CBSE

LAWS OF MOTION WS 3

Class 11 - Physics

Section A

1. According to the first law of motion: **[1]**

   a) body acted on by no net force moves with constant velocity (which may be zero) and zero acceleration

   b) body acted on by zero net force moves with non zero acceleration

   c) body acted on by no net force moves with increasing velocity and negative acceleration

   d) body acted on by net force moves with constant velocity (which may be zero)

2. Two billiard balls each of mass 0.05 kg moving in opposite directions with speed 6 ms^{-1} collide and rebound at the same speed. What is the impulse imparted to each ball due to the other? **[1]**

   a) 0.4 kg ms^{-1}

   b) 0.6 kg ms^{-1}

   c) 0.3 kg ms^{-1}

   d) 0.5 kg ms^{-1}

3. A bird, resting on the floor of an airtight box, which is being carried by a boy, starts flying. The boy will feel that the box: **[1]**

   a) Lighter in the beginning and heavier afterwards

   b) Shows no change in weight

   c) Is now lighter

   d) Is now heavier

4. **Assertion:** The driver in a vehicle moving with a constant speed on a straight road is in a non-inertial frame of reference. **[1]**

   Reason: A reference frame in which Newton's laws of motion are applicable is non-inertial.

   a) If both assertion and reason are true and reason is the correct explanation of assertion.

   b) If both assertion and reason are true but reason is not the correct explanation of assertion.

   c) If assertion is true but reason is false.

   d) If both assertion and reason are false.

5. **Assertion (A):** A table cloth can be pulled from a table without dislodging the dishes. **[1]**

   Reason (R): To every action there is an equal and opposite reaction.

   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.

6. **Assertion:** Newton's first and second laws hold good in an inertial frame only. **[1]**

   Reason: Newton's third law holds good in all frames.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false.

d) If both assertion and reason are false.

7. **Assertion (A):** A table cloth can be pulled from a table without dislodging the dishes kept on the table. **[1]**

Reason (R): If the net external force on a body is zero then its acceleration is zero.

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.

8. **Assertion:** Newton's first law is not merely a special case (a = 0) of the second law (F = ma). **[1]**

Reason: Newton's first law defines the frame from where Newton's second law, $\vec{\mathbf{F}} = m\vec{\mathbf{a}}$ is applicable.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion.

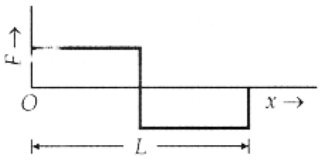
c) If assertion is true but reason is false.

d) If both assertion and reason are false.

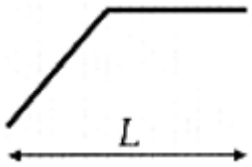
9. **State True or False:** **[1]**

(a) If there are no external forces acting on a system, the total momentum of the system remains constant. **[1]**

10. A person used force (F), shown in figure to move a load with constant velocity on a surface. Identify the correct surface profile. **[1]**



a)



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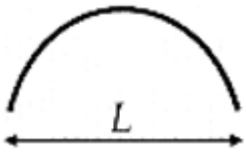
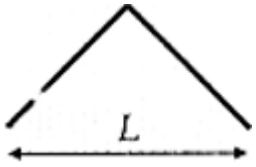
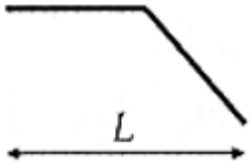


c)



d)



11. Why are the passengers thrown outwards when a car in which they are travelling suddenly takes a circular turn? **[1]**

12. If the net external force acting on a body is zero, then the body at rest continues to remain at rest and a body in motion continuous to move with uniform motion. What is the name given to this property of the body? **[1]**

13. How does Newton's first law of motion define force? **[1]**

14. We beat a blanket with stick to remove dust particles. Why? **[1]**

15. The distance travelled by a body is directly proportional to time. Is any external force acting on it? **[1]**

16. Name the scientist who first gave the laws of motion. **[1]**

17. How many newtons make one kg wt.? **[1]**

Section B

18. A woman weighing 50 kgf stands on a weighing machine placed in a lift. What will be the reading of the machine, when the lift is (i) moving upwards with a uniform velocity of 5 ms^{-1} and (ii) moving downwards with **[2]**

a uniform acceleration of 1 ms^{-2}? Take g = 10 ms^{-2}.

19. State Newton's first law of motion. Give an example to illustrate it. **[2]**

20. A disc of mass m is placed on a table. A stiff spring is attached to it and is vertical. To the other end of the spring is attached a disc of negligible mass. What minimum force should be applied to the upper disc to press the spring such that the lower disc is lifted off the table when the external force is suddenly removed? **[2]**

21. Why does Newton's first law of motion appear to be contradicted in our day-to-day life? **[2]**

22. State Newton's second law of motion and deduce the Newton's first law from it. **[2]**

Section C

23. A ball is suspended by a cord from the ceiling of a motor car. What will be the effect on the position of the ball if **[3]**

    i. the car is moving with uniform velocity

    ii. the car is moving with accelerated motion and

    iii. the car is turning towards right?

Section D

24. **Fill in the blanks:** **[4]**

    (a) _____ is the quantity of motion possessed by the body. **[1]**

    (b) If the forces applied to a body are such that their lines of action meet at a single point, then they are called _____ forces. **[1]**

    (c) The SI unit of momentum is _____. **[1]**

    (d) The cause of every accelerated motion is an _____ force. **[1]**

Section E

25. For ordinary terrestrial experiments, which of the observers below are inertial and which non-inertial: **[5]**

    i. a child revolving in a giant wheel,

    ii. a driver in a sports car moving with a constant high speed of 200 km/h on a straight road,

    iii. the pilot of an aeroplane which is taking off,

    iv. a cyclist negotiating a sharp turn,

    v. the guard of a train which is slowing down to stop at a station?