Multiple choice questions

1. A body goes from A to B with a velocity of 20 m/s and comes back from B to A with a velocity of 30 m/s. The average velocity of the body during the whole journey is

(1) zero (3) 25 m/s (2) 24 m/s (4) none of these

2. A farmer has to go 500 m due north, 400 m due east and 200 m due south to reach his field. If he takes 20 min to reach the field, what is the average velocity of farmer during the walk?

(1) 35 m/min. (2) 45 m/min. (3) 25 m/min. (4) 55 m/min.

3. A rubber ball dropped from a certain height is an example of

(1) non-uniform acceleration (2) uniform retardation

(3) uniform speed (4) non-uniform speed

4. For motion on a straight line path with constant acceleration, the ratio of the magnitude of the displacement to the distance covered is

(1) = 1 (2) ≥ 1 (3) ≤ 1 (4) < 1

5. An object is moving with velocity 10 m/s. A constant force acts for 4 s on the object and gives it a speed of 2 m/s in opposite direction. The acceleration produced is

(1) 3 m/s^2 (2) −3 m/s^2 (3) 6 m/s^2 (4) −6 m/s^2

6. A car is moving along a circular path with a uniform speed 54 kmph. Find the difference in the velocities of the car when it is at the diametrically opposite points.

(1) 54 kmph (2) 108 kmph (3) 81 kmph (4) 27 kmph

7. A point traversed 3/4th of the circle of radius R in time t. The magnitude of the average velocity of the particle in this time interval is

(1) $\frac{\pi R}{t}$ (2) $\frac{3\pi R}{2t}$ (3) $\frac{R\sqrt{2}}{t}$ (4) $\frac{R}{\sqrt{2}t}$

8. Which of the following statements is false?

(1) A body can have zero velocity and still be accelerated.

(2) A body can have a constant velocity and still have a varying speed.

(3) A body can have a constant speed and still have a varying velocity.

(4) The direction of the velocity of a body can change when its acceleration is constant.

9. A particle moves along the side AB, BC, CD of a square of side 25 m with a velocity of 15 m/s. Its average velocity is

(1) 15 ms^{-1} (2) 10 ms^{-1} (3) 7.5 ms^{-1} (4) 5 ms^{-1}

10. If an object covers distances directly proportional to the square of the time lapsed, then the acceleration is

(1) increasing (2) decreasing (3) constant (4) none of these

11. A stone weighing 3 kg falls from the top of a tower 100 m high and buries itself 2 m deep in the sand. The time of penetration is

(1) 0.09 sec (2) 0.9 sec (3) 2.1 sec (4) 1.3 sec

12. The velocity of a body at any instant is 10 m/s. After 5 sec, velocity of the particle is 20 m/s. The velocity at 3 seconds before that instant is

(1) 8 m/sec (2) 4 m/sec (3) 6 m/sec (4) 7 m/sec

13. A body covers 200 cm in the first 2 sec and 220 cm in next 4 sec. What is the velocity of the body at the end of 7th second?

(1) 40 cm/sec (2) 20 cm/sec (3) 10 cm/sec (4) 5 cm/sec

14. A body falls from a height h = 200 m. The ratio of distance travelled in each 2 s, during t = 0 to t = 6 s of the journey is

(1) 1 : 4 : 9 (2) 1 : 2 : 4 (3) 1 : 3 : 5 (4) 1 : 2 : 3

15. A stone is thrown vertically upward with an initial velocity u from the top of a tower. It reaches the ground with a velocity 3u. The height of the tower is

(1) $\frac{3u^2}{g}$ (2) $\frac{4u^2}{g}$ (3) $\frac{6u^2}{g}$ (4) $\frac{9u^2}{g}$

16. A particle is moving in a straight line with initial velocity u and uniform acceleration f. If the sum of the distances travelled in t^{th} and $(t + 1)^{th}$ seconds is 100 cm, then its velocity after t seconds in cm/s is

(1) 20 (2) 30 (3) 50 (4) 80

17. A body freely falling from rest has velocity v after it falls through a height h. The distance it has to fall down further for its velocity to become double is

(1) 4h (2) 6h (3) 3h (4) 10h

18. A body falls from rest in the gravitational field of the earth. The distance travelled in the fifth second of its motion is ($g = 10\ m/s^2$)

(1) 25 m (2) 45 m (3) 90 m (4) 125 m

19. A stone is dropped from the top of a tower. If it travels 34.3 m in the last second before it reaches the ground, find the height of the tower. ($g=9.8\ m/s^2$)

(1) 39.2 m (2) 58.8 m (3) 78.4 m (4) 98 m

20. A freely falling object falls through a height *h* in the n^{th} second. What is the fall of height in the next second?

(1) h – g (2) hg (3) h + g (4) $\frac{h}{g}$

21. A stone is dropped from a certain height and another stone is dropped from the same height after 2 s. What will be their separation after 10 more seconds?

(1) 115.6 m (2) 156.5 m (3) 172.3 m (4) 215.6 m

22. A body falls from a height of 100 m. After 2 seconds if gravity disappears, find the total time it would take to reach the ground (take $g = 10\ ms^{-2}$).

(1) 2 s (2) 4 s (3) 6 s (4) 8 s

23. A body is falling freely. If the displacement in the last second is equal to the displacement in the first 3 seconds, find the time of free fall.

(1) 5 s (2) 10 s (3) 15 s (4) 20 s

24. An object is thrown vertically up with a velocity of $49\ ms^{-1}$. How high will it rise?

(1) 98 m (2) 117.6 m (3) 122.5 m (4) 137.2 m

25. A body thrown vertically upward remains in air for 2 seconds. Another body is thrown vertically upward with double the velocity. How long does it stay in air?

(1) 4 s (2) 8 s (3) 16 s (4) 32 s

26. A stone is thrown vertically up with an initial velocity $49\ ms^{-1}$ from the top of a tower and reaches ground after 12 seconds. Find the height of the tower.

(1) 98 m (2) 117.6 m (3) 137.2 m (4) 156.8 m

27. Two stones are projected from the top of a tower 100 m high each with a velocity $10\ ms^{-1}$. One is projected vertically up and the other vertically down. Find the ratio of the speeds with which they strike the ground.

(1) 1 : 10 (2) 10 : 1 (3) 1 :1 (4) 2 :1

28. A ball is projected vertically up from the foot of a tower of height 100 m with a velocity of 40 ms^{-1}. At the same instant another ball is dropped from the top of the tower. When and where do they meet each other? (take $g = 10\ ms^{-2}$)

(1) 2.5 s ; 68.75 m from ground (2) 2 s ; 65 m from ground

(3) 3 s ; 75 m from ground (4) 3.5 s ; 85 m from ground

29. An object is projected vertically up from the top of a tower of height 58.8 m with an initial velocity 4.9 ms^{-1}. Calculate the time of flight of the object.

(1) 2 s (2) 4 s (3) 6 s (4) 8 s

30. If the time of fall of two objects are in the ratio 1 : 2, find the ratio of the heights from which they fall.

(1) 1: 2 (2) 2: 1 (3) 1: 4 (4) 4: 1

31. An object is dropped from a balloon rising up with a velocity 2 ms^{-1}. Find the velocity of the object after 2 seconds of its release. (take g = 10 ms^{-2})

(1) 9 ms^{-1} (2) 18 ms^{-1} (3) 27 ms^{-1} (4) 36 ms^{-1}

32. A ball is dropped from the top of a building. The ball takes 0.5 sec to fall past the 3 m height of a window some distance from the top of the building. If the speed of the ball at the top and the bottom of the window are v_T and v_B respectively, then ($g = 9.8\ m/s^2$)

(1) $v_T + v_B = 12$ m/s (2) $v_T - v_B = 4.9$ m/s (3) $v_T\, v_B = 1$ m/s (4) $\frac{v_B}{v_T} = 1$ m/s

33. An object dropped from the top of a tower covers in the last second, seven times the distance it covered in the first second. Find the time of flight.

(1) 2 s (2) 3 s (3) 4 s (4) 5 s

34. A stone is dropped into water from a bridge of height 44.1 m above the water level. Another stone is thrown into water 1 second later. If both strike the water simultaneously, find the initial speed of the second stone.

(1) 12.25 ms^{-1} (2) 12.5 ms^{-1} (3) 12.75 ms^{-1} (4) 13 ms^{-1}

35. A stone is projected up with a velocity *'u'* and at the same time another is dropped from a height *2u*. When will they meet in air?

(1) 1 s (2) 2 s (3) 3 s (4) 4 s

36. Two bodies are held separated by 9.8 m vertically one above the other. They are released simultaneously to fall freely under gravity. After 2 s the distance between them is

(1) 4.9 m (2) 19.6 m

(3) 9.8 m (4) 39.2 m

37. A train running at a speed of 120 kmph is approaching a station. Driver applies brakes just 200 m before the station to stop it at the station. Find the retardation of the train.

(1) $\frac{25}{9}\ ms^{-2}$ (2) $\frac{30}{11}\ ms^{-2}$ (3) $\frac{37}{13}\ ms^{-2}$ (4) $\frac{41}{11}\ ms^{-2}$

38. A bullet fired into a fixed wooden target loses half of its velocity after penetrating 3 cm. How much further will it penetrate before coming to rest, if it experiences a constant deceleration?

(1) 1 cm (2) 2 cm (3) 3 cm (4) 4 cm

39. A particle under the action of a constant force moves from rest upto 20 seconds. If distance covered in first 10 seconds is s_1 and that covered in next 10 seconds is s_2 then

(1) $s_1 = s_2$ (2) $s_2 = 3s_1$ (3) $s_2 = 2s_1$ (4) $s_2 = 4s_1$

40. A ball is thrown vertically upward. It has a speed of 10 m/sec when it has reached one half of its maximum height. How high does the ball rise? (Take g = 10 m/s^2)

(1) 10 m (2) 5 m (3) 15 m (4) 20 m

41. A body moves with a uniform acceleration a and zero initial velocity. Another body B starts from the same point and moves in the same direction with a constant velocity v. The two bodies meet after a time 't'. The value of t is

(1) $\frac{2v}{a}$ (2) $\frac{v}{a}$ (3) $\frac{v}{2a}$ (4) $\sqrt{\frac{v}{2a}}$

42. Two balls are dropped from height h and 2h respectively. The ratio of times of these balls to reach the earth is

(1) $1:\sqrt{2}$ (2) $\sqrt{2}:1$ (3) 2:1 (4) 1:4

43. A car moving with a speed of 50 km/hour can be stopped by brakes after a distance 6 m. If the same car is moving at a speed of 100 km/hour, the minimum stopping distance is

(1) 6 m (2) 12 m (3) 18 m (4) 24 m

44. A ball is dropped from the roof of a tower of height h. The total distance covered by it in the last second of its motion is equal to the distance covered by it in first three seconds. The value of h in meters is ($g = 10\ m/s^2$)

(1) 125 (2) 200 (3) 100 (4) 80

45. A balloon is flying up with a constant velocity of 5 m/s. At a height of 100 m, a stone is dropped from it. At the instant the stone reaches the ground level, the height of the balloon will be

(1) 25 m (2) 0 m (3) 125 m (4) 100 m

46. A stone is thrown vertically up from the ground. It reaches a maximum height of 50 meters in 10 sec. After what time it will reach the ground?

(1) 10 sec (2) 20 sec (3) 30 sec (4) 40 sec

47. A particle starts sliding down a frictionless inclined plane. If s_n is the distance travelled by it from time $t = (n-1)$ sec to $t = n$ sec, the ratio $\frac{s_n}{s_{n+1}}$ is

(1) $\frac{2n-1}{2n+1}$ (2) $\frac{2n+1}{2n}$ (3) $\frac{2n}{2n+1}$ (4) $\frac{2n+1}{2n-1}$

48. If a body starts from rest and travels 120 m in the 8^{th} second, then acceleration is

(1) $16\ m/s^2$ (2) $10\ m/s^2$ (3) $0.227\ m/s^2$ (4) $0.03\ m/s^2$

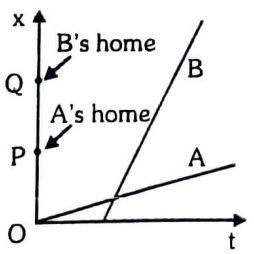
49. A particle travels 10 m in first 5 s and 10 m in next 3 s. Assuming constant acceleration, what is the distance travelled in next 2 s?

(1) 8.3 m (2) 9.3 m (3) 10.3 m (4) None of these

50. Initially a body is at rest. If its acceleration is $5\ ms^{-2}$ then the distance travelled in the 18^{th} second is

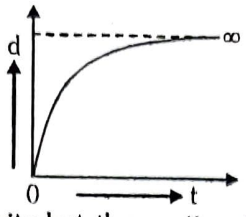
(1) 86.6 m (2) 87.5 m (3) 88 m (4) 89 m

51. Figure shows the position-time (x-t) graph of the motion of two boys A and B returning from their school O to their homes P and Q respectively. Which of the following statements is true?



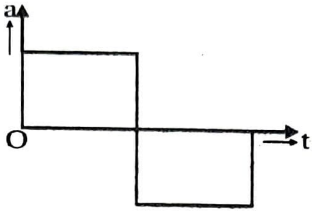
(1) A walks faster than B
(2) Both A and B reach home at the same time
(3) B starts for home earlier than A
(4) B overtakes A on his way to home

52. The distance of a particle as a function of time is shown below. The graph indicates that

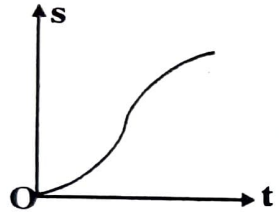


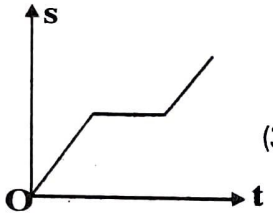
(1) The particle starts with certain velocity but the motion is retarded and finally the particle stops
(2) The velocity of the particle is constant throughout
(3) The acceleration of the particle is constant throughout in the direction of motion
(4) The particle starts with some constant velocity, the motion is accelerated, and finally the particle moves with some constant velocity.

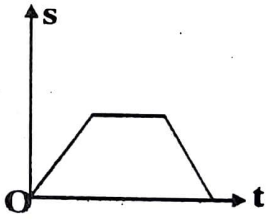
53. A particle starts from rest and its acceleration plotted against time (t) is shown below.

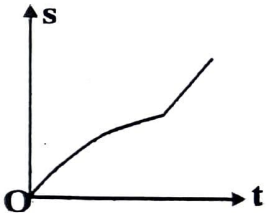


Which of the following represents displacement (s) plotted against time (t)?

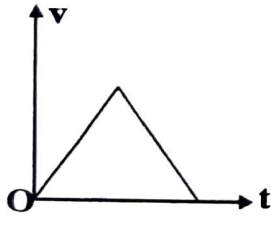
(1) 

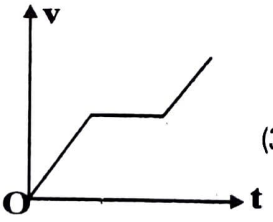
(2) 

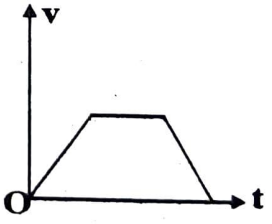
(3) 

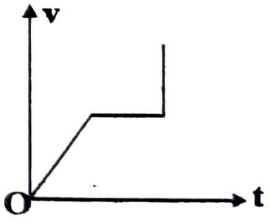
(4) 

54. In question 53, which of the following will represent velocity (v) plotted against time (t)?

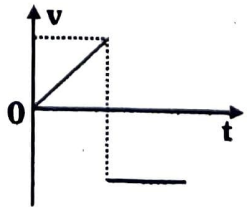
(1) 

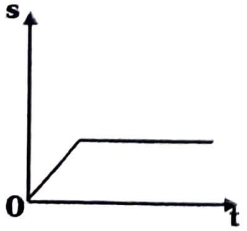
(2) 

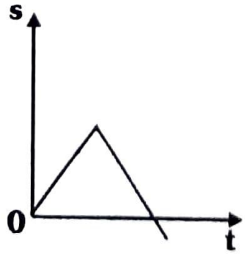
(3) 

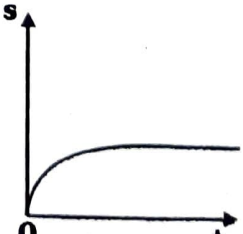
(4) 

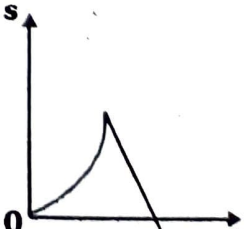
55. The velocity-time graph for a particle moving along x-axis is shown in the figure. The corresponding displacement -time graph is correctly shown by



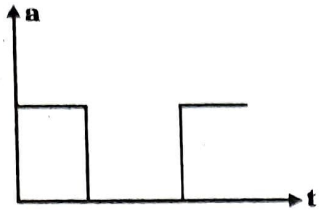
(1) 

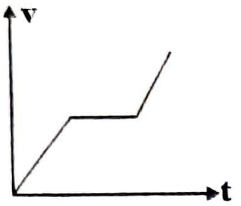
(2) 

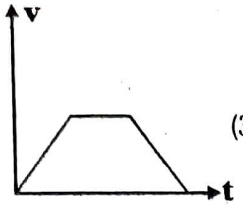
(3) 

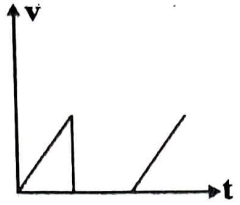
(4) 

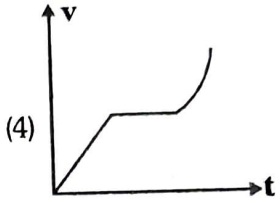
56. Which of the following graphs would probably show the velocity plotted against time graph for a body whose acceleration-time graph is shown in the figure?



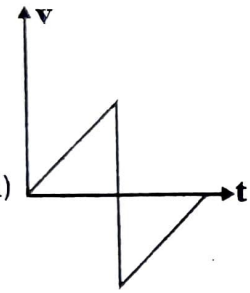
(1) 

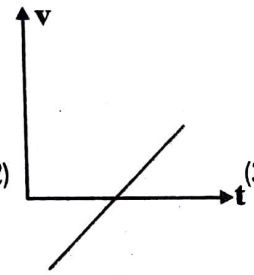
(2) 

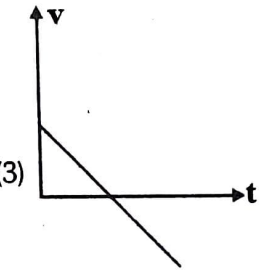
(3) 

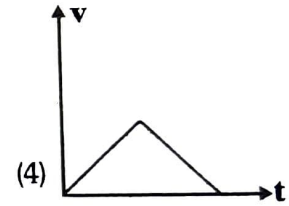
(4) 

57. The velocity-time graph of a body falling from rest under gravity and rebounding from a solid surface is represented by which of the following graphs?

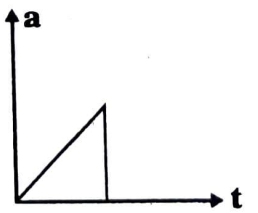
(1) 

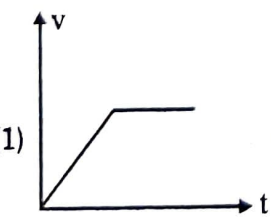
(2) 

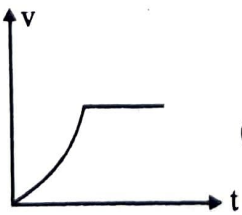
(3) 

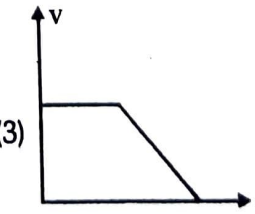
(4) 

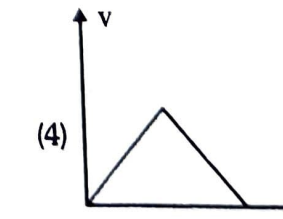
58. The acceleration-time graph for a body is shown in the figure. The most probable velocity-time graph for the body is



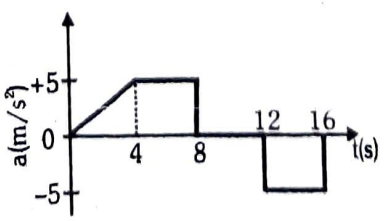
(1) 

(2) 

(3) 

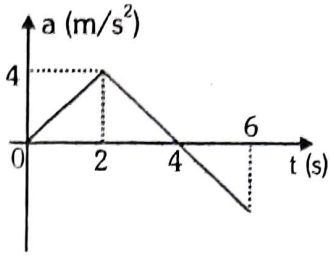
(4) 

59. The acceleration of a train between two stations is shown in the figure. The maximum speed of the train is



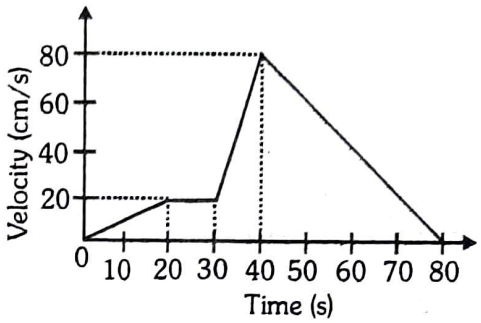
(1) 60 m/s (2) 30 m/s (3) 120 m/s (4) 90 m/s

60. Acceleration-time graph for a particle moving in a straight line is as shown in figure. Change in velocity of the particle from t = 0 to t = 6 s is



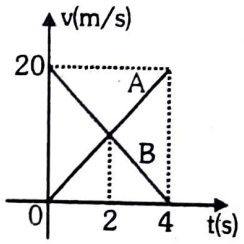
(1) 10 m/s (2) 4 m/s (3) 12 m/s (4) 8 m/s

61. The v-t graph of a moving object is given in figure. The maximum acceleration is



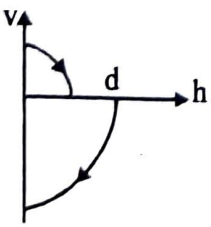
(1) 1 cm/s² (2) 2 cm/s² (3) 3 cm/s² (4) 6 cm/s²

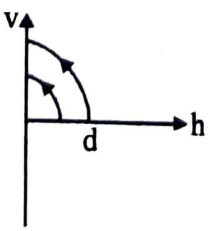
62. Speed-time graph of two cars A and B approaching towards each other is shown in figure. Initial distance between them is 60 m. The two cars will cross each other after time

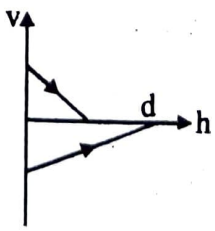


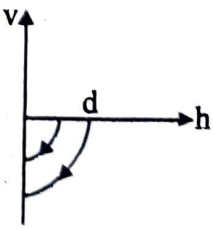
(1) 2 s (2) 3 s (3) 1.5 s (4) $\sqrt{2}$ s

63. A ball is dropped vertically from a height d above the ground. It hits the ground and bounces up vertically to a height $\frac{d}{2}$. Neglecting subsequent motion and air resistance, its velocity v varies with the height h above the ground as

(1) 

(2) 

(3) 

(4) 

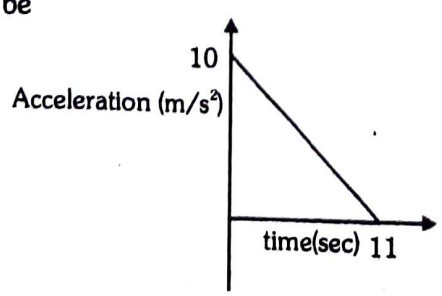
64. A body starts from rest at time t = 0. The acceleration – time graph is shown in the figure. The maximum velocity attained by the body will be

(1) 110 m/s

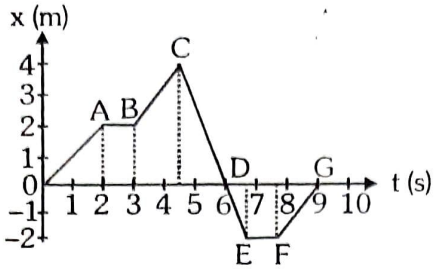
(2) 55 m/s

(3) 650 m/s

(4) 550 m/s

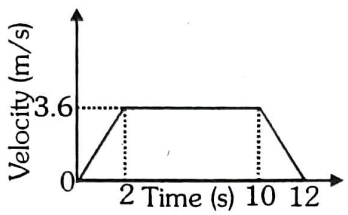


65. A dancer is demonstrating dance steps along a straight line. The position-time graph is given below. The average velocity of the dancer during time interval between t = 4.5 s to t = 9 s is



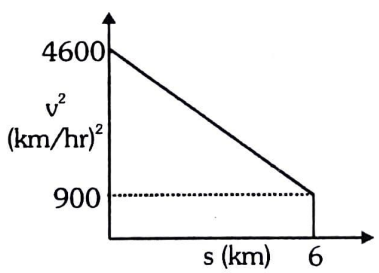
(1) 1 ms^{-1} (2) – 1.33 ms^{-1} (3) 2.75 ms^{-1} (4) –0.89 ms^{-1}

66. A lift is going up. The variation in the speed of the lift is as given in the graph. What is the height to which the lift takes the passengers?



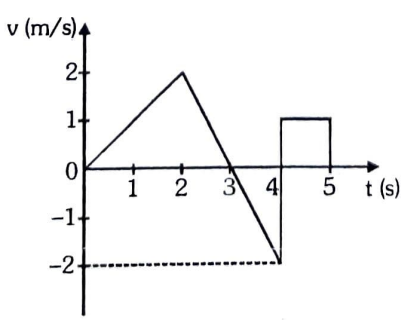
(1) 3.6 m (2) 28.8 m
(3) 36.0 m (4) Cannot be calculated from the above graph

67. A graph between the square of the velocity of a particle and the distance (s) moved is shown in figure. The acceleration of the particle in kilometres per hour squared is



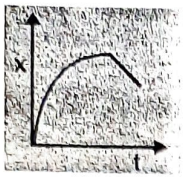
(1) 225 (2) 308.3 (3) – 225 (4) – 308.3

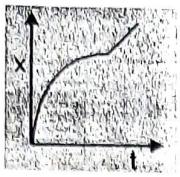
68. The velocity versus time graph of a body moving along a straight line is as shown in fig. The ratio of displacement and distance covered by body in 5 seconds is

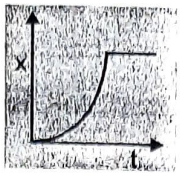


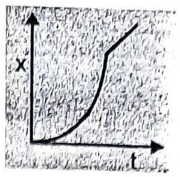
(1) 2 : 3 (2) 3 : 5 (3) 1 : 1 (4) 1.5 : 5

69. A car starts from rest, accelerates uniformly for 4 seconds and then moves with uniform velocity. Which of the x-t graphs represents the motion of the car?

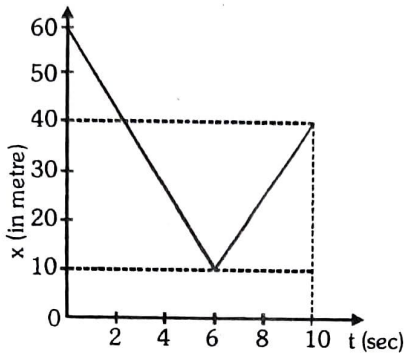
(1) 

(2) 

(3) 

(4) 

70. The fig. shows the displacement-time graph of a particle moving on a straight line path. What is the average velocity of the particle over 10 seconds?



(1) 2 ms^{-1} (2) 4 ms^{-1} (3) 6 ms^{-1} (4) 8 ms^{-1}

71. The earth's radius is 6400 km. It makes one rotation about its own axis in 24 hrs. The centripetal acceleration of a point on its equator is nearly

(1) 340 cm/s^2 (2) 34 cm/s^2 (3) 3.4 cm/s^2 (4) 0.34 cm/s^2

72. The acceleration of a point on the rim of flywheel 1 m in diameter, if it makes 1200 revolutions per minute is

(1) $8\pi^2$ m/s^2 (2) 80 π^2 m/s^2 (3) 800 π^2 m/s^2 (4) none of these

73. A phonograph record on turn table rotates at 30 rpm. The linear speed of a point on the record at the needle at the beginning of the recording when it is at a distance of 14 cm from the centre is

(1) 22 cm/sec (2) 44 cm/sec (3) 48 cm/sec (4) 52 cm/sec

74. A particle is acted upon by a constant force, the direction of which is always perpendicular to the velocity of particle. The motion of particle takes place in same plane. From the above statement it implies

(1) Particle is moving in a circular path

(2) Magnitude of its acceleration is constant

(3) Its velocity is uniform

(4) Both (1) and (2)

75. A body moves along the circumference of a circular track. It returns back to its starting point after completing the circular track twice. If the radius of the track is R, the ratio of displacement to the distance covered by the body will be

(1) 0 (2) $8\pi R$ (3) $\sqrt{3R}$ (4) $\frac{\pi}{R}$

76. Two cars are going round curves, one car travelling at 60 km/hr and the other at 30 km/hr. Each car experiences the same centripetal acceleration. The radii of the two curves are in the ratio

(1) 4 : 1 (2) 2 : 1 (3) 1 : 2 (4) 1 : 4

77. A fan is making 600 revolutions/minute. If it makes 1200 revolutions/minute, what is the increase in its angular velocity?

(1) 10 π rad/sec (2) 20 π rad/sec (3) 60 π rad/sec (4) 40 π rad/sec

78. A stone tied to the end of a 20 cm long string is whirled in a horizontal circle. If the centripetal acceleration is 9.8 m/s^2, its angular speed in rad/sec is

(1) $\frac{22}{7}$ (2) 7 (3) 14 (4) 20

79. The ratio of angular speed of minute's hand and hour's hand of a watch is

(1) 1 : 6 (2) 6 : 1 (3) 1 : 12 (4) 12 : 1

80. A point on the rim of a wheel 3 m in diameter has linear velocity of 18 m/sec. The angular velocity of the wheel is given by

(1) 12 rad/s (2) 10 rad/s (3) 8 rad/s (4) 6 rad/s

81. A particle is moving along a circular path of radius 5 m with a uniform speed 5 ms^{-1}. What will be the average acceleration when the particle completes half revolution?

(1) zero (2) 10 ms^{-2} (3) 10 π ms^{-2} (4) $\frac{10}{\pi} ms^{-2}$

82. Two racing cars of masses m_1 and m_2 are moving in circles of radii r_1 and r_2 respectively. Their speeds are such that each makes a complete circle in the same length of time t. The ratio of angular speed of the first car to that of the second car is

(1) $m_1 : m_2$ (2) $r_1 : r_2$ (3) 1 : 1 (4) $m_1r_1 : m_2r_2$

83. The angular velocity of a wheel is 70 rad/s. If the radius of the wheel is 0.5 m, then linear velocity of the wheel is

(1) 70 m/s (2) 35 m/s (3) 30 m/s (4) 20 m/s

84. An insect trapped in a circular groove of radius 12 cm moves along the groove steadily and completes 7 revolutions in 100 s. What is the linear speed of the motion?

(1) 2.3 cm/s (2) 5.3 cm/s (3) 0.44 cm/s (4) None of these

85. A stone tied to the end of a string 80 cm long is whirled in a horizontal circle with a constant speed. If the stone makes 14 revolutions in 22 s, then the acceleration of the stone is

(1) 5 m/s^2 (2) 10 m/s^2 (3) 12.8 m/s^2 (4) None of these

ANSWERS

Qu.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	1	3	4	3	2	2	3	2	4	3	1	2	3	3	2	3	3	2	3	3
Qu.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans.	4	3	1	3	1	2	3	1	2	3	2	1	3	1	2	3	1	1	2	1
Qu.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans.	1	1	4	1	3	1	1	1	1	2	4	1	1	1	4	1	1	2	2	2
Qu.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Ans.	4	2	1	2	4	3	4	2	4	1	3	3	2	4	1	1	2	2	4	1
Qu.	81	82	83	84	85															
Ans.	4	3	2	2	3															