PHYSICS

BOOKS - MODERN PUBLICATION PHYSICS (KANNADA ENGLISH)

DESCRIPTION OF MOTION IN ONE DIMENSION

Multiple Choice Question Level I

1. A boy throws a ball in air in such a manner that when the ball is in its max. height, he throws another ball. If the balls are thrown after the time difference of 1 s, then what will be the height attained by them:

A. 19.6 m

B. 9.8 m

C. 4.9m

D. 2.45 m

Answer: c

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2. A bus starts from rest with an acceleration of 1 m/s^2 A man who is 48 m behind the bus starts with a uniform velocity of 10 m s^{-1}. Then after how much time the man will catch the bus ?

A. 12 s

B. 8s

C. 10 s

D. 4s

Answer: b

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3. A body is released from the top of a tower of height metre. It takes time T seconds to reach the ground. Where is the body at time $\frac{T}{2}$ seconds?

A. At $\frac{h}{2}$ m from the ground

B. At $\frac{h}{4}$ m from the ground

C. At $3\frac{h}{4}$ m from the ground

D. Depend upon mass and volume of the body

Answer: c

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4. The displacement y (in metres) of a body varies with time T (in sec.) as $y = \frac{-3}{2}t^2 + 36t + 2$. How long does the body takes to come to the rest ?

A. 8s

B. 10s

C. 12s

D. 16s

Answer: c

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5. A body experiences acceleration for 6 seconds after starting from rest. If it travels a distance x_1 in first 2 s, x_2 in the next two s, and x_3 in the last two s. then :

A. $x_1 : x_2 : x_3 : = 1 : 1 : 1$

B. $x_1 : x_2 : x_3 : = 1 : 2 : 3$

C. $x_1 : x_2 : x_3 : = 1 : 3 : 5$

D. $x_1 : x_2 : x_3 : = 1 : 4 : 8$

Answer: c

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6. The velocity of a particle is given by $v = 3 + 6(a_1 + a_2 t)$ where a, and an are constants and t is time. The acc. of particle is:

A. $a_1 + a_2$

B. $6(a_1 + a_2)$

C. $6a_1$

D. $6a_2$

Answer: d

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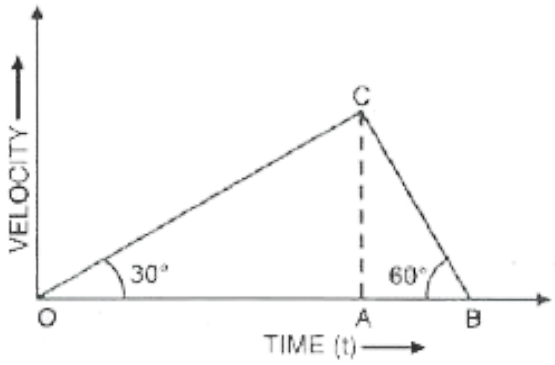
7. On a velocity time graph of a body, the ratio of average acceleration during time interval OA and AB is:



A. 1

B. $\frac{1}{2}$

C. $\frac{1}{3}$

D. 3

Answer: c

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8. A bullet fired into a target loses half of its velocity after penetrating 36 cm. Further distance covered by it before coming to rest will be

A. 18 cm

B. 24 cm

C. 12 cm

D. 30 cm

Answer: c

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9. A balloon is going vertically upward with a velocity of 15 ms^{-1}. When it is at a height of 50 m above the ground a stone is gently dropped from it. The stone will reach the ground in time (take g = 10 ms^{-2}):

A. 5 s

B. 7 s

C. 9 s

D. 3 s

Answer: a

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10. A train is moving with a speed of 54 km/h. A monkey is running on the roof of a train against its motion with a speed of 5 ms. w.ut the train. The velocity of the monkey as observed by a man on the ground is :

A. $20ms^{-1}$

B. $15ms^{-1}$

C. $10ms^{-1}$

D. $5ms^{-1}$

Answer: c

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11. A particle moving in straight line cover half the distance with speed $3ms^{-1}$. The other half is covered in two equal time intervals with speed

$4.5ms^{-1}$ and $7.5ms^{-1}$ respectively. The average speed of the particle during motion is

A. $4ms^{-1}$

B. $5ms^{-1}$

C. $5.5ms^{-1}$

D. $4.5ms^{-1}$

Answer: a

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12. A 120 m long train is moving towards west at a speed of 10 ms^{-1}.A small bird flying towards east at a speed of 5 ms^{-1} crosses the train. What is time taken by the bird to cross the train :

A. 4 s

B. 8 s

C. 12 s

D. 24 s

Answer: b

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13. A body moves along a circular track of radius R. It starts from one end of a diameter and reaches the other end of diameter. What is the ratio of the distance travelled by the body to its displacement :

A. $\frac{\pi}{2}$

B. $\frac{2}{\pi}$

C. 2π

D. $\frac{1}{2\pi}$

Answer: a

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14. A car accelerates from rest at a constant rate a for some time after which it retards at a constant rate to come to rest. If the time elapsed is t, maximum velocity reached is

A. $v = t\left(\frac{\alpha\beta}{\alpha+\beta}\right)$

B. $v = t\left(\frac{\alpha\beta}{\alpha-\beta}\right)$

C. $v = t\left(\frac{\alpha^2}{\alpha-\beta}\right)$

D. $v = t\left(\frac{\beta^2}{\alpha-\beta}\right)$

Answer: a

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15. The displacement of a particle moving in one dimension under the action of a constant force is related to timer by the equation $t = \sqrt{x+3}$, where x is in metres and in second. What is the displacement of particle when its velocity is zero?

A. zero

B. 1 m

C. 2 m

D. 3 m

Answer: a

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16. A car accelerates from rest at constant rest a α t for same time after which it deaccelerates at constant rate β to come to rest. If total time taken is t then distance covered is given by :

A. $x = t^2\left(\frac{\alpha\beta}{\alpha+\beta}\right)$

B. $x = t^2\left(\frac{\alpha\beta}{\alpha-\beta}\right)$

C. $x = \frac{t^2}{2}\left(\frac{\alpha\beta}{\alpha-\beta}\right)$

D. $x = \frac{t^2}{2}\left(\frac{\alpha\beta}{\alpha+\beta}\right)$

Answer: d

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17. A Body start from origin and move along x-axis such that velocity at any instant is given by $4t^3 - 2t$ is in second and velocity in m/s Find acceleration of the particle when it is at a distance of 2 m from the origin:

A. $28ms^{-2}$

B. $22ms^{-2}$

C. $12ms^{-2}$

D. $10ms^{-2}$

Answer: b

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18. Tennis ball is dropped on the floor from a height of 100 m. It rebounds to a height of 100 m. Ir the ball was in contact with the floor for 3.16 3. then the average acceleration during the contact is:

A. 700 m/s^2

B. 140 m/s^2

C. 280m/s^2

D. 28 m/s^2

Answer: d

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19. The relation between time and displacement is $t = \alpha x^2 + \beta x$ where α and β are constants. What is retardation of the body:

A. $2\alpha v^3$

B. $2\alpha v^2$

C. $2\alpha^2 v^2$

D. $2\alpha\beta v$

Answer: a

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20. A freely falling body, falling from a tower of heighth covers a distance h/2 in the last second of its motion The height of the tower is 10 ms^{-2}):

A. 58 m

B. 50 m

C. 65 m

D. 60 m

Answer: a

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21. A car starting from rest, accelerates at a constant rate of 5 ms for some time. It then retards at a constant rate of 10 ms and finally comes to rest. If the total time taken is 6 s, what is the maximum speed attained by the car:

A. $10ms^{-1}$

B. $40ms^{-1}$

C. $20ms^{-1}$

D. $5ms^{-1}$

Answer: c

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22. A body is dropped from a height of 125 m. If = 10 ms^{-2} what is the ratio of the distances travelled by it during the first and last second of its motion :

A. $2:9$

B. $1:9$

C. $1:3$

D. $4:9$

Answer: b

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23. A car moving at a speed v is stopped in a certain distance when the brakes produce a deceleration a. If the speed of car was nv , what must be the decceleration of the car to stop it in the same distance and in the same time?

A. $n^3 a$

B. na

C. $n^2 a$

D. $\sqrt{na}$

Answer: c

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24. The distance x covered by a body moving in a straight line in time is given by the relation 2 + 3x = t. If is the velocity of the body at a certain instant of time, its acceleration will be

A. $-v^3$

B. $-3v^3$

C. $=2v^3$

D. $-4v^3$

Answer: d

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25. A body is moved along a straight line by a machine delivering constant power, the distance moved by the body in time in proportional to :

A. $t^{3/2}$

B. $t^{3/4}$

C. t^2

D. $t^{1/2}$

Answer: a

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26. Two buses leave with a minute gap and move with acceleration of 0.2 ms - How long after the departure of the second bus do the distance hew them become equal to three times its initial value?

A. 1 min

B. 2 min

C. $\frac{1}{2}$ min

D. $\frac{3}{2}$ min

Answer: a

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27. The two ends of a train moving with a constant acceleration pass a certain point with velocities M and w. The velocity with which the middle point of a train passes the same point is:

A. $\frac{u+v}{2}$

B. $\frac{u^2+v^2}{2}$

C. $\sqrt{\frac{u^2+v^2}{2}}$

D. $\sqrt{(u^2+v^2)}$

Answer: c

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28. A stone is thrown upwards from the top of a tower with some initial speed and it reaches the ground in second. Now it is allowed to fall with the same initial speed downward and it reaches the ground in 1 second In

how much time will it reach the ground if the stone is allowed to fall freely under gravity from the same place:

A. $\left(\frac{t_1 + t_2}{2}\right)$

B. $\left(\frac{t_1 - t_2}{2}\right)$

C. $\sqrt{t_1 t_2}$

D. $(t_1 + t_2)$

Answer: c

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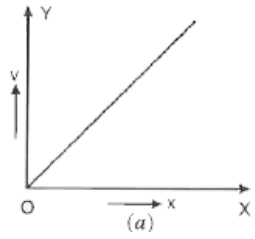
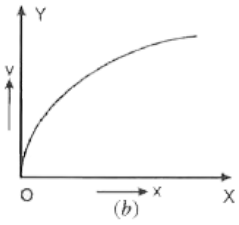
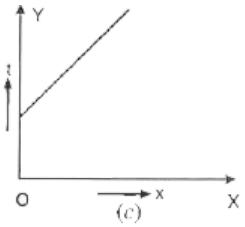
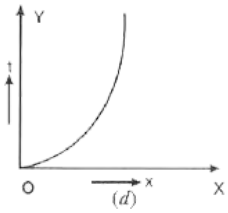
29. A body starting from rest moves along a straight line with constant acceleration. The variation of speed (v) and distance (x) is given by graph represented in:

A. 

B. 

C. 

D. 

Answer: b

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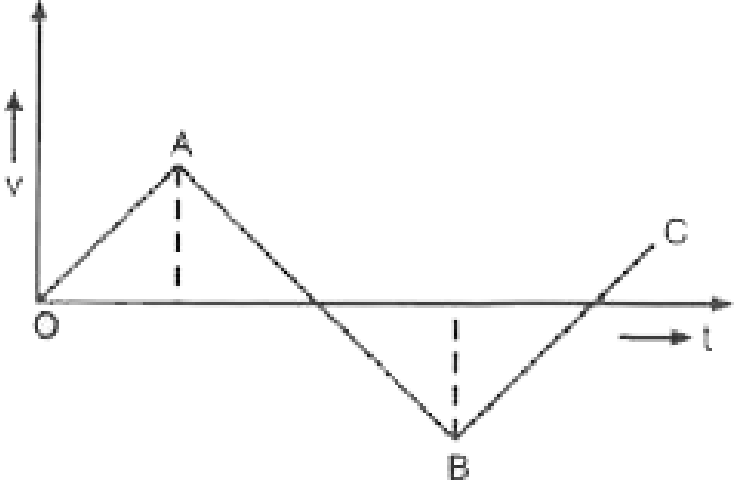
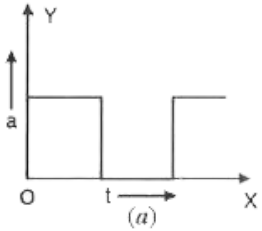
30. Given the graph of velocity of material point as a function of time. The plot of acceleration of the particle as a function of time is given as:



A.



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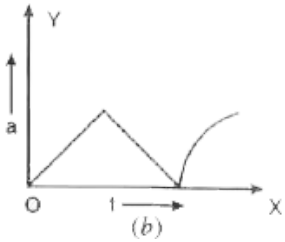
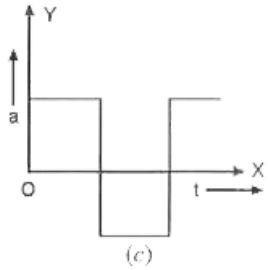
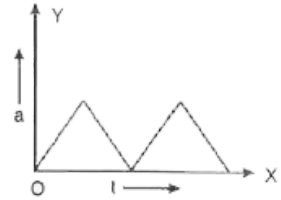


C.



D. 

Answer: c

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31. A car covers $\frac{1}{3}$part of total distance with a speed of 20 km h^{-1} and second $\frac{1}{3}$and the last part with a speed of 60 km h^{1} The average speed of the car is:

A. 55 km h^{-1}

B. 37.3km h^{-1}

C. 30km h^{-1}

D. 45km h^{-1}

Answer: c

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32. A bus is moving along a straight road with a uniform acceleration. It passes through two points A and B separated by a distance with velocity 30 km/h and 40 kmh respectively. The velocity of the bus midway between A and B is:

A. 33.3 km/h

B. 35.35 km/h

C. $20\sqrt{3}km/h$

D. None of these

Answer: b

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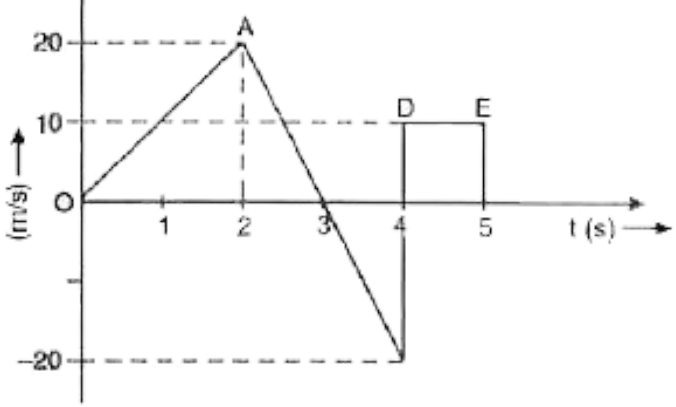
33. The velocity time graph of a body moving along a straight line is shown in Fig. The acceleration of the body during OA will be:



A. Zero

B. 20 m / s^2

C. 10 m / s^2

D. 5 m / s^2

Answer: c

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34. A boy completes one round of a circular track of radius "R' in 40 What will be his displacement at the end of 2 minutes 20 second

A. zero

B. 2 R

C. 7 π R

D. 2 πR.

Answer: b

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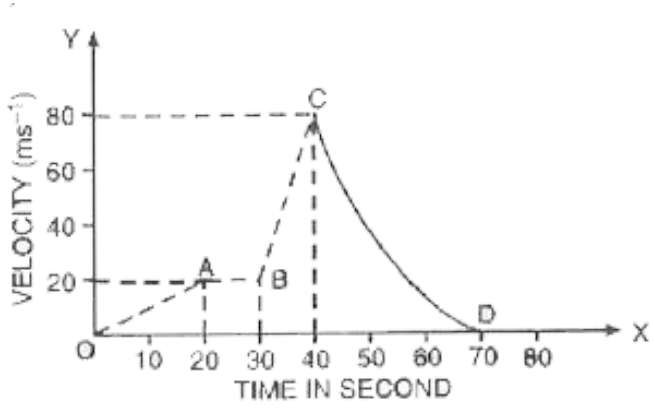
35. The velocity versus time curve of a moving point is as given ahead:

The maximum acceleration is :



A. $1m/s^2$

B. $2m/s^2$

C. $3m/s^2$

D. $4m/s^2$

Answer: d

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36. A man in a balloon rising vertically with an acceleration of 4.9 ms releases a ball 2 second after the balloon is let go from the ground. The greatest height above the ground reached by the ball is:

A. 14.7 m

B. 24.4 m

C. 19.6 m

D. 9.8 m

Answer: a

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37. A car completes the first half of its journey with a velocity v_1 and the rest half with a velocity v_2. Then the average velocity of the car for the whole journey is :

A. $v = \sqrt{v_1 v_2}$

B. $v = \sqrt{\frac{v_2}{v_1}}$

C. $\frac{2}{v} = \frac{1}{v_1} + \frac{1}{v_2}$

D. $v = \frac{v_1 + v_2}{2}$

Answer: d

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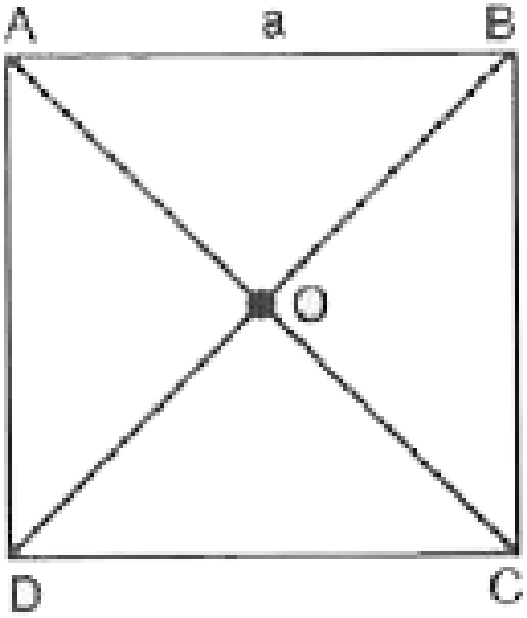
38. Four boys are standing at the four comers of a square ABCD of length of sideal. They simultaneously start running such that runs towards B, B runs towards C, C runs towards D and D runs towards A each with velocity

. They will meet at after time given by :



A. $\frac{\sqrt{2}a}{v}$

B. $\frac{a}{v}$

C. $\frac{a}{\sqrt{2}v}$

D. $\sqrt{a/v}$

Answer: b

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39. A body when released from the top of a tower of height h reaches the ground in time T. At what time it is at a height $\frac{h}{2}$ above the ground?

A. $\frac{T}{2}$

B. $\frac{T}{4}$

C. $\frac{T}{\sqrt{2}}$

D. $\sqrt{2T}$

Answer: c

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40. A bullet loses $\frac{1}{20}$ of its velocity in passing through one plank What is the minimum number of plank's required to stop the ballet:

A. 5

B. 10

C. 11

D. 20

Answer: c

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41. Which of the following is a false statement :

A. A body can have zero velocity and still be accelerated

B. A body can have constant velocity and can still have varying speed

C. A body can have constant speed but can have a varying velocity

D. The direction of velocity can change when its acceleration is constant.

Answer: b

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42. A person throws ball with velocity from the top of a building in vertically upward direction the ball reaches the ground with a speed of 3v then the height of the building is :

A. $\frac{4v^2}{g}$

B. $\frac{3v^2}{g}$

C. $\frac{6v^2}{g}$

D. $\frac{9v^2}{g}$

Answer: a

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43. A body is released from a great height and falls freely under gravity vertically towards eurth. Another body is released from the same height exactly one second later from the same point. Separation between the two after 2 second of release of the second body is :

A. 24.5 m

B. 14.6 m

C. 9.8 m

D. 4.9 m

Answer: a

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44. A parachutist after bailing out falls 50 m without friction When parachute opens, he descends at 2 ms and reaches the ground with a speed of 3 m l At what height did he bailout ?

A. 111 m

B. 293 m

C. 182 m

D. 91 m

Answer: b

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45. A man is throwing balls in air. He throws next ball when previous one is at the highest point. If he throws each ball after 2s , then height to which ball rises is

A. 10 m

B. 20 m

C. 30 m

D. 15 m

Answer: b

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46. The displacement of a particle is represented by following equation:

$s = 3t^3 + 7t^2 + 5t + 8$

where is in metre and in second the acceleration of particle at s is

A. 18 ms^{-2}

B. 14 ms^{-2}

C. 32 ms^{-2}

D. zero

Answer: c

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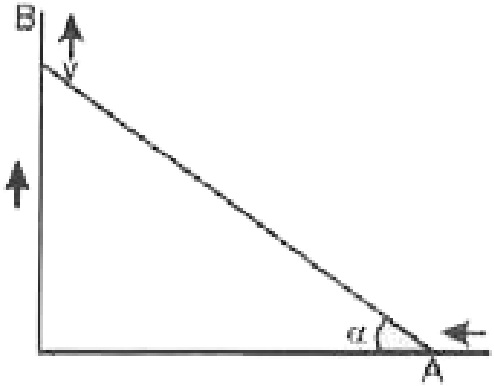
47. Two particles A and B are connected by a rigid rod AB. The rod slides along perpendicular rails as shown. The velocity of A to the left is 10

ms^{-1} What is the velocity of B when angle$\alpha = 60^\circ$?



A. 9.8 ms^{-1}

B. 10 ms^{-1}

C. 5.8 ms^{-1}

D. 17.3 ms^{-1}

Answer: c

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48. A car moving with a speed of 40 km/h can be stopped by applying brakes after at least 2 m. If the same car is moving with 80 km/h, what is

the least stopping distance ?

A. 8 m

B. 2 m

C. 4 m

D. 6 m

Answer: a

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49. A rubber ball is dropped from a height of 5 m on a planet where the acceleration due to gravity is not known. On bouncing it rises to 1.8 m. The ball loses its velocity on bouncing by a factor of:

A. $\frac{16}{25}$

B. $\frac{2}{5}$

C. $\frac{3}{5}$

D. $\frac{9}{2}$

Answer: b

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50. The displacement X (in meters) of a body varies with time (in sec) as $x = -\frac{4}{5}t^2 + 16 + +20$. The velocity of body will be zero at time:

A. 8 s

B. 10 s

C. 16 s

D. 20 s

Answer: b

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51. A stone, dropped from a certain height can reach the ground in 10 s. If it is stopped after 5 s of its fall and then allowed to fall again, find the time taken by it to reach the ground for the remaining distance.

A. 5 sec

B. 10 sec

C. 8.67 sec

D. 10 s

Answer: c

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52. A truck crosses a stationary motorcycle at a speed of 54 km/h. At the same instant, the motor cyclist follows the truck by accelerating his motorcycle at the rate of 1 ms. The motor cyclist catches the truck after a time interval of:

A. 45 s

B. 40 s

C. 30 s

D. 60 s

Answer: c

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53. A particle starts from rest and travels a distance 's' with uniform acceleration, then it travels a distance '2s' with uniform speed and finally it travels a distance '38' with uniform retardation and comes to rest. If whole motion is in a straight line, the ratio of maximum velocity to average velocity is

A. $6/7$

B. $4/5$

C. $5/3$

D. $5/2$

Answer: c

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54. A particle thrown vertically upwards has velocity 10 ms^{-1} at half of its height, then maximum height attained by it is :

A. 10 m

B. 20 m

C. 8 m

D. 16 m

Answer: a

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55. A car completes the first half of its journey with a velocity v_1 and the rest half with a velocity v_2. Then the average velocity of the car for the whole journey is :

A. $v = \sqrt{v_1 v_2}$

B. $v = \dfrac{v_1 + v_2}{2}$

C. $v = \dfrac{v_1}{v_2}$

D. $\dfrac{2}{v} = \dfrac{1}{v_1} + \dfrac{1}{v_2}$

Answer: d

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56. The numerical ratio of average velocity to average speed is

A. Unity

B. Unity or less

C. Unity or more

D. Less than unity

Answer: b

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57. A particle starts from rest and has acceleration of 2 ms-2 for 10 s. After that it travels for 30 s. with constant speed and then undergoes a constant retardation of 4 ms and comes back to rest. The total distance covered by the particle is:

A. 650 m

B. 700 m

C. 750 m

D. 800 m

Answer: c

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58. If a car at rest accelerates uniformly to a speed of 144 km/h in 20 s, it covers a distance of:

A. 20 m

B. 1440 m

C. 400 m

D. 2980 m

Answer: c

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59. The position x of a particle varies with time t as $x = at^2 - bt^3$. For what value of time acceleration is zero?

A. $\frac{2a}{3b}$

B. a/b

C. $\frac{a}{3b}$

D. zero

Answer: c

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60. Three different objects of masses $m_1 m_2$and m_3 are allowed to fall from rest from the same point along three different frictionless paths, the speeds of the three objects on reaching the ground, will be in the ratio

A. $m_1 : m_2 : m_3$

B. $m_1 : 2m_2 : 3m_3$

C. 1: 1: 1

D. $\frac{1}{m_1} : \frac{1}{m_2} : \frac{1}{m_3}$

Answer: d

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61. Two cars are moving in the same direction with a speed of 30 kmh. They are separated from each other by 5 km. Third car moving in the opposite direction meets the two cars after an interval of 4 minutes. What is the speed of the third car ?

A. $30kmh^{-1}$

B. $35kmh^{-1}$

C. $40kmh^{-1}$

D. $45kmh^{-1}$

Answer: d

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62. A particle is moving along a straight line path according to the relations $s^2 = at^2 + 2bt + c$

represent the distance travelled in t seconds and a, b, c are constant. Then the acceleration of the particle varies as:

A. s^{-3}

B. $s^{3/2}$

C. $s^{-2/3}$

D. s^2

Answer: a

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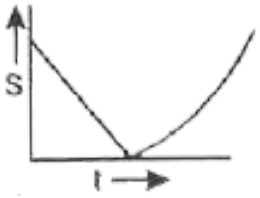
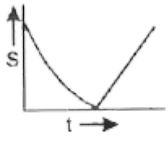
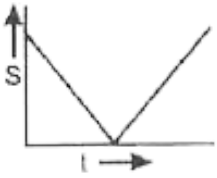
63. A ball is thrown vertically upwards. Which of the following plots represents the speed-time graph of the ball during its flight in the air (resistance of air is not ignored)?

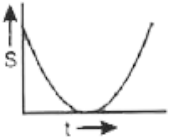
A.



B.



C. 

D. 

Answer: c

Watch Video Solution

64. A body moves for a total of nine seconds starting from rest with uniform acceleration and then with uniform retardation, which is twice the value of acceleration and then stops. The duration of uniform acceleration is:

A. 3 s

B. 4.5 s

C. 5 s

D. 6 s

Answer: d

Watch Video Solution

65. A body falls from a heighth = 200 m. The ratio of distance travelled in each 2, during != 0 to 6 second of the journey is:

A. $1:4:9$

B. $1:2:4$

C. $1:3:5$

D. $1:2:3$

Answer: c

Watch Video Solution

66. A man throws balls with the same speed vertically upwards one after the other at an interval of 2 second. What should be the speed of the throw so that two balls are in the sky at any time?

A. At least 9.8 m/s

B. Any speed less than $19.6m/s$

C. Only with speed $19.6m/s$

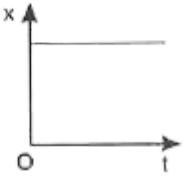
D. More than $19.6m/s$

Answer: d

Watch Video Solution

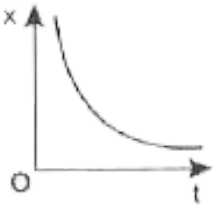
67. Which of the following position-time graph represent uniform motion ?

A.

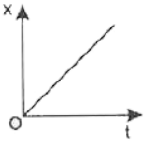


B.

C.



D.



Answer: d

Watch Video Solution

68. A student is standing at a distance of 50 metre from the bus. As soon as the bus begins its motion with an acceleration of $1m/s^2$, the student starts running towards the bus with a uniform velocity u. assuming the motion to be along a straight road, the minimum value of u. so that the student is able to catch the bus is

A. $12m/s^{-1}$

B. $10m/s^{-1}$

C. $8m/s^{-1}$

D. $5m/s^{-1}$

Answer: b

Watch Video Solution

69. A balloon is rising vertically up with a velocity of 29 ms^{-1}. A stone is dropped from it and it reaches the ground in 10 seconds. The height of the balloon when the stone was dropped from it is

A. 400 m

B. 150 m

C. 100 m

D. 200 m

Answer: d

Watch Video Solution

70. A particle moves along a straight line OX. At a time (in second) the distance x (in metre) of the particle from "O' is given by : $x = 40 + 12t - t^3$ How long particle travels before coming to rest ?

A. 16 m

B. 21 m

C. 40 m

D. 56 m

Answer: d

Watch Video Solution

71. A body initially at rest is moving with uniform acceleration 'a'. It's velocity after n seconds is v. The displacement of the body in last 2 seconds is:

A. $\frac{2v(n-1)}{n}$

B. $\frac{v(n-1)}{n}$

C. $\frac{v(n+1)}{n}$

D. $\frac{2v(n+1)}{n}$

Answer: a

Watch Video Solution

72. A particle moves with constant acceleration a and $v_1 v_2 v_3$. are its average velocities in the three successive intervals$t_1 t_2$ and t_3 is of time. Then which relation out of the following holds good for its motion ?

A. $\frac{v_1 - v_2}{v_2 - v_3} = \frac{t_1 + t_2}{t_2 + t_3}$

B. $\frac{v_1 - v_2}{v_2 - v_3} = \frac{t_1 - t_2}{t_2 - t_3}$

C. $\frac{v_1 - v_2}{v_2 - v_3} = \frac{t_1 - t_1}{t_2 - t_3}$

D. $\frac{v_1 - v_2}{v_2 - v_3} = \frac{t_1 + t_2}{t_2 - t_3}$

Answer: a

Watch Video Solution

73. A body starting from rest moves with constant acceleration 'a'. This acceleration is a pr where p is a constant. What is the displacement of particle in a time interval=0 to t = t_1 ?

A. $\frac{1}{3} p t_1^3$

B. $\frac{1}{4}pt_1^2$

C. $\frac{-1}{6}pt_1^3$

D. $\frac{1}{4}pt_1^3$

Answer: c

Watch Video Solution

74. A body falls from rest. In the last second of its fall, it covers half of the total distance then the total time of its fall is

A. $\left(2-\sqrt{2}\right)s$

B. $\left(2+\sqrt{2}\right)$s

C. 2 s

D. 4s

Answer: b

Watch Video Solution

75. In the above question (A body falls from rest. In the last second of its fall, it covers half of the tot the total height of fall is :

A. 50 m

B. 56 m

C. 78.4 m

D. 19.6 m

Answer: b

View Text Solution

76. A small block slides without friction down an inclined plane starting from rest. Lets s_n be the distance travelled from time t=n - 1 to t = n. Then $\frac{S_n}{s_n + 1}$ is:

A. $\frac{2n-1}{2n}$

B. $\frac{2n+1}{2n-1}$

C. $\frac{2n-1}{2n+1}$

D. $\frac{2n}{2n+1}$

Answer: c

Watch Video Solution

77. A parachutist after bailing out falls 50 m without friction When parachute opens, he descends at 2 ms and reaches the ground with a speed of 3 m l At what height did he bailout ?

A. 191 m

B. 182 m

C. 293 m

D. 111 m

Answer: c

Watch Video Solution

78. A particle located at x = 0 at time t=0 starts moving along positive x-direction with velocity v that varies as $v = a\sqrt{x}$. The displacement of the particle varies with time as :

A. t^2

B. t

C. $t^{1/2}$

D. t^3

Answer: a

Watch Video Solution

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

A. 12 m

B. 18 m

C. 24 m

D. 6 m

Answer: c

Watch Video Solution

80. An automobile travelling with a speed of 60 km/h, can brake to stop within a distance of 20 m. If the car is moving twice as fast i.e. 120 km/h, the stopping distance will be

A. 20 m

B. 80 m

C. 60 m

D. 40 m

Answer: b

Watch Video Solution

81. A bullet fired into a fixed target loses half of its velocity after penetrating 3 cm. How much further it will penetrate before coming to rest assuming that it faces constant resistance to motion ?

A. 3.0 cm

B. 2.0 cm

C. 1.5 cm

D. 1.0 cm

Answer: d

Watch Video Solution

82. The relation between time and displacement is $t = \alpha x^2 + \beta x$ where α and β are constants. What is retardation of the body:

A. $-2abv^2$

B. $2bv^3$

C. $-2av^3$

D. $2av^2$

Answer: c

Watch Video Solution

83. A car, starting from rest, accelerates at the rate f through a distance S, then continues at constant speed for time t and then decelerates at the rate $\frac{f}{2}$ to come to rest. If the total distance traversed is 5 S, then :

A. S=ft

B. $S = \frac{1}{6} ft^2$

C. $S = \frac{1}{2} ft^2$

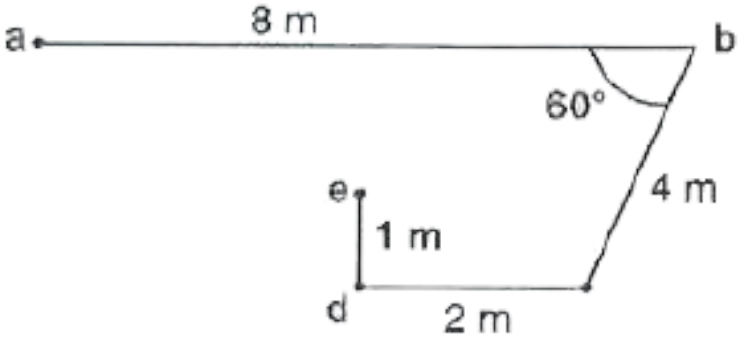
D. $S = \frac{1}{4} ft^2$

Answer: c

Watch Video Solution

Multiple Choice Question Level Ii

1. A man moves along the path abode as shown in the Fig. What is his displacement from the point of start?



A. 15 m

B. 4 m

C. 4.7 m

D. 5.2 m

Answer: c

Watch Video Solution

2. A body is projected vertically upwards and attains maximum height H. If the time to reach height 'h' and H are in the ratio of 1:3, then the ratio $\frac{h}{H}$ is :

A. $\frac{4}{9}$

B. $\frac{3}{2}$

C. $\frac{5}{9}$

D. $\frac{3}{2}$

Answer: c

Watch Video Solution

3. A stone weighing 2 kg falls from the top of a tower 40 metre heigh and burries itself 1m deep in sand. The time of penetration is :

A. $\frac{1}{15}s$

B. $\frac{1}{13}s$

C. $\frac{1}{14}s$

D. None of these

Answer: c

Watch Video Solution

4. What is the maximum height of a stone thrown vertically upwards if its velocity is halved in 2 second ?

A. 20 m

B. 40 m

C. 80 m

D. 100 m

Answer: c

Watch Video Solution

5. Three particles A, B, C are thrown from the top of a tower with the same speed. A is thrown straight up, B is thrown straight down and C is thrown horizontally. They hit the ground with speeds va, v_b and v_c and respectively.

A. $v_a = v_b = v_c$

B. v_a gtv_b gtv_c

C. $v_a = v_b$ gt v_c

D. $v_a = v_b$ ltv_c

Answer: d

Watch Video Solution

6. The displacement of a particle is given by $x = (t-2)^2$ where x is in meters and in seconds. The distance covered by the particle in first 4 seconds is :

A. 4m

B. 8 m

C. 12 m

D. 16 m

Answer: b

Watch Video Solution

7. In the above question what is the distance covered bythe particle in 5th second of its motion ?

A. 4 m

B. 8 m

C. 5 m

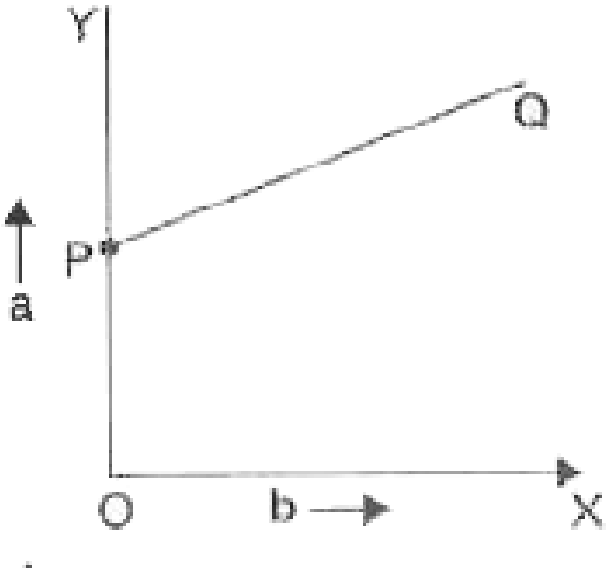
D. 11 m

Answer: c

View Text Solution

8. In the given graph between two physical quantities 'a' and 'b' as shown in the figure 'b' is along x-axis while 'a' is along y-axis. The plot describes

the motion of a particle in a straight line then



A. Quantity 'b' may represent time.

B. Quantity 'a' can be velocity if motion is uniform.

C. Quantity a should be displacement if motion in uniform

D. Quantity 'a' should be velocity if motion is uniformly accelerated.

Answer: a,c,d

Watch Video Solution

9. An object falling through a static water column is observed to have an acceleration given by the relation ang-bu where g is acceleration due to gravity and 'b' is a constant. After sufficiently long time of its release, it is observed to fall with a constant speed. What must be the value of its constant speed ?

A. $v=g/b$

B. $v=a/b$

C. $v=g \times b$

D. None of these

Answer: a

Watch Video Solution

10. A bird is flying to and fro between two cars moving with constant speeds on a straight smooth road. One car is moving at 18 km/h while other is moving towards the other at 27 km/h. The bird starts moving

from the first car towards the other with a speed of 36 km/h when the distance of separation between the two is 36 km. What is the displacement of the bird when the two cars meet each other?

A. 18 km

B. 22.6 m

C. 28.8 km

D. 30.2 km

Answer: c

Watch Video Solution

11. Two tall buildings are standing in front of each other at a straight separations of 10 m one of them is taller than the other by 9 m. A man is running on the roof top of taller at a speed of 9 m/s horizontally and jumps as such in the hope that he will land on the roof of the building with lower height. Find will be able to land ?

A. Yes

B. No

C. Just on head of edge

D. Falls in the middle of street.

Answer: a

Watch Video Solution

12. A ball is dropped from tower of height 45 m. At the same moment another ball is thrown up with a speed of 40 ms from base. What is the relative speed of the balls as a function of time?

A. The relative speed with respect to time is zero

B. The relative speed goes on increasing with time

C. The relative speed goes on decreasing with time

D. The relative speed is constant and is 40 m/sec.

Answer: d

Watch Video Solution

13. A car and a truck are going on a straight road each having a velocity of 72 km/h. The car cannot come to a stop in less than 3.0 sec and the truck takes 5.0 seconds time to stop on the high-way. The car is behind the truck. The truck gives a signal for stopping at a tollplaza. What should be the least distance of the car from the truck so that it does not bump onto the truck? (Take human response time to be 0.5 sec)

A. 1.25 m

B. 0.75 m

C. 1.5 m

D. 1.75 m

Answer: a

Watch Video Solution

14. Two cars leave one after the other and travel with an acceleration of 0.4 ms. Two minutes after the departure of the first car, the distance between them becomes 1.90 km. The time interval between their departures is :

A. 50 s

B. 60 s

C. 70 s

D. 80 s

Answer: a

Watch Video Solution

15. A point mass initially at rest moves along x-axis. Its acceleration varies with time as a = 6t+ 5 ms. If it starts from origin, the distance covered by it in 1 s is

A. 3 m

B. 5.5 m

C. 3.5 m

D. 4 m

Answer: c

Watch Video Solution

16. The deceleration experienced by a moving motor boat after its engine is cut off is given by $d\frac{v}{dt} = kv^3$, where is a constant. Ifv, is the magnitude of the velocity at cut off, the magnitude of velocity at time after the cut off is :

A. $\frac{v_0}{2}$

B. v_0

C. $\frac{v_0}{\sqrt{2v_0^2kt+1}}$

D. $v_0 e^{-kt}$

Answer: c

Watch Video Solution

17. A pole is held vertically with one end on the ground. The length of the pole is 30 m. The pole is allowed to fall. Assuming that the lower end of the pole does not slip with what velocity will the upper end strike the ground g = 10 m

A. 5 m s^{-1}

B. 10 s^{-1}

C. 20 s^{-1}

D. 30 s^{-1}

Answer: d

Watch Video Solution

18. The distance time graph of a particle at time t makes an angle of 45° with time axis. After 1 second it makes an angle of 60° with time axis, what is the acceleration of the particle ?

A. $\sqrt{3-1}$

B. $\sqrt{3+1}$

C. $\sqrt{3}$

D. 1

Answer: a

Watch Video Solution

19. A stone falls from rest. The total distance covered by it in the last second of its motion is equal to the distance covered by it in the first three seconds of its motion. How long does the stone remain in air?

A. 4 s

B. 5 s

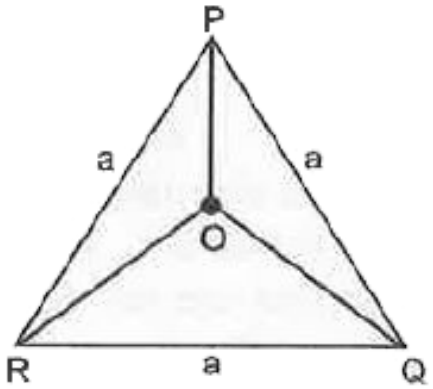
C. 6 s

D. 7 s

Answer: b

Watch Video Solution

20. Three persons P, Q, R are at the three comers of an equilateral triangle of each side 1. They start moving simultaneously with velocity v such that Pathways moves towards Q Q always moves towards R and R always moves towards P. After what time they would meet each other at O?



A. $\frac{a}{v}$

B. $\frac{2a}{v}$

C. $\frac{2a}{\sqrt{3v}}$

D. $\frac{2a}{3v}$

Answer: d

Watch Video Solution

21. A bus starts moving with an acceleration2 ms? A cyclist 96 m behind the bus starts simultaneously towards the bus at 20 m s-, after what time will he able to overtake the bus?

A. 4 s

B. 8 s

C. 12 s

D. 16 s

Answer: b

Watch Video Solution

22. A boat can go across a lake of length I and return in time To at a speed yo. On a rough day there is a uniform current moving with a speed y to help onward journey and impede the return journey. If the time taken to go across and return on the rough day is $\frac{t}{t_0}$ then the ratio is :

A. $1 - \frac{v^2}{v_0^2}$

B. $\frac{1}{1 - \frac{v^2}{v_0^2}}$

C. $1 + \frac{v^2}{v_0^2}$

D. $\frac{1}{1 + \frac{v^2}{v_0^2}}$

Answer: b

Watch Video Solution

23. A man is at a distance from the bus: when the bus begins to move with a constant acceleration 'a', with what minimum velocity the man should run towards the bus so as to catch it?

A. $\sqrt{2ax}$

B. 2ax

C. $\sqrt{ax}$

D. ax

Answer: a

Watch Video Solution

24. A ball is thrown upwards from the ground. It is at a height 100 m in upward and downward journeys at time t_1 and t_2 respectively. If g = 10 $\frac{m}{s^2}$, then the product of $t_1 . t_2$ is:

A. 10

B. 20

C. 40

D. 50

Answer: b

Watch Video Solution

25. Between two stations a train accelerates uniformly at first, then moves with constant velocity and finally retards uniformly. If the ratio of the time taken for these is 1:8:1 and the maximum speed attained be 60 km h- then what is the average speed over the whole journey ?

A. 48 Kmh^{-1}

B. 52Kmh^{-1}

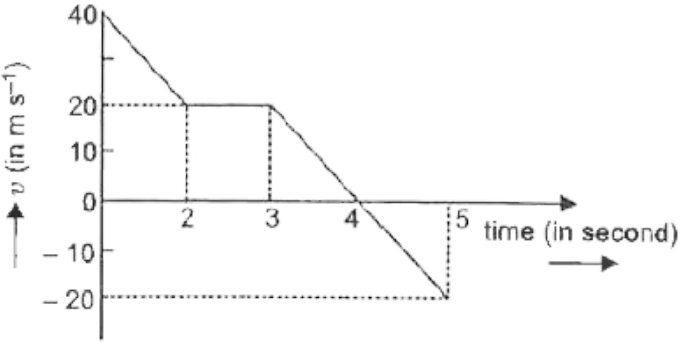
C. 54Kmh^{-1}

D. 56Kmh^{-1}

Answer: c

Watch Video Solution

26. In the given v -1 graph, the distance travelled by the body in 5 second will be



A. 20 m

B. 40 m

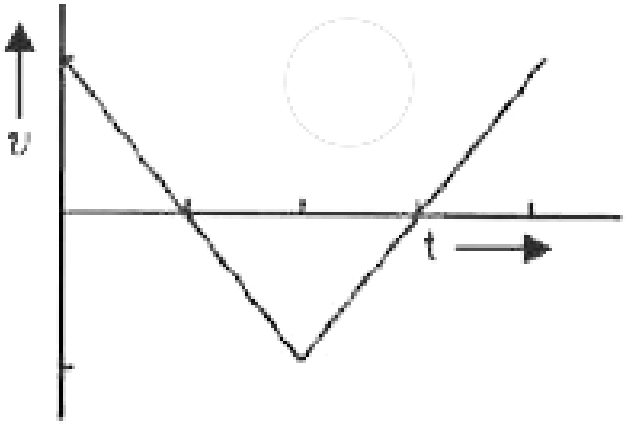
C. 80 m

D. 100 m

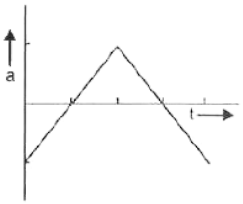
Answer: d

Watch Video Solution

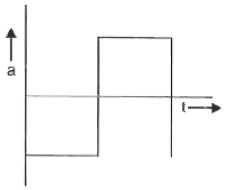
27. The graph shown in Fig. shows the velocity v tk versus time for a body, Which of the graphs shown below represents the corresponding acceleration versus time graphs ?



A.

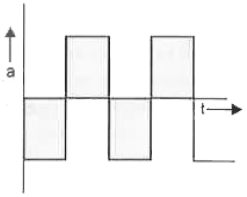


B.

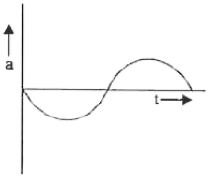


(b)

C.



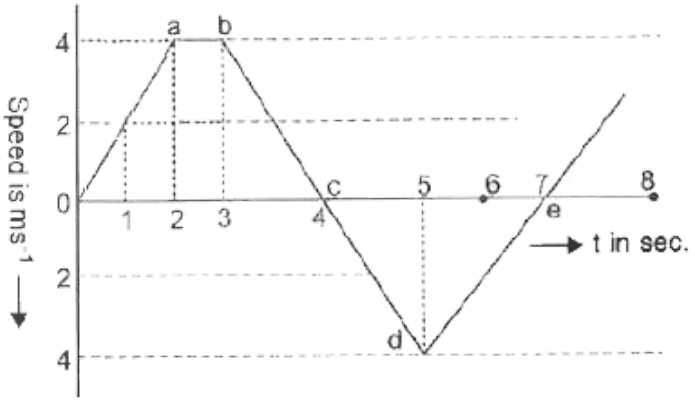
D.



Answer: b

Watch Video Solution

28. Figure here gives the speed-time graph for a body. The distance travelled between I = 1.0 second and t = 7.0 second is nearest to:



A. 1.5 m

B. 2 m

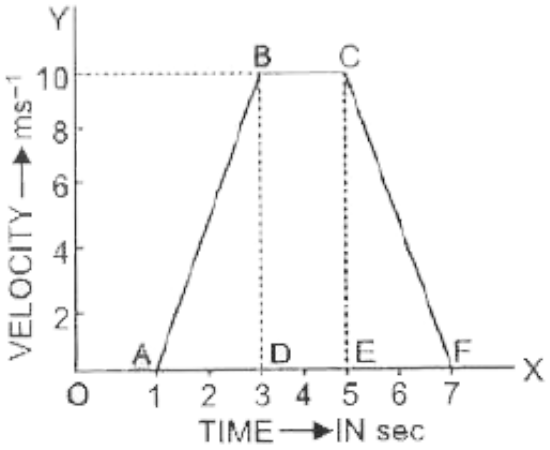
C. 3 m

D. 4 m

Answer: c

Watch Video Solution

29. For the velocity time graph shown in the figure below the distance covered by the body in last two seconds of its motion is what fraction of the total distance covered by it in all the seven seconds ?



A. $\frac{1}{2}$

B. $\frac{1}{4}$

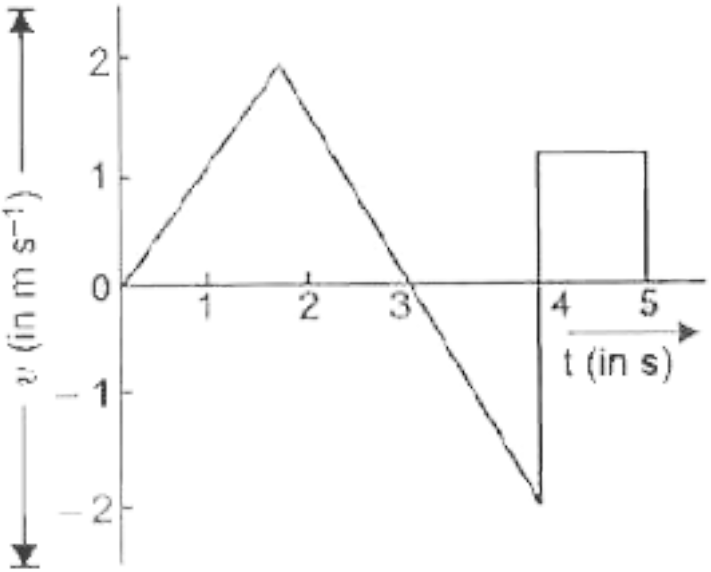
C. $\frac{1}{3}$

D. $\frac{2}{3}$

Answer: b

Watch Video Solution

30. The velocity-time graph of a particle moving along a straight line is shown in Fig. The displacement of the body in 5 second is :



A. 0.5 m

B. 1 m

C. 2 m

D. 3 m

Answer: d

Watch Video Solution

31. The position x of a particle varies with time t as $x = at^2 - bt^3$. For what value of time acceleration is zero?

A. $\frac{a}{3b}$

B. $\frac{a}{b}$

C. $\frac{a}{2b}$

D. $\frac{3a}{b}$

Answer: a

Watch Video Solution

32. A boy walks to his school at a distance of 6 km with constant speed of 2.5 km/h and walks back with a constant speed of 4 km/h. His average speed for the round trip is:

A. $\frac{24}{13} kmh^{-1}$

B. $\frac{40}{13} kmh^{-1}$

C. 3 km/h

D. $\frac{1}{2}Kmh^{-1}$

Answer: b

Watch Video Solution

33. A particle is dropped from rest vertically from a height The time taken by it to fall through successive distances of 1 m cach will then be :

A. All equal being equal to $\sqrt{\frac{2}{g}}$sec.

B. In the ratio of square roots of integers 1,2,3,4

C. In the ratio of the difference in the square roots of integers i.e. $(\sqrt{1}-\sqrt{0}), (\sqrt{2}-\sqrt{1}), (\sqrt{3}-\sqrt{2})$

D. In the ratio of $\frac{1}{\sqrt{1}}:\frac{1}{\sqrt{2}}:\frac{1}{\sqrt{3}}$

Answer: c

Watch Video Solution

34. The position of a particle moving in a x - y plane at any instant is given by$x = \left(3t^2 - 6t\right)$ metres $y = \left(t^2 - 2t\right)$ metres. Select the correct statement.

A. Acceleration is zero at i = 0

B. Velocity is zero at t = 0

C. Velocity is zero at 1 sec.

D. Velocity and acceleration are never zero.

Answer: c

Watch Video Solution

35. A ball falls on the surface from 10 m height and rebounds to 2.5 m. If the duration of contact with the floor is 0.01 sec. Then average acceleration during contact is:

A. 2100 ms^{-2}

B. 1400 ms^{-2}

C. 700 ms^{-2}

D. 400 ms^{-2}

Answer: a

Watch Video Solution

36. The acceleration a' in ms-2 of a particle is given by a = $3t^2$ +2t+2, where is the time. If the particle starts with a velocity v = 2 m s-at i=0 then velocity at the end of 2 sec is:

A. 12ms^{-1}

B. 18 ms^{-1}

C. 27 ms^{-1}

D. 36 ms^{-1}

Answer: b

Watch Video Solution

37. The x and y co-ordinates of a particle at any instant are $x = 4t^2$ + 7t and y = 5t where x, y are in metres and in seconds. The acceleration at t=5s is :

A. Zero

B. 20 ms^{-2}

C. 8 ms^{-2}

D. 40 ms^{-2}

Answer: c

Watch Video Solution

38. Two stones are thrown from the top of a tower, one straight down with an initial speed and the second straight up with the same speed. When the two stones hit the ground, they will have speeds in the ratio :

A. $2:3$

B. $2:1$

C. $1:2$

D. $1:1$

Answer: d

Watch Video Solution

39. A lunar landing module is descending toward the moon's surface at a steady velocity of 10 ms. At a height of 120 m, a small objects falls from its landing gear. Taking the moon's gravitational acceleration as 1.6 ms , at what speed (in ms) does the object strike the moon ?

A. 202

B. 22

C. 19.6

D. 16.8

Answer: b

Watch Video Solution

40. A car starts from rest and moves with constant acceleration. The ratio of distance covered by the car in nth second with that covered in n seconds is:

A. $\frac{2n-1}{2n^2}$

B. $\frac{n^2}{2n-1}$

C. $\frac{2n-1}{n^2}$

D. 1:n

Answer: c

Watch Video Solution

41. A balloonist release a ballast bag from a balloon rising at 40 ms at a time when the balloon is 100 m above the ground. If g = 10m/s2 then the bag reaches the ground in:

A. $16s^{-1}$

B. 18 s

C. 10 s

D. 20 s

Answer: c

Watch Video Solution

42. Two bodies begin a free fall from the same height at a time interval of Ns. If vertical separation between the two bodies is 1 after second from the start of the first body, then is equal to :

A. $\sqrt{nN}$

B. $\frac{1}{gN}$

C. $\frac{1}{gN} + \frac{N}{2}$

D. $\frac{1}{gN} - \frac{N}{4}$

Answer: c

Watch Video Solution

43. A boy releases a hall from the top of a building. It will clear a window 2 m high at a distance 10 m below the top in nearly :

A. 1 s

B. 1.3 s

C. 0.6 s

D. 0.13 s.

Answer: d

Watch Video Solution

44. Two balls are projected simultaneously with the same speed from the top of a tower, one vertically upwards and the other vertically downwards. They reach the ground in 9 second and 4 second respectively. The height of the tower is:

A. 100 m

B. 120 m

C. 180 m

D. 200 m

Answer: c

Watch Video Solution

45. A particle travels half the distance with a velocity of 6 ms. The remaining half distance is covered with a velocity of 4 ms for half the time and with a velocity of 8 ms for the rest of the half time. What is the velocity of the particle averaged over the whole time of motion?

A. 9 ms^{-1}

B. 6 ms^{-1}

C. 5.35 ms^{-1}

D. 5 ms^{-1}

Answer: b

Watch Video Solution

46. A body starts from a point with a velocity and uniform acceleration a. The direction of acceleration is reversed when the velocity of the body

becomes 5u. The velocity of body al point will be

A. $-v$

B. $-5v$

C. $-7v$

D. $-9v$

Answer: c

Watch Video Solution

47. The greatest acceleration or deceleration that a train may have is a. The minimum time in which the train can get from one station to the next at a distance s is:

A. $\sqrt{\frac{s}{a}}$

B. $\sqrt{\frac{2s}{a}}$

C. $2\sqrt{\left(\frac{s}{a}\right)}$

D. $\frac{1}{2}\sqrt{\frac{s}{a}}$

Answer: c

Watch Video Solution

48. If the velocity of a car in increased by 20%, then the minimum distance in which it can be stopped increases by:

A. 0.44

B. 0.55

C. 0.66

D. 0.88

Answer: a

Watch Video Solution

49. The acceleration of a particle increasing linearly with timer is be. The particle starts from the origin with an initial velocity, The distance travelled by the particle in time will be

A. $v_0 t + \frac{1}{6} b t^3$

B. $v_0 t + \frac{1}{3} b t^2$

C. $v_0 t + \frac{1}{3} b t^3$

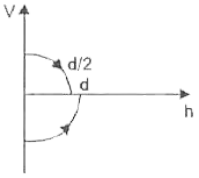
D. $v_0 t + \frac{1}{2} b t^2$

Answer: a

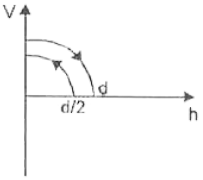
Watch Video Solution

50. A ball is dropped vertically from a height above the ground. It hits the ground and bounces up vertically to a height d/2. Neglecting air resistance its velocity varies with the heighth above the ground as:

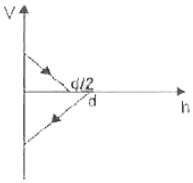
A.



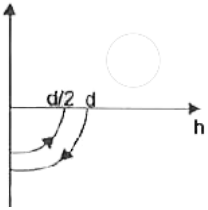
B.



C.



D.



Answer: a

Watch Video Solution

51. A ball is released from the top of a tower of heighth metre. It takes T second to each the ground. What is the position of the ball at $\frac{T}{3}$ second

?

A. $\frac{h}{9}$ meter from the ground

B. $\frac{7h}{9}$ meter from the ground

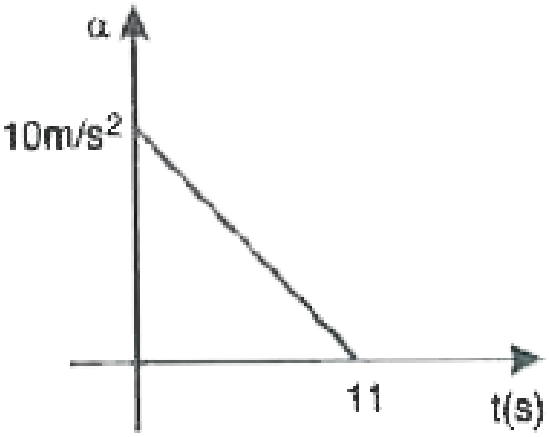
C. $\frac{8h}{9}$ meter from the ground

D. $\frac{17h}{18}$ meter from the ground

Answer: c

Watch Video Solution

52. A particle stars from rest. Its acceleration (a) versus time (t) is as shown in the figure . The maximum speed of the particle will be:



A. 110 m/s

B. 55 m/s

C. 550 m/s

D. 660 m/s

Answer: b

Watch Video Solution

53. The velocity of particle is v=v_0 +gt+ft^2 if its position is x =0 at t=0, then its displacement after unit time is:

A. $v_0 + g/2 + f/3$

B. v_0 +g+f

C. v_0+g/2+f

D. v_0 +2g+3f

Answer: a

Watch Video Solution

54. An object moving with a speed of 6.25 m/s , is decelerated at a rate given by: $\frac{dv}{dt} = -2.5\sqrt{v}$

where v is the instantaneous speed The time taken by the object to come to rest would be:

A. 2s

B. 4 s

C. 8 s

D. 1 s

Answer: a

Watch Video Solution

Recent Competitive Question

1. A train is moving slowly on a straight track with a constant speed of $2\ \mathrm{m\,s^{-1}}$. A passengers in the train starts walking at a stready speed of $2\ \mathrm{m\,s^{-1}}$ to the back of the train in the opposite direction of the motion of the train. So to an observer standing on the platform directly in front of that passenger, the velocity of the passenger appears to be

A. 2 ms^{-1} in the opposite direction of the train

B. zero

C. $4ms^{-1}$

D. 2 ms^{-1}

Answer: b

Watch Video Solution

2. A motorboat covers a given distance in 6 hours moving downstream on a river. It covers the same distance in 10 hours moving upstream. The time it takes to cover the same distance in still water is

A. 6.5 hours

B. 8 hours

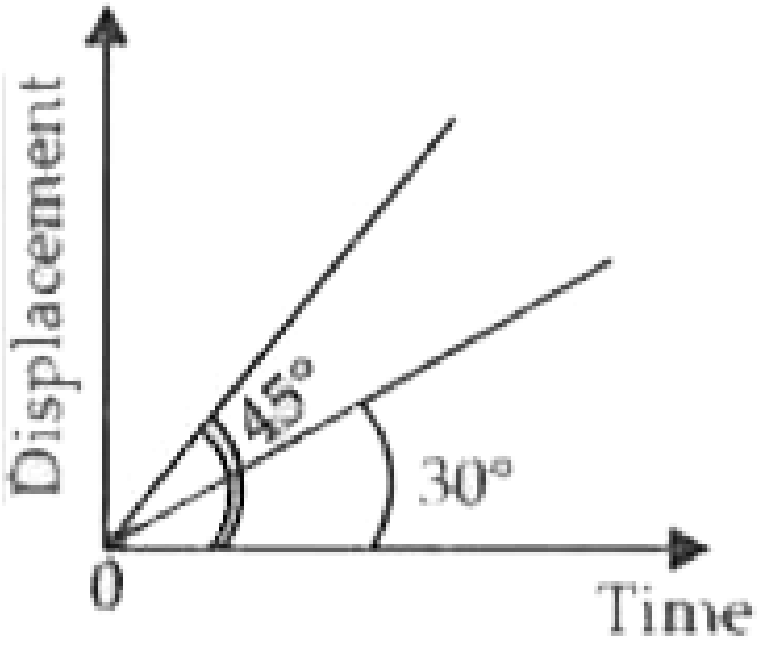
C. 9 hours

D. 7.5 hours

Answer: d

Watch Video Solution

3. The displacement-time graphs of two moving particles makes anlges of 30° and 45° with the X-axis.The ratio of their velocities is



A. $\sqrt{3:2}$

B. $1:1$

C. $1:2$

D. $:\sqrt{3}$

Answer: d

Watch Video Solution

4. A person throws balls into air vertically upward in regular intervals of time of one second . The next ball is thrown when the velocity of the ball thrown earlier becomes zero . The height to which the balls rise is ... (Assume , g = $10ms^{-2}$)

A. 5 m

B. 10 m

C. 7.5m

D. 20m

Answer: a

Watch Video Solution

5. A body of mass 'm' is travelling with a velocity 'u' . When a constant retarding force 'F' is applied , it comes to rest after travelling a distance s_1 . If the initial velocity is 2u , with the same force F , the distance travelled before it comes to rest is s_2 . then

A. $s_2 = 2s_1$

B. $s_2 = \frac{s_1}{2}$

C. $s_2 = s_1$

D. $s_2 = 4s_1$

Answer: d

Watch Video Solution

6. In a lift moving up with an acceleration of $5ms^{-2}$, a ball is dropped from a height of 1.25 m. The time taken by the ball to reach the floor of the lift is .....(nearly) ($g = 10ms^{-2}$)

A. 0.3 second

B. 0.2 second

C. 0.16 second

D. 0.4 second

Answer: d

Watch Video Solution

7. A car moves from A to B with a speed of 30 kmph and from B to A with a speed of 20 kmph. What is the average speed of the car ?

A. 25 kmph

B. 24 kmph

C. 50 kmph

D. 10 kmph

Answer: b

Watch Video Solution

8. A body starts from rest and moves with constant acceleration for t s. It travels a distance x_1 in first half of time and x_2 in next half of time, then

A. $x_2 = x_1$

B. $x_2 = 2x_1$

C. $x_2 = 3x_1$

D. $x_2 = 4x_1$

Answer: c

Watch Video Solution

9. A stone is thrown vertically at a speed of $30ms^{-1}$ taking an angle of 45° with the horizontal. What is the maximum height reached by the stone ? Take $g = 10ms^{-2}$.

A. 30 m

B. 22.5 m

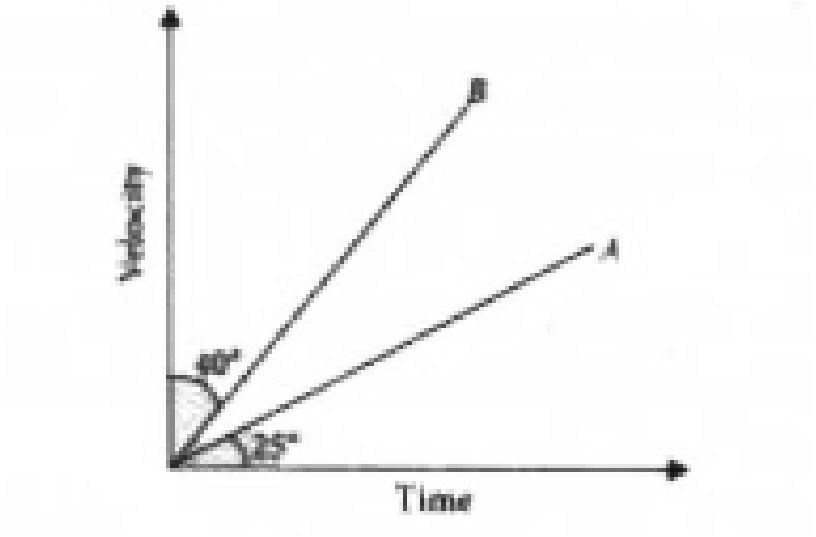
C. 15 m

D. 10 m

Answer: b

Watch Video Solution

10. The velocity - time graph for two bodies A and B are in the ratio



A. tan 25 to tan50

B. cos 25 to cos 50

C. tan25 to tan 40

D. sin 25 to sin 50

Answer: a

Watch Video Solution

11. A stone of mass 0.005 kg is thrown vertically upwards. What is the direction and magnitude of net force on the stone during its upward motion ?

A. 0.049 N vertically downwards

B. 9.8 N vertically downwards

C. 0.49 N vertically upwards

D. 0.98 N vertically downwards.

Answer: a

Watch Video Solution

12. A ball is dropped from top of the building 100m high. Simultaneously another ball is thrown upwards from bottom of tower with such a velocity that the balls collide midway. What is the speed of 2nd ball ?

A. 31.6 m/s

B. 27.8 ms^{-1}

C. 22.4 ms^{-1}

D. 19.6 ms^{-1}

Answer: a

Watch Video Solution

Revision Test

1. The acceleration of a particle increasing linearly with timer is be. The particle starts from the origin with an initial velocity, The distance travelled by the particle in time will be

A. $ut + \frac{bt^3}{3}$

B. $ut + \frac{bt^3}{3}$

C. $ut + \frac{bt^3}{6}$

D. None of these

Answer: C

Watch Video Solution

2. The relation between time and displacement is $t = \alpha x^2 + \beta x$ where α and β are constants. What is retardation of the body:

A. $2\alpha v^3$

B. $2\alpha\beta v^3$

C. $2\beta v^3$

D. $2\alpha\beta$

Answer: A

Watch Video Solution

3. A body moves with uniform acceleration. If , U, and 1, be the average velocities in three successive intervals of time , and I, then

A. $V_1 - v_2 : v_2 - v_3 = t_1 - t_2 : t_2 + t_3$

B. $V_1 - v_2 : v_2 - v_3 = t_1 + t_2 : t_2 + t_3$

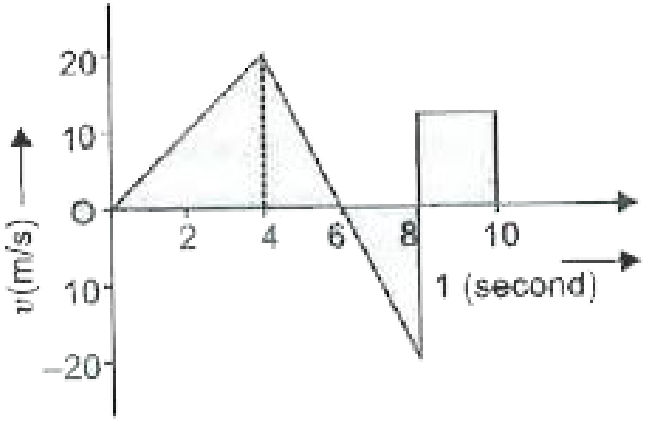
C. $V_1 - v_2 : v_2 - v_3 = t_1 - t_2 : t_1 - t_3$

D. $V_1 - v_2 : v_2 - v_3 = t_1 - t_2 : t_2 - t_3$

Answer: B

Watch Video Solution

4. The velocity-time graph of a body moving in one dimension is as shown below. The displacement of body in 10 second is :



A. 40 m

B. 60 m

C. 80 m

D. 100 m

Answer: B

Watch Video Solution

5. A bus is moving along a straight road with a uniform acceleration. It passes through two points A and B separated by a distance with velocity

30 km/h and 40 kmh respectively. The velocity of the bus midway between A and B is:

A. 35 km/h

B. 33.3 km/h

C. $20\sqrt{3}km/h$

D. $25\sqrt{2}$km/h

Answer: D

Watch Video Solution

6. A body is released from tower of height 1000 m and falls freely. Another body is released from the same height exactly one second later. Then the separation between the two bodies 3 second after the release of Ist body is :

A. 24.5 m

B. 34.3m

C. 9.8 m

D. 4.9 m

Answer: A

Watch Video Solution

7. The two ends of a train moving with a constant acceleration pass a certain point with velocities M and w. The velocity with which the middle point of a train passes the same point is:

A. $\frac{v_1 + v_2}{2}$

B. $\frac{v_1 + v_2^2}{2}$

C. $\sqrt{\frac{v_1 + v_2^2}{2}}$

D. $\sqrt{v_1^2 + v_2^2}$

Answer: C

Watch Video Solution

8. A body starts from rest with uniform acceleration in a st. line, Then distance travelled by body in 3rd and 4th second are in the ratio :

A. $1:1$

B. $1:3$

C. $3:4$

D. $5:7$

Answer: D

Watch Video Solution

9. A body is thrown up from the top of a tower with some velocity reaches the ground in 16 second. The same body if thrown with same velocity in downward direction reaches the ground in 4 second. If the body is just dropped from the tower, then it will reach the ground in time:

A. 10 s

B. 8 s

C. 6 s

D. None of these

Answer: B

Watch Video Solution

10. A motor car moving with uniform acceleration covers two successive kilometre in 30 second and 20 second respectively. Then the acceleration of motor car is:

A. $3ms^{-2}$

B. $\frac{3}{2}ms^{-2}$

C. $\frac{2}{3}ms^{-2}$

D. $\frac{1}{3}ms^{-2}$

Answer: C

Watch Video Solution

11. A bullet fired into a fixed target loses half of its velocity after penetrating 3 cm. How much further it will penetrate before coming to rest assuming that it faces constant resistance to motion ?

A. 4 cm

B. 2 cm

C. 40 cm

D. 20 m

Answer: A

Watch Video Solution

12. What is the maximum height of a stone thrown vertically upwards if its velocity is halved in 2 second ?

A. 100 m

B. 80 m

C. 3 cm

D. 1 cm

Answer: B

Watch Video Solution

13. A bullet loses half of its velocity in penetrating 18 cm into a block. Further distance covered by bullet before coming to rest is:

A. 9 cm

B. 6 cm

C. 3 cm

D. None of these

Answer: B

Watch Video Solution

14. A plumb line is hanging from the ceiling of a train. If the train moves along the horizontal track with a uniform acceleration, the plumb line gets inclined to the vertical at an angle:

A. $\tan^{-1}\left(\frac{a}{g}\right)$

B. $\tan^{-1}\left(\frac{g}{a}\right)$

C. $\sin^{-1}\left(\frac{a}{g}\right)$

D. $\cos^{-1}\left(\frac{g}{a}\right)$

Answer: A

Watch Video Solution

15. A smooth steel ball is moving to and fro about the lowest position of a frictionless hemispherical bowl. The ball attains a maximum height of 20

cm on either side of O. If g = 10 ms-2, and mass of the body is 5g, the speed of the ball when it passes through O will be:

A. $\sqrt{3}ms^{-1}$

B. 2 ms^{-1}

C. $\sqrt{2}ms^{-1}$

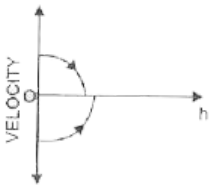
D. 0.2 ms^{-1}

Answer: B

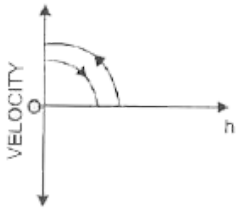
Watch Video Solution

16. A ball is dropped vertically from a height above the ground. It hits the ground and bounces up vertically to a height d/2. Neglecting air resistance its velocity varies with the heighth above the ground as:

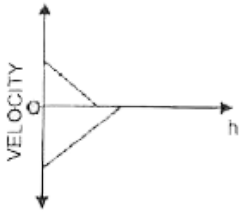
A.



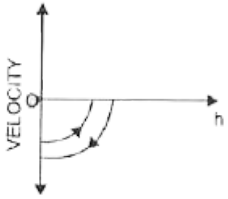
B.



C.



D.



Answer: A

Watch Video Solution

17. A car leaves station A for station B every 10 minutes. Simultaneously a car leaves station B for station A every 10 minutes. The cars move at constant speed and go from A to B or vice versa in 1 hour. How many cars coming from other side will meet each car on rate from A to B :

A. 12

B. 11

C. 6

D. 5

Answer: B

Watch Video Solution

18. A body starts from rest with uniform acceleration in a st. line, Then distance travelled by body in 3rd and 4th second are in the ratio :

A. $1:2:3$

B. $1:4:9$

C. $1:3:5$

D. $2:4:6$

Answer: C

Watch Video Solution

19. A body falls from rest. In the last second of its fall, it covers half of the total distance then the total time of its fall is

A. $\left(2-\sqrt{2}\right)s$

B. $\left(2+\sqrt{2}\right)$s

C. 2s

D. 4s

Answer: B

Watch Video Solution

20. In the above question the total height of fall is :

A. 50 m

B. 57 m

C. 78.4 m

D. 19.6 m

Answer: B

View Text Solution

21. A bus is moving with a velocity 10 mson a straight road. A scooterist wishes to overtake the bus in 100 second. If the bus is at a distance 1 km from the scooter, with what velocity should the scooterist chase the bus?

A. 20 ms^{-1}

B. 40ms^{-1}

C. 30ms^{-1}

D. 50ms^{-1}

Answer: A

Watch Video Solution

22. A man runs at a speed of 4 ms to overtake a standing bus. When he is 6m behind the door (a) the bus moves forward and continues moving with constant acceleration of 1.2 $\frac{m}{s^2}$. The time after which the man is able to catch the bus is :

A. 4.4s

B. 2.3 s

C. 6.7 s

D. 2.1 s

Answer: B

Watch Video Solution

23. A particle starts from origin goes along x-axis to point (+ 20 m, 0) and then returns along same line to (-20 m, 0) point total distance moved is:

A. $+20m$

B. $-20m$

C. $-40m$

D. $-60m$

Answer: D

Watch Video Solution

24. what is the displacement of the particle during the motion is?

A. $+20m$

B. $-20m$

C. $-40m$

D. 60 m

Answer: B

View Text Solution

25. A body moving with uniform acceleration has velocities 20 ms and 30 ms when passing two points A and B. The velocity mid-way between A and B is:

A. 25 ms^{-1}

B. 25.5ms^{-1}

C. 34ms^{-1}

D. $10\sqrt{6}ms^{-1}$

Answer: B

Watch Video Solution

26. A body sliding on a smooth inclined plane requires 4 secs to reach the bottom after starting from rest at the $\frac{1}{4}$top. How much time does it take to cover th the length of plane starting from the top ?

A. 3 s

B. 1 s

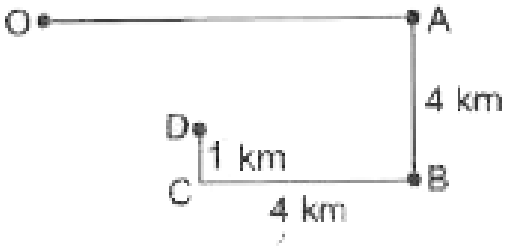
C. 2 s

D. 0.5 s

Answer: C

Watch Video Solution

27. Acyclist moves from Oto D along path as shown. What is the is the distance moved by him ?



A. 17 km

B. 10 km

C. 3 km

D. 5 km

Answer: A

Watch Video Solution

28. In the above question what is the displacement of the cyclist from his starting point ?

A. 17 km

B. 10 km

C. 5 km

D. 3 km.

Answer: C

View Text Solution

29. In the above question the average speed of the particle nearly is:

A. 2 ms^{-1}

B. 6 ms^{-1}

C. 11 ms^{-1}

D. 8 ms^{-1}

Answer: C

View Text Solution

30. A stone weighing 2 kg falls from the top of a tower 40 metre heigh and burries itself 1m deep in sand. The time of penetration is :

A. $\frac{1}{15}s$

B. $\frac{1}{13}s$

C. $\frac{1}{14}s$

D. None of these

Answer: C

Watch Video Solution

31. Drops of water fall from the overflow pipe of a overhead water reservoir 9 m high at a regular intervals of time, the first drop reaching the ground at the same instanta which fourth drop just begins to fall. At what distances are the second and third drops from the ground?

A. 6 m, 2 m

B. 6 m, 3 m

C. 4 m , 1m

D. 4 m and 2 m

Answer: C

Watch Video Solution

32. In the above question the retardation is given by :

A. 1 ms^{-2}

B. 2 ms^{-2}

C. 3 ms^{-2}

D. 4 ms^{-2}

Answer: B

View Text Solution

33. A particle starting from rest falls from a certain height. Assuming that the value of acceleration due to gravity remains the same throughout the motion is displacement in three successive half second intervals are $S_1. S_2. S_3$ then $S_1. S_2. S_3$ is given by :

A. $1:5:9$

B. $1:2:3$

C. $1:1:1$

D. $1:3:5$

Answer: D

Watch Video Solution

34. A balloon is going upwards with a velocity of 20 m It releases a packet when it is at a height of 160 m from the ground. The time taken by the packet to reach the ground is

A. 6 s

B. 8 s

C. 10 s

D. 18 s

Answer: B

Watch Video Solution

35. A particle is projected vertically upwards and attains maximum height H. If the ratio of the times to attain heighth on two way journey t (h

A. $\frac{2}{3}$

B. $\frac{3}{4}$

C. $\frac{4}{5}$

D. $\frac{5}{6}$

Answer: B

Watch Video Solution

36. A body is projected vertically upwards and attains maximum height H. If the time to reach height 'h' and H are in the ratio of 1:3, then the ratio $\frac{h}{H}$ is :

A. $\frac{4}{9}$

B. $\frac{3}{4}$

C. $\frac{5}{9}$

D. $\frac{3}{5}$

Answer: C

Watch Video Solution

37. A particle travels half the distance with a velocity of 6 ms. The remaining half distance is covered with a velocity of 4 ms for half the time and with a velocity of 8 ms for the rest of the half time. What is the velocity of the particle averaged over the whole time of motion?

A. $\frac{V_0 + v_1 + v_2}{3}$

B. $\frac{2V_0 + v_1 + v_2}{3}$

C. $\frac{V_0 + 2v_1 + v_2}{3}$

D. $\frac{2V_0 + v_1 + v_2}{2V_0 + v_1 + v_2}$

Answer: D

Watch Video Solution

38. A dog chases a cat 30 m ahead of it and gains 3 meters in 3 sec after the chase started. After 10 sec the distance between them is :

A. 6 m

B. 14 m

C. 18 m

D. 24 m

Answer: C

Watch Video Solution

39. A beat needs one-third of the time to go a certain distance downstream that it takes upstream. Then number of times the velocity of

boat is greater than that of current is:

A. four times

B. $1\frac{1}{2}$times

C. two times

D. Three times

Answer: C

Watch Video Solution

40. A man can swim three kilometre distance in three hours in a still water. A log of wood floating downstream cowers a distance of 1 km during this time. How much distance the man would swim opposite to the log of wood in three hours?

A. 1 km

B. 2 km

C. 3 km

D. 4 km

Answer: B

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41. A body moving with the constant retardation d loses $\frac{2}{3}$ of its initial velocity w What is the distance covered by the body in the time during which it occurs ?

A. $\left(\frac{2v_0}{3a}\right)^2$

B. $\frac{4v_0^2}{9a}$

C. $\frac{2v_0^2}{3a}$

D. $\frac{2v_0^2}{9a}$

Answer: B

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42. Two buses start off with a gap of 2 minutes move with the same acceleration. How long after the departure of $\frac{1}{9}$the second is the distance covered by it equal to of the distance covered by the first?

A. 4 minutes

B. 2 minutes

C. 1 minute

D. $\frac{1}{2}$ minutes

Answer: C

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43. The velocity of projection of a body is increased by2%. Other factors remaining unchanged, what will be the percentage change in the maximum height reached

A. 0.01

B. 0.02

C. 0.08

D. 0.04

Answer: D

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44. A particle moving along the x-axis has a position given by x= 16t t metres where t is in second, then how far is the particle from the origin when it just stops momentarily ?

A. $\frac{e}{16}$ meter

B. $e \times 16$ meter

C. $\frac{16}{e}$ meter

D. 16 meter

Answer: C

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45. Two bodies begin to move from rest in the same straight line at the same instant of time from the same point. The first moves with constant velocity of 40 ms and the second starts with uniform acceleration of 4 ms. The time which the distance between them is maximum is :

A. 20 s

B. 10 s

C. 40 s

D. 5 s

Answer: B

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