

# MOTION IN A STRAIGHT LINE

## SET 3

### SET 3 – Motion in a Straight Line (50 MCQs)

**Q101.** Which of the following is always non-negative?

- a) Displacement
- b) Velocity
- c) Distance
- d) Acceleration

**Answer:** c) Distance

**Q102.** The slope of position-time graph gives:

- a) Speed
- b) Velocity
- c) Acceleration
- d) Distance

**Answer:** b) Velocity

**Q103.** If displacement is zero, which is necessarily true?

- a) Distance = 0
- b) Average velocity = 0
- c) Body has not moved
- d) Time = 0

**Answer:** b) Average velocity = 0

**Q104.** A particle moves 5 m east, then 5 m west. Distance covered is:

- a) 0 m
- b) 5 m
- c) 10 m
- d) -10 m

**Answer:** c) 10 m

**Q105.** The speed of a particle can never be:

- a) Zero
- b) Negative
- c) Positive
- d) Constant

**Answer:** b) Negative

**Q106.** A runner completes one round of circular track of radius 50 m in 40 s. His displacement is:

- a) 100 m
- b) Zero
- c) 50 m
- d) 314 m

**Answer:** b) Zero

**Q107.** In uniform acceleration, the velocity-time graph is:

- a) Curve

- b) Straight line
  - c) Hyperbola
  - d) Horizontal line
- Answer:** b) Straight line

**Q108.** Which of the following cannot be negative?

- a) Speed
- b) Velocity
- c) Acceleration
- d) Displacement

**Answer:** a) Speed

**Q109.** Average speed is defined as:

- a) Total displacement / time
- b) Total path length / time
- c)  $dx/dt$
- d) Area under velocity-time graph

**Answer:** b) Total path length / time

**Q110.** A particle covers 20 m in 4 s, then 20 m in next 2 s. Average speed for total journey is:

- a) 5 m/s
- b) 6.67 m/s
- c) 10 m/s
- d) 7 m/s

**Answer:** b) 6.67 m/s

**Q111.** A ball is thrown vertically upwards. Acceleration at topmost point is:

- a) 0
- b) g upward
- c) g downward
- d) Infinity

**Answer:** c) g downward

**Q112.** A body moving with constant velocity has:

- a) Zero acceleration
- b) Non-zero acceleration
- c) Increasing acceleration
- d) Retardation

**Answer:** a) Zero acceleration

**Q113.** Which of the following is NOT possible?

- a) Zero velocity with non-zero acceleration
- b) Non-zero velocity with zero acceleration
- c) Zero velocity with zero acceleration
- d) Zero displacement with non-zero distance

**Answer:** c) Zero velocity with zero acceleration (except at rest forever)

**Q114.** If a particle moves along a straight line, its motion is:

- a) One-dimensional
- b) Two-dimensional
- c) Three-dimensional
- d) Oscillatory

**Answer:** a) One-dimensional

**Q115.** The velocity-time graph of a uniformly retarded body is:

- a) Straight line with positive slope
- b) Straight line with negative slope

- c) Curve with decreasing slope
- d) Horizontal line

**Answer:** b) Straight line with negative slope

**Q116.** A car increases speed from 36 km/h to 72 km/h in 10 s. Acceleration is:

- a) 1 m/s<sup>2</sup>
- b) 2 m/s<sup>2</sup>
- c) 4 m/s<sup>2</sup>
- d) 5 m/s<sup>2</sup>

**Answer:** a) 1 m/s<sup>2</sup>

**Q117.** In a position-time graph, a straight line inclined to time axis indicates:

- a) Variable velocity
- b) Constant velocity
- c) Constant acceleration
- d) Rest

**Answer:** b) Constant velocity

**Q118.** Displacement can be equal to distance when:

- a) Path is curved
- b) Motion is in a straight line without changing direction
- c) Motion is circular
- d) Body returns to initial position

**Answer:** b) Motion is in a straight line without changing direction

**Q119.** The average velocity and average speed of a particle are equal if:

- a) Motion is uniform
- b) Motion is one-dimensional
- c) Displacement = Distance
- d) Velocity is constant

**Answer:** c) Displacement = Distance

**Q120.** A freely falling body falls 80 m in t seconds. Value of t is ( $g = 10 \text{ m/s}^2$ ):

- a) 3 s
- b) 4 s
- c) 5 s
- d) 6 s

**Answer:** b) 4 s

**Q121.** Which equation is not dimensionally correct?

- a)  $v = u + at$
- b)  $s = ut + \frac{1}{2}at^2$
- c)  $v^2 = u^2 + 2as$
- d)  $v = u + s/t$

**Answer:** d)  $v = u + s/t$

**Q122.** A body thrown upward reaches height 45 m. Initial velocity is ( $g = 10 \text{ m/s}^2$ ):

- a) 20 m/s
- b) 25 m/s
- c) 30 m/s
- d) 40 m/s

**Answer:** b) 30 m/s

**Q123.** For a body projected vertically, time of ascent equals:

- a) Time of descent
- b) Half of time of descent
- c) Twice of time of descent

d) Zero

**Answer:** a) Time of descent

**Q124.** The ratio of distances covered in 1st and 2nd seconds by free falling body is:

a) 1:2

b) 1:3

c) 3:5

d) 1:1

**Answer:** b) 1:3

**Q125.** A particle moves with velocity  $v = 6t$ . Its acceleration is:

a)  $6 \text{ m/s}^2$

b)  $t \text{ m/s}^2$

c) 0

d)  $36 \text{ m/s}^2$

**Answer:** a)  $6 \text{ m/s}^2$

**Q126.** If velocity is constant, which of the following is zero?

a) Displacement

b) Acceleration

c) Distance

d) Speed

**Answer:** b) Acceleration

**Q127.** A particle covers 100 m in 10 s starting from rest. Acceleration is:

a)  $1 \text{ m/s}^2$

b)  $2 \text{ m/s}^2$

c)  $3 \text{ m/s}^2$

d)  $4 \text{ m/s}^2$

**Answer:** b)  $2 \text{ m/s}^2$

**Q128.** The average velocity of a particle moving with uniform acceleration is:

a)  $(u+v)/2$

b)  $u + at$

c)  $v - at$

d)  $u/2$

**Answer:** a)  $(u+v)/2$

**Q129.** If velocity of a particle is zero at some instant, then:

a) Acceleration must be zero

b) Acceleration may or may not be zero

c) Displacement must be zero

d) Distance must be zero

**Answer:** b) Acceleration may or may not be zero

**Q130.** A car covers first 100 m in 10 s and next 100 m in 20 s. Average speed is:

a) 10 m/s

b) 8 m/s

c) 6.67 m/s

d) 5 m/s

**Answer:** c) 6.67 m/s

**Q131.** If initial velocity is  $u$  and retardation  $a$ , stopping distance is:

a)  $u^2/2a$

b)  $2u^2/a$

c)  $u/a$

d)  $u^2/a$

**Answer:** a)  $u^2/2a$

**Q132.** Which of the following quantities changes when reference frame is changed?

- a) Distance
- b) Speed
- c) Displacement
- d) Velocity

**Answer:** d) Velocity

**Q133.** A man walks 4 km north, then 3 km east. Displacement is:

- a) 7 km
- b) 5 km
- c) 1 km
- d) 10 km

**Answer:** b) 5 km

**Q134.** A train moving with 20 m/s is stopped in 10 s. Distance covered is:

- a) 50 m
- b) 100 m
- c) 200 m
- d) 400 m

**Answer:** b) 100 m

**Q135.** A particle moves with displacement  $x = 4t^3$ . At  $t = 2$  s, velocity is:

- a) 12 m/s
- b) 16 m/s
- c) 24 m/s
- d) 48 m/s

**Answer:** c) 24 m/s

**Q136.** A ball thrown upwards has velocity zero at:

- a) Start
- b) Topmost point
- c) Halfway
- d) Never

**Answer:** b) Topmost point

**Q137.** The unit of retardation is:

- a) m/s
- b)  $m/s^2$
- c)  $-m/s^2$
- d) s

**Answer:** b)  $m/s^2$

**Q138.** If displacement of body is zero, its distance is:

- a) Always zero
- b) Always non-zero
- c) May or may not be zero
- d) Negative

**Answer:** c) May or may not be zero

**Q139.** For motion with uniform velocity, which is constant?

- a) Displacement
- b) Distance
- c) Speed

d) Acceleration

**Answer:** d) Acceleration

**Q140.** A body covers distance proportional to square of time. The motion is:

- a) Uniform
- b) Uniformly accelerated
- c) Retarded
- d) Oscillatory

**Answer:** b) Uniformly accelerated

**Q141.** A stone thrown upward with velocity 19.6 m/s will reach maximum height in:

- a) 1 s
- b) 2 s
- c) 3 s
- d) 4 s

**Answer:** b) 2 s

**Q142.** A body moving with velocity 10 m/s is uniformly retarded at 2 m/s<sup>2</sup>. Time to stop is:

- a) 2 s
- b) 5 s
- c) 10 s
- d) 20 s

**Answer:** b) 5 s

**Q143.** The distance covered in nth second of uniformly accelerated motion is given by:

- a)  $u + \frac{1}{2} a (2n-1)$
- b)  $u + a n$
- c)  $u + a (2n-1)$
- d)  $2u + a n$

**Answer:** a)  $u + \frac{1}{2} a (2n-1)$

**Q144.** Which of the following motions has zero average velocity but non-zero average speed?

- a) Straight line motion
- b) Circular motion
- c) Projectile motion
- d) Oscillatory motion

**Answer:** b) Circular motion

**Q145.** A particle thrown vertically upwards comes back in 6 s. Maximum height reached is ( $g=10$  m/s<sup>2</sup>):

- a) 45 m
- b) 60 m
- c) 90 m
- d) 120 m

**Answer:** b) 45 m

**Q146.** If displacement-time graph is a straight line parallel to time axis, body is:

- a) At rest
- b) Moving with constant velocity
- c) Accelerated
- d) Retarded

**Answer:** a) At rest

**Q147.** Which of the following is a kinematic equation?

- a)  $F = ma$
- b)  $v = u + at$
- c)  $W = Fd \cos\theta$

d)  $P = W/t$

**Answer:** b)  $v = u + at$

**Q148.** A bullet fired from a gun returns to ground in 10 s. Initial velocity is:

- a) 50 m/s
- b) 100 m/s
- c) 200 m/s
- d) 250 m/s

**Answer:** b) 50 m/s

**Q149.** If a particle is uniformly accelerated, then its average velocity equals:

- a) Initial velocity
- b) Final velocity
- c) (Initial velocity + Final velocity)/2
- d) Zero

**Answer:** c) (Initial velocity + Final velocity)/2

**Q150.** A car travels 30 km with speed 30 km/h and next 30 km with speed 60 km/h. Average speed is:

- a) 40 km/h
- b) 45 km/h
- c) 50 km/h
- d) 48 km/h

**Answer:** b) 40 km/h