WORKSHEET 2

CHAPTER 2 – FORCE AND LAWS OF MOTION

A. Tick (✓) the correct option.

1. Larger the mass of an object larger is its
   a. inertia. b. momentum. c. force. d. none of these.
2. SI unit of force is
   a. newton(N). b. kg m/s. c. N-s d. none of these.
3. The momentum of a ball of mass 6 kg and velocity 5 m/s is
   a. 10 kg m/s. b. 20 kg m/s. c. 30 kg m/s. d. none of these.
4. Two balls of mass m and $3m$ have velocities $3v$ and v respectively. Their momentum is in the ratio of
   a. 1 : 1. b. 3 : 1. c. 1 : 3. d. 2 : 1.
5. If the result of all forces is zero, then the forces are
   a. unbalanced. b. perpendicular. c. linear. d. balanced.

B. Fill in the blanks.

1. _____ is a push or pull acting upon an object.
2. The _____ of an object is a measure of its inertia.
3. The velocity with which the gun moves in the backward direction is known as _____
4. A change in momentum over a longer time requires _____ force.
5. The total momentum of the system remains _____

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

1. Fast moving objects have more inertia than slow moving objects.
2. If the object is at rest then there are no forces acting upon the object.
3. It would cause an unbalanced force to cause an object to accelerate from rest.
4. A force is a vector quantity; there is always a direction associated with it.
5. An object can experience two or more forces and not accelerate.

D. Match the following.

1. Law of inertia	SI unit of force
2. Newton	uniform velocity or rest
3. Balanced force	action reaction forces
4. Momentum of 1 kg object with velocity 4 m/s	4 kg m/s
5. Never act on the same body	Newton's first law

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

Class: IX Date: .....

E. Answer the following questions.

Very Short Answer Questions

1. Which of the Newton's law defines inertia?
2. Define one Newton force.

Short Answer Questions

1. State Newton's third law of motion.
2. A bullet of mass 4 g is fired at a velocity of 400 m/s. Calculate its momentum.

Long Answer Questions

1. Why does a cricketer move his arms backwards while taking a catch?
2. A car weighing 1600 kg is accelerated to 30 m/s from rest in 20 s. Calculate the force applied.

ANSWERS

WORKSHEET 2

A. Tick (✓) the correct option.

1. a 2. a 3. c 4. a 5. d

B. Fill in the blanks.

1. Force
2. mass
3. recoil velocity
4. less
5. conserved or constant

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

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

D. Match the following.

1. Law of inertia	Newton's first law
2. Newton	SI unit of force
3. Balanced force	uniform velocity or rest
4. Momentum of 1 kg object with velocity 4 m/s	4 kg m/s
5. Never act on the same body	action reaction forces

E. Answer the following questions.

Very Short Answer Questions

1. Newton's first law of motion.
2. One Newton is the force which when acting on a mass of 1 kg produces in it an acceleration of 1 m/s^2 in its own direction.

Short Answer Questions

1. According to Newton's third law of motion. To every action, there is an equal and opposite reaction; action and reaction forces act on different bodies.
2. $m = 4\ g = 4 \times 10^{-3}\ kg$

   $v = 400\ m/s$

   $P = m \times v$

   $= 4 \times 10^{-3} \times 4 \times 10^{2}$

   $= 16 \times 10^{-1}$

   $= 1.6\ kg\ m/s$

Long Answer Questions

1. A cricketer moves his arms back while taking a catch to increase the tune which will decrease the rate of change of momentum. The entire momentum of ball is reduced to zero in a longer time, therefore, the cricketer does not get hurt.

2. m = 600 kg

   u = 0 m/s

   v = 20 m/s

   t = 10 s

   Initial momentum = mu = 0

   Final momentum = mv = 12000 kg m/s

   Rate of change of momentum = Force applied

   $$F = \frac{mv - mu}{t}$$

   $$= \frac{12000 - 0}{10}$$

   = 1200 N