

Q) How hydrometer work?

Hydrometer is glass tube with a scale marked on its stem and heavy weight in the bottom. It is partially immersed in a liquid, the density of which is to be measured.

1) Define terms Elasticity, Stress, Strain.

Elasticity :- The property of a body to restore its original size and shape as the deforming force is ~~rem~~ ceases to act (removed) is called elasticity.

Stress :- The force acting on unit area on the surface of body is called stress, its unit is  $Nm^{-2}$ .

$$\text{Stress} = \frac{\text{Force}}{\text{Area}}$$

Strain :- When stress applied on body, it may change its length, volume, shape. Ratio of this change with original length, volume, shape is called strain.

If stress produces change in length of body it is called tensile strain.

$$\text{Tensile strain} = \frac{\text{Change in length}}{\text{original length}}$$

→ Strain is ratio of similar things so has no unit.

Q) Explain Hooke's law.  
Hooke's law :-

Strain produced in body by stress is directly proportional, within the elastic limit.  
Stress  $\propto$  strain  
Stress = (constant) (strain)

$$\frac{\text{Stress}}{\text{Strain}} = \text{constant}$$

Elastic limit :- Maximum stress that a material withstand without breaking is called elastic limit. Stress more than elastic limit will break the substance.

Q) What is Young Modulus? Derive its relationship.

Ans. Young Modulus :- Ratio of stress to tensile strain is called Young Modulus, its symbol is (Y) and unit is  $\text{Nm}^{-2}$ .

Let a long bar has length  $L_0$  and area "A", due to applied stress its length become L, Change in length  $\Delta L = L - L_0$

$$\text{Young Modulus} = \frac{\text{Stress}}{\text{Tensile Strain}}$$

$$Y = \frac{F}{A} \div \frac{\Delta L}{L_0}$$

$$Y = \frac{F}{A} \times \frac{L_0}{\Delta L}$$

$$Y = \frac{FL_0}{A \Delta L}$$

Q) It is easy to remove air from a balloon but it is very difficult to remove air from a glass bottle. Why?

Ans) Because the atmospheric pressure act more easily on balloon as compared to glass bottle, so emptying air is easier from balloon than glass bottle.

Q) What makes a sucker pressed on smooth wall stick to it?

Ans) When a sucker is pressed on a smooth surface, the air pressure below

it become very small (due to displaced air)  
as compared to air pressure above it.  
Therefore it sticks with smooth surface.

→ why does the atmospheric pressure  
vary with height?

As we go to height, density  
of air start decreasing, therefore  
atmospheric pressure also decreasing.