BAL BHARATI PUBLIC SCHOOL, PITAMPURA

ASSIGNMENT   CLASS IX

FORCE AND LAWS OF MOTION

1. A bullet fired from a gun is more dangerous than an air molecule hitting a person, though both bullet and air molecule are moving with same velocity. Explain.

2. Why are road accidents at high speeds very much worse than accidents at low speeds?.

3. What was the misbelief about the theory of motion before Newtonian motion theory?

   Why was it overruled?

4. When force acting on a body has an equal and opposite reaction, then why should the body move at all?

5. What can you say about the speed of a moving object if no force is acting on to it.?

6. Is a marble rolling down an inclined plane moving with constant velocity? Explain.

7. Two forces of 5N &22N are acting in a body in the same direction what will be the

    resultant force& in which direction will it act?

   If the two forces in the above example would have been acting in the opposite direction

What would be the resultant force& in which direction will it act?

8. If we push the box with a small force, the box does not move, why?

9. What should be the force acting on an object moving with uniform velocity?

10. Give reasons:

   (a) Carpet is beaten with a stick to clean it,

   (b) Seat belts are provided in the cars to prevent accidents.

   (c) Only the carom coin at the bottom of a pile is removed when a fast moving carom

       coin (or striker) hits it.

   (d) Place a water-filled tumbler on a tray.Hold the tray and turn around as fast as you can. We observe that the water spills. Why?

   (e)   a groove is provided in a saucer for placing the tea cup.

(f)   it is easier to push an empty box than a box full of books.

(g)   If we kick a football it flies away. But if we kick a stone of the same size with

equal force, it hardly moves

(h)   In comparison to the cart the train has a much lesser tendency to change its state of motion

(i)   During the game of table tennis if the ball hits a player it does not hurt him. On the other hand, when a fast moving cricket ball hits a spectator, it may hurt him.

(j) A truck at rest does not require any attention when parked along a roadside. But a moving truck, even at speeds as low as   5 m s$_{-1}$, may kill a person standing in its path.

(k) A small mass, such as a bullet may kill a person when fired from a gun.

(l) a car with a dead battery is to be pushed along a straight road to give it a speed of 1 m s$_{-1}$,

Which is sufficient to start its engine? If one or two persons give a sudden push (unbalanced

force) to it, it hardly starts. But a continuous push over some time can start the engine?

(m) While catching a fast moving cricket ball, a fielder in the ground gradually pulls his

hands backwards with the moving ball

(n) In a high jump athletic event, the athletes are made to fall either on a cushioned bed or on a sand bed

(o) A karate player breaks a slab of ice with a single blow

(p) you are standing at rest and intend to start walking on a road. You must accelerate

(q) Even though the action and reaction forces are always equal in magnitude, these forces may not

produce accelerations of equal magnitudes.

(r) When a bullet is fired from gun, it results in the recoil of the gun

(s) When a sailor jumps out of a rowing boat ,boat moves backwards

(t)Huge damage to the moving train takes place when it suddenly collides with a stationary train

(u) the vehicles are fitted with shockers

11. State and prove the law of conservation of momentum.

Numericals:

1. A200kg motorcycle is moving over a horizontal road with uniform velocity. If this motorcycle has to be stopped with a negative acceleration of 1.5m/s^2 , hen what is the force of friction between the tyre of the motorcycle and the road?

2. An iron sphere of 1kg is moving a velocity of 20m/s on a cemented floor. It comes to rest after traveling a distance of 50 m. Find the force of friction between the sphere and the floor.

3. A ball of mass 100g moving with a velocity of 0m/s is stopped by a boy in 0.2s. Calculate the force applied by the boy to stop the ball.

4. A car weighing 2400 kg and moving with a velocity of 20 m/s is stopped in 10s on applying breaks. Calculate the retardation and retarding force?

5. A car of mass 1000kg and a bus of mass 8000kg are moving with the same velocity of 36 km/h. Find the forces to stop both the car and the bus in 5s.

6. A mechanic strikes a nail with a hammer of mass 500g moving with a velocity of 20m/s The hammer comes to rest in 0.02s.after striking the nail. Calculate the force exerted by the nail on the hammer.

7. A bullet of mass 10g traveling with a velocity of 100 m/s penetrates in a wooden plank and is brought to rest in 0.01s Find (a) the distance through which the bullet penetrates in the wooden plank and (b) the force exerted on the bullet.

8. A bullet of mass 100g is fired from a gun of mass 20 kg with a velocity of 100m/s. Calculate the velocity of recoil of the gun.

9. Two bodies each of mass 1kg are moving in a straight line but opposite in direction with the same velocity of 2m/s. They collide with each other and stick to each other after collision. What is the common velocity of these bodies after collision?