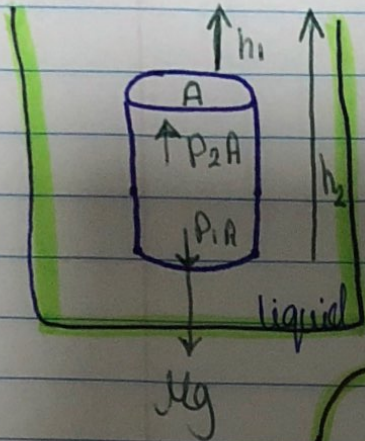


Experiment 3: Density of Liquids:

- Fluids Means :
 → Gases : if they are at the rest
 → Liquids : The force they exert on the surface is :

Perpendicular on the surface.



The pressure of the fluid on a surface is = $P = \frac{\text{Force}}{\text{Area}} = \frac{F}{A}$

$$P_2A - P_1A - Mg = \text{Zero}$$

because of the cylinder is on static equilibrium
 $F_{\text{net}} = \text{Zero}$

$$M = \rho V = \text{density} \times \text{volume}$$

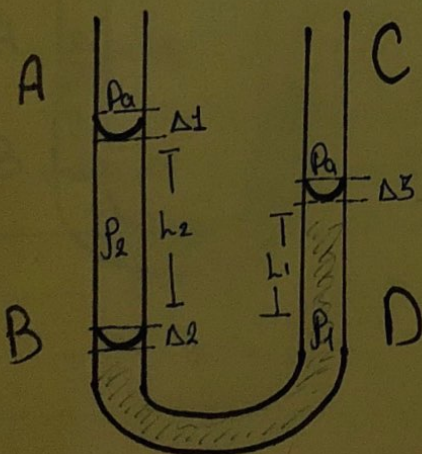
$$V = A(h_2 - h_1)$$

$$A(P_2 - P_1) = \underbrace{\rho A(h_2 - h_1)}_M g$$

$$P_2 - P_1 = \rho \Delta h g$$

The difference in pressure depends on :

- 1] vertical height
- 2] liquid's type



$$P_B - P_A = \rho_2 h_2 g \quad \text{--- [1]}$$

$$P_D - P_C = \rho_1 L_1 g \quad \text{--- [2]}$$

$P_A = P_C = P_0$ (atmospheric pressure)
 $P_B = P_D = \text{same vertical height}$

$$\text{So } \rho_2 h_2 = \rho_1 L_1$$

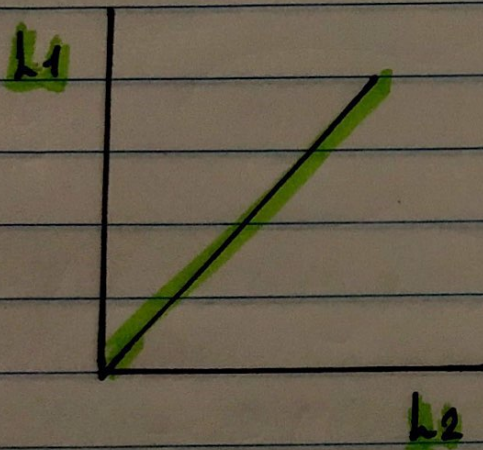
since ρ is water's density = 1

$$\rho = \frac{L_1}{L_2}$$

UNC. ? $\frac{\Delta \rho}{\rho} = \frac{\Delta L_1}{L_1} + \frac{\Delta L_2}{L_2}$

$$\Delta L_1 = \Delta_2 + \Delta_3$$

$$\Delta L_2 = \Delta_1 + \Delta_2$$



Graph of 8

L_1 vs L_2

so the slope 8

$$\frac{\Delta L_1}{\Delta L_2} = \rho$$