MOTION IN A STRAIGHT LINE
SET 3

SET 4 – Motion in a Straight Line (50 MCQs)

Q151. The rate of change of velocity is called:
a) Speed
b) Acceleration
c) Retardation
d) Momentum
Answer: b) Acceleration

Q152. A body moving with uniform speed must have:
a) Constant velocity
b) Zero velocity
c) Changing velocity
d) Constant acceleration
Answer: a) Constant velocity

Q153. A freely falling body covers 80 m in last second of its motion. Height of fall is ($g = 10\ m/s^2$):
a) 100 m
b) 125 m
c) 180 m
d) 200 m
Answer: b) 125 m

Q154. The first equation of motion is:
a) $v = u + at$
b) $s = ut + \frac{1}{2} at^2$
c) $v^2 = u^2 + 2as$
d) $s = (u+v)/2 \times t$
Answer: a) $v = u + at$

Q155. The slope of velocity-time graph gives:
a) Velocity
b) Speed
c) Acceleration
d) Displacement
Answer: c) Acceleration

Q156. The slope of distance-time graph gives:
a) Velocity
b) Speed
c) Acceleration
d) Jerk
Answer: b) Speed

Q157. The displacement of a particle is given by $x = 2 + 5t + 3t^2$. Initial velocity is:
a) 2 m/s
b) 5 m/s
c) 3 m/s
d) 10 m/s
Answer: b) 5 m/s

Q158. In one-dimensional motion, average velocity can be negative if:
a) Distance is negative
b) Displacement is negative
c) Acceleration is negative
d) Speed is negative
Answer: b) Displacement is negative

Q159. A car moves with uniform retardation and comes to rest in 5 s after covering 50 m. Its initial velocity is:
a) 5 m/s
b) 10 m/s
c) 15 m/s
d) 20 m/s
Answer: d) 20 m/s

Q160. A particle covers 100 m in 5 s moving with uniform acceleration, starting from rest. Its acceleration is:
a) 4 m/s²
b) 8 m/s²
c) 10 m/s²
d) 5 m/s²
Answer: a) 8 m/s²

Q161. When a body is thrown vertically upwards, time taken to reach maximum height depends on:
a) Mass of body
b) Initial velocity
c) g
d) Both b and c
Answer: d) Both b and c

Q162. If velocity-time graph of a particle is parallel to time axis, then acceleration is:
a) Zero
b) Positive
c) Negative
d) Variable
Answer: a) Zero

Q163. Which motion has acceleration opposite to velocity?
a) Uniform motion
b) Accelerated motion
c) Retarded motion
d) Oscillatory motion
Answer: c) Retarded motion

Q164. A particle starts from rest and moves with constant acceleration. Distance covered in 4th second is:
a) 4a
b) 7a/2
c) 8a
d) 7a
Answer: d) 7a (using $s_n = u + \frac{1}{2}a(2n-1)$, u=0)

Q165. Displacement-time graph of an object thrown upwards is:
a) Straight line
b) Parabola opening downwards
c) Parabola opening upwards
d) Horizontal line
Answer: b) Parabola opening downwards

Q166. Which of the following is NOT a scalar?
a) Distance
b) Speed
c) Displacement
d) Time
Answer: c) Displacement

Q167. A stone is dropped from height 80 m. Distance covered in last second is (g = 10 m/s²):
a) 30 m
b) 35 m
c) 40 m
d) 45 m
Answer: c) 40 m

Q168. A body starts from rest and moves with acceleration 2 m/s². Its velocity after 10 s is:
a) 10 m/s
b) 20 m/s
c) 30 m/s
d) 40 m/s
Answer: b) 20 m/s

Q169. A car travels 100 km at 50 km/h and 100 km at 100 km/h. Average speed is:
a) 66.7 km/h
b) 75 km/h
c) 80 km/h
d) 70 km/h
Answer: a) 66.7 km/h

Q170. A particle moves with uniform acceleration a. If its velocity at time t is v, then acceleration is:
a) v/t
b) u/t
c) v²/t
d) v²/2t
Answer: a) v/t (when u=0)

Q171. If a body moves in a straight line with constant speed, then:
a) Acceleration is zero
b) Velocity is zero
c) Displacement is zero
d) Retardation is zero
Answer: a) Acceleration is zero

Q172. Average velocity is equal to instantaneous velocity when:
a) Acceleration = 0
b) Acceleration ≠ 0
c) Motion is accelerated
d) Motion is variable
Answer: a) Acceleration = 0

Q173. Which of the following has negative slope in velocity-time graph?
a) Accelerated motion
b) Uniform motion
c) Retarded motion
d) Rest
Answer: c) Retarded motion

Q174. The unit of jerk (rate of change of acceleration) is:
a) m/s
b) m/s^2
c) m/s^3
d) m^2/s^2
Answer: c) m/s^3

Q175. A car moving with velocity 20 m/s is stopped by brakes with deceleration 4 m/s^2. Stopping distance is:
a) 25 m
b) 50 m
c) 100 m
d) 200 m
Answer: c) 50 m

Q176. If a body has uniform acceleration, its displacement-time graph is:
a) Straight line
b) Parabola
c) Hyperbola
d) Circle
Answer: b) Parabola

Q177. If slope of velocity-time graph is positive, then motion is:
a) Uniform
b) Accelerated
c) Retarded
d) Oscillatory
Answer: b) Accelerated

Q178. A stone is dropped from rest and covers 45 m in last second of fall. Height is:
a) 80 m
b) 100 m
c) 125 m
d) 120 m
Answer: b) 100 m

Q179. The acceleration of a body moving in a straight line is defined as:
a) dv/dt
b) dx/dt
c) ds/dt
d) d^2x/dt^2
Answer: a) dv/dt (also d^2x/dt^2)

Q180. A particle starts from rest and moves with acceleration 4 m/s^2. Distance covered in 5 s is:
a) 25 m
b) 50 m
c) 100 m
d) 125 m
Answer: d) 50 m ($s = \frac{1}{2}at^2 = \frac{1}{2}\times4\times25$)

Q181. A train is moving with constant acceleration. Ratio of distances covered in successive seconds is:
a) 1:2:3
b) 1:3:5
c) 2:4:6
d) 1:4:9
Answer: b) 1:3:5

Q182. Which of the following is NOT a kinematic quantity?
a) Displacement
b) Velocity
c) Acceleration
d) Force
Answer: d) Force

Q183. A car accelerates uniformly from 10 m/s to 30 m/s in 5 s. Displacement is:
a) 50 m
b) 75 m
c) 100 m
d) 125 m
Answer: b) 100 m ($s = (u+v)/2 \times t = 20 \times 5$)

Q184. A stone thrown vertically upwards with velocity 40 m/s will return to ground after ($g = 10\ m/s^2$):
a) 4 s
b) 6 s
c) 8 s
d) 10 s
Answer: c) 8 s

Q185. If displacement-time graph is curve concave upwards, acceleration is:
a) Positive
b) Negative
c) Zero
d) Variable
Answer: a) Positive

Q186. A particle moving with constant velocity has acceleration:
a) Positive
b) Negative
c) Zero
d) Constant
Answer: c) Zero

Q187. A ball dropped from height 20 m reaches ground in ($g=10\ m/s^2$):
a) 1 s
b) 2 s
c) 3 s
d) 4 s
Answer: b) 2 s

Q188. For uniform motion, which of the following is true?
a) Distance = Displacement
b) Average velocity = Instantaneous velocity
c) Velocity constant
d) All of these
Answer: d) All of these

Q189. A car moving with velocity u is stopped in distance d with uniform retardation a. Relation is:
a) $u^2 = 2ad$
b) $u = 2ad$
c) $d = au^2$
d) $a = 2ud$
Answer: a) $u^2 = 2ad$

Q190. The motion of a body thrown vertically upwards is an example of:
a) Uniform motion
b) Uniformly accelerated motion
c) Uniformly retarded then uniformly accelerated motion
d) Non-uniform motion
Answer: c) Uniformly retarded then uniformly accelerated motion

Q191. The total path length covered by a particle is called:
a) Speed
b) Distance
c) Displacement
d) Velocity
Answer: b) Distance

Q192. The position of a particle is given by $x = 4t^2$. Its velocity at t=3 s is:
a) 8 m/s
b) 12 m/s
c) 24 m/s
d) 36 m/s
Answer: c) 24 m/s

Q193. A train of length 200 m crosses a pole in 20 s. Speed of train is:
a) 5 m/s
b) 10 m/s
c) 15 m/s
d) 20 m/s
Answer: b) 10 m/s

Q194. A body thrown upward returns to ground in 4 s. Its initial velocity is:
a) 10 m/s
b) 15 m/s
c) 20 m/s
d) 30 m/s
Answer: c) 20 m/s

Q195. Which of the following represents one-dimensional motion?
a) Motion of train on straight track
b) Motion of planet around sun
c) Rotation of earth
d) Motion of pendulum
Answer: a) Motion of train on straight track

Q196. If speed-time graph is a horizontal line, motion is:
a) Uniform
b) Accelerated
c) Retarded
d) Variable
Answer: a) Uniform

Q197. Displacement-time graph of uniform velocity is:
a) Straight line
b) Parabola
c) Circle
d) Hyperbola
Answer: a) Straight line

Q198. A body dropped from height h takes time t to fall. If h is quadrupled, new time is:
a) t
b) 2t
c) 4t
d) √2t
Answer: b) 2t

Q199. In equations of motion, which of the following is not assumed constant?
a) Acceleration
b) Mass
c) Velocity
d) Displacement
Answer: c) Velocity

Q200. Which of the following cannot be zero simultaneously?
a) Velocity and acceleration
b) Displacement and distance
c) Average velocity and average speed
d) Acceleration and force
Answer: a) Velocity and acceleration