Ch-5

Separation of Substances.

Topics – Sedimentation, decantation, filtration, evaporation, Condensation, Water cycle, Saturated Solution, unSaturated Solution, Supersaturated Solution.

Sedimentation:-

It is defined as the separation process in which solids are separated from the liquid. All the solids settle down at the bottom of the beaker and on top, a clear layer of liquid is obtained.

Decantation:-

It is defined as the separation process in which two immiscible liquids are separated. This is done by pouring out the clear upper layer of liquid. Separation of a mixture of oil from water is an example of decantation.

Filtration:-

It is defined as the separation process in which insoluble impurities are separated from the solution. filtration is done with the help of filter paper. filtering mud from muddy water is an example of filtration. You can use parchment paper also for filtering purpose.

* Evaporation:-

* Evaporation is a process by which water is converted from liquid to gaseous state.

* Temperature is the main cause of evaporation.
* The temperature at which the water starts evaporating is known as latent heat of vaporisation.
* Rise in temperature escalates water absorption and retention capasity of the given parcel of air.
* Movement of air substitutes the saturated layer with the unsaturated layer.
* Hence, the greater the movement of air, the greater is the evaporation.

* Factors of evaporation:-

i) Source of heat. (Direct relation)
ii) Surface area. (" ")
iii) Humidity (Inverse ")
iv) Wind Speed. (Direct ").

* Condensation:-

* The conversion of water vapour into the water.
* condensation is caused by the loss of heat.
* When moist air is cooled it may reach a level when its capacity to hold water vapour terminates.
* The surplus water ~~o~~ vapour condenses into the liquid stage.
* In free air, condensation results from cooling around very small particles named as hygroscopic condensation nuclei.
* condensation depends upon the amount of cooling and the relative humidity of the air.
* It is influenced by the volume of air, temperature, pressure and humidity.
* It takes place when the temp. of the air is decreased to dew point with its volume remaining constant.
* When both the temperature and volume are decreased.
* When moisture is added to the air through evaporation. However, the most favourable circumstance is the

reduction in the air temperature.

* Water cycle:-

The water cycle is also known as the hydrologic cycle or hydrological cycle. It means the continuous movement of water on, above and below the surface of Earth.

During day time under the scorching head of sun rays the water gets evaporated from the water bodies, then it transforms to water vapour, it is lighter than normal air and it moves upward, after reaching a certain height it transforms to cloud by the process of condensation. When it becomes heavy then it starts to fall on the ground due to gravitational pull in the form of precipitation (snow, hailstone, rain). This is called water cycle.

Water cycle involves the exchange of energy, which leads to temp. changes. When water evaporates, it takes up energy from it surroundings &

cools the environment. When it condenses, it releases energy & warms the environment.

Water cycle involves the following steps →

i) Canopy interception
ii) Snowmelt
iii) Run off
iv) Infiltration
v) Surface flow
vi) Evaporation
vii) Sublimation
viii) Deposition
ix) Advection
x) Condensation
xi) Transpiration
xii) percolation

* Unsaturated Solution :-

A solution that is capable of dissolving more solute at a given temp. than it already contains, is known as unsaturated solution.

Ex- If 100ml water can dissolve 36gm of salt at 20°C, but there is 30gm of salt is present at that temp, so, it can dissolve more salt at that moment, so, it is unsaturated solution.

* Saturated Solution:-

A Solution that contains max amount of a Solute in a given Solvent at room temp, NO more Solute can dissolve in it! This type of Solution is called Saturated Solution.

Ex- If 100ml water can dissolve 36 gm Salt in it at 20°C and same amount of Salt is present in it then it is called Saturated.

* Supersaturated Solution:-

A Solution that contains more dissolved substance than a Saturated Solution is called Super Saturated Solution.

Ex- The Solubility of Sodium (Salt) Chloride is 36 gm/100ml at 20°C. On heating more Salt can be dissolved.