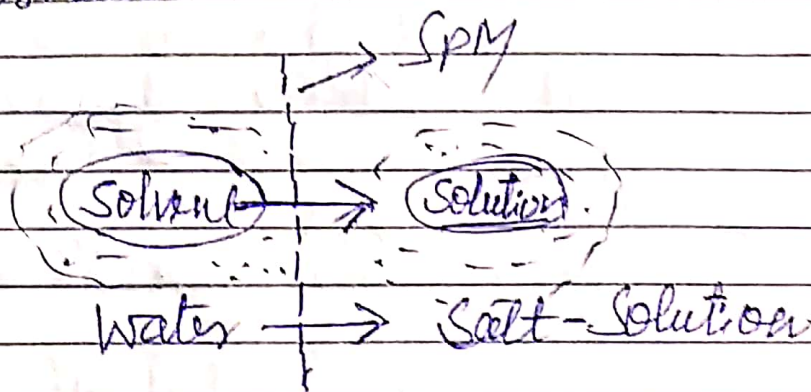
Day - I (H) Solution

Topics - Osmosis & Osmotic Pressure

Osmosis :- The Passage of Solvent from the solution of lower Concentration to a higher Concentration through SPM is known as Osmosis.
(Osmo means to push)

OR

The flow of solvent through Semi-permeable (SPM) from pure solvent to the solution.



Semi-permeable membrane -

It was observed that neither solute, nor liquid-solvent or solution passes through SPM. Only pure solvent passes through SPM because pure solvent has high V.P. than solution.

When two solutions are separated by SPM, the solution of lower molar-concentration has high V.P.

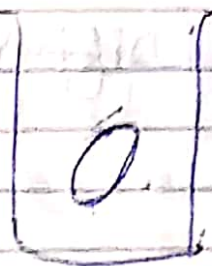
Examples - There are two types of SPM.

Natural SPM: - Plant & Animal membrane.
ex. pl - Goat's bladder, Egg membrane,
wall of living cell.

Artificial SPM: - Made in laboratory.
ex - Parchment paper, Cellophane, etc.
Before permeable to U_2 (or) O_2 is
used. SPM

Experimental Demonstration:-

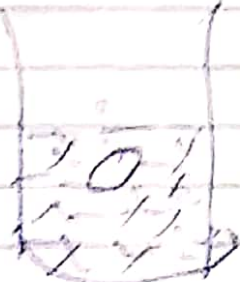
We take two eggs. its outer layer
(made by Caloz) shell is removed
in dissolving it in dil HCl.
One egg is placed
in water & other in concentrated salt solution.



Normal
size of
egg



Egg swells
in water



Egg shrinks
in salt
solution

Due to osmosis water enters into the
egg membrane. Therefore its size increases.
In a concentrated salt solution, water comes out from egg.
Placed in salt solution shrinks because
water comes out from egg.

Cause of Osmosis:-

Different theories have been proposed to explain the phenomenon of osmosis but vapour pressure approach is most suitable.

According to such - Concept Osmosis occurs as a result of difference b/w V.P of solution & solvents or b/w pure - solution of different - concentration. Due to high V.P of pure solvent it moves spontaneously from a region of high V.P to region of lower V.P. As a result there is net transfer of solvent - particles from pure - solvent to solution.

Difference b/w Osmosis & Diffusion

Osmosis	Diffusion
① The process takes place only through semi permeable membrane (S.P.M)	① No need for S.P.M.
② It involves movement of solvent - particle only.	② It involves both solute & solvent particles.
③ Movement of solvent from region of lower concn to higher concn.	③ In diffusion, movement of particles from high concn to lower concn.

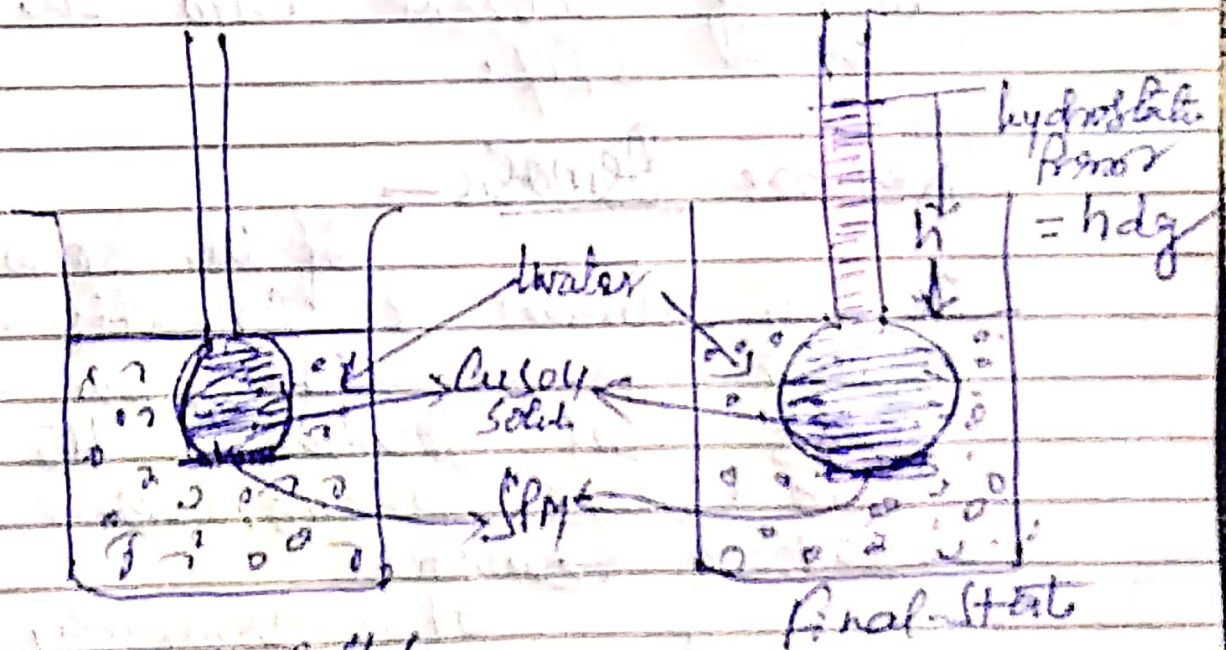
(4) Osmosis is limited to solution only

(5) Osmosis can be stopped by applying osmotic pressure or it can be reversed

(6) It is common in both gases as well as in liquids
(7) It never stops or reverse by applying additional pressure.

Concept of Osmotic Pressure:-

Two thistle funnel covered with semipermeable membrane are taken in which CuSO₄ solution is present. It placed in beaker containing



Initial State

Final State

water. In final state due to osmosis the level of CuSO₄ soln in thistle funnel rises. It continues till the equilibrium is reached. At this stage flow of water into solution ceases & the tendency of water

of water to enter into solution through
SPM is balanced by hydrostatic
pressure of the liquid column.

Definition of O.P. —

Def (1) It is equal to the hydro-
static pressure developed due to osmosis
when solution & pure solvent
is separated by SPM.

Def (2) It is equal to the external
pressure which should be applied
on the solution to prevent the
flow of solvent into the solution
through SPM.

Reverse Osmosis —

If the pressure applied
on the solution is greater than
osmotic pressure, then flow of solvent
goes from solution to the solvent
side. This phenomenon is called
Reverse Osmosis.

It is generally used
for the purification of sea
water or hard water.

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