

BASIC DEFINITIONS:

Particle:

- * An object that has mass but the dimension is negligible is termed as particle.
- * A particle is assumed to occupy a point in space.

Rigid Body:

- * A rigid body is a combination of large no. of particles occupying fixed positions with respect to each other.
- * The distance b/w any two particles remain same before and after application of forces. {In reality a rigid body does not exist}

Resistant Body:

- * If the deformation or change in distance b/w any two particles is negligible and not significant when a force is applied, it is known as resistant body.

Scalar Quantity

- * A physical quantity that has only magnitude is called scalar quantity. Ex: Length, Mass, Area, Volume

Vector Quantity

- * A physical quantity that has both magnitude and direction is called vector quantity. Ex: Force, Velocity, Acceleration.

Inertia:

- * Inertia is the resistance of any physical object to any change in its state.
- * changes to object's speed, direction or state of rest.

Inertia force:

* A force equal in magnitude but opposite in direction and collinear with applied force.

$$* F_I = -m \cdot a$$

Mass:

* It is the quantity of matter & is constant at all places.

* It is a scalar quantity whose value never goes to zero.

* Unit = kilogram (kg)

Weight:

* It is the force with which an object is attracted towards the center of the earth.

* Hence value changes if acceleration due to gravity ($g = 9.81 \text{ m/s}^2$) changes.

* $g = 0$ at earth center / $W = m \cdot g$
 $m = \text{mass of body (kg)}$
 $g = \text{acceleration due to gravity (m/s}^2\text{)}$

* Unit = Newton (N)

* $1 \text{ kgf} = 9.81 \text{ N}$ (sometimes expressed in kgf)

FORCE:

"A force can be defined as a physical quantity that changes or tries to change the state of rest or of uniform motion of an object."

* Force is the exhibition of action of one particle on the other.

Force System:

Combination of more than one forces acting on an object.