COLLISION

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COLLISION

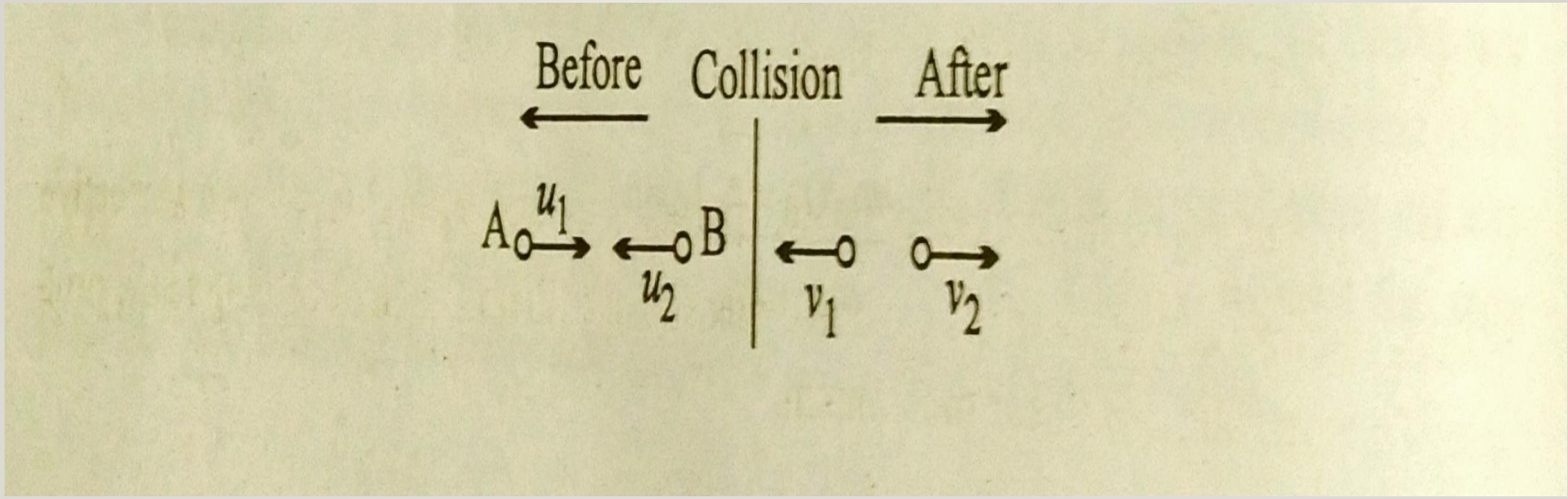
- When two bodies are approaching each other,a force comes into play between them for a finite time and brings about a measurable change in their velocities , momenta and energy according to the conservation law;then it is said to be collision.
- If the nature of the bodies does not change after collision,then the collision is termed scattering.
- The deflection of an alpha particles by an atomic nucleus is the familiar example of scattering.

THERE ARE TWO TYPES OF COLLISION

- Elastic collision
- Inelastic collision

ELASTIC COLLISION

- A collision said to be an elastic collision if collision if linear momentum and kinetic energy are conserved.



Consider particles 1 and 2 with masses m1, m2, and velocities u1, u2 before collision, v1, v2 after collision. The conservation of the total momentum before and after the collision is expressed by

Total linear momentum before collision = Total kinetic energy after collision

$$\Rightarrow \quad m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$$

i.e., Linear momentum is conserved during the process

Total K.E. Before collision= Total K.E. After collision

$$\Rightarrow \quad \frac{1}{2}m_1u_1^2 + \frac{1}{2}m_2u_2^2 = \frac{1}{2}m_1v_1^2 + \frac{1}{2}m_2v_2^2$$

i.e.,K.E. Is conserved during the process.

Example

- Collision between atoms and nuclei
- Collision between particles like electron, protons,alpha particles etc.

INELASTIC COLLISION

A collision is said to be inelastic collision if linear momentum conserved and K.E. Doesn't conserve.

In this process K.E. May be increased or decreased after collision.

Before collision Total K.E.> after collision Total K.E.

$$\Rightarrow \quad \frac{1}{2}m_1u_1^2+\frac{1}{2}m_2u_2^2>\frac{1}{2}m_1v_1^2+\frac{1}{2}m_2v_2^2$$

Or before collision Total K.E.<after collision Total K.E.

$$\frac{1}{2}m_1u_1^2+\frac{1}{2}m_2u_2^2<\frac{1}{2}m_1v_1^2+\frac{1}{2}m_2v_2^2$$

It is important to note that in the case of inelastic Collision,only the sum of the K.E. After collision is different from the sum of the K.E. Before the collision but the total energy of the system remain conserved