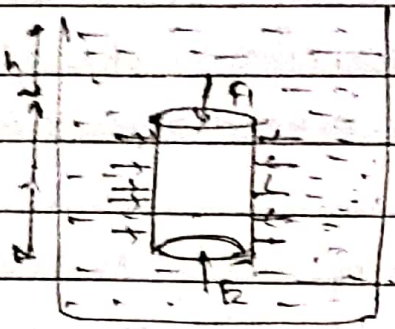
Page

Force vertically up − force vertically down = B



For example, buoyancy force on cylinder is

$B = F_2 - F_1$

$= \rho g (h+l) \times A - \rho g h \times A$

$= (A \times l) \times \rho \times g$

= wt. of liquid displaced.

∴ **B = wt. of liquid displaced**

Let m_s = mass of solid

V_s = volume of solid.

ρ_s = density of solid.

Now B = wt. of liquid displaced.

$= V_l \times \rho_l \times g$

But if body is completely immersed,

then

$V_l = V_s$

∴ $B = V_s \times \rho_l \cdot g$

$= \frac{m_s}{\rho_s} \times \rho_l \times g$

$= \frac{m_s \cdot g}{\rho_s / \rho_l}$

$\rho_s / \rho_l = \rho_{rel} = S$ is called Relative density.

∴ $B = \frac{m_s g}{\rho_{rel}}$