Qu

HOME ASSIGNMENT (CH-2)

1. By law of conservation of linear momentum

$$M_G V_G + M_B V_B = 0$$

$$\Rightarrow V_G = \frac{-M_B V_B}{M_G} = -\frac{0.02 \times 1500}{20} = 1.5 \text{ m/s}$$

[recoil velocity]

$$\text{Force} = n M_B V_B = 10 s \times 0.2 \frac{kg}{} \times 150 m/s$$
$$= 300 N$$

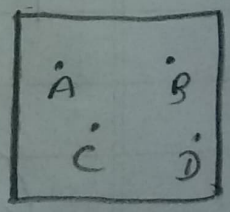
2. The total momentum of an isolated system of interacting particles is conserved

$$(F_{net})_{external} = 0$$

$$\vec{F}_{AB} = -\vec{F}_{BA} \Rightarrow \vec{F}_{AB} + \vec{F}_{BA} = 0$$

$$\vec{F}_{BC} = -\vec{F}_{CB} \Rightarrow \vec{F}_{BC} + \vec{F}_{CB} = 0$$

$$\vec{F}_{CD} = -\vec{F}_{DC} \Rightarrow \vec{F}_{CD} + \vec{F}_{DC} = 0$$



$$\vec{F}_{AB} + \vec{F}_{BA} + \vec{F}_{BC} + \vec{F}_{CB} + \vec{F}_{CD} + \vec{F}_{DC} = 0$$

∴ The total internal forces is zero.
Hence, law of conservation of linear momentum is proved.

3 A bomb explodes into several parts. These parts move in different directions. Let the mass of the one part be m_1 and other part is m_2. So, according to the conservation of momentum,

$$Mv = m_1v_1 + m_2v_2$$

Here v will be 0 as the bomb is at rest.
V_1 & V_2 are velocities of two masses after explosion.

$$M(0) = m_1v_1 + m_2v_2$$
$$m_1v_1 + m_2v_2 = 0$$
$$m_1v_1 = -m_2v_2$$

The masses can't be negative & so, the velocities are negative. Therefore a bom exploded into several parts.

Home Assigment (Ch-2)

1 The total momentum after collision = 7.5 kg m/s

The velocity of the combination of these objects after collision is = 1.15 m/s.