## Force and Laws of Motion

## **Assertion & Reason Type Questions**

Directions : Each of the following questions consists of two statements, one is Assertion (A) and the other is Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

c. Assertion (A) is true but Reason (R) is false.

d. Assertion (A) is false but Reason (R) is true.

**Q1. Assertion (A):** Balanced forces do not change the state of rest or of motion of an object.

**Reason (R):** If a number of forces acting on a body produce an acceleration in the body, then the forces acting are called unbalanced forces.

**Answer :** (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

Q2. Assertion (A): When we stop pedalling, the bicycle begins to slow down.

**Reason (R):** Force of friction always opposes motion of objects.

**Answer :** (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

**Q3. Assertion (A):** An object maintains its motion under the continuous application of an unbalanced force.

**Reason (R):** The change in the direction of motion would continue as long as this unbalanced force is applied.

**Answer :** (d) Assertion (A) is false but Reason (R) is true.



**Q4. Assertion (A):** When a motorcar makes a sharp turn at a high speed, we tend to get thrown to one side.

**Reason (R):** Inertia is the tendency of undisturbed objects to stay at rest or to keep moving with the same velocity.

**Answer :** (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q5. Assertion (A): A five-rupee coin has more inertia than one-rupee coin.

**Reason (R):** The mass of an object is a measure of its inertia.

**Answer :** (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q6. Assertion (A): Newton's second law of motion gives the measurement of force.

**Reason (R):** According to Newton's second law of motion, force is directly proportional to the rate of change of momentum.

**Answer :** (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

**Q7. Assertion (A):** The force necessary to change the momentum of an object depends on the time rate at which the momentum is changed.

**Reason (R):** Rate of change of momentum of a body is directly proportional to the applied unbalanced force.

**Answer :** (b) Both Assertion (A) and R are true but R is not the correct explanation of Assertion (A).

**Q8. Assertion (A):** If the net external force on the body is zero, then its acceleration is zero.

**Reason (R):** Acceleration does not depend on force.

**Answer :** (c) Assertion (A) is true but Reason (R) is false.

According to Newton's second law of motion,

F = ma

Clearly, acceleration depends on force acting on the body.

Also, if net external force is zero, i.e.,

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## 0 = ma

 $\Rightarrow$  a = 0, i.e., no acceleration in the body.

**Q9. Assertion (A):** When a bullet is fired from a gun, the force sending the bullet forward is equal to the force sending the gun backward.

**Reason (R):** Every action has an equal and opposite reaction.

**Answer :** (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

