

SUBJECT:- PHYSICS

CLASS:- IXTH

DATE :- 24/06/XXI

SUBJECT TEACHER:- MR. NEEL NIRANJAN

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

1. Explain why some of the leaves may get detached from a tree if we vigorously shake its branch.

Ans. When the tree's branch is shaken vigorously the branch attain motion but the leaves stay at rest.

Due to the inertia of rest, the leaves tend to remain in its position and hence detaches from the tree to fall down.

2. Why do you fall in the forward direction when a moving bus brakes to a stop and fall backwards when it accelerates from rest?

Ans. When a moving bus brakes to a stop: When the bus is moving, our body is also in motion, but due to sudden brakes, the lower part of our body comes to rest as soon as the bus stops. But the upper part of our body continues to be in motion and hence we fall in forward direction due to inertia of motion.

When the bus accelerates from rest we fall backwards: When the bus is stationary our body is at rest but when the bus accelerates, the lower part of our body being in contact with the floor of the bus comes in motion, but the upper part of our body remains at rest due to inertia of rest. Hence we fall in backward direction.

3. If action is always equal to the reaction, explain how a horse can pull a, cart?

Ans. The third law of motion states that action is always equal to the reaction but they act on two different bodies.

In this case the horse exerts a force on the ground with its feet while walking, the ground exerts an equal and opposite force on the feet of the horse, which enables the horse to move forward and the cart is pulled by the horse.

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

Ans. 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.

5. An object experiences a net zero external unbalanced force. Is it possible for the object to be travelling with a non-zero velocity? If yes, state the conditions that must be placed on the magnitude and direction of the velocity. If no, provide a reason.

Ans. When an object experiences a net zero external unbalanced force, in accordance with second law of motion its acceleration is zero. If the object was initially in a state of motion, then in accordance with the first law of motion, the object will continue to move in same direction with same speed. It means that the object may be travelling with a non-zero velocity but the magnitude as well as direction of velocity must remain unchanged or constant throughout.

6. When a carpet is beaten with a stick, dust comes out of it. Explain.

Ans. The carpet with dust is in state of rest. When it is beaten with a stick the carpet is set in motion, but the dust particles remain at rest. Due to inertia of rest the dust particles retain their position of rest and falls down due to gravity.