

SUBJECT:- PHYSICS

CLASS:- IXTH

DATE :- 29/06/XXI

SUBJECT TEACHER:- MR. NEEL NIRANJAN

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

1. Why is it advised to tie any luggage kept on the roof of a bus with a rope?

Ans. In moving vehicle like bus, the motion is not uniform, the speed of vehicle varies and it may apply brake suddenly or takes sudden turn. The luggage will resist any change in its state of rest or motion, due to inertia and this luggage has the tendency to fall sideways, forward or backward.

To avoid the fall of the luggage, it is tied with the rope.

2. A batsman hits a cricket ball which then rolls on a level ground. After covering a short distance, the ball comes to rest. The ball slows to a stop because

(a) the batsman did not hit the ball hard enough,

(b) velocity is proportional to the force exerted, on the ball.

(c) there is a force on the ball opposing the motion.

(d) there is no unbalanced force on the ball, so the ball would want to come to rest.

Ans. (c) there is a force on the ball opposing the motion.

3. Two objects each of mass 1.5 kg, are moving in the same straight line but in opposite directions. The velocity of each object is 2.5 ms^{-1} before the collision during which they stick together. What will be the velocity of the combined object after collision?

Ans. Mass of the objects $m_1 = m_2 = 1.5 \text{ kg}$

Velocity of first object $v_1 = 2.5 \text{ m/s}$, Velocity of second object $v_2 = - 2.5 \text{ m/s}$

Momentum before collision = $m_1v_1 = m_2v_2$

$$= (1.5 \times 2.5) + (1.5 \times -2.5) = 0$$

Momentum after collision = $m_1 + m_2 = 1.5 + 1.5 = 3.0 \text{ kg}$

After collision $v = ?$

According to law of conservation of momentum

Momentum before collision = Momentum after collision

$$0 = 3 \times v, \quad v = 0 \text{ m/s}$$

4. A hockey ball of mass 200 g travelling at 10 ms^{-1} is struck, by a hockey stick so as to return it along its original path with a velocity at 5 ms^{-1} . Calculate the change of momentum occurred in the motion of the hockey ball by the force applied by the hockey stick.

Ans. Mass of ball $m = 200 \text{ g} = 0.2 \text{ kg}$

Initial speed of ball $u = 10 \text{ m/s}$, Final speed of ball $v = -5 \text{ m/s}$

Initial momentum of the ball = mu

$$= 0.2 \text{ kg} \times 10 \text{ m/s}$$

$$= 2 \text{ kg m/s}$$

Final momentum of the ball = mv

$$= 0.2 \text{ kg} \times (-5 \text{ m/s})$$

$$= -1 \text{ kg m/s}$$

Hence, change in momentum = Difference in the momentum

$$= 2 - (-1). \quad , V = 3 \text{ m/s}$$