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): When an object changes its position while moving, it gets displaced.

Reason (R): Displacement is the shortest distance between the initial and final position of the moving object.

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

Q2. Assertion (A): If the displacement of the body is zero, the distance covered by it may not be zero.

Reason (R): Displacement is a vector quantity and distance is a scalar quantity.

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

As distance being a scalar quantity is always positive but displacement being a vector quantity may be positive, zero and negative depending on situation.

Q3. Assertion (A): The displacement of an object can be either positive, negative or zero.

Reason (R): Displacement has both the magnitude and direction.

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

Q4. Assertion (A): The ratio of displacement to distance is equal to or less than 1.

Reason (R): The displacement is the longer distance between initial and final positions.

Answer : (c) Reason (R) is false because displacement is the shortest distance between the initial and final positions.

Q5. Assertion (A): Motion with uniform velocity is always along a straight line path.

Reason (R): In uniform velocity, speed is the magnitude of the velocity and is equal to the instantaneous velocity.

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

Q6. Assertion (A): The position-time graph of a uniform motion in one dimension of a body can have negative slope.

Reason (R): When the speed of body decreases with time, the position-time graph of the moving body has negative slope.

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

The negative slope of the position-time graph represents that the body is moving towards the negative direction but if the slope decreases with time, then it represents the decrease in speed i.e., retardation in motion. So, the constant negative slope of the position-time graph cannot represent the decrease in speed.

Q7. Assertion (A): If velocity of the object changes at a uniform rate, then the average velocity of a moving body can be zero.

Reason (R): Average velocity is the velocity of body when it covers unequal distances in equal intervals of time along a fixed direction.

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

Q8. Assertion (A): The average speed of a body over a given interval of time is equal to the average velocity of the body in the same interval of time if a body moves in a straight line in one direction.

Reason (R): Here, the distance travelled by a body is equal to the displacement of the body.

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

Q9. Assertion (A): A particle can have acceleration even, if its velocity is zero at an instant.

Reason (R): Acceleration is the rate of change of velocity.

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

Q10. Assertion (A): A body can have acceleration even its speed is constant.

Reason (R): In uniform circular motion, speed of body is constant but its velocity continuously changes.

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