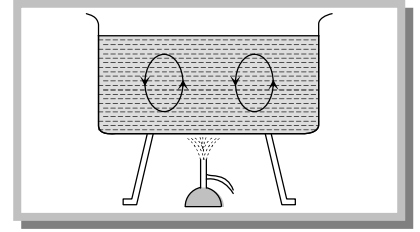


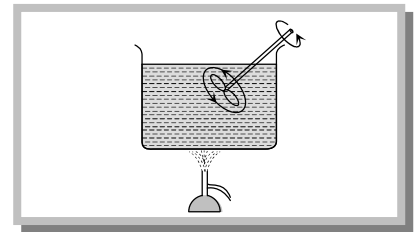
## Convection.

Mode of transfer of heat by means of migration of material particles of medium is called convection. It is of two types.

(1) Natural convection: This arise due to difference of densities at two places and is a consequence of gravity because on account of gravity the hot light particles rise up and cold heavy particles try setting down. It mostly occurs on heating a liquid/fluid.



(2) Forced convection: If a fluid is forced to move to take up heat from a hot body then the convection process is called forced convection. In this case Newton's law of cooling holds good. According to which rate of loss of heat from a hot body due to moving fluid is directly proportional to the surface area of body and excess temperature of body over its surroundings



i.e. 
$$\frac{Q}{t} \propto A(T - T_0)$$

$$\frac{Q}{t} = h A(T - T_0)$$

Where h = Constant of proportionality called convection coefficient,

T = Temperature of body and T<sub>0</sub> = Temperature of surrounding

Convection coefficient (h) depends on properties of fluid such as density, viscosity, specific heat and thermal conductivity.

- (i) Natural convection takes place from bottom to top while forced convection in any direction.
- (ii) In case of natural convection, convection currents move warm air upwards and cool air downwards. That is why heating is done from base, while cooling from the top.
- (iii) Natural convection plays an important role in ventilation, in changing climate and weather and in forming land and sea breezes and trade winds.
- (iv) Natural convection is not possible in a gravity free region such as a free falling lift or an orbiting satellite.
- (v) The force of blood in our body by heart helps in keeping the temperature of body constant.
- (vi) If liquids and gases are heated from the top (so that convection is not possible) they transfer heat (from top to bottom) by conduction.
- (vii) Mercury though a liquid is heated by conduction and not by convection.