MOTION IN A STRAIGHT LINE
SET 2

SET 2 – Motion in a Straight Line (50 MCQs)

Q51. Which of the following is true for displacement?
a) Scalar quantity
b) Always greater than distance
c) Vector quantity
d) Cannot be zero
Answer: c) Vector quantity

Q52. The numerical ratio of displacement to distance is always:
a) Less than 1
b) Greater than 1
c) Equal to 1
d) Less than or equal to 1
Answer: d) Less than or equal to 1

Q53. A train travels 120 km at 60 km/h and returns at 40 km/h. Average speed is:
a) 48 km/h
b) 50 km/h
c) 45 km/h
d) 52 km/h
Answer: a) 48 km/h

Q54. SI unit of acceleration is:
a) m/s
b) m/s²
c) m
d) m²/s
Answer: b) m/s²

Q55. A body has negative acceleration if:
a) It moves in negative direction
b) It slows down
c) It speeds up
d) It moves at uniform velocity
Answer: b) It slows down

Q56. Which graph represents uniform motion?
a) Straight line in velocity-time graph
b) Parabola in x–t graph
c) Straight line parallel to time axis in v–t graph
d) Straight line in a–t graph
Answer: c) Straight line parallel to time axis in v–t graph

Q57. The slope of velocity-time graph is equal to:
a) Speed
b) Acceleration
c) Displacement
d) Distance
Answer: b) Acceleration

Q58. The area under acceleration-time graph gives:
a) Displacement
b) Distance
c) Change in velocity
d) Jerk
Answer: c) Change in velocity

Q59. In SI system, displacement is measured in:
a) cm
b) km
c) m
d) m/s
Answer: c) m

Q60. An object moves 20 m in 5 s. Its average speed is:
a) 2 m/s
b) 3 m/s
c) 4 m/s
d) 5 m/s
Answer: c) 4 m/s

Q61. If velocity is negative and acceleration is positive:
a) Speed increases
b) Speed decreases
c) Speed remains constant
d) Body is at rest
Answer: b) Speed decreases

Q62. If velocity-time graph is a straight line inclined downward, motion is:
a) Accelerated
b) Retarded
c) Uniform
d) Zero
Answer: b) Retarded

Q63. A stone falls freely from rest. Distance covered in 3rd second is:
a) 9.8 m
b) 14.7 m
c) 19.6 m
d) 29.4 m
Answer: c) 19.6 m

Q64. For uniformly accelerated motion, which is correct?
a) $v = u + at$
b) $s = ut + \frac{1}{2} at^2$
c) $v^2 = u^2 + 2as$
d) All of these
Answer: d) All of these

Q65. If displacement is proportional to square of time, the motion is with:
a) Zero acceleration
b) Constant acceleration
c) Variable acceleration
d) Uniform speed

Answer: b) Constant acceleration

Q66. A bus starts from rest with acceleration 1 m/s². Its velocity after 10 s is:
a) 5 m/s
b) 10 m/s
c) 20 m/s
d) 30 m/s
Answer: c) 10 m/s

Q67. The displacement of a particle is given by $x = 5t^2$. Its acceleration is:
a) 5 m/s²
b) 10 m/s²
c) 20 m/s²
d) 0
Answer: b) 10 m/s²

Q68. A car moves with uniform acceleration and covers 400 m in 20 s. If initial velocity is 5 m/s, acceleration is:
a) 2 m/s²
b) 3 m/s²
c) 1.5 m/s²
d) 4 m/s²
Answer: a) 2 m/s²

Q69. In one-dimensional motion, if velocity and acceleration are in opposite directions:
a) Speed increases
b) Speed decreases
c) Speed constant
d) Body at rest
Answer: b) Speed decreases

Q70. The displacement-time graph of a particle moving with constant velocity is:
a) A parabola
b) A straight line
c) A curve with changing slope
d) Hyperbola
Answer: b) A straight line

Q71. A car increases its velocity from 20 m/s to 40 m/s in 10 s. Its acceleration is:
a) 1 m/s²
b) 2 m/s²
c) 3 m/s²
d) 4 m/s²
Answer: b) 2 m/s²

Q72. A particle is projected vertically upward with velocity 49 m/s. Maximum height reached is ($g = 9.8$ m/s²):
a) 98 m
b) 122.5 m
c) 245 m
d) 50 m
Answer: b) 122.5 m

Q73. A ball is dropped from a height of 80 m. Time taken to reach ground is ($g = 9.8$ m/s²):
a) 3 s
b) 4 s
c) 5 s
d) 6 s
Answer: c) 4 s

Q74. The distance-time graph of uniform acceleration is:
a) Straight line
b) Curve
c) Zigzag
d) Parallel line
Answer: b) Curve

Q75. A body thrown upwards returns to ground in 4 s. Initial velocity is ($g = 10\ m/s^2$):
a) 10 m/s
b) 20 m/s
c) 40 m/s
d) 30 m/s
Answer: b) 20 m/s

Q76. A motorbike starts from rest with acceleration 2 m/s^2. Distance covered in 5 s is:
a) 10 m
b) 25 m
c) 50 m
d) 75 m
Answer: c) 25 m

Q77. If displacement-time graph is a parabola opening upwards, motion is with:
a) Constant velocity
b) Uniform acceleration
c) Uniform retardation
d) Variable acceleration
Answer: b) Uniform acceleration

Q78. Which equation gives relation between displacement, acceleration, and velocity without involving time?
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: c) $v^2 = u^2 + 2as$

Q79. A car retards uniformly from 20 m/s to rest in 4 s. Distance covered is:
a) 40 m
b) 20 m
c) 30 m
d) 80 m
Answer: a) 40 m

Q80. If acceleration is zero, then:
a) Velocity increases
b) Velocity decreases
c) Velocity remains constant
d) Motion stops
Answer: c) Velocity remains constant

Q81. A particle moves with equation $x = 2t^3$. At $t = 2$ s, acceleration is:
a) 6 m/s^2
b) 8 m/s^2
c) 12 m/s^2
d) 24 m/s^2
Answer: d) 24 m/s^2

Q82. A ball thrown upward reaches maximum height in 3 s. Initial velocity is ($g = 10\ m/s^2$):
a) 10 m/s
b) 15 m/s
c) 20 m/s
d) 30 m/s
Answer: d) 30 m/s

Q83. The distance travelled by freely falling body in nth second is:
a) $\frac{1}{2} g n^2$
b) $\frac{1}{2} g (2n–1)$
c) $g n^2$
d) $g(2n–1)$
Answer: b) $\frac{1}{2} g (2n–1)$

Q84. A body moving with velocity u is brought to rest by retardation a. Distance travelled is:
a) $u^2/2a$
b) $2u^2/a$
c) u/a
d) u^2/a
Answer: a) $u^2/2a$

Q85. Relative velocity of two objects moving in opposite directions with velocities v_1 and v_2 is:
a) $v_1 – v_2$
b) $v_2 – v_1$
c) $v_1 + v_2$
d) Zero
Answer: c) $v_1 + v_2$

Q86. If a body is at rest, which of the following is correct?
a) Displacement = 0
b) Velocity = 0
c) Acceleration = 0
d) All of these
Answer: d) All of these

Q87. A particle moves with uniform acceleration. Average velocity in time t is:
a) (u+v)/2
b) u + at
c) v – at
d) at/2
Answer: a) (u+v)/2

Q88. The velocity of a body at any time t is v = u + at. This relation shows:
a) Newton’s second law
b) Kinematic relation
c) Graphical method
d) Differential equation
Answer: b) Kinematic relation

Q89. Which graph cannot represent one-dimensional motion?
a) x-t straight line
b) v-t straight line
c) v-t curve bending upward
d) Closed loop in x-t graph
Answer: d) Closed loop in x-t graph

Q90. A stone is dropped from a building and takes 5 s to reach ground. Height of building is (g = 10 m/s²):
a) 100 m
b) 120 m
c) 125 m
d) 150 m
Answer: c) 125 m

Q91. Which condition indicates uniform motion?
a) Constant velocity
b) Constant acceleration
c) Constant displacement
d) Constant time
Answer: a) Constant velocity

Q92. The ratio of distance travelled in 1st and 2nd second of free fall is:
a) 1:2
b) 1:3
c) 1:5
d) 1:7
Answer: b) 1:3

Q93. A bus increases speed from 36 km/h to 72 km/h in 10 s. Its acceleration is:
a) 1 m/s²
b) 2 m/s²
c) 3 m/s²
d) 4 m/s²
Answer: a) 1 m/s²

Q94. A car moves with velocity v = 2t + 3. Its initial velocity is:
a) 2 m/s
b) 3 m/s
c) 5 m/s
d) Zero
Answer: b) 3 m/s

Q95. The maximum height reached by a projectile depends on:
a) Mass
b) Initial velocity
c) Acceleration due to gravity
d) Both b and c
Answer: d) Both b and c

Q96. A train accelerates uniformly from rest and attains velocity 72 km/h in 5 minutes. Its acceleration is:
a) 0.2 m/s²
b) 0.5 m/s²
c) 0.4 m/s²
d) 0.1 m/s²
Answer: a) 0.2 m/s²

Q97. If velocity-time graph passes through origin with constant slope, the motion is:
a) Uniformly accelerated
b) Uniformly retarded
c) Uniform motion
d) Non-uniform
Answer: a) Uniformly accelerated

Q98. A stone is dropped from height h. Time to fall is proportional to:
a) h
b) $\sqrt{h}$
c) h^2
d) $1/\sqrt{h}$
Answer: b) $\sqrt{h}$

Q99. In equations of motion, if initial position is not zero, x is replaced by:
a) $x + x_0$
b) $x - x_0$
c) x_0
d) $x^2 - x_0^2$
Answer: b) $x - x_0$

Q100. If acceleration is constant, velocity-time graph is:
a) Straight line
b) Parabola
c) Hyperbola
d) Curve with changing slope
Answer: a) Straight line