Motion in a Straight Line

Assertion Reason Questions

Two statements are given one labelled Assertion

(A) and the other labelled Reason (R). Select the correct answer to these question from the codes

(a), (b), (c) and (d) as given below.

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

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

(c) A is true but R is false.

(d) A is false and R is also false.

1. Assertion (A): In real life, in a number of situations, the object is treated as a point object.

Reason(R): An object is treated as a point object, as far as its size is much smaller than the distance, it moves in a reasonable duration of time.

Ans. (a) Both A and R are true and R is the correct explanation of A. Explanation: The approximation of an object as a point object is valid only when the size of the object is much smaller than the distance it moves in a reasonable duration of time.

2. Assertion (A): The actual distance covered by an object in a given time interval can be equal or greater than the magnitude of the displacement.

Reason(R): The distance covered is a scalar quantity, while the displacement is a vector quantity.

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

Explanation: The actual distance covered by an object in the given time interval is equal to the magnitude of the displacement when the object moves along a straight path in one fixed direction.

3. Assertion (A): The speed of a body can be negative.

Reason(R): If the body is moving in the opposite direction of positive motion, then its speed is negative.

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Ans. (d) A is false and R is also false. Explanation: Speed can never be negative because it's a scalar quantity. So if a body is moving in a negative direction, then also the speed will be positive.

4. Assertion (A): An object may have varying without having speeds varying velocity. **Reason(R):** If the velocity is zero at an instant, the acceleration is zero at that instant.

Ans. (d) A is false and R is also false. Explanation: If the speed varies, then velocity will definitely vary when a particle is thrown upwards at the highest point a 0 but v = 0

5. Assertion (A): For an object having uniformly accelerated motion, the position-time graph is parabolic in nature.

Reason(R): In a uniformly accelerated motion, the acceleration is constant

Ans. (b) Both A and R are true and R is not the correct explanation of A. **Explanation:** In a uniformly accelerated motion, the distance (x) covered in a time t is given by

$$s = ut + \frac{1}{2}at^2.$$

It represents that its parabola.

6. Assertion (A): For an object in uniform motion, the velocity-time graph is a straight line parallel to the time axis.Reason(R): In a uniform motion, velocity remains constant

Ans. (b) Both A and R are true and R is not the correct explanation of A. **Explanation:** In a uniform motion velocity does not change with time and according to the velocity-time graph is a straight line parallel to the time axis.

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