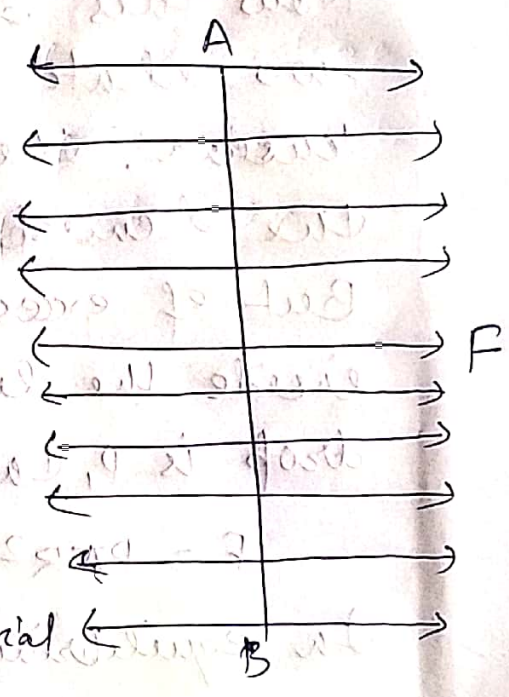


Surface tension

The free surface of a liquid tends to have a minimum surface area, this property of a liquid is called surface tension.

The surface of liquid is in stretched state. On the surface of liquid, a straight line AB is assumed to be drawn on either side of straight line tangential force F acts at perpendicular direction, on either side tangential force per unit length.



$$T = (F/l)$$

N/m is measure of surface tension of liquid.

$$\begin{aligned} ST &= F/l \\ &= \frac{[MLT^{-2}]}{[L]} \\ &= [MT^{-2}] \end{aligned}$$

Relation between surface tension and excess pressure :-

(2)

Let us suppose that there is a drop of radius r , we know that due to surface tension the shape of liquid is spherical. Now, this spherical drop is split into two identical parts. Due to surface tension, the upward force acting on the hemisphere is $2\pi r t$.

But of excess pressure inside the liquid drop is P , then

$$F = P \pi R^2$$

In equilibrium,

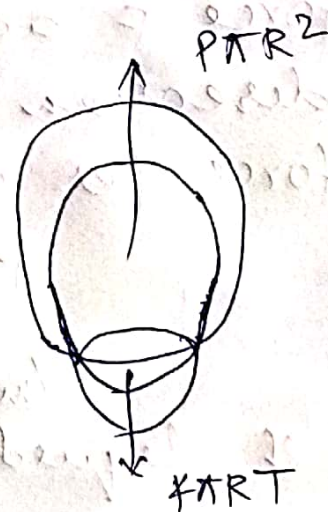
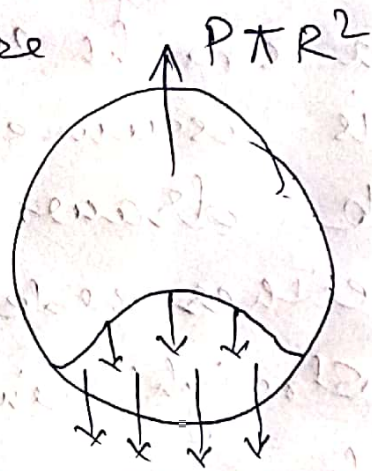
$$P \pi R^2 = 2 \pi r t$$

$$P = \frac{2T}{R}$$

Excess pressure in soap bubble :-

$$P \pi R^2 = 4 \pi r t$$

$$\Rightarrow P = \frac{4T}{R}$$



Adhesive force :- →

The force of attraction acting between molecules of different substances is called force of adhesion.

Cohesive force :- →

The force of attraction acting between molecules of same substance is called force of cohesion.

