

CHAPTER-2 | Motion in a Straight

QUIZ-01

1. What is the SI unit of acceleration?

- A. m/s B. m/s^2
C. km/h^2 D. m^2/s (B)

Explanation: Acceleration is defined as the rate of change of velocity with respect to time, so its unit is metres per second squared (m/s^2).

2. Which of the following graphs shows a motion with zero acceleration?

- A. Position-time graph is a curve
B. Velocity-time graph is a straight line with positive slope
C. Position-time graph is a straight line
D. Velocity-time graph is a straight line with negative slope (C)

Explanation: A straight line in a position-time graph indicates constant velocity, hence zero acceleration.

3. The area under a velocity-time graph represents:

- A. Acceleration
B. Distance only when velocity is constant
C. Displacement
D. Speed (C)

Explanation: The area under the velocity-time graph gives the displacement of the object during a time interval.

4. For an object in free fall from rest, the velocity after time t is:

- A. $v = 0$ B. $v = g$
C. $v = -gt$ D. $v = (1/2)gt^2$ (C)

Explanation: The velocity of a freely falling object is given by $v = -gt$, as the acceleration due to gravity acts downward.

5. In the kinematic equation $v^2 = v_0^2 + 2a(x - x_0)$, what does v represent?

- A. Initial velocity B. Average velocity
C. Final velocity D. Constant velocity (C)

Explanation: The variable v represents the final velocity in uniformly accelerated motion.

6. What is the acceleration of a particle at the topmost point of its vertical motion when thrown upward?

- A. 0 m/s^2 B. 9.8 m/s^2 upward
C. -9.8 m/s^2 D. Depends on speed (C)

Explanation: At the topmost point, velocity becomes zero but acceleration remains -9.8 m/s^2 due to gravity.

7. The distance covered by a body in free fall during the third second is proportional to:

- A. 3 B. 6
C. 5 D. 9 (C)

Explanation: By Galileo's law of odd numbers, the distance covered in successive seconds follows the ratio $1 : 3 : 5 : 7 \dots$. Hence, 5 in the third second.

8. Which of the following is true for motion with constant acceleration?

- A. Acceleration changes with time
B. Velocity remains constant
C. The velocity-time graph is curved
D. Displacement-time graph is a parabola (D)

Explanation: For uniformly accelerated motion, the position-time graph is parabolic.

9. A car stops after applying brakes with retardation ' a ' and initial velocity v_0 . The stopping distance is given by:

- A. $v_0^2 / 2a$ B. v_0 / a
C. $v_0 \times a$ D. $2a / v_0^2$ (A)

Explanation: From the equation $v^2 = v_0^2 + 2ax$ and using $v = 0$, we get stopping distance $x = v_0^2 / 2a$.

10. Instantaneous speed is equal to:

- A. Average speed over long time
B. The area under acceleration-time graph
C. Magnitude of instantaneous velocity
D. Slope of acceleration-time graph (C)

Explanation: Instantaneous speed is defined as the magnitude of the instantaneous velocity at a given instant.