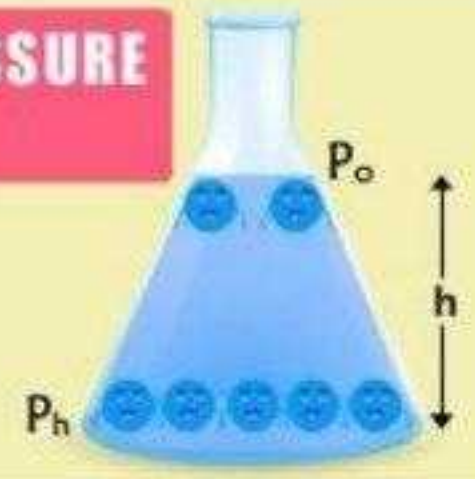
FLUID MECHANICS

1 PRESSURE IN A FLUID

$$P = \frac{F}{A} = \frac{\text{Force}}{\text{Area}}$$

2 VARIATION IN PRESSURE WITH DEPTH

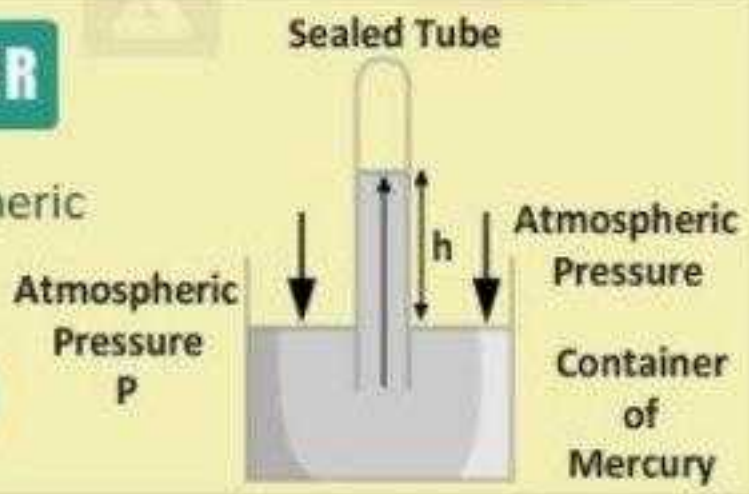
$$P_h = P_o + \rho gh$$



3 BAROMETER

Measures atmospheric pressure

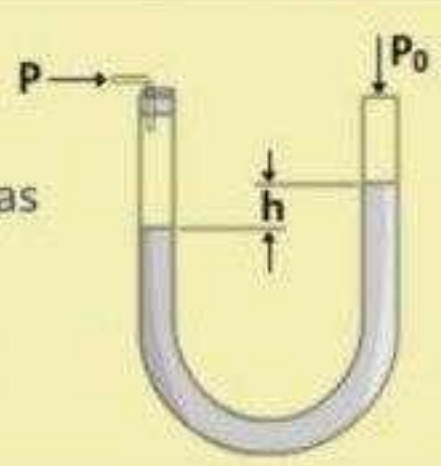
$$P_o = \rho gh$$



4 MANOMETER

Measures the Pressure of gas inside a container

$$P - P_o = \rho gh$$



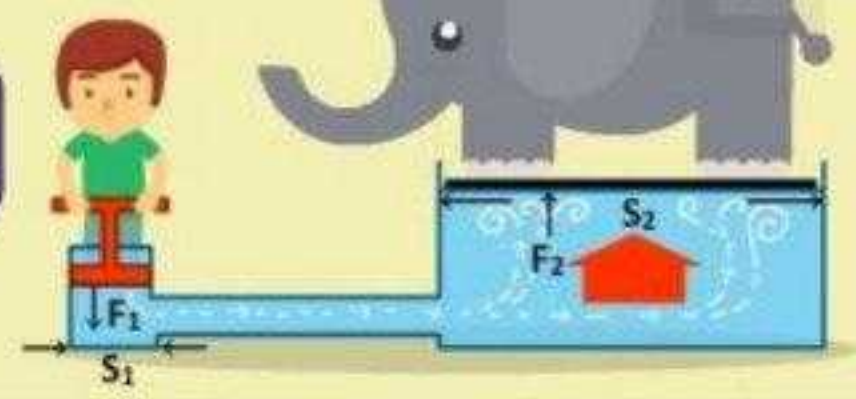
5 PASCAL'S LAW

The pressure applied at one point in an enclosed fluid is transmitted uniformly to every part of the fluid and to the walls of the container.

$$\frac{F_1}{S_1} = \frac{F_2}{S_2}$$

6 HYDRAULIC LIFT

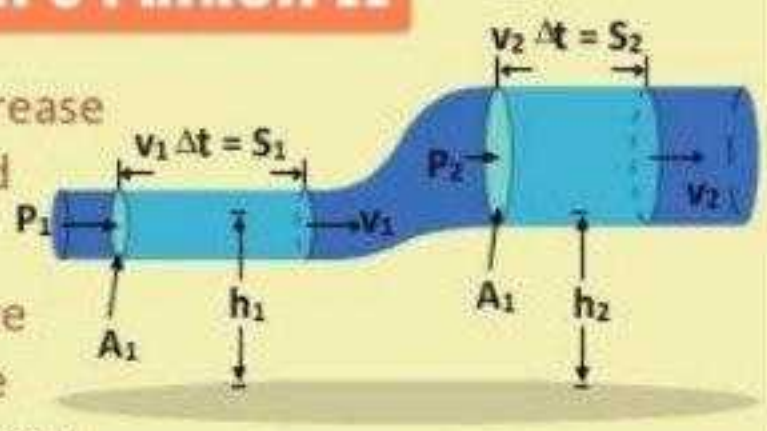
$$P_2 = P_1$$
$$F_2 = P_1 S_2$$



7 BERNOULLI'S PRINCIPLE

A simultaneous increase in the speed of fluid occurs with a decrease in pressure or a decrease in the fluid's potential energy.

$$P + \rho gh + \frac{1}{2}\rho v^2 = \text{constant}$$



8 EQUATION OF CONTINUITY

In steady flow, the mass of fluid entering per second at one end is equal to the mass of fluid leaving per second at the other end

$$A_1 v_1 = A_2 v_2 = \text{Constant}$$

Meaning that in steady flow the product of cross-section and the speed of fluid remains constant everywhere .

9 ARCHIMEDE'S PRINICIPLE

A body totally or partially submerged in a fluid is subjected to an upward force equal in magnitude to the weight of fluid it displaces.

$$F_2 = V_i \rho_L g$$

V_i : submerged volume of solid