Physics

→ Dynamics

First law of motion - An object will remain at rest or at uniform motion unless an external unbalanced force acts on it

Second law of motion - Force acting on a body is equal to rate of change of momentum

Third law of motion - If object A exerts a force on object B then object B exerts equal and opposite force on object A

Inertia - The tendency of an object to remain at rest or uniform motion
- more mass, more inertia.

Mass - The property of an object to resist changes in motion.

Momentum - momentum is the product of the mass and velocity of an object.

Principle of conservation of momentum
- In a closed system, the total momentum before collision is equal to the total momentum after collision.

Perfectly Elastic collisions
- all momentum is conserved
- all kinetic energy is conserved (k.e before collision = k.e after)

Perfectly Inelastic Collisions
- all momentum is conserved
- kinetic energy not conserved
- objects stick together after the collision

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⇒ Force, Density and Pressure

Centre of Gravity - The point where all the weight of the body seems to be concentrated.

Centre of Mass - The point where all the mass seems to be concentrated

Moment of a Force - The moment of a force about a pivot is the product of that force and the perpendicular distance between the line of action of the force and the pivot.

Couple - it is a pair of equal, parallel forces that are opposite in direction

Torque of a couple - The torque of the couple is the product of one of the forces and the perpendicular distance between the lines of actions of these two forces.

Principle of moments - An object is in equilibrium if the sum of anticlockwise moment = clockwise moment about the same pivot.

System in equilibrium - When there is no resultant force and no resultant moment the system

Density - The density of a material is its mass per unit volume

Pressure - Force per unit area

Origin of the upthrust acting on a body in a fluid

- A fluid will exert a force upward on a body if it is partly or wholly submerged in it, because the deeper you go into a fluid the greater the pressure. The difference between the pressure on the top and bottom of the body produces an upward force called upthrust.

⇒ Work, Energy and Power

Work Done - it is the product of force and displacement moved in the direction of the force.

Kinetic Energy - The energy stored in an object due to its velocity

Gravitational Potential Energy - The energy stored in a mass due to its position in a gravitational field.

Elastic Potential Energy - The energy stored by an object due to extension / compression.

Power - Rate of work done $\left(\frac{W}{t}\right)$