

SAQs

- Conservation of linear momentum is described with the help of Newton's laws of motion.
 - Is the momentum a vector or a scalar quantity?
 - State the law of conservation of momentum.
 - A jumbo jet of mass $4 \times 10^5 \text{ kg}$ travelling at a speed of 5000 m/s lands on the airport. It takes 2 minutes to come to rest. Calculate the average force applied by the ground on the aeroplane.
 - After landing the aeroplanes' momentum becomes zero. Explain how the law of conservation holds here.
- Frictional force is the opposing force that acts between two surfaces when they are in contact,
 - State the laws of limiting friction.
 - A box of mass 15 kg placed on horizontal floor is pulled by a horizontal force. What will be the work done by the force if coefficient of sliding friction between the box and the surface of the floor is 0.3 and body moves at unit distance at uniform velocity.
 - Why limiting friction is always greater than kinetic friction?
- You want to move a 500 N crate across a level floor. To start the crate moving, you have to pull with a 230 N horizontal force. Once the crate starts to move, you can keep it moving at constant velocity with only 200 N .
 - Which Newton's law of motion is applicable in the crate's motion?
 - Draw free body diagram for crate (i) just before it starts to move (ii) moving at constant speed.
 - Find the coefficients of static and kinetic friction.
- Momentum and impulse are related to each other using Newton's 2nd law,
 - Define momentum and impulse. Give its unit and dimension.
 - When a man weighing 10 kg in lift is accelerated downward with the acceleration of 1 m/s^2 , then apparent weight is either increased or decreased. Calculate its apparent weight.
 - A block is sliding down a 30° smooth inclined plane. Then coefficient of sliding friction will be what?
- Newton's laws are fundamental laws in physics,
 - Explain how Newton's first law of motion follows from the second law.
 - Why does a cricketer lower his hand while catching a ball?
 - Why is it easier to pull a body than to push it?
 - A cricket ball of mass 145 g is moving with a velocity of 14 m/s and is being hit by a bat, so that the ball is turned back with a velocity of 22 m/s . The force of blow acts on the ball for 0.015 sec . Find the average force exerted by the bat on the ball.
- Frictional force is the opposing force that acts between two surfaces when they are in contact,
 - Is friction force a necessary evil? Explain.
 - Why is the kinetic friction less than the limiting friction?
 - Define angle of repose. Show that the angle of repose and the angle of friction are equal for the given pair of surfaces.
 - An iron block of mass 10 kg rests on a wooden plane inclined at 30° to the horizontal. It is found that the least force parallel to the plane which causes the block just slides up is 100 N . Calculate the coefficient of friction between the two surfaces.
- Newton's laws are fundamental laws in physics,
 - Write the significance of Newton's 1st, 2nd and 3rd law.
 - If action and reaction are always equal and opposite, why don't they always cancel each and leave no force for acceleration of the body?
 - Show that the principle of conservation of linear momentum can be verified by using Newton's laws.