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Multiple Choice Questions

1. A force can change the

(a) Mass of an object
(b) Shape of an object
(c) Colour of an object
(d) Chemical nature of an object

2. The SI unit of force is

(a) Dyne
(b) Kilogram
(c) Newton
(d) Joule

3. According to Newton's first law of motion, a body continues in its state of rest or uniform motion unless

(a) It changes direction
(b) A force is applied
(c) Gravity acts on it
(d) Friction is present

4. Inertia depends upon the

(a) Shape of the body
(b) Volume of the body
(c) Mass of the body
(d) Speed of the body

5. The product of mass and velocity is called

(a) Force
(b) Acceleration
(c) Momentum
(d) Inertia

6. Newton's second law of motion relates force with

(a) Mass and time
(b) Velocity and distance
(c) Mass and acceleration
(d) Speed and displacement

7. Action and reaction forces

(a) Act on the same body
(b) Act in the same direction
(c) Act on different bodies
(d) Cancel each other

8. When a bus suddenly stops, passengers fall forward due to

(a) Gravity
(b) Friction
(c) Inertia of motion
(d) Inertia of rest

9. The force responsible for stopping a moving ball on the ground is

(a) Muscular force
(b) Gravitational force
(c) Frictional force
(d) Magnetic force

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10. **The momentum of a stationary object is**

(a) Maximum (b) Minimum

(c) Zero (d) Infinite

Fill in the blanks :

11. The tendency of an object to resist change in its state of motion is called _____.

12. The rate of change of momentum is equal to the applied _____.

True / False

13. Heavier objects have more inertia than lighter objects.

14. Action and reaction forces act on the same object.

Very Short Type Questions

15. Define momentum.

16. State Newton's third law of motion.

Short Type Questions

17. Why is it difficult to stop a moving truck than a moving bicycle?

18. State any two applications of Newton's second law of motion.

Essay Type Questions

19. Explain Newton's three laws of motion with suitable examples.

20. Define momentum. Derive the relation between force and momentum using Newton's second law of motion.

HOTS

21. **Assertion (A):**A cricketer pulls his hands backward while catching a fast-moving ball.
Reason (R): Increasing the time of contact reduces the force acting on the hands.

a) Both A and R are true and R is the correct explanation of A

b) Both A and R are true but R is not the correct explanation of A

c) A is true but R is false

d) A is false but R is true

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1. **(b)** Shape of an object
2. **(c)** Newton
3. **(b)** A force is applied
4. **(c)** Mass of the body
5. **(c)** Momentum
6. **(c)** Mass and acceleration
7. **(c)** Act on different bodies
8. **(c)** Inertia of motion
9. **(c)** Frictional force
10. **(c)** zero
11. Inertia
12. Force
13. True
14. False
15. Momentum is the product of mass and velocity of an object.
16. For every action, there is an equal and opposite reaction.
17. A truck has a larger mass than a bicycle, so its inertia and momentum are greater. Therefore, a greater force is required to stop a moving truck compared to a bicycle.
18. Newton's second law explains the working of seat belts in vehicles and the effect of force in kicking a football to change its speed.
19. Newton's first law of motion states that an object remains at rest or in uniform motion unless acted upon by an external unbalanced force. This law explains inertia. For example, a book lying on a table remains at rest until pushed.

    Newton's second law of motion states that the rate of change of momentum of an object is directly proportional to the applied force and occurs in the direction of the force. This law explains why a greater force is needed to move a heavier object.

    Newton's third law of motion states that for every action there is an equal and opposite reaction. When a person walks, the foot pushes the ground backward, and the ground pushes the person forward. These laws together explain the motion of objects in daily life.
20. Momentum is defined as the product of the mass and velocity of an object. It is a vector quantity, and its SI unit is kg m/s. According to Newton's second law of motion, the force acting on an object is equal to the rate of change of its momentum.

    If an object of mass m has an initial velocity u and a final velocity v in time t, the change in momentum is m(v – u). The rate of change of momentum is therefore m(v – u)/t. Since (v – u)/t represents acceleration, the rate of change of momentum becomes mass × acceleration. Thus, force is equal to mass multiplied by acceleration, written as F = ma. This relation shows that the force acting on an object depends on both its mass and the acceleration produced

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21. Correct option: a

Explanation: By increasing the time of contact while catching the ball, the rate of change of momentum decreases, reducing the force on the hands.

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