CHAPTER 06

HEAT

Evaporation:

"The process of escaping of molecules from the surface of l liquid at any temperature is called Evaporation".

The reason for evaporation is as follows:

When a liquid is taken in a dish, the molecules of a liquid move randomly in all directions and collide with other molecules. During the collisions, they transfer energy. When the molecules inside the liquid collide with molecules at surface, they acquire energy and fly off from the surface. These particles collide with air particles and few of them return into liquid. If returned particles are less than escaped particles, the quantity of liquid decreases. The same process continues further and entire liquid evaporates.

Examples of evaporation:

(1) Wet clothes dry when kept under ceiling fan.

(2) Spirit in the dish evaporates.

Note:

(1) Evaporation is faster in presence of wind.

(2) Temperature of system falls during evaporation.

(3) Evaporation is surface phenomenon.

(4) Evaporation is a surface phenomenon. During evaporation, process particles escape from the surface of liquid. The increase in area provides more particles to escape. Therefore, as surface area increases, rate of evaporation also increase.

(5) If humidity in air increases, evaporation will decreases because humid air has more amount of water vapour, hence it cannot take more liquid molecules into it. This is the reason why wet clothes dry easily during sunny day than a rainy day.

(6) Wind speed increases, evaporation also increase. Because the particles on the surface of the liquid are blown away with the wind.

Condensation:

Air contains water molecules in the form of vapour. When molecules of water in air, during their motion, strike the surface of gambler, which is cool, they lose their KE, which lowers their temperature and they get converted into droplets.

"Condensation is process in which phase change takes place from gas to liquid". It is a warming process.

Ex:

When a glass lid is kept on hot water bowl, the glass surface is covered by droplets due to condensation.

Humidity:

The amount of water vapour in air is called Humidity. These vapour molecules in air comes from evaporation of water from rivers, lakes, ponds etc.

Dew:

During winter nights, the temperatures go down hence the air near the surfaces like window planes, leaves, glass, etc becomes saturated with vapour and condensation begins. The water droplets condensed on such surfaces are known as Dew.

Fog:

When temperature of atmosphere is very low, that region contains large amount if vapour. This vapour condenses on dust particles on air and form small droplets of water. These droplets float in the air and form thick mist called Fog.

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Boiling:

The process in which liquid changes to gas at constant temperature is called Boiling point of that liquid.

When the phase change takes place temperature constant and the heat energy used for changing a phase from liquid to gas is called Latent heat from vaporization.

If 'Q' is the energy required to convert 'm' mass of liquid into gas, the latent heat is,

$$L_{Vapour} = \frac{Q}{m}$$, Units: J/Kg - SI ; Cal/g – CGS.

For water its value is,

$L_{Vapour} = 540$ Cal/g

Freezing:

The process of conversion of liquid into solid is called Freezing. It takes place at constant Temperature.

The heat energy required to convert solid into liquid is called Latent heat of fusion of Ice.

$L_{ice} = 80$ Cal/gm

Ice – Converts into water at 0^oC.

Or

Water freezes into ice at 0^oC.

This value is called melting point or freezing point.

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