LAWS OF MOTION

Force: Force is an agent which can cause the change in position, shape or size of the body.

Contact forces: when the force is in contact with the body on which it is been applied

Non – contact forces: when the force is not in contact with the body on which it is been applied.

Newton's First Law of Motion

Everybody remains in rest of state of uniform motion. Unless and until on external unbalanced force is applied on it.

Inertia: Inability to change

Inertia of Rest: The tendency of body to remain in rest.

Inertia of motion: the tendency of body to remain in uniform motion

Inertia of direction: Inability to change the direction of motion by its own.

Newton's Second Law of Motion –

Force on body is directly proportional to rate of change of momentum of body.

$$F \propto \frac{dP}{dt}$$

$$\vec{F} = m\vec{a}$$

Newton's Third Law of Motion

Every action has an equal and opposite reaction.

Weight
Weight is the force exerted by earth on the body of mass 'm'

$$W = mg$$

Frame of Reference: The position or co – ordinate system from where, an observer is observing.

Inertial frame of reference	Non - Inertial frame of reference
The frame of reference which is either at rest or moving with constant velocity.	The accelerated frame of reference
Newton's law's of motion are valid in inertial frame of reference	Newton law motion are not valid in non - inertial frame of reference

Normal Reaction force

- It is a contact force
- NRF always acts in $\perp^{er}$ direction of the surface in contact
- If contact loses, then NRF becomes zero.

Types of equilibrium –

- **Equilibrium:** When net force on a body is zero, then we say that body is in equilibrium
- **Static Equilibrium:** When body is at rest
- **Dynamic Equilibrium:** When body is in uniform state of motion

Tension Force - It is a contact force produced in string when a mass is hanged to it or a force as applied on it

➤ It is always pulling in nature

Con-current forces: When all the forces on a body passes through a point, then they are called as concurrent forces.

Lami's Theorem:

When three concurrent forces act on a body & body is in equilibrium then

$$\frac{F_1}{\sin \alpha} = \frac{F_2}{\sin \beta} = \frac{F_3}{\sin \gamma}$$

$$\alpha + \beta + \gamma = 360°$$