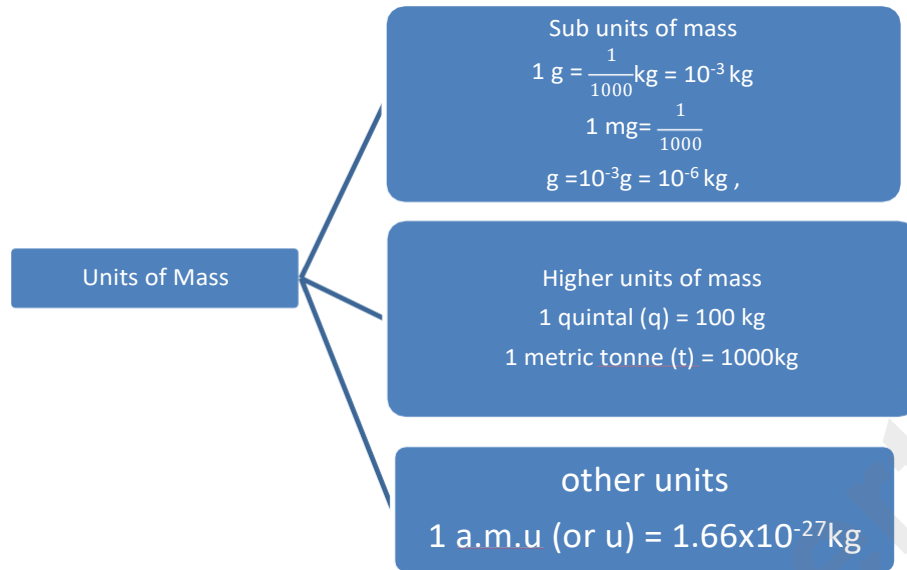


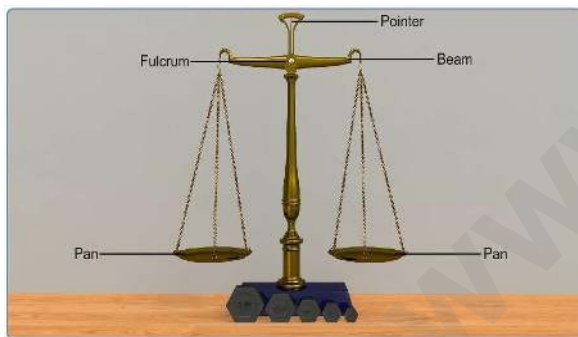
MEASUREMENTS

Mass : - the mass of a body is the quantity of matter contained in it regardless of its volume or any force acting on it.

Units of Mass :



Measurement of Mass: Beam Balance



Characteristics of true beam balance :

1. Both the arms must be of equal lengths.
2. Both the pans must be of equal masses.
3. On lifting up the empty beam balance, the pointer should be vertical and the rod should be horizontal.

Principle of a beam balance :

Two bodies of equal or same mass would secure a balance on the beam balance having arms of equal length and pans of equal masses.

Weight : It is the force with which a body is attracted towards the earth.

Units of Weight:

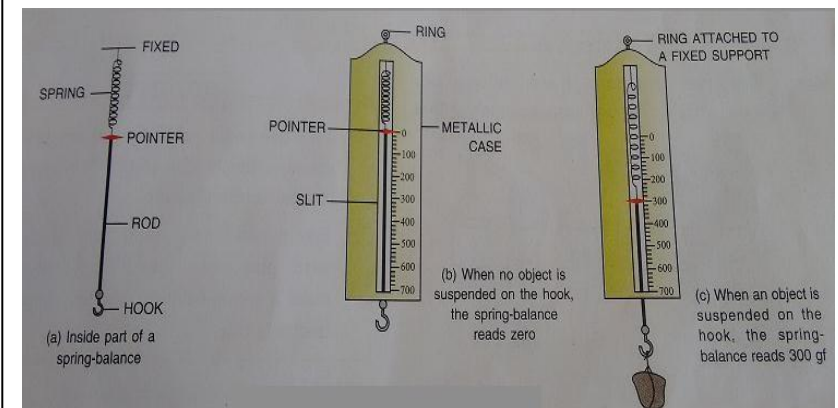
SI unit - newton (N)

$1 \text{ N} = 10^5 \text{ dyne}$

$1 \text{ Kgf} = 9.8 \text{ N}$

$1 \text{ gf} = 980 \text{ dyne}$

Measurement of Weight : Spring Balance



Principle :

The more the weight attached to the spring, the more the spring gets stretched .

| Mass | Weight |
|------------------------------|--|
| Quantity of matter contained | Force with which a body is attracted towards earth |
| can never be zero | can be zero |
| scalar quantity | vector quantity |
| measured by beam balance | measured by spring balance |
| SI unit- kg | SI unit - N |
| It is universally constant | depends on gravity |

Density :

$$\text{Density of a substance} = \frac{\text{mass of substance}}{\text{volume of substance}}$$

SI unit : kg m^{-3} ; CGS unit : g cm^{-3}

$$1 \text{ g cm}^{-3} = 1000 \text{ kg m}^{-3}$$

$$\text{Density of water} = 1 \text{ g cm}^{-3} = 1000 \text{ kg m}^{-3}$$

Relative Density :

$$\text{R.D} = \frac{\text{Density of substance}}{\text{Density of water at } 4^{\circ}\text{C}}$$

Unit : **NO UNIT**

$$\text{Density in g cm}^{-3} = \text{R.D}$$

$$\text{Density in Kg m}^{-3} = \text{R.D} \times 1000$$

$$\text{R.D} = \frac{\text{Mass of a certain volume of substance}}{\text{Mass of the same volume of water at } 4^{\circ}\text{C}}$$

Sinking and Floating

When Object floats ?

☐ Density of object < Density of liquid.

When Object Sinks ?

☐ Density of object > Density of liquid.

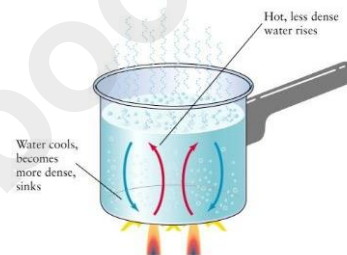
Effect of Temperature on Density :

In solids ,Liquids and gases – density decreases with increase in temperature.

Exception : Water – density decreases on freezing ., i.e., ice floats on water.

Convectonal current in liquids and gases :

Fluids on heating expands and become lighter moves upwards , whereas the cold fluid being heavier moves downwards. This cycle of upward and downward movements of fluids forms convectonal currents.



Practical Applications :

- ☐ Ventilators placed near roof and windows near floor
- ☐ Chimneys in factories
- ☐ Cooling chest in refrigerator (fitted near top of fridge)
- ☐ Installation of air conditioner (above window level)
- ☐ Installation of room heater (near the floor)