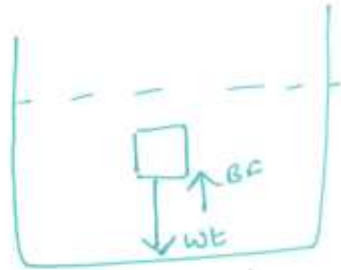


FLOATATION

LIST OF FORMULAE

① Pressure = $\frac{\text{Force}}{\text{Area}}$

② Pressure = $\frac{\text{Thrust}}{\text{Area}}$



③ Liquid pressure \Rightarrow

$$P = \frac{f}{A} = \frac{W}{A} = \frac{mg}{A}$$

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

$$f = \frac{m}{V} \Rightarrow m = f \times V$$

$$P = \frac{f \times V \times g}{A}$$

we know, $V = A \times h$

$$P = \frac{f \times A \times h \times g}{A} = f h g$$

$$P = h f g$$

④ Buoyant force,

$$\begin{aligned} \text{B.F} &= W = mg \\ &= f \times V \times g \end{aligned}$$

⑤ Laws of Floatation -

(a) If $\rho_{obj} < \rho_{water}$
object floats

(b) If $\rho_{obj} > \rho_{water}$
object sinks

(c) If $\rho_{obj} = \rho_{water}$
object floats just below the surface

⑥ Archimede's principle -

when an object is immersed wholly (or fully) or partially ~~immersed~~ in any fluid, it experiences an upward force (B.F) that is equal to weight of fluid displaced by it.

Loss in wt. = Buoyant force

Actual wt in air = B.F (Upthrust)
- wt. in liquid

⑦ Relative Density (RD) = $\frac{\text{Density of substance}}{\text{Density of water}}$

$$R.D = \frac{\rho_{\text{object}}}{\rho_{\text{water}}}$$

$$\rho_{\text{water}} = 1 \text{ g/cm}^3 \text{ or } 1000 \text{ kg/m}^3$$

Units -

- ① Pressure \Rightarrow Pascal or N/m^2
- ② Upthrust / Buoyant force / force \Rightarrow Newton
- ③ Volume \Rightarrow cm^3 or m^3
- ④ Density \Rightarrow kg/m^3 or g/cm^3
- ⑤ Relative density \Rightarrow Unitless

Application of Archimede's Principle -

- ① For designing ships & Submarines
- ② For making lactometers / Hydrometers.