H.W
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HOME ASSIGNMENT

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Q.1. Two objects of ~~no~~ masses 100g & 200g are moving along the same line & direction with velocities of 2m/s & 1m/s respectively. They collide & after the collision, the first objects moves at a velocity of 1.67m/s. Determine the velocity of the second object.

Ans- $m_1 = 100g$
$= \underline{0.1kg}$
$m_2 = 200g$
$= \underline{0.2kg}$
$v_1 = 2m/s$
$v_2 = 1m/s$
$v_3 = 1.67m/s$

According to the law of conservation of momentum :-
Total momentum before collision = Total momentum after collision.

=) $m_1v_1 + m_2v_2 = m_1v_3 + m_2v_4$
=) $2(0.1) + 1(0.2) = 1.67(0.1) + v_4 \times 0.2$
=) $0.4 = 0.167 + 0.2 \times v_4$
=) $v_4 = 1.165 m/s$

Q.2. From a rifle of mass 4 kg, a bullet of mass 50 g is fired with an initial velocity of 35 m/s. Calculate the initial recoil velocity of the rifle.

Ans- $m_1 = 50\ g = 0.05\ kg$

$m_2 = 4\ kg$

$v_1 = 35\ m/s$

$$v_2 = \frac{-m_1 v_1}{m_2}$$ (v_2 = recoil velocity)

$$= \frac{-0.05 \times 35}{4} \quad = \frac{-1.75}{4} = -0.4375\ m/s$$