Motion

Multiple Choice Questions:

1   Rest and motion both are :
    (A) Relative terms
    (B) Absolute terms
    (C) Can't say
    (D) None of these

2   Displacement could be :
    (A) More than distance
    (C) less than or equal to distance
    (B) equal to distance
    (D) None of these

3   Which of the following does not need direction to be defined completely :
    (A) Speed
    (B) Velocity
    (C) Force
    (D) Displacement

4   ABC is the shortest path length between the two points and ADC is the actual path length. Then which of the two corresponds to displacement:
    (A) ADC
    (B) *ABC*
    (C) Can't say
    (D) None of these

5   Odometer is a device, which is used to measure :
    (A) Distance
    (B) Displacement
    (C) Speed
    (D) None of these

6   If both observer and moving body are moving with the same velocity of 5 m/s in the same direction then distance between them would
    (A) Increase
    (C) Won't change
    (B) Decrease
    (D) May or may not change

7   Vector quantities are those which can be defined completely only if :
    (A) Both magnitude and direction are given
    (B) Only direction is given
    (C) Only magnitude is given
    (D) None of these

8   A ball is thrown vertically upward and after ascending a height of 15 m it comes back to the same point. The total displacement of the ball is :
    (A) zero
    (B) 15 m
    (C) 30 m
    (D) 98 m

9   The numerical ratio of displacement to distance is :
    (A) always less than one
    (C) always more than one

(B) always equal to one
(D) equal to or less than one

10 What would be the value of average velocity for the duration $0 - 10$ s in the graph shown below?
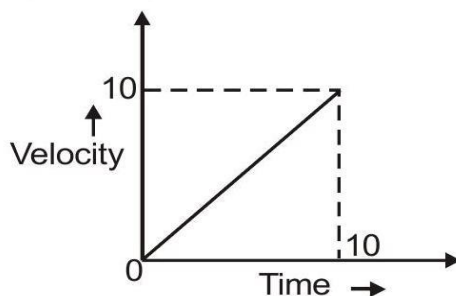

(A) 4 m/s
(B) 5 m/s
(C) 3 m/s
(D) 6 m/s

11 At a particular instant the speedometer of a vehicle shows 30 km/hr. It is the :
(A) Average speed
(B) Instantaneous speed
(C) Uniform speed
(D) Non-uniform speed

12 A body covered 30 km in 10hr. The average speed for the whole journey would be :
(A) 3 km/hr
(B) 6 km/hr
(C) 2 km/hr
(D) None of these

13 A body travels equal distances in equal time intervals. Then motion is of following type :
(A) Uniform speed
(B) Non-uniform speed
(C) Uniform velocity
(D) Instantaneous speed

14 A car travelling on a busy road is an example of :
(A) Uniform motion
(B) Non-uniform motion
(C) Constant speed
(D) Constant velocity

15 A boy travels 50 km with 5 km/hr and then for next 4hr travels with a uniform speed of 20 km/hr. What is the average speed for the whole journey?
(A) 62/7 km/hr
(B) 65/7 km/hr
(C) 60/7 km/hr
(D) 9 km/hr

16 The unit(s) of speed and velocity is/are :
(A) m/s
(B) km/hr
(C) m/s^2
(D) Both (A) and (B)

17 A body is moving in a circle with constant speed 10 m/s. Circumference of the circle is 40 m. Then the average speed and average velocity 4 s is :
(A) 10 m/s and 10 m/s
(B) 10 m/s and 0 m/s
(C) 10 m/s and 5 m/s
(D) 0 m/s and 0 m/s

18 A boy goes from one point to another with 40 m/s and returns to the same point with a speed of 80 m/s. Then what would be the average velocity during the whole journey.
(A) 60 m/s
(B) Zero
(C) 40 m/s
(D) 80 m/s

19 What is the change in velocity when a body accelerates with 2 m/s^2 starting with an initial velocity of 5 m/s for a time of 10 s.
(A) 20 m/s
(B) 25 m/s
(C) 15 m/s
(D) 30 m/s

20 For the equation $s = ut - \frac{1}{2}at^{2^2}$ acceleration is in the :
(A) Opposite direction of velocity
(B) Opposite direction of displacement
(C) Same direction of velocity
(D) Both (A) and (B)

21 If a body covers a distance d with velocity v_1 and another distance d with same velocity v_2, then average velocity for the whole journey would be equal to :
(A) $\frac{2v_1v_2}{v_1+v_2}$
(B) $\frac{v_1v_2}{v_1+v_2}$
(C) $\frac{v_1+v_2}{2v_1v_2}$
(D) $\frac{2(v_1+v_2)}{v_1v_2}$

22 If a body covers some distance with speed v_1 for time t_1 and some another distance with speed v_2 for some time t_2. Then what would be the average velocity for the whole duration.
(A) $\frac{v_1+v_2}{2}$
(B) $\frac{v_1t_1+v_2t_2}{t_1+t_2}$
(C) $\frac{v_1v_2}{v_1+v_2}$
(D) $\frac{2v_1v_2}{v_1+v_2}$

23 A body is covering equal distances in equal time intervals along a circle. Which quantities would remain constant for his motion?
(A) Speed
(B) Velocity
(C) Acceleration
(D) Displacement

24 Deceleration and retardation have units which are :
(A) Same
(B) Different
(C) May be different
(D) None of these

25 Slope of a displacement - time graph is negative. That means the velocity is :
    (A) Positive
    (B) Negative
    (C) Constant
    (D) Zero

26 Acceleration and velocity could be:
    (A) Positive
    (B) Negative
    (C) Zero
    (D) All of these

27 What is the name given to change in velocity per unit time?
    (A) Average velocity
    (B) Acceleration
    (C) Relative velocity
    (D) None of these

28 What would be the graph for a body moving with a velocity which is gradually (uniformly) increasing with time?
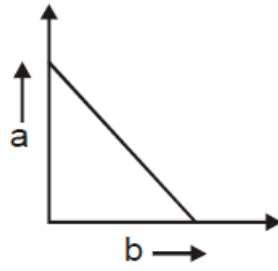
    (A) distance
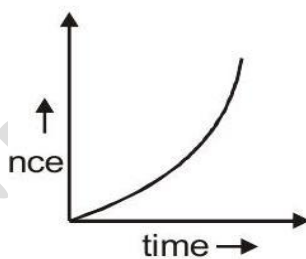
    (B)
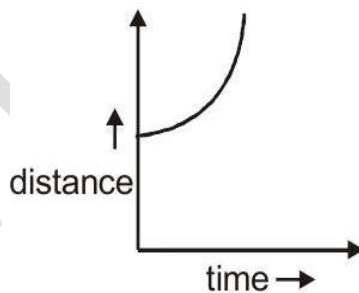
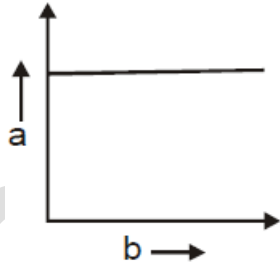

    (C)
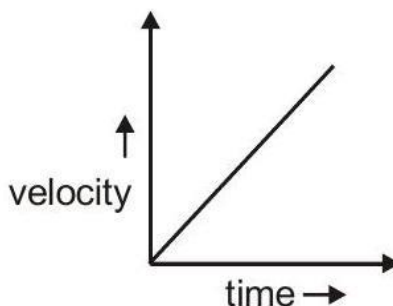
    (D) All are correct

29 When two quantities are directly proportional then graph would be similar to :
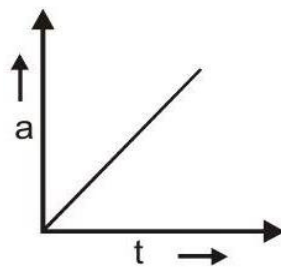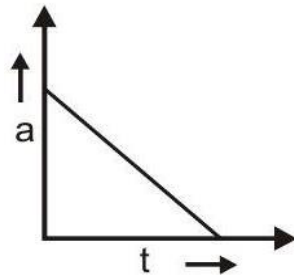
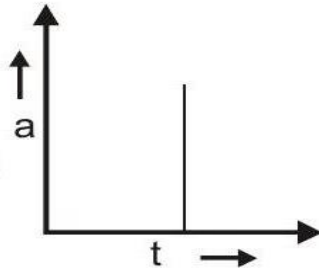   (A)
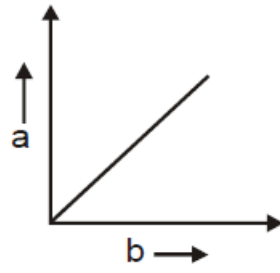
(B)

(C)

(D) Both (A)&(B) possible

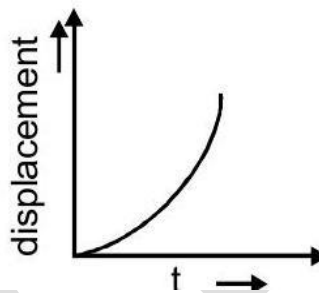30   Which of the acceleration - time graph is not possible ?
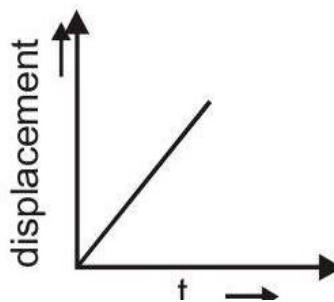

(C)

(D)
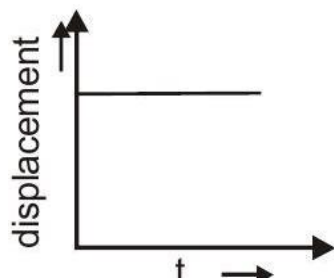

31 Which of the following is correct for uniformly accelerated motion?
(A)

(B)

(C) $\frac{\pi}{가}$

(D) All are correct

32 The distance time graph shown below indicates motion with uniform speed for which part of the graph:
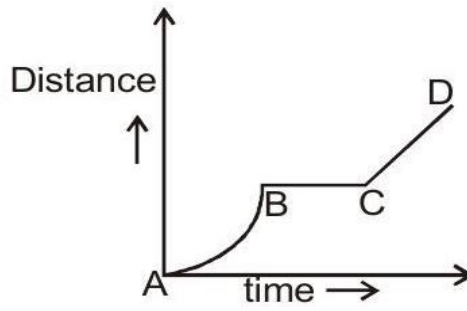
(A) *AB*
(B) BC
(C) CD
(D) Both *BC* and *CD*

33 Which of the following graph is possible?

(A)
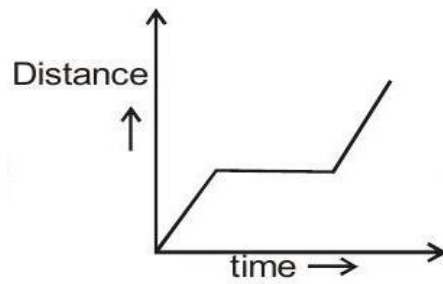
(B)

(C)

(D)

34 A body accelerates to a certain maximum velocity and then moves with negative acceleration for some time such that the final velocity is opposite to initial velocity. Then graph for the above case would be:

(A)

(B)

(C)

(D)

35 If a body is travelling in a zig-zag path. Then which of the following quantities may be constant :
(A) Speed
(B) Velocity
(C) Acceleration
(D) Both (A) and (C)

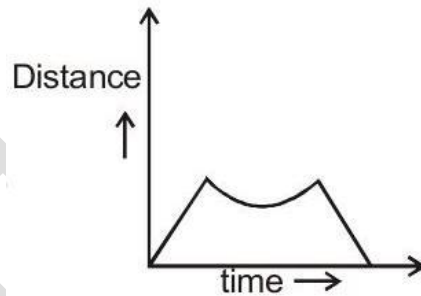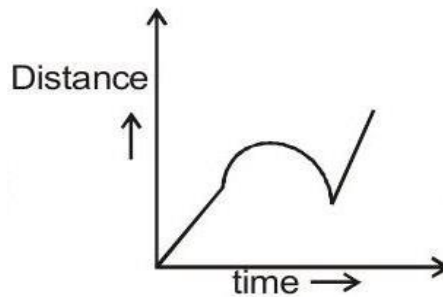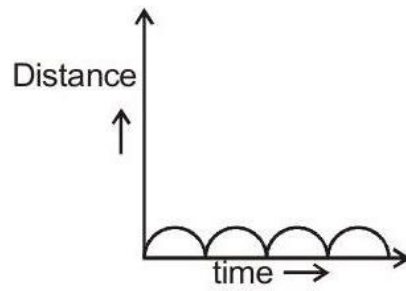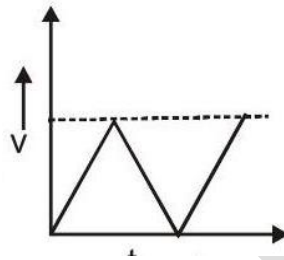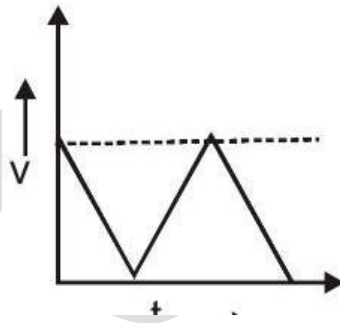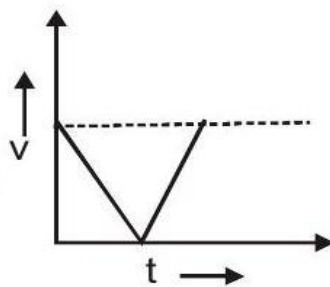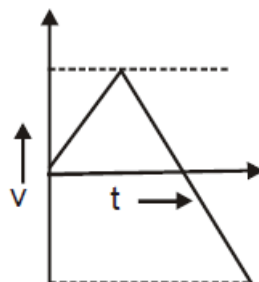36 If a particle covers unequal distances in equal time intervals. Then motion is :
(A) Uniform
(B) Non-uniform
(C) Both (A) and (B)
(D) None of these

37 The motion of a point on the rim of a wheel rotating about an axis fixed in a wall is :
(A) Circular
(B) Linear
(C) Linear and circular
(D) Vibratory

Assertion and Reason Questions

DIRECTION: In each of the following questions, a statement of Assertion is given followed by a corresponding statement of Reason just below it. Of the statements, mark the correct answer as
(a) Both assertion and reason are true and reason is the correct explanation of assertion.
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.
(c) Assertion is true but reason is false.
(d) Assertion is false but reason is true

Q38. Assertion: Displacement for a course of motion may be zero but the corresponding distance covered is not zero.
Reason : Displacement and distance covered may not always be equal.

Q39. Assertion: A boy riding on bicycle in a crowded street exhibit non uniform motion.
Reason: The boy covers equal distance in equal interval of time.

Q40. Assertion: Velocity is the speed of an object in a particular direction.
Reason: SI unit of velocity is same as speed.

Q41. Assertion: A stone tied with a piece of thread describing a circular path with constant velocity on being released moves in a straight line.
Reason: Along the circular path direction of motion remains the same at every point.

Q42. Assertion: Weight of an object is the force with which a body is attracted towards the earth.
Reason: Its direction is vertically upward.

Q43. Assertion: Motion of satellites around their planets is considered an accelerated motion.
Reason: During their motion, the speed remains constant, while the direction of motion changes continuously.

Q44. Assertion: A tiger can accelerate from rest at the rate of 4 m/s2
Reason: Th velocity attained by it in 10 s is 40 m/s.

Q45. Assertion (A) : The distance-time graph of uniform motion is a straight line.
Reason (R): Dependent variable is along y-axis and independent variable is along x-axis.

Q46. Assertion (A) : The velocity of a body is a scalar quantity.
Reason (R) : A vector quantity has both magnitude and direction.

Q47. Assertion (A) : Motion of Moon around Earth is a non-uniform motion.
Reason (R) : The size of Moon is smaller than that of Earth.

Q48. Assertion (A) : The distance and displacement are different physical quantities.
Reason (R) : Distance is the length of actual path while displacement is directed distance between initial and final positions.

Q49. Assertion (A) : A body can have acceleration even if it's velocity is zero at a given instant.
Reason (R) : A body is momentarily at rest when it reverses it's direction of motion.

Q.50. Assertion (A) : The motion of the athlete moving along a circular path is an example of an accelerated motion.
Reason (R) : If a boy moves with a velocity of constant magnitude along a circular path, the change in his velocity is due to the change in the direction of motion.

Q51. Assertion (A) : If a particle is moving with constant velocity, then average velocity for any time interval is equal to instantaneous velocity.
Reason (R) : If average velocity of a particle moving on a straight line is zero for a given time, then instantaneous velocity at some instant within this interval may be zero.

Q52. Assertion (A) : Displacement of a body may be zero, when distance travelled by it is not zero.
Reason (R) : The displacement is the longest distance between initial and final positions.

Q53. Assertion (A) : The displacement of a body may be zero, though its distance is finite.
Reason (R) : If body has moved, then displacement is zero when initial and final positions are same; while distance is finite.

Q54. Assertion (A) : An object can have constant speed but variable velocity.
Reason (R): Velocity changes due to change in direction, though speed is same.

Q55. Assertion (A) : A body cannot move on a circular path without any acceleration.
Reason (R) : In uniform circular motion, the velocity of the body remains constant.

Q56. Assertion : Displacement of an object may be zero even if the distance covered by it is not zero.
Reason : Displacement is the shortest distance between the initial and final position.

Q57. Assertion : In a uniformly accelerated motion, graph will be a straight line parallel to the time axis and the slope of graph is zero.
Reason : For a uniformly accelerated motion, acceleration is constant with time.

Q58. Assertion : The graph between two physical quantities P and Q is straight line, when P/Q is constant.
Reason : The straight line graph means that P is inversely proportional to Q or P multiplied by Q is equal to constant.

Q59. Assertion : Velocity versus time graph of a particle in uniform motion along a straight path is a line parallel to the velocity axis.
Reason : In uniform motion the velocity of a particle is always constant as the square of the time elapsed.

Q60. Assertion : The speedometer of a car measures the instantaneous speed of the car
Reason : Average speed is equal to the total distance covered by an object divided by the total time taken.

Q61. Assertion : An object may have acceleration even if it is moving with uniform velocity.
Reason : An object may be moving with uniform velocity but it may be changing its direction of motion

Q62. Assertion : There is difference between distance and displacement.
Reason : Distance and displacement have different units.

Q63. Assertion : A car moving with a speed of 25 m/s takes a U-turn in 5 seconds, without changing its speed. The average acceleration during these 5 seconds is 10 m/s2
Reason : Average acceleration = Change in Velocity / Time Taken

Q64. Assertion : Average velocity = (initial velocity + final velocity) / 2
Reason : This formula applies when the velocity of a body is changing at a constant acceleration only.

Q65. Assertion : When the displacement of a body is directly proportional to the square of the time. Then the body is moving with uniform acceleration.
Reason : The slope of velocity-time graph with time axis gives acceleration.

Q66. Assertion: The Speedometer of a bike measures its average speed.
Reason: Average velocity is equal to total displacement divided by total time taken.

Q67. Assertion: The accelerated motion of an object may be due to change in magnitude of velocity or direction or both of them.
Reason: Acceleration can be produced only by change in magnitude of the velocity. It does not depend the direction

Case Study Questions

Case Study-I

Read the following and answer any four questions from (68) to (72) Suppose the boy first runs a distance of 100 metres in 50 seconds in going from his home to the shop in the East direction, and then runs a distance of 100 metres again in 50 seconds in the reverse direction from the shop to reach back home from where he started (see Figure).
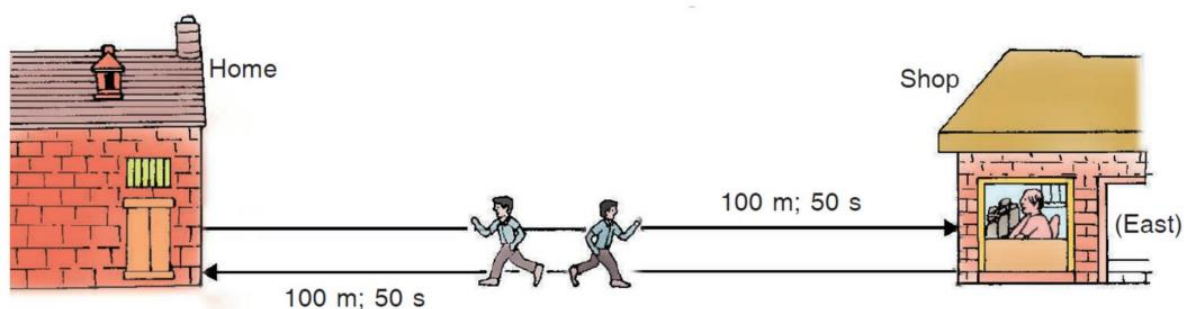
(68) Find the speed of the boy.

(a) 1 m/s

(b) 2 m/s

(c) 3 m/s

(d) none of these

(69) Find the Velocity of the boy.

(a) 1 m/s

(b) 2 m/s

(c) 3 m/s

(d) 0 m/s

(70) A boy is sitting on a merry-go-round which is moving with a constant speed of 10m/s. This means that the boy is :

(a) at rest

(b) moving with no acceleration

(c) in accelerated motion

(d) moving with uniform velocity

(71) In which of the following cases of motion, the distance moved and the magnitude of displacement are equal ?

(a) if the car is moving on straight road

(b) if the car is moving on circular road

(c) if the pendulum is moving to and fro

(d) if a planet is moving around the sun

(72) A particle is moving in a circular path of radius r. The displacement after half a circle would be :

(a) 0

(b) πr

(c) 2r

(d) $2\pi r$

Case Study-II

Read the following and answer any four questions from (i) to (v) One day Rahul decided to go his office by his car. He is enjoying the driving along with listening the old songs. His car is moving along a straight road at a steady speed. On a particular moment, he notices that the car travels 150 m in 5 seconds.

(73)   What is its average speed ?

(a) 20 m/s

(b) 30 m/s

(c) 10 m/s

(d) 40 m/s

(74)   How far does it travel in 1 second ?
(a) 20 m
(b) 30 m
(c) 10 m
(d) 40 m

(75)   How far does it travel in 6 seconds ?
(a) 120 m
(b) 130 m
(c) 180 m
(d) 140 m

(76)   How long does it take to travel 240 m ?
(a) 2s
(b) 4s
(c) 6s
(d) 8s

(77)   Which of the following statement is correct regarding velocity and speed of a moving body ?

(a) velocity of a moving body is always higher than its speed

(b) speed of a moving body is always higher than its velocity

(c) speed of a moving body is its velocity in a given direction

(d) velocity of a moving body is its speed in a given direction