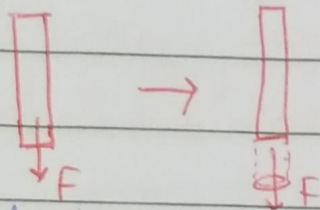# Mechanical Properties of Solid :-

Stress :- The internal restoring force per unit area of the body subjected to external deforming force

$$\text{Stress} = \frac{\text{Restoring Force}}{\text{Area}} = \frac{\text{Deforming Force}}{\text{Area}} = \frac{F}{A}$$

SI unit :- Nm^{-1} or Pa (Pascal)

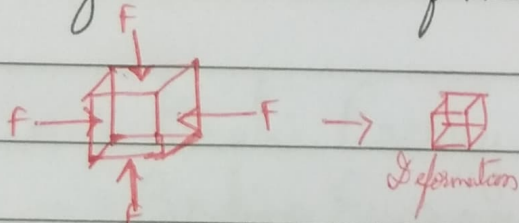## Types of stress :-

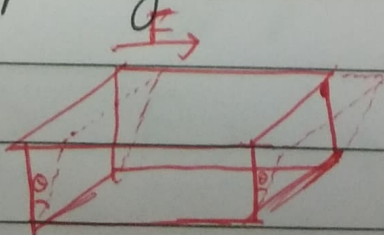1) Longitudinal stress :- Stress experienced by material along its longitudinal axis

$$\text{Tensile stress} = \frac{F}{A}$$

2) Volumetric / Bulk stress :- Stress experienced by material which brings about change in volume of material

Deformation

3) Shearing / Tangential stress :- Stress experienced by material such that the one part of body slides across other part of body.

<u>Strain:-</u> It is the ratio of change in size/shape to the original size/shape

It is dimensionless

<u>Types of strain:-</u>

1) <u>Longitudinal strain:-</u> Strain resulted by tensile/longidutinal stress on the material

$$\text{Longitudinal strain} = \frac{\text{Change in length}}{\text{Original length}} = \frac{\Delta L}{L}$$

2) <u>Volume strain:-</u> Strain resulted by bulk/volumetric stress on the material

$$\text{Volume strain} = \frac{\text{Change in volume}}{\text{Original volume}} = \frac{\Delta V}{V}$$

3) <u>Shearing strain:-</u> Strain resulted by shearing stress on material

$$\text{Shear strain} = \tan\theta$$