WORKSHEET 2

CHAPTER 3 – LAWS OF MOTION

A. Tick (✓) the correct option.

1. 1 N is the force which produces
   a. an acceleration of 1 $m s^{-2}$ in a body of mass 1 g.
   b. an acceleration of 1 $cm s^{-2}$ in a body of mass 1 kg.
   c. an acceleration of 1 $cm s^{-2}$ in a body of mass 1 g.
   d. an acceleration of 1 $m s^{-2}$ in a body of mass 1 kg.
2. A rocket works on the principle of
   a. conservation of mass.
   b. conservation of linear momentum.
   c. conservation of angular momentum.
   d. none of these.
3. The action and reaction forces referred to in Newton's third law of motion
   a. must act on the same body.
   b. must act on different bodies.
   c. need not be equal in magnitude but must have the same line of action.
   d. must be equal in magnitude but need not have the same line of action.
4. An object will continue accelerating until
   a. the resultant force on it begins to decrease.
   b. the resultant force on it is zero.
   c. the resultant force on it is increased continuously.
   d. none of these.
5. Momentum is directly proportional to
   a. acceleration.
   b. massm
   c. force.
   d. speed.

B. Fill in the blanks.

1. _____ = Mass × Acceleration.
2. 1 N = _____ dyne.
3. Momentum = Mass × _____
4. 1 kgf = _____ N (approx.)
5. 1 N = _____ kgf.

C. State whether the following statements are true or false.

1. A person jumping out of a speeding bus may fall backward.
2. A cyclist does not come to rest immediately after he stops paddling.
3. The force needed to stop a moving body is directly proportional to its mass and its velocity.
4. A gun does not recoil when a shot is fired from it.
5. The forces which do not involve physical contact between the surfaces are called non-contact forces.

Name: ..... Teacher's signature: .....

Class: IX Date: .....

D. Match the following.

1. Momentum	final momentum is equal to initial momentum
2. Force	force × time
3. Weight	mass × acceleration due to gravity
4. Law of conservation of momentum	mass × velocity
5. Change in momentum	mass × acceleration

E. Answer the following questions.

Very short answer questions

1. Define the term force.
2. Define inertia.

Short answer questions

1. State the effects that a force can produce. Give one example of each effect.
2. Why do we feel pain in our hand when we hammer a nail into a wooden plank?

Long answer questions

1. Springs are provided in car seats. Give reason.
2. What are contact and non-contact forces? Give examples.

ANSWERS

WORKSHEET 2

A. Tick (✓) the correct option.

1. d 2. b 3. b 4. b 5. b

B. Fill in the blanks.

1. Force
2. 10^5
3. velocity
4. 9.8
5. 0.1

C. State whether the following statements are true or false.

1. F 2. T 3. T 4. F 5. T

D. Match the following.

1. Momentum	mass × velocity
2. Force	mass × acceleration
3. Weight	mass × acceleration due to gravity
4. Law of conservation of momentum	final momentum is equal to initial momentum
5. Change in momentum	force × time

E. Answer the following questions.

Very short answer questions

1. Force is that physical cause which changes or tends to change the state of rest or the state of motion of a body. It is a vector quantity.
2. The inability of a body to change its state of rest or of uniform motion on its own is known as inertia. The mass of a body is a measure of its inertia.

Short answer questions

1. In general, a force can produce the following effects:
   a. **Push:** A body can be set in motion which is at rest or a moving body can be brought to rest by means of pushing it.

      For example:

      i. A ball moves when kicked.

      ii. A moving ball stoped by a fielder.

      iii. Pushing a door to open or to shut it.

   b. **Pull:** The direction of motion of a body can be changed.

      For example:

      i. A load is lifted by using a pulley.

ii. The pull by the engine when the train moves.

iii. A hockey player changes the speed and direction of motion of a ball with his stick.

c. It can bring change in dimensions.

For example: On stretching a rubber string, its length increases.

2. While hammering a nail, the force of the hammer on the nail is the action. According to Newton's third law of motion, the nail exerts an equal and opposite force on the hammer (the reaction). Since the hammer is held in our hand firmly, our hand experiences the force due to the reaction, and feels hurt.

Long answer questions

1. Contact forces are the forces which act only when objects are in physical contact with each other. Examples of contact forces: (a) Frictional force (b) Normal reaction force (c) Tension force (d) Force exerted during collision (e) Force applied as a pull or push.

Non-contact forces: The forces which do not involve physical contact between the surfaces are called non-contact forces. Examples of non-contact forces: (a) Gravitational force (b) Electrostatic force (c) Magnetic force.

2. Vehicle seats are provided with springs to reduce their hardness. When the passengers sit on the seats all of a sudden, the springs enable the seats to get compressed.

The compression increases the duration of the passengers coming to rest on the seat. Since the rate of change of momentum is small, the passengers apply less force on the seats. The reaction force of seats becomes negligible, thus, there are no chances of any injury to the passengers.