Chapter 2: Kinematics

MCQ's Question from the Chapter "Kinematics":

EXERCISE MCQs with Answers

2.1 The numerical ratio of displacement to distance is:
(a) always less than one (b) always equal to one
(c) always greater than one (d) equal to or less than one ✓

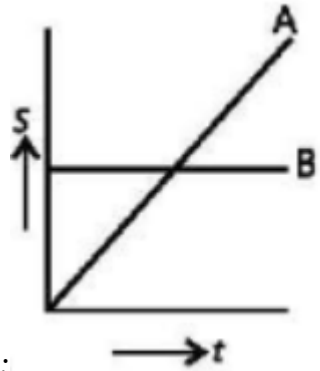
2.2 If a body does not change its position with respect to some fixed point, then it will be in a state of:
(a) rest ✓ (b) motion
(c) uniform motion (d) variable motion

2.3 A ball is dropped from the top of a tower, the distance covered by it in the first second is:
(a) 5 m ✓ (b) 10 m
(c) 50 m (d) 100 m

2.4 A body accelerates from rest to a velocity of 144 km h^{-1} in 20 seconds. The distance covered by it is:
(a) 100 m (b) 400 m
(c) 1400 m (d) 1440 m ✓

2.5 A body is moving with constant acceleration starting from rest. It covers a distance S in 4 seconds. How much time does it take to cover one-fourth of this distance?
(a) 1 s ✓ (b) 2 s
(c) 4 s (d) 16 s

2.6 The displacement-time graphs of two objects A and B are shown in the figure. Point out the true statement from the following:



Graph shown:

- Line **A** → sloping upward → moving with constant velocity.
- Line **B** → horizontal → body at rest.

(a) The velocity of A is greater than B. ✓ (b) The velocity of A is less than B.
(c) The velocity of A is equal to that of B. (d) The graph gives no information in this regard.

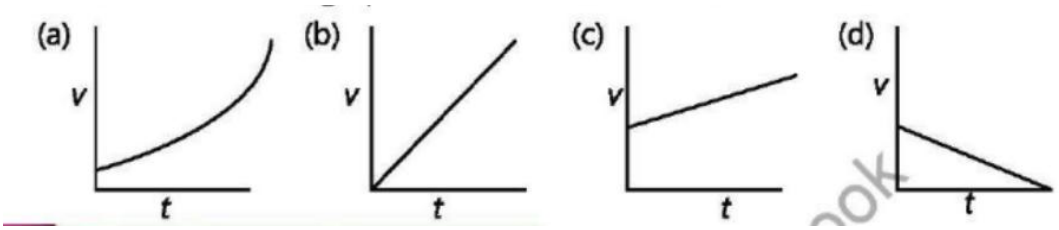
2.7 The area under the speed-time graph is numerically equal to:
(a) velocity (b) uniform velocity
(c) acceleration (d) distance covered ✓

2.8 Gradient of the speed-time graph is equal to:
(a) speed (b) velocity
(c) acceleration ✓ (d) distance covered

2.9 Gradient of the distance-time graph is equal to the:
(a) speed ✓ (b) velocity
(c) distance covered (d) acceleration

2.10 A car accelerates uniformly from 80.5 km h^{-1} at t = 0 to 113 km h^{-1} at t = 9 s. Which graph best describes the motion of the car?

Graph options:



(a) Curved upward (non-uniform acceleration)
(b) Straight line from origin (starts from zero velocity)
(c) Straight slanted line upward from non-zero velocity ✓ (correct for uniform acceleration with initial velocity)
(d) Slanted line downward (deceleration)

Additional MCQs with Answers

1. Distance and Displacement

Q1 Which of the following is a vector quantity?
(a) Distance (b) Speed
(c) Displacement ✓ (d) Path length

Q2 If a car goes around a circular track and returns to its starting point, its displacement is:
(a) Zero ✓ (b) Equal to distance
(c) Greater than distance (d) Infinity

Q3 Which of the following can never be negative?
(a) Displacement (b) Distance ✓
(c) Velocity (d) Acceleration

2. Speed and Velocity

Q4 The SI unit of velocity is:
(a) m (b) m/s ✓
(c) km/ (d) s

Q5 Which quantity can change direction without changing magnitude?
(a) Speed (b) Velocity ✓
(c) Distance (d) Acceleration

Q6 A car completes one round of a circular track with constant speed. Which statement is correct?
(a) Velocity is constant (b) Speed is variable
(c) Velocity is variable ✓ (d) Both speed and velocity are constant

3. Acceleration

Q7 Negative acceleration is also called:
(a) Retardation ✓ (b) Uniform motion
(c) Constant velocity (d) Positive acceleration

Q8 If a car's velocity changes from 20 m/s to 30 m/s in 5 seconds, its acceleration is:
(a) 5 m/s^2 ✓ (b) 2 m/s^2
(c) 10 m/s^2 (d) 50 m/s^2

Q9 The SI unit of acceleration is:
(a) m/s (b) m/s^2 ✓
(c) m^2/s (d) km/h^2

4. Graphical Representation of Motion

Q10 The slope of a velocity-time graph gives:
(a) Displacement (b) Speed
(c) Acceleration ✓ (d) Distance

Q11 A horizontal line on a distance-time graph indicates:
(a) Motion with acceleration (b) Body at rest ✓
(c) Uniform speed (d) Increasing speed

Q12 The area under a velocity-time graph represents:
(a) Distance travelled ✓ (b) Speed
(c) Acceleration (d) Time

5. Equations of Motion

Q13 Which equation of motion relates velocity, acceleration, and displacement?
(a) $v = u + at$ (b) $s = ut + \frac{1}{2}at^2$
(c) $v^2 = u^2 + 2as$ ✓ (d) None of these

Q14 A body starting from rest under uniform acceleration covers distance ‘s’ in time ‘t’. Which formula applies?
(a) $s = ut$ (b) $s = ut + \frac{1}{2}at^2$ ✓
(c) $s = v^2 – u^2$ (d) $s = at$

Q15 If a body starts from rest, then initial velocity (u) is:
(a) Zero ✓ (b) Infinite
(c) Constant (d) Undefined

6. Uniform Circular Motion

Q16 In uniform circular motion, the speed of the body is:
(a) Constant ✓ (b) Decreasing
(c) Increasing (d) Zero

Q17 In uniform circular motion, acceleration is always directed:
(a) Along tangent (b) Towards center ✓
(c) Away from center (d) Opposite to motion

Q18 The force that provides centripetal acceleration in circular motion is called:
(a) Gravitational force (b) Centripetal force ✓
(c) Centrifugal force (d) Inertia

Free-Fall Acceleration

Q19. The acceleration of a body in free fall (near Earth's surface) is approximately:
(a) 9.8 m/s² (b) **10 m/s²** ✓
(c) 9.8 km/h² (d) 980 m/s²

Q20. Free-fall acceleration is caused by:
(a) Earth's magnetic field (b) **Gravity (weight)** ✓
(c) Air resistance (d) Centripetal force

Q21. Neglecting air resistance, two objects of different masses dropped simultaneously from the same height will:
(a) Lighter one reaches first (b) Heavier one reaches first
(c) **Reach at the same time** ✓ (d) Time depends on shape only

Q22. A stone is dropped from rest. The distance it falls in the first second is (take g = 10 m/s²):
(a) 4.9 m (b) **5 m** ✓
(c) 10 m (d) 2.5 m

Q23. A body is in free fall from rest. Its speed after 3 s (g = 10 m/s²) is:
(a) 9.8 m/s (b) **30 m/s** ✓
(c) 3 m/s (d) 90 m/s

Q24. The time taken by an object to fall freely from a height of 45 m (take g = 10 m/s²) is:
(a) 1.5 s (b) 2 s
(c) **3 s** ✓ (d) 4.5 s

Q25. A ball is thrown vertically upward with initial speed 20 m/s. The maximum height reached (g = 10 m/s²) is:
(a) 10 m (b) **20 m** ✓
(c) 40 m (d) 4 m

Q26. For an object thrown upward (in free fall), the direction of acceleration while it rises is:
(a) Same as velocity (b) **Opposite to velocity (downwards)** ✓
(c) Zero (d) Perpendicular to motion