



INTERMEDIATE

Fluids

Hand Notes For JEE Mains, Advance, NEET UG, Class 11 & 12 etc...

Hand Notes

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'FLUIDS'

State of matter which can flow are called fluid. Therefore, liquid & gases are in the category of fluids. They do not have any shape & size their own but have capability to acquire the shape of containers.

Types of fluid →

→ Ideal fluid are those which are incompressible i.e. volume fixed.
 * They have property of zero resistance i.e. viscosity & surface tension assumed to zero.

Density (ρ): (Mass density (ρ)) →

For uniformly distributed mass, ρ is defined as mass/volume

$$\rho = \frac{\text{Mass}}{\text{Volume}} = \frac{\Delta m}{\Delta V}$$

But, in case of non-uniformly distributed mass, density at a point is given by -

$$\rho = \frac{dm}{dv}$$

$$\rho_{\text{Water}} = 1 \text{ g/cc} = 1000 \text{ kg/m}^3$$

Weight density (w)

$$W = \frac{(\Delta m)g}{\Delta V}$$

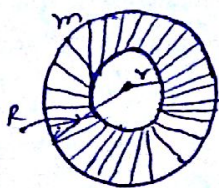
$$w = \rho g$$

Relative density

$$= \frac{\text{density of substance}}{\text{density of water at } 4^\circ\text{C}}$$

$$\rightarrow 1 \text{ g/cm}^3 = 10^3 \text{ kg/m}^3$$

*** # ' ρ ' of material & ' ρ ' of body →



$$\rho_{\text{body}} = \frac{m}{\frac{4}{3}\pi R^3}$$

$$\rho_{\text{material}} = \frac{m}{\frac{4}{3}\pi(R^3 - r^3)}$$

* Both have equal density if there is no gravity.

$$\rho_{\text{body}} \leq \rho_{\text{material}}$$