CBSE

LAWS OF MOTION WS 2

Class 11 - Physics

Section A

1. According to the special theory of relativity, which of the following has same value in all inertial frames? **[1]**

   a) Velocity of light
   b) Mass of an object
   c) Length of an object
   d) Velocity of sound

2. No force is required for **[1]**

   a) an object moving in circular motion
   b) an object moving with constant acceleration
   c) an object moving in straight line with constant velocity
   d) an object moving in elliptical path

3. A person sitting in an open car moving at constant velocity throws a ball vertically into air, the ball falls **[1]**

   a) outside the car
   b) in the car ahead of the person
   c) in the car behind the person
   d) exactly in the hand of thrower

4. For ordinary terrestrial experiments, the observer in an inertial frame in the following cases is **[1]**

   a) a child revolving in a giant wheel
   b) a cyclist negotiating a sharp curve
   c) a driver in a sports car moving with a constant high speed of 200 kmh^{-1} on a straight rod
   d) the pilot of an aeroplane which is taking off

5. **Assertion:** If the net force acting on a body is zero, it is possible to find a reference frame in which the body has no acceleration. **[1]**
   Reason: The mass of a body is the characteristic that relates the force on the body to the resulting acceleration.

   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.

6. **Assertion (A):** The passengers sitting in a bus fall backward, when the bus suddenly starts moving. **[1]**
   Reason (R): Every body has the inability to change by itself, its state of rest.

   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.

7. **Assertion:** A boy facing forward in a bus throws a ball straight up. At the same instant the bus begins to accelerate. The ball goes up and falls behind him. **[1]**
   Reason: As the ball rises, the horizontal velocity of the ball remains same.

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.

8. **Assertion (A):** Mass is the measure of inertia of a body in linear motion. **[1]**

Reason (R): Greater the mass, greater is the force required to change its state of rest or of uniform motion.

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.

9. **Assertion:** Inertia is the property by virtue of which the body is unable to change by itself the state of motion. **[1]**

Reason: The bodies do not change their state unless acted upon by an unbalanced external force.

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.

10. **Assertion (A):** Inertia is the property by virtue of which the body is unable to change by itself the state of rest only. **[1]**

Reason (R): The bodies do not change their state unless acted upon by an unbalanced external force.

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.

11. Which of the following is scalar quantity? Inertia, force and linear momentum. **[1]**

12. A 75 kg man stands in a lift. What force does the floor exert on him when the elevator starts moving upwards with an acceleration of 2.0 ms^{-2}? Take g = 10 ms^{-2}. **[1]**

13. A ball of mass 100 g is suspended by a string 40 cm long. Keeping the string taut, the ball describes a horizontal circle of radius 10 cm. Find the angular speed. **[1]**

14. Why is it difficult to drive a nail into a wooden block without supporting it? **[1]**

15. A person driving a car suddenly applies the brakes on seeing a child on the road ahead. If he is not wearing the seat belt, he falls forward and hits his head against the steering wheel. Why? **[1]**

16. What gives the measure of inertia? **[1]**

17. Bodies of larger mass need greater initial effort to put them in motion. Why? **[1]**

18. Define the term inertia. **[1]**

19. Why are porcelain objects wrapped in paper or straw before packing for transportation? **[1]**

20. Why an athlete runs some steps before taking a jump? **[1]**

Section B

21. What are inertial and non-inertial frames of reference? Give an example of each. **[2]**

22. A man jumping out of a moving train falls with his head forward. Why? **[2]**

Section C

23. What is inertia? Discuss its types giving one example in each case. **[3]**

Section D

24. a. Why does a horse pull a cart harder during the first few steps of its motion. **[5]**

b. Sudden motion of a blanket removes the dust particles from the blanket. Why?

c. A batman deflects a ball by an angle of 45° without changing its initial speed which is equal to 54 km h^{-1}. What is the impulse imparted to the ball Mass of the ball is 0.15 kg?

Section E

25. **Fill in the blanks:** **[6]**

(a) Newton's first law of motion is also called the law of _____. **[1]**

(b) The inertia of _____ is defined as the tendency of a body to change by itself its direction of motion. **[1]**

(c) _____ is the inherent property of a material body by virtue of which it remains in its state of rest or of uniform motion in a straight line. **[1]**

(d) The frame from where the law of inertia is valid is known as _____ frame of reference. **[1]**

(e) The inertia of _____ is defined as the tendency of a body to remain in its state of uniform motion in a straight line. **[1]**

(f) The inertia of _____ is defined as the tendency of a body to remain in its position of rest. **[1]**