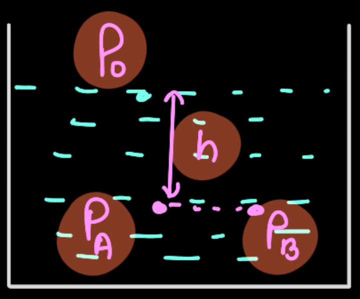
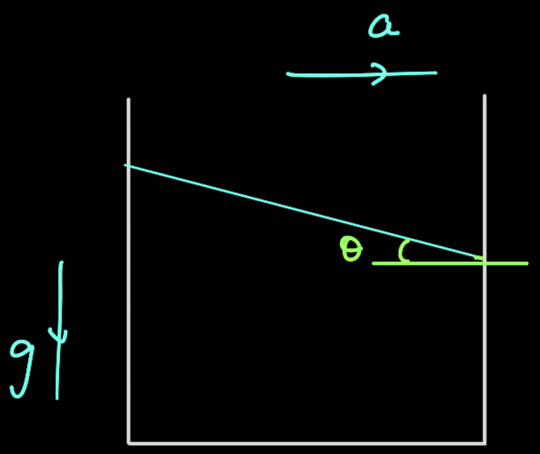
Mechanical Properties Of Fluids

Pressure → Lagta nhi hota hai iski wajah se force lagta hai



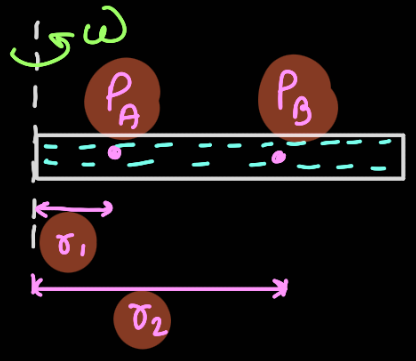
$$\boxed{P_A = P_0 + h\rho g = P_B}$$

If container and liquid is at rest then same hight par pressure same hoga



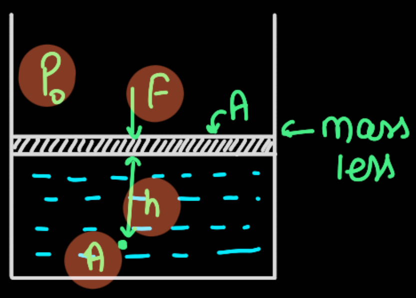
$$\boxed{\tan\theta = \left(\frac{a}{g}\right)}$$

Hz me pseudo force ki dirxⁿ me pressure badhega.

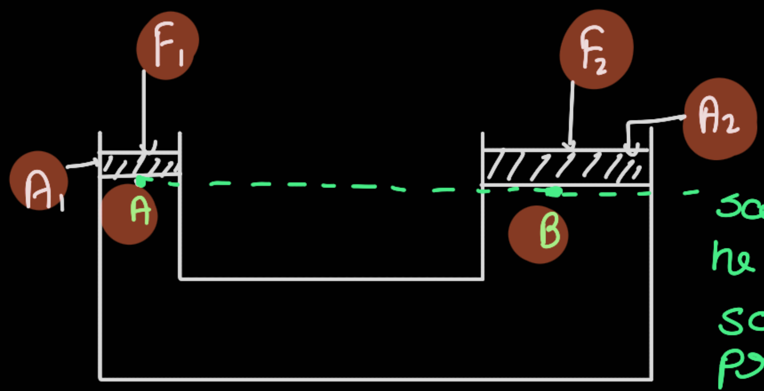


$$\boxed{P_A - P_B = \frac{1}{2}\rho\omega^2\left(r_2^2 - r_1^2\right)}$$

r = distance of point from the rotating axis



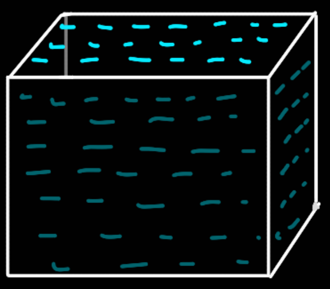
$$\boxed{P_A = P_0 + \frac{F}{A} + \rho g h}$$



same height same pressure.

$(P_A = P_B)$

$$\boxed{F_2 = F_1\left(\frac{A_2}{A_1}\right)}$$

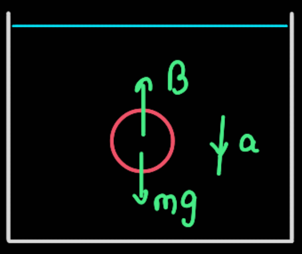


$$\boxed{F_{\text{on side walls}} = \left(P_{\text{at centre of wall}}\right)\left(\text{Area of wall}\right)}$$

BUOYANCY

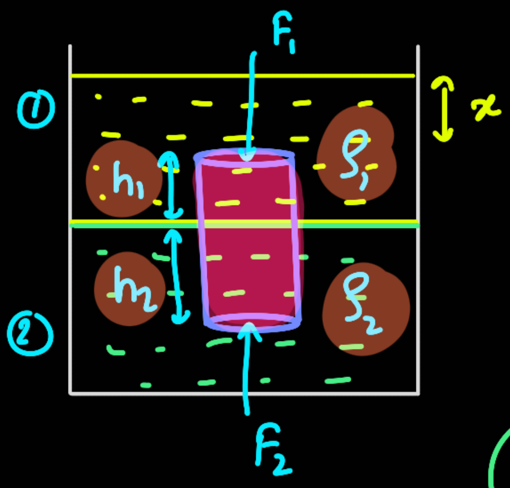
$$\boxed{\text{Buoyancy} = \rho_L V_d\, g}$$

ρ_L = density of liq.
V_d = vol. of liq. displaced
or
vol. of obj inside liq.



$$a = g\left(1 - \frac{\rho_L}{\rho_s}\right)$$

ρ_L = density of liq.
ρ_s = density of obj.



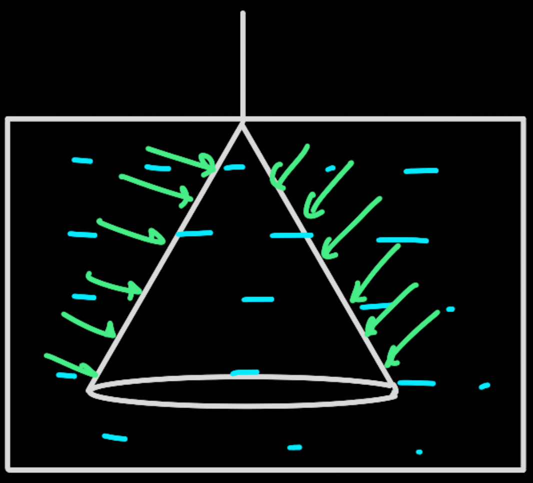
force by ① on cylinder

$$\boxed{(P_0 + \rho_1 g x)A = F_1}$$

force by ② on cylinder

$$\boxed{F_2 = (P_0 + \rho_1 g x + \rho_1 g h_1 + \rho_2 g h_2)A}$$

$$\boxed{\boxed{F_1 - F_2 = B}}$$

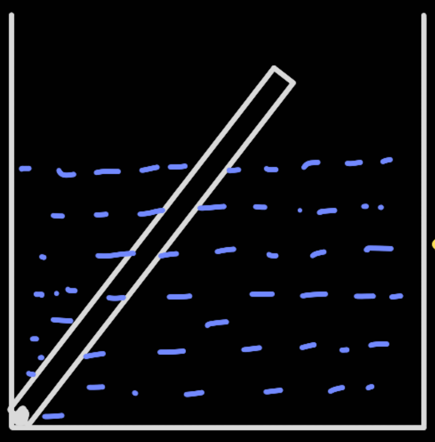


$$\boxed{B = F_b - F_s}$$

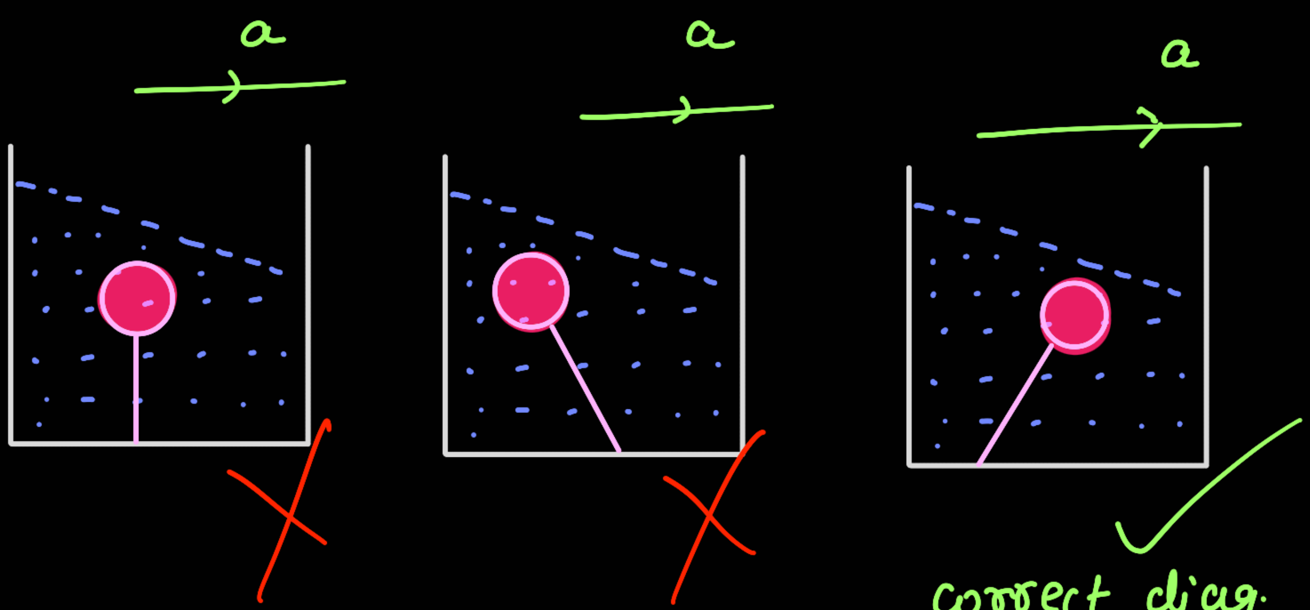
F_b: F_{on} base
F_s: F_{on} side walls

$$\boxed{\text{Specific gravity / Relative } \rho = \frac{\rho_s}{\rho_w}}$$

ρ_s ← substance
ρ_w ← ρ of water.



Is case me Buoyency displaced liquid ke com par lagega yani jitna rod duba hua hai uske com par.

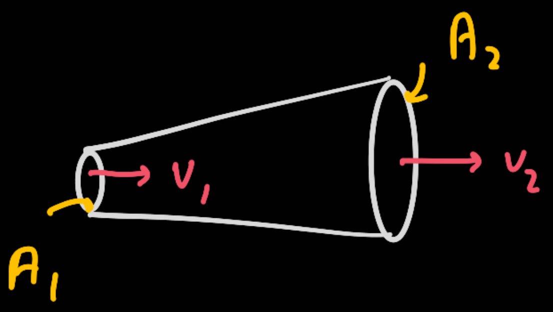


correct diag.

FLUID DYNAMICS

Equation of Continuity →

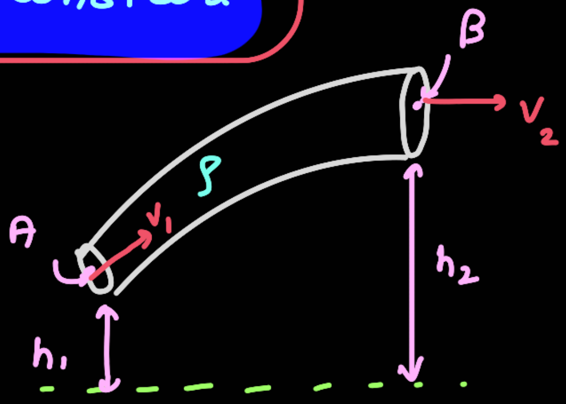
$$\boxed{A_1V_1 = A_2V_2}$$



Bernoulli Theorem

$$\boxed{P_A + \rho g h + \frac{1}{2}\rho v^2 = \text{constant}}$$

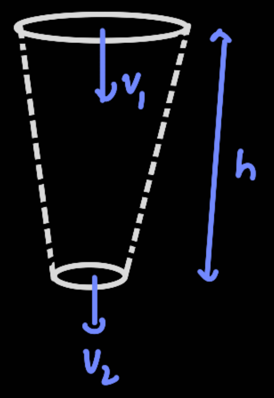
i.e.



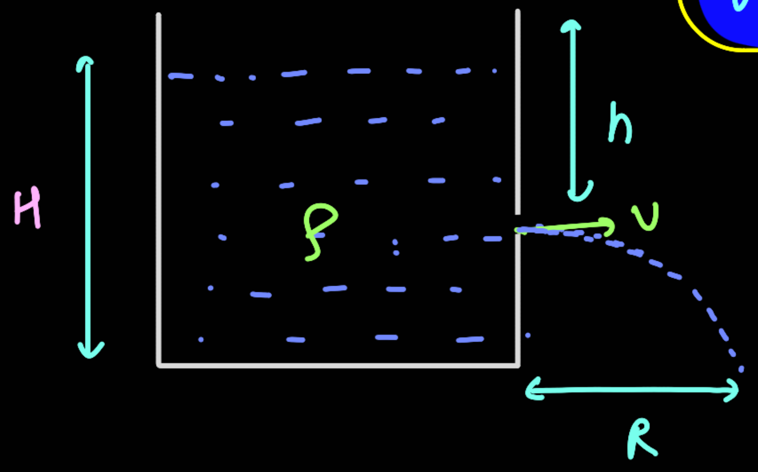
$$P_A + \rho g h_1 + \frac{1}{2}\rho v_1^2 = P_B + \rho g h_2 + \frac{1}{2}\rho v_2^2$$

Tap water (Dhaar walla Sawal)

$$\boxed{v_2^2 = v_1^2 + 2gh}$$



Velocity of Efflux.



$$\boxed{v = \sqrt{2gh}}$$

$$\boxed{R_{max} = H}$$

$$\boxed{h = H/2} \leftarrow \text{for } R_{max}.$$

$$\boxed{R = \sqrt{h(H-h)}}$$

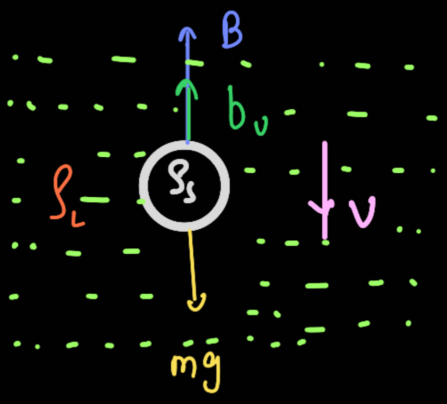
$$\boxed{F_{thrust} = \rho A_{hole}\, 2gh} \leftarrow F_{thrust} = \frac{dm}{dt} \cdot V_{rel.}$$

STOKES LAW

$$\boxed{f_v = 6\pi r \eta v}$$

for a spherical body.

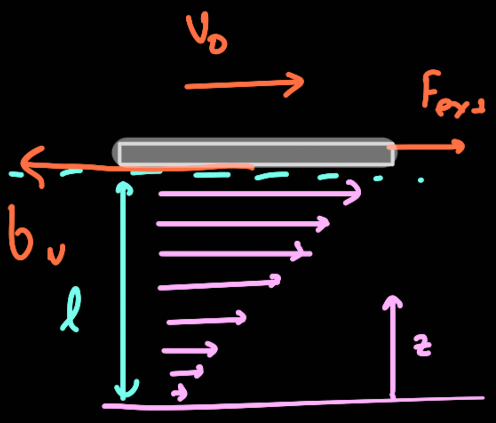
- f_v = viscous force
- η = coefficient of viscocity.
- r = radius of sphere



$$\boxed{V_T = \frac{2}{9} \frac{r^2 g (\rho_s - \rho_l)}{\eta}}$$

Terminal velocity.

VISCOSITY

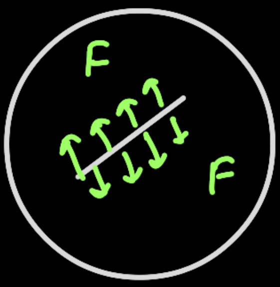


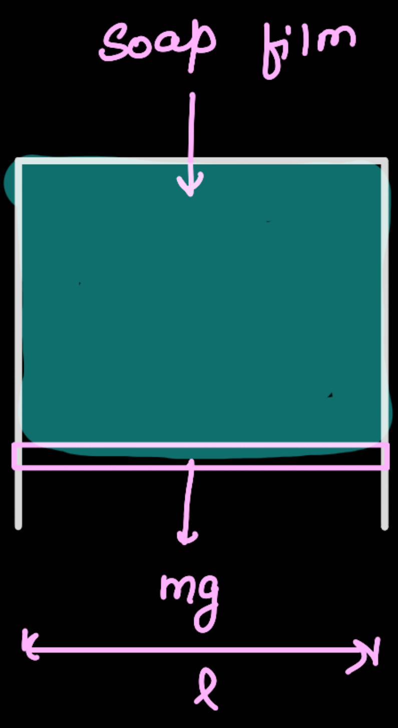
$$f_v = \left|\eta A \frac{dv}{dz}\right| = \boxed{f_v = \left|\eta A \frac{v_0}{l}\right|}$$

A = area of contact

Surface Tension

$$\boxed{F = S\ell}$$





Soap film ke case me surface 2 hota hai dhyan rakhna !!

$$\boxed{mg = 2S\ell}$$

$$\boxed{\text{Surface Energy} = S \cdot A}$$

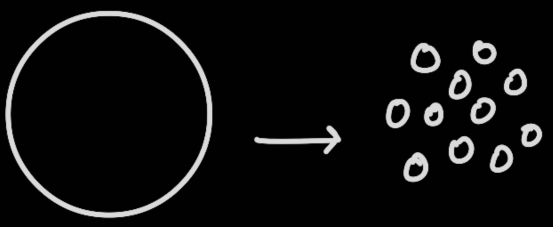
S = Surface Tension.

A = Free Surface area.

SI unit of viscocity → 1 Pa sec = Poiseuille.

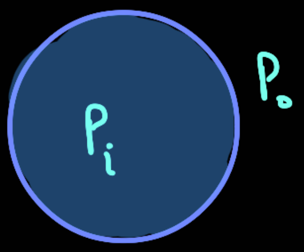
CGS unit of viscosity → 1 Poise

$$\boxed{10 \text{ Poise} = 1 \text{ Deca Poise} = 1 \text{ Poiseuille}}$$



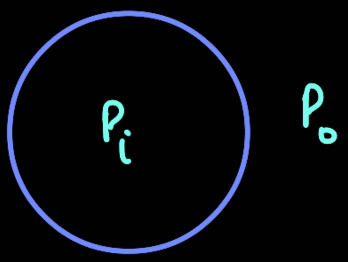
$$\boxed{(\Delta SE) = mS\Delta T = \Delta Q}$$

Liquid Bubble



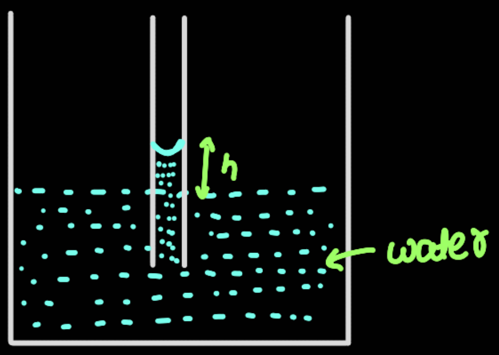
$$\boxed{P_i - P_o = \frac{2S}{R}}$$

Soap Bubble



$$\boxed{P_i - P_o = \frac{4S}{R}}$$

Tube/ Capilliary Action



$$h = \frac{2S}{R\rho g} = \frac{2S\cos\theta}{r\rho g}$$