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SUBJECT:- PHYSICS CLASS:- IXTH DATE:17/09/XX

SUBJECT TEACHER:- MR. NEEL NIRANJAN

CHAPTER 2. (FORCE & LAWS OF MOTION)(BASED ON NCERT PATTERN)

Question 1. Two objects of masses 100 g and 200 g are moving along the same line and direction with velocities of 2 m/s and 1 m/s respectively. They collide and after the collision the first object moves at a velocity of 1.67 m./s. Determine the velocity of the second object.

Answer:

$$m_1 = 100\ g = 0.1\ kg$$
$$m_2 = 200\ g = 0.2\ kg$$
$$u_1 = 2\ m/s$$
$$u_2 = 1\ m/s$$

After collision

$$v_1 = 1.67\ m/s$$
$$v_2 = ?$$
$$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$$
$$(0.1 \times 2) + (0.2 \times 1) = (0.1 \times 1.67) + (0.2 \times v_2)$$
$$\therefore \quad 0.2 + 0.2 = 0.167 + 0.2v_2$$
$$0.4 - 0.167 = 0.2v_2$$
$$\frac{0.4 - 0.167}{0.2} = v_2$$
$$\therefore \quad \frac{0.233}{0.2} = 1.165\ m/s$$

$\therefore$ The velocity of the second object is 1.165 m/s.

Question 2. Explain, why is it difficult for a fireman to hold a hose, which ejects a large amount of water at a high velocity.

Answer: The water that is ejected out from the hose in the forward direction comes out with a large momentum and equal amount of momentum is developed in the hose in the opposite direction and hence the hose is pushed backward. It becomes difficult for a fireman to hold a hose which experiences this large momentum.