PHYSICS

AIMED AT STUDENTS PREPARING FOR IIT JEE EXAMS

MOTION IN A STRAIGHT LINE

Examples

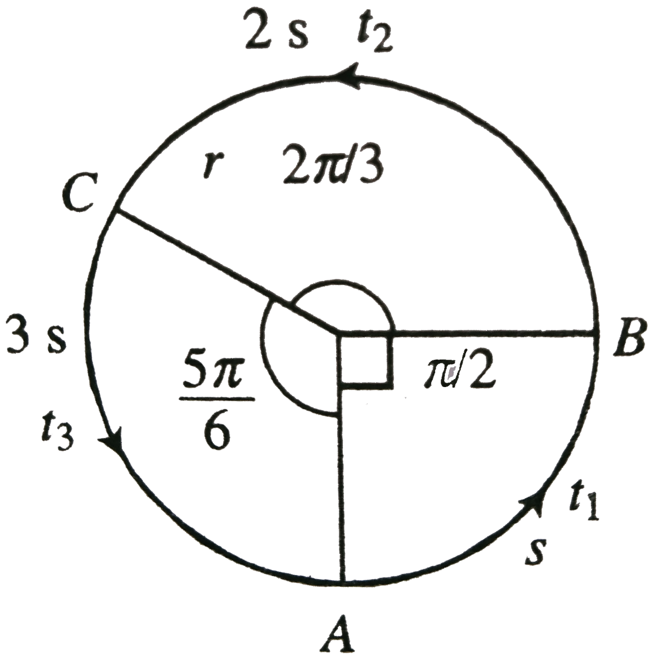
1. An athelete completes one round of a circular track of radius R in 40 seconds. What will be the displacement at the end of ` 2 min. 20 second ?

Watch Video Solution

2. If the position of a particle along Y axis is represented as a funtion of time t by the equation $y(t) = t^3$ then find displacement of the particle during the period t to $t + \Delta t$

Watch Video Solution

3. Shows a particle starting from point A,travelling up to B with a speed s, then up to point C with a speed $2s$, and finally up to A with a speed of $3s$, Determine its average speed.



Watch Video Solution

4. For a man who walks 72 m at a uniform speed of $2m/s$, then runs at a uniform speed of $4m/s$ for 5 minute and then again walks at a speed of $1m/s$ for 3 minutes. His average speed is

Watch Video Solution

5. A particle is at $x =_5 m$ at $t = 0$, $x = -7m$ at $t = 6s$ and $x = +2m$ at $t = 10s$, find the average velocity of the particle during the interval (a) $t = 0$ to $t = 6s$, (b) $t = 6s$ to $t = 10s$, (c) $t = 0$ to $t = 10s$

Watch Video Solution

6. A particle traversed on third of the distance with a velocity v_0, the remaining part of the distance was covered with velocity v_1 for half the time and with a velocity v_2 for the remaining half of time. Assuming motion to be rectilinear, find the the mean velocity of the particle averaged over the whole time of motion.

Watch Video Solution

Watch Video Solution

7. A body covers 100 cm in first 2 seconds and 128 cm in the next four seconds moving with constant acceleration. Find the velocity of the body at the end of 8 sec?

Watch Video Solution

8. A car starts from rest and moves with uniform acceleration a, At the same instant from the same point a bike crosses with a uniform velocity u. When and there will they meet ? What is the velocity of car with respect to the bike at the time of meeting?

Watch Video Solution

9. (a) What does $\left|\frac{dv}{dt}\right|$ and $\frac{d|v|}{dt}$ represent? (b) Can these be equal?

Watch Video Solution

10. In a car race, car A takes t_0 time less to finish than car B and passes the finishing point with a velocity v_0 more than car B. The cars start from rest and travel with constant accelerations a_1 and a_2. Then the ratio $\frac{v_0}{t_0}$ is equal to.

Watch Video Solution

11. A drunkard waking in a barrow lane takes 5 steps forward and 3 steps backward, followed again 5 steps forward and 3 steps backward, and so on. Each step is $1m$long and requires 1 s. Determine how long the drunkard takes to fall in a pit $13m$ away from start.

Watch Video Solution

12. An α particle travels inside a strainght hollow tube 2m long of a particle acceleration under uniform acceleration. How long is the particle in the tube if it enters at a speed of $1000m/s$ and leaves at $9000m/s$. What is its acceleration during this interval?

Watch Video Solution

13. A car starts from rest and moves along the x-axis with constant acceleration $5ms^{-2}$ for 8 seconds. If it then continues with constant velocity, what distance will the car cover in 12 seconds since it started from the rest ?

Watch Video Solution

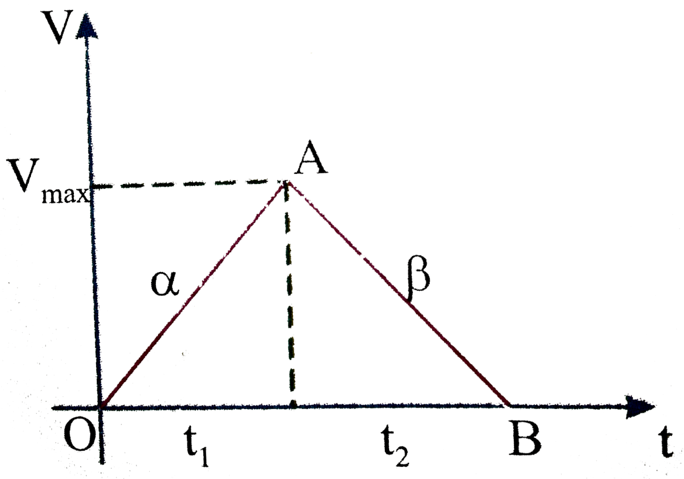
14. A car is moving wth a velocity of $40m/s$ the driver sees a stationary truck a head at a distance of 200 m. After some reaction time Δt the breaks are applied producing a (reaction) retardation of $8m/s^2$. What is the maximum reaction time to avoid collision ?

Watch Video Solution

15. Two trans one t ravelling at 54 kmph and the other at 72 kmph are headed towards one another along a straingt track. When they are $1/2$

km apart, both drivers simultaneously seee the other train and apply their brakes. If each train is decelerated at the rate of $1m/s^2$, will there be a collision ?

Watch Video Solution



16.

A bus accelerated from rest at a constant rate α for some time, after which it decelerates at a constant rate β to come to rest. If the total time elapsed is t seconds. Then evaluate following parameters from the given graph

(a) the maximum velocity achieved.

(b) the total distance travelled graphically and

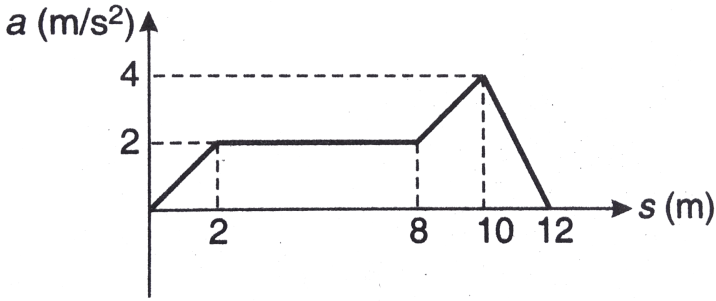
(c) Average velocity.

Watch Video Solution

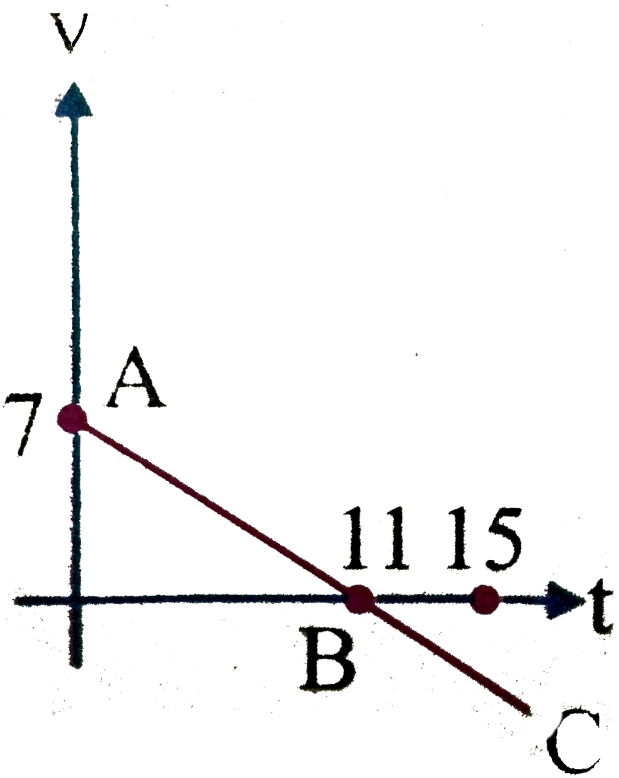
17. A body starts from rest and travels a distance S with uniform acceleration, then moves uniformly a distance $2S$ uniformly , and finally comes to rest after moving further $5S$ under uniform retardation. The ratio of the average velocity to maximum velocity is.

Watch Video Solution

18. The acceleration-displacement graph of a particle moving in a straight line is as shown in figure, initial velocity of particle is zero. Find the velocity of the particle when displacement of the particle is $s = 12m$.



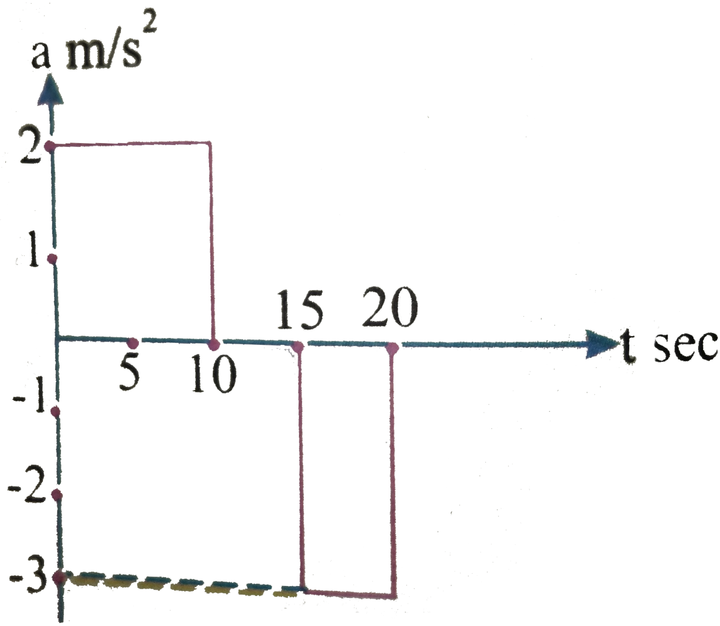
Watch Video Solution



19.

Velocity-time graph for the motion of a certain body is shown in fig. Explain the nature of this motion. Find the initial velocity and acceleration and write the equation for the variation of displacement with time. What happens to the moving body at point B? how will the body more after this moment?

Watch Video Solution



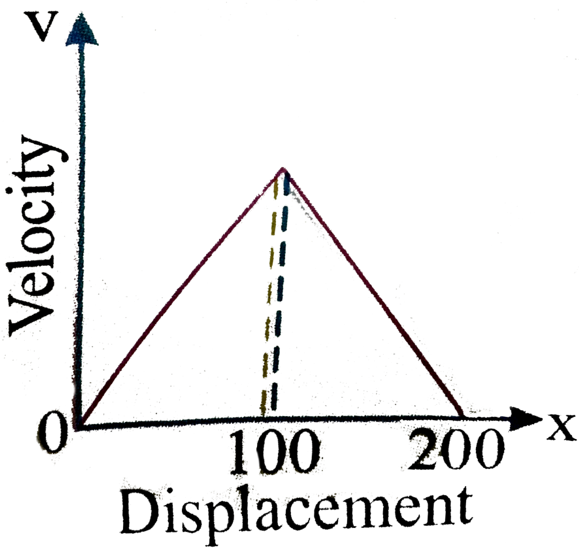
20.

A particle starts from rest and accelerated as shown in the graph. Determine

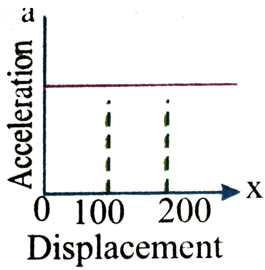
(a). The particle's speed at $t = 10s$ and at $t = 20s$

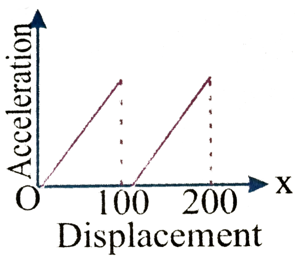
(b). The distance travelled in the first $20s$.

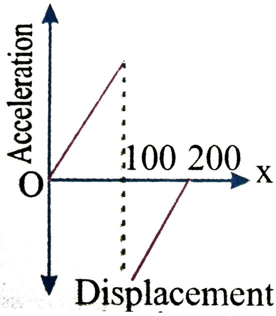
Watch Video Solution

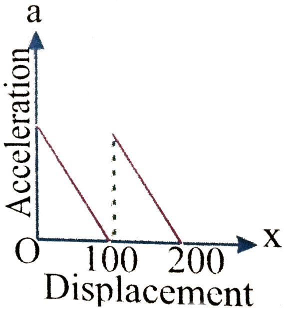


21.

1) 

2) 

3) 

4) 

Velocity (v) versus desplacement (x) plot of a body moving along a straight line is as shown in the graph. The corresponding plot of acceleration (a) as a function of displacement (x) is

Watch Video Solution

22. A particle located at $x = 0$ at time $t = 0$, starts moving along with the positive $x - direction$ with a velocity 'v' that varies as $v = a\sqrt{x}$. The displacement of the particle varies with time as

Watch Video Solution

23. The acceleration (a) of a particle moving in a straight line varies with its displacement (S) as $a = 2S$. The velocity of the particle is zero and zero displacement. Find the corresponding velocity-displacement equation.

Watch Video Solution

24. An object , moving with a speed of $6.25m/s$, 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 :

Watch Video Solution

25. The velocity of a particle moving in the positive direction of the X-axis varies as $V = K\sqrt{S}$ where K is a positive constant. Draw $V - t$ graph.

Watch Video Solution

26. Drops of water fall at regular intervals from the roof of a building of height $h = 16m$. The first drop striking the ground at the same moment as the fifth drop is ready to leave from the roof. Find the distance betweent he successive drops.

Watch Video Solution

27. A body falls freely from a height of 125 m $\left(g = 10m / s^2\right)$. After 2 sec gravity ceases to act find time taken by it to reach the ground?

Watch Video Solution

28. A parachutist drops freely from an aeroplane for 10 seconds before the parachute opens out. Then he descends with a net retardation of $2m / s^2$. His velocity when he reaches the ground is $8m / s$ find the height at which he gets out of the aeroplane?

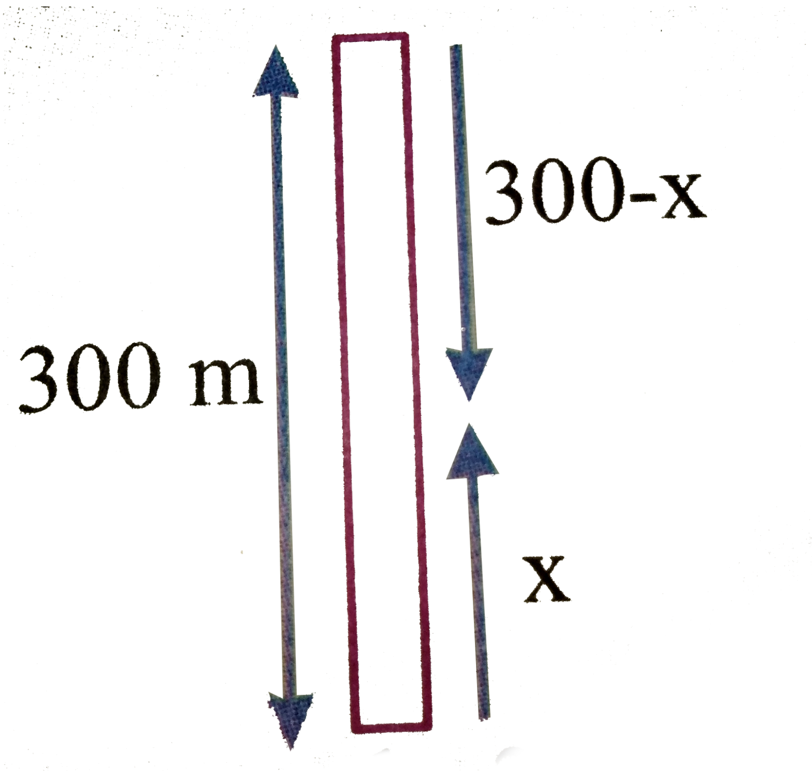
Watch Video Solution

29. If body travels half of its path in the last second of its fall from rest, find the time and height of its fall.

Watch Video Solution

30. A body is projected vertically up with a valocity u. its velocity at ghalf of its maximum height and at $3/4th$ of its maximum height are.

Watch Video Solution

31. 

A stone is allowed to fall from the top of a tower 300 m height and at the same time another stone is projected vertically up from the ground with a velocity $100m/s$. Find when and where the two stones meet?

Watch Video Solution

32. A stone is dropped from certain height above the ground. After 5 s a ball passes trhough a pane of glass held horizontally and instantaneously loses 20% of its velocity. If the ball takes 2 more seconds to reach the ground the height of the glass above the ground is

Watch Video Solution

33. A ball is thrown from the top of a tower in vertically upward direction. Velocity at a point h m below the point of projection is twice of the velocity at a point h m above the point of projection. Find the maximum height reached by the ball above the top of tower.

Watch Video Solution

34. From a tower of height H, a particle is thrown vertically upwards with a speed u . The time taken by the particle , to hit the ground , is n times that taken by it to reach the highest point of its path. The relative between H, u and n is :

Watch Video Solution

35. A bolloon starts from rest moves vertically upwards with an acceleration $g/8ms^{-2}$ a stone falls from the balloon after 8 s from the start. Further time taken by the stone to reachg the ground $(g = 9.8ms^{-2})$ is

Watch Video Solution

36. A passenger is standing d metres away from a bus. The bus begins to move eith constat acceleration `a. To catch the bus the passenger runs at a constant speed (v) towards the bus, at what minimum speed he must have ,so that he may catch the bus.

Watch Video Solution

37. Two trains, each travelling with a speed of $37.5kmh^{-1}$ are approaching each other on the same straingh track. A bird that can fly at 60 kmph flies off from one train when they are 90 km apart and heads directly for the other train. On reaching the other train, it flies back to the first and so on. total distance covered by the bird before trains collide is

Watch Video Solution

38. On a two lane road , car (A) is travelling with a speed of $36kmh^{-1}$. Tho car B and C approach car (A) in opposite directions with a speed of $54kmh^{-1}$ each . At a certain instant , when the distance (AB) is equal to (AC), both being $1km, (B)decides \rightarrow overtake$ A before C does , What minimum accelration of car (B) is required to avoid and accident.

Watch Video Solution

39. A body is at rest at $x = 0$. At $t = 0$, it starts moving in the positive $x - direction$ with a constant acceleration . At the same instant another body passes through $x = 0$ moving in the positive $x - direction$ with a constant speed . The position of the first body is given by $x_1(t)$ after time 't', and that of the second body by $x_2(t)$ after the same time interval . which of the following graphs correctly describes $(x_1 - x_2)$ as a function of time 't' ?

Watch Video Solution

40. A particle has an initial velocity of $3\hat{i} + 4\hat{j}$ and an acceleration of $0.4\hat{i} + 0.3\hat{j}$. Its speed after $10s$ is :

Watch Video Solution

C.U.Q

1. The numerical ratio of displacement to the distance covered is always

A. always less than 1

B. always greater than 1

C. always equal to 1

D. may be less than 1 or equal to the

Answer: D

Watch Video Solution

2. The location of a particle is changed. What can we say about the displacement and distance covered by the particle?

A. both cannot be zero

B. one of the two may be zero

C. both must be zero

D. both must be equal

Answer: A

Watch Video Solution

3. Consider the motion of the tip of the minute hand of a clock. In one hour

A. a & b are correct

B. 1,b & c are correct

C. a & d are correct

D. b,c & d are correct

Answer: C

Watch Video Solution

4. The ratio of the numerical values of the average velocity and average speed of a body is always.

A. always less than one

B. always equal to one

C. always more than one

D. equal to or less than one.

Answer: D

Watch Video Solution

5. If a particle moves in a circle describing equal angles in equal intervals of time, then the velocity vector.

A. remains constant.

B. changes in magnitude

C. changes in direction.

D. changes both in magnitude and direction.

Answer: C

Watch Video Solution

6. In which of the following exmples of motion, can the body be considered approxinmately a point object :

(a) a railway carriage moving without jerks between two two stations.

(b) a mondey sistting on top of a man cycling smoothly on a circulat track. (c) a spinning cricket ball that turns sharply on hitting the round .

(d) a tumbling beake theat has slopped off the edge of a table ?

A. a,b

B. b,c

C. a,c

D. b,d

Answer: A

Watch Video Solution

7. An object may have

(a). Varying speed without having varying velocity (b). Varying velocity without having verying speed

(c). Non zero acceleration without having varying velocity

(d). Non zero acceleration without having varying speed.

A. a,b & c are correct

B. b & d are correct

C. a,b & c are correct

D. a & d are correct

Answer: B

Watch Video Solution

8. The distance travelled by a particle in a straight line motion is directly proportional to $t^{1/2}$, where t is the time elapsed.

A. increasing acceleration

B. decreasing acceleration

C. increasing retardation

D. decreasing retardation

Answer: D

Watch Video Solution

9. If a body starts from rest, the time in which it covers a particular displacement with uniform acceleration is :

A. inversely proportional to the square root of the displacement.

B. inversely proportional to the displacement

C. directly proportional to the displacement

D. directly proportional to the square root of the displacement.

Answer: D

Watch Video Solution

10. Check up only the correct statement in the following.

A. A body has a constant velocity and still it can have a varying speed

B. a body has a constant speed but it can have a varying velocity

C. a body having constant speed cannot have any acceleration

D. none of these

Answer: B

Watch Video Solution

11. When the speed of a car is u, the minimum distance over which it can be stopped is a, If speed becomes nu, what will be the minimum distance over which it can be stopped during the same time?

A. s/n

B. ns

C. s/n^2

D. $n^2 s$

Answer: D

Watch Video Solution

12. The distance covered by a moving body is directly proportional to the square to the time. The acceleration of the body is

A. increasing

B. decreasing

C. zero

D. constant

Answer: D

Watch Video Solution

13. Mark the correct statements for a particle going on a straight line:

A. If the velocity and acceleration have opposite sign, then the object is slowing down

B. If the position and velocity have opposite sign then the particle is moving towards the origin.

C. If the velocity is zero at an instant then the acceleration should also be zero at that ibnstant.

D. If the velocity is zero for a time interval, then the acceleration is zero at any instant within the time interval.

Answer: C

Watch Video Solution

14. B_1,B_2, and B_3, are three balloons ascending with velocities v, $2v$, and $3v$, respectively, If a bomb is dropped from each when they are at the same height, then.

A. bomb from B_1 reaches ground first

B. bomb from B_2 reaches ground first

C. bomb from B_3 reaches ground first

D. they reach the ground simultaneously

Answer: A

Watch Video Solution

15. The distance moved by a freely falling body (starting from rest) during $st, 2nd, 3rd, \ldots\ldots nth$ second of its motion are proportional to .

A. even numbers

B. odd numbers

C. all integral numbers

D. squares of integral numbers

Answer: B

Watch Video Solution

16. To reach the same height on the moon an on the earth, a body must be projected up with

A. higher velocity on the moon.

B. lower velocity on the moon

C. same velocity on the moon and earth.

D. it depends on the mass of the body

Answer: B

Watch Video Solution

17. At the maximum height of a body thrown vertically up

A. velocity is not zero but acceleration is zero

B. acceleration is not zero but velocity is zero.

C. both acceleration and velocity are zero.

D. both acceleration and velocity are not zero.

Answer: B

Watch Video Solution

18. A ball is dropped freely while another is thrown vertically downward with an initial velocity v from the same point simultaneously. After t second they are separated by a distance of

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

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

C. vt

D. $vt + \frac{1}{2}gt^2$

Answer: C

Watch Video Solution

19. The average velocity of a freely falling body is numerically equal to half of the acceleration due to gravity. The velocity of the body as it reaches the ground is

A. g

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

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

D. $\sqrt{2}g$

Answer: A

Watch Video Solution

20. Two bodies of different masses are dropped simultaneously from the top of a tower. If air resistance is proportional to the mass of the body then,

A. The heavier body reaches the ground earlier.

B. the lighter body reaches the ground earlier.

C. both the bodies reach the ground simultaneously.

D. cannot be decided

Answer: C

Watch Video Solution

21. A man standing in a lift falling under gravity releases a ball from his hand. As seen by him the ball

A. falls down

B. remains stationary

C. goes up

D. executes SHM

Answer: B

Watch Video Solution

22. A particles is dropped from certain height. The tame taken by it to fall through successive distance of 1 m each will be

A. all equal being equal to $\sqrt{2/g}$ second

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

C. in the ratio of the difference in the square roots of the integers i.e., $\sqrt{1}, (\sqrt{2}-\sqrt{1}), (\sqrt{3}-\sqrt{2}), (\sqrt{4}-\sqrt{3})$,....

D. In the ratio of the reciprocals of the square roots of the integers, i.e., $\frac{1}{\sqrt{1}}, \frac{1}{\sqrt{2}}, \frac{1}{\sqrt{3}}$,,....

Answer: C

Watch Video Solution

23. A body, freely falling under gravity will have uniform

A. speed

B. velocity

C. momentum

D. acceleration

Answer: D

Watch Video Solution

24. A person standing near the edge of the top of a building throws two balls A and B. The ball A is thrown vertically upward and B is thrown vertically downward with the same speed. The ball A hits the ground with speed v_A and the ball B hits the ground wiht a speed v_B. We have

A. $V_A < V_B$

B. $V_A < V_B$

C. $V_A = V_B$

D. the relation between V_A and V_B depends on height of the building above the ground.

Answer: C

Watch Video Solution

25. A lift is coming from $8th$ floor and is just about to reach $4th$ floor. Taking ground floor as origin and positive direction upwards for all quantities, which one of the following is correct ?

A. $x < 0, v < 0, a > 0$

B. $x > 0, v < 0, a < 0$

C. $x > 0, v < 0, a > 0$

D. $x > 0, v > 0, a > 0$

Answer: A

Watch Video Solution

26. Choose the correct statement:

A. The area of displacement -time graph gives velocity.

B. The slope of velocity-time graph gives acceleration.

C. The slope of displacement-time graph gives acceleration

D. the area of velocity-time graph gives average velocity.

Answer: B

Watch Video Solution

27. Velocity-time graph of a body thrown vertically up is

A. a straight line

B. a parabola

C. a hyperbola

D. circle

Answer: A

Watch Video Solution

28. Velocity-displacement graph of a freely falling body is

A. straight line passing through the origin

B. straight line intersecting x and y axes

C. parabola

D. hyperbola

Answer: C

Watch Video Solution

29. Displacement-time graph of a body projected vertically up is

A. a straight line

B. a parabola

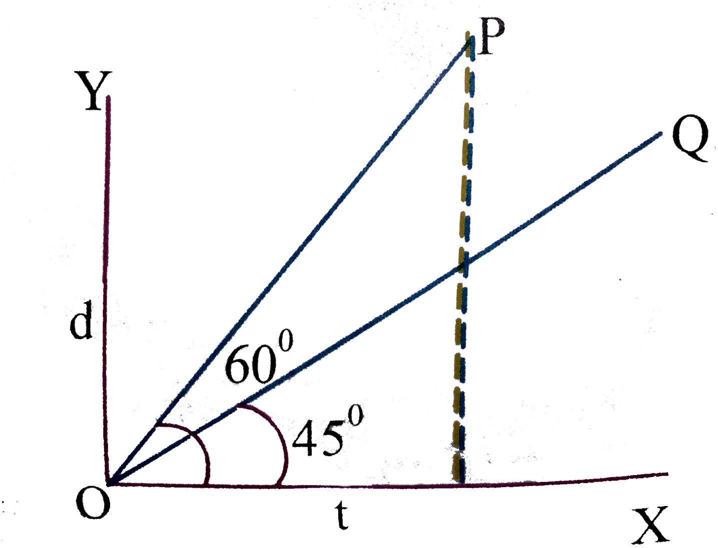
C. a hyperbola

D. a circle

Answer: B

Watch Video Solution

30.



The displacement-time graphs of two bodies A and B are OP and OQ respectively. If $\angle POX$ is 60° and $\angle QOX$ is 45° the ratio of the velocity of A to that of B is

A. $\sqrt{3}:\sqrt{2}$

B. $\sqrt{3}:1$

C. $1:\sqrt{3}$

D. $3:1$

Answer: B

Watch Video Solution

31. If the distance travelled by a particle and corresponding time be laid off along y and x axes respectively, then the correct statement of the following is

A. the curve may lie in fourth quadrant

B. the curve lies in first quadrant

C. the curve exhibits peaks corresponding to maximum

D. the curve may drop as time passes

Answer: B

Watch Video Solution

32. In relation to a velocity-time graph

A. the curve can be a circle

B. the area under the curve and above the time axis between any two instants gives the average acceleration.

C. the slope at any instant gives the rate of change of acceleration at that instant

D. the area under the curve and above the time axis gives the displacement.

Answer: D

Watch Video Solution

33. The displacment-time graph of a particle moving with respect to a reference point is a straight line

A. the reference point is stationary with zero velocity.

B. the accleration of the object is zero

C. body moves with uniform velocity

D. all the above

Answer: D

Watch Video Solution

34. For a uniform motion.

A. the velocity-time graph is a straight line parallel to time axis

B. the position-time graph is a parabola

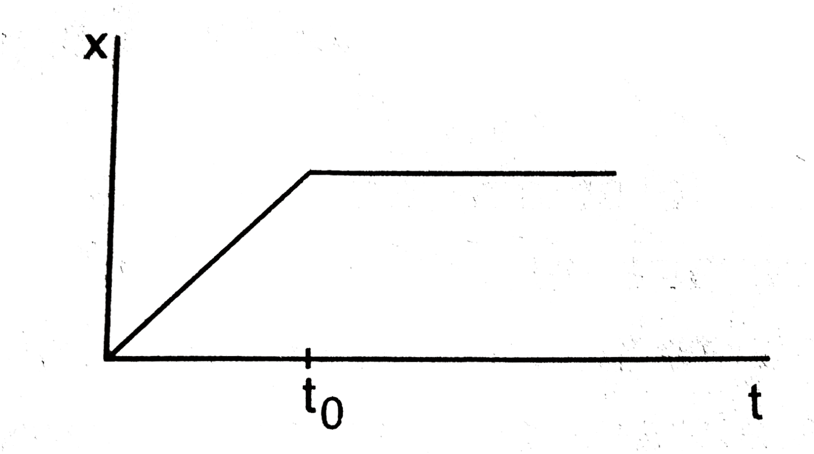
C. the acceleration-time graph is a straight line inclined with time axis

D. the position-time graph is a straight line

Answer: A

Watch Video Solution

35. Figure shows the displacement time graph of a particle moving on the X-axis



A. The particle is continuously going in positive X direction.

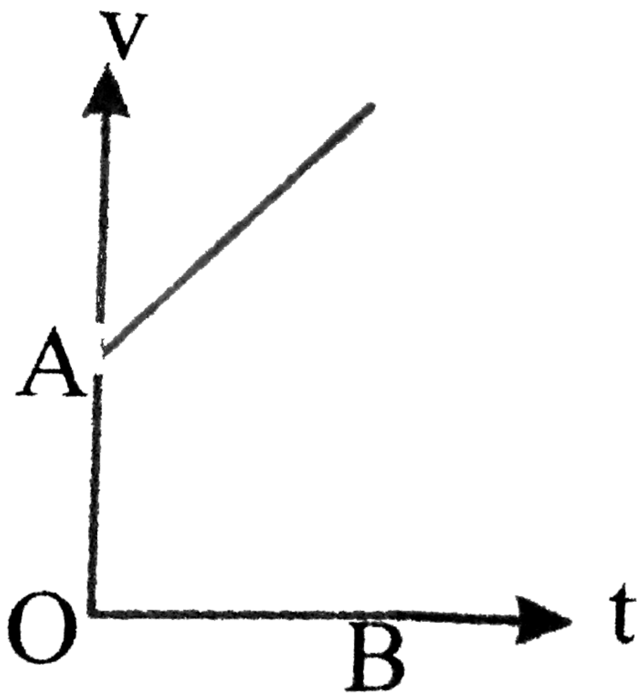
B. the particle is at rest

C. the velocity increases up to a time t_0 and then becomes constant.

D. the particle moves at constant velocity up to a time t_0 and then stops.

Answer: D

Watch Video Solution



36.

The variation of quantity A with quantity B. plotted in the fig. Describes the motion of a particle in a straight line.

(a) Quantity B may represent time.

(b) Quantity A is velocity if motion is uniform.

(c) Quantity A is displacement if motion is uniform

(d) Quantity A is velocity if motion is uniformly accelerated.

A. a,c,d

B. b,c,d

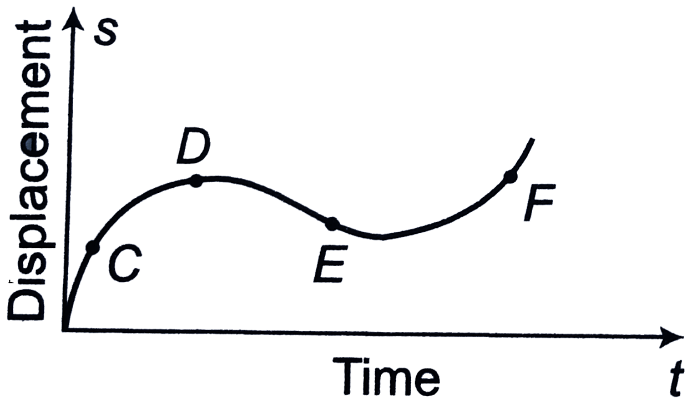
C. a,b

D. c,d

Answer: A

Watch Video Solution

37. The displacement-time graph of moving particle is shown below



The instantaneous velocity of the particle in negative at the point

A. D

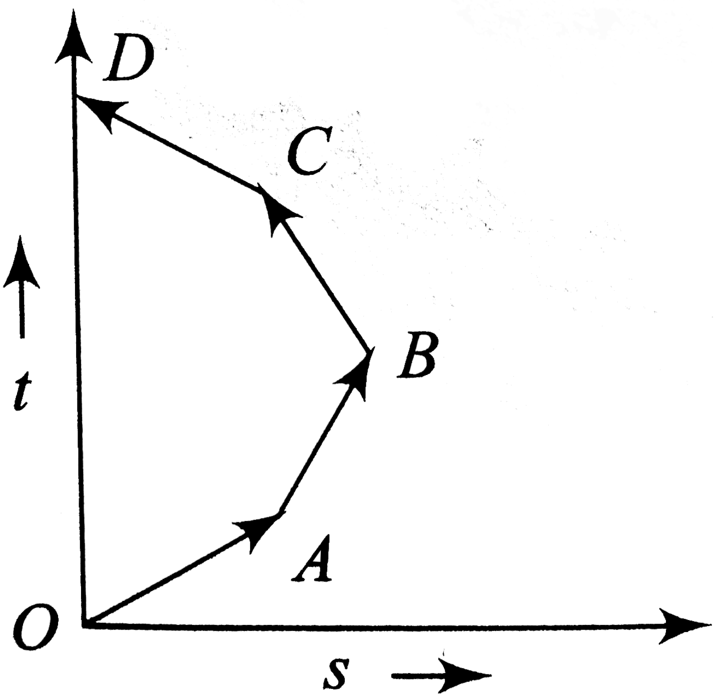
B. F

C. C

D. E

Answer: D

Watch Video Solution



38.

Which of the following option is correct for the object having a staright line motion represented by the following graph?

A. The object moves with constantly increasing velocity from O to A then it moves with constant velocity.

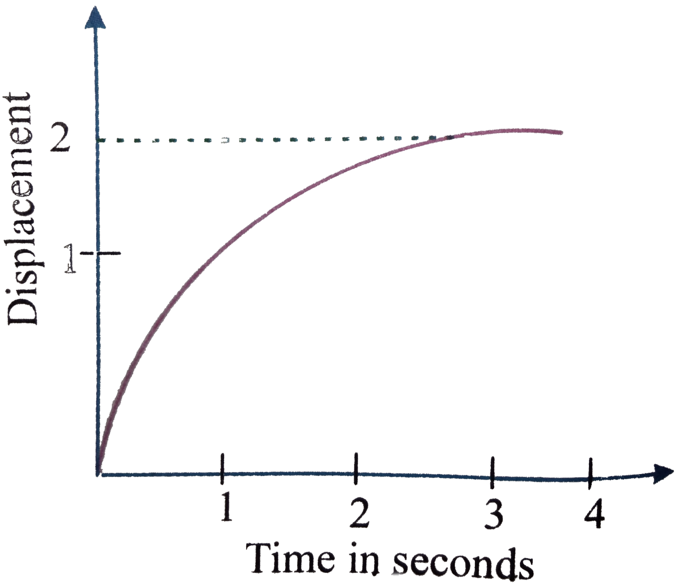
B. velocity of the object increases uniformly

C. Average velocity is zero.

D. The graph shown is impossible.

Answer: C

Watch Video Solution



39.

The displacement of a particle as a funtion of time is shown in the figure.

The figure shows that

A. the particle starts with certain velocity but the motion is retarded and finally the particle stops

B. the velocity of the particle is constant through out.

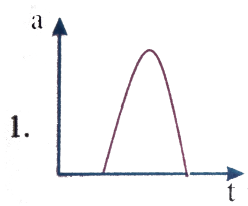
C. the acceleration of the particle is constant throughout

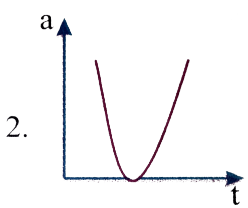
D. the particle starts with constant velocity, the motion is accelerated and finally the particle move with another constant velocity.

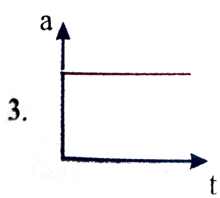
Answer: A

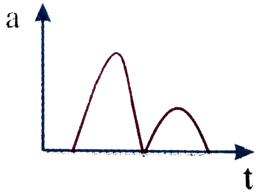
Watch Video Solution

40. A uniform moving cricket ball is turned back by hitting it with a bat for a very shart time interval. Show the variation of its acceleration with time. (Take acceleration in the back ward direction as positive).

A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

41. A small body is dropped from a rising balloon. A person A stands on ground, while another person N is on the balloon. Choose the correct statement : Immediately, after the body is released.

A. A and B both feel that the body is coming (going) down.

B. A and B both feel that body is coming up.

C. A feels that the body is coming down, while B feels that the body is going up

D. A feels that the body is going up, while B feels that the body is going down.

Answer: D

Watch Video Solution

42. Seeta is moving due east with a velocity of $V_1 m/s$ and geets iss moving due west with velocity of $V_2 m/s$. The velocity of Seeta with respect to Geeta is

A. $V_1 + V_2$ due east

B. $V_1 - V_2$ due east

C. $V_1 - V_2$ due west

D. $V_1 + V_2$ due west.

Answer: A

Watch Video Solution

Level 1 C.W

1. A body is moving along the circumference of a circle of radius R and completes half of the revolution. Then the ratio of its displacement to distance is

A. $\pi : 2$

B. $2 : 1$

C. $2 : \pi$

D. $1 : 2$

Answer: C

Watch Video Solution

2. A body completes one round of a circle of radius R in 20 second. The displacement of the body after 45 seconds is

A. $\frac{R}{\sqrt{2}}$

B. $\sqrt{2}R$

C. $2\sqrt{R}$

D. $2R$

Answer: B

Watch Video Solution

3. If a body covers first half of its journey with uniform speed v_1 and the second half of the journey with uniform speed v_2. Then the average speed is

A. $V_1 + V_2$

B. $\frac{2V_1V_2}{V_1 + V_2}$

C. $\frac{V_1V_2}{V_1 + V_2}$

D. V_1V_2

Answer: B

Watch Video Solution

4. A car is moving along a straight (OP). It moves from $O \rightarrow P$ in $18 \sec onds$ amd retuns from $P \rightarrow Q$ in 6 seconds, $where$OP=360 m and OQ=240 m What are the car the average velcoty and average speed of the car in going (a) from $O \rightarrow P$ and back to Q ?

A. $10ms^{-1}, 20ms^{-1}$

B. $20ms^{1-}, 10ms^{-1}$

C. $10ms^{-1}, 10ms^{-1}$

D. $20ms^{-1}, 20ms^{-1}$

Answer: A

Watch Video Solution

5. For body moving with uniform acceleration a, initial and final velocities in a time interval t are u and v respectively. Then its average velocity in the time interval t is

A. $(v + at)$

B. $\left(v - \frac{at}{2}\right)$

C. $(v - at)$

D. $\left(u - \frac{at}{2}\right)$

Answer: B

Watch Video Solution

6. A body moves with a velocity of $3m/s$ due east and then turns due north to travel with the same velocity. If the total time of travel is 6s. The acceleration of the body is

A. $\sqrt{3}m/s^2$ towards north west

B. $\frac{1}{\sqrt{2}}m/s^2$ towards north west

C. $\sqrt{2}m/s^2$ towards north east

D. all the above

Answer: B

Watch Video Solution

7. If a body travles 30 m in an interval of 2 s and 50 m in the next interval of 2s. Then the acceleration of the body is

A. $10m/s^2$

B. $5m/s^2$

C. $20m/s^2$

D. $25m/s^2$

Answer: B

Watch Video Solution

8. A bullet travelling horizontally looses $1/20^{th}$ of its velocity while piercing a wooden plank. Then the number of such planks required to stop the bullet is

A. 6

B. 9

C. 11

D. 13

Answer: C

Watch Video Solution

9. If $S_n = 2 + 0.4n$ find initial velocity and acceleration

A. 2.2 units. 0.4 units

B. 2.1 units, 0.3 units

C. 1.2 units, 0.4 units

D. 2.2 units, 0.3 units

Answer: A

Watch Video Solution

10. A particle starts moving from rest under uniform acceleration it travels a distance x in the first two seconds and a distance y in the next two seconds. If $y = nx$, then $n =$

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

11. 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 $100cm$, then its velocity after t seconds, in cm/s, is.

A. 20

B. 30

C. 80

D. 50

Answer: D

Watch Video Solution

12. A particle is moving with uniform acceleration along a straight line ABC. Its velocity at A and B are 6 m/s and 9 m/s respectively if $AB: BC = 5: 16$ then its velocity at C is

A. $9.6m / s^2$

B. $12m / s$

C. $15m / s$

D. $21.5m / s$

Answer: C

Watch Video Solution

13. A car moving on a straight road accelerated from a speed of $4.1m/s$ to a speed of $6.9m/s$ in 5.0 s. Then its average acceleration is

A. $0.5m/s^2$

B. $0.6m/s^2$

C. $0.56m/s^2$

D. $0.65m/s^2$

Answer: C

Watch Video Solution

14. A body projected vertically upwards with a velocity of $19.6m/s$ reaches a height of 19.8 m on earth. If it is projected vertically up with the same velocity on moon, then the maximum height reached by it is

A. 19.18 m

B. 3.3 m

C. 9.9 m

D. 118.8 m

Answer: D

Watch Video Solution

15. A ball is thrown straight upward with a speed v from a point h meter above the ground. The time taken for the ball to strike the ground is

A. $\frac{v}{g}\left[1+\sqrt{1+\frac{2hg}{v^2}}\right]$

B. $\frac{v}{g}\left[1-\sqrt{1-\frac{2hg}{v^2}}\right]$

C. $\frac{v}{g}\left[1-\sqrt{1+\frac{2hg}{v^2}}\right]$

D. $\frac{v}{g}\left[2+\frac{2hg}{v^2}\right]$

Answer: A

Watch Video Solution

16. A ball is dropped on the floor from a height of 10m. It rebounds to a height of 2.5 m if the ball is in contact with floor for 0.01 s then the average acceleration during contact is nearly

A. $500\sqrt{2}m/s^2$ upwards

B. $1800\sqrt{2}m/s^2$ downwards

C. $1500\sqrt{2}m/s^2$ upwards

D. $1500\sqrt{2}m/s^2$ downwards

Answer: C

Watch Video Solution

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

A. 5

B. 1

C. 2

D. 3

Answer: D

Watch Video Solution

18. A ball A is dropped from a building of height $45m$. Simultaneously another ball B is thrown up with a speed $40m/s$. Calculate the relative speed of the balls as a function of time.

A. $20ms^{-1}$

B. $40ms^{-1}$

C. $30ms^{-1}$

D. $0ms^{-1}$

Answer: D

Watch Video Solution

19. Two cars 1 & 2 starting from rest are moving with speeds V_1 and $V_2 m/s (V_1 > V_2)$. Car 2 is ahead of car 1 by a meter when the driver of the car 1 sees car 2 what minimum retardation should be given to car 1 to avoid collision.

A. $\dfrac{V_1 - V_2}{s}$

B. $\dfrac{V_1 + V_2}{S}$

C. $\dfrac{(V_1 + V_2)^2}{2S}$

D. $\dfrac{(V_1 - V_2)^2}{2S}$

Answer: D

Watch Video Solution

20. Two cars are travelling towards each other on a straight road at velocities $15m/s$ and m/s respectively. When they are 150 m apart both the drivers apply the brakes and the car decelerate at $3m/s^2$ and $4m/s^2$ until they stop separation between the cars when they come to rest is

A. 86.5 m

B. 89.5 m

C. 85.5 m

D. 80.5 m

Answer: D

Watch Video Solution

Level 2 C.W

1. A person moves $30m$ north,, $then$20 m towards east and finally $30\sqrt{2}m$ in south-west direction. The displacement of the person from the origin will be

A. 10 m along north

B. 10 m along south

C. 10 along west

D. zero

Answer: C

Watch Video Solution

2. If a car covers $\frac{2}{(5)^{th}}$ of the total distance with v_1 speed and $\frac{3}{(5)^{th}}$ distance with v_2. Then average speed is

A. $\frac{1}{2}\sqrt{v_1 v_2}$

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

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

D. $\frac{5v_1 v_2}{3v_1 + 2v_2}$

Answer: D

Watch Video Solution

3. Four person K,L,M and N are initally at the corners of a square of side of length d. If every person starts moving, such that K always heads towards L, L heads towards M, M heads directly towards N and N heads towards K, then the four perons will meet after

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

B. $\frac{\sqrt{2}d}{v}$

C. $\frac{d}{2v}$

D. $\frac{d}{\sqrt{2}v}$

Answer: A

Watch Video Solution

4. A man walks on a straight road from his home to a market $2.5km$ away with a speed of $5km/h$. Finding the market closed, he instantly turns and walks back with a speed of $7.5km/h$. What is the (a) magnitude of average velocity and (b) average speed of the man, over the interval of time (i) 0 to 30 min `. (ii) 0 to 50 min (iii) 0 to 40 min ?

A. 0,4

B. 0,6

C. 0,8

D. 0,12

Answer: B

Watch Video Solution

5. A starts from rest and moves with acceleration a_1. Two seconds later B starts from rest and moves with an acceleration a_2. If the displacement of A in the 5^{th} second is the same as that of B in the same interval, the ratio of a_1 to a_2 is

A. $9:5$

B. $5:9$

C. $1:1$

D. $1:3$

Answer: B

Watch Video Solution

6. A body travels 200 cm in the first two seconds and 220 cm in the next 4 seconds with deceleration the velocity of the body at the end of the 7^{th} second is

A. 20 cm/s

B. 15 cm/s

C. 10 cm/s

D. 0 cm/s

Answer: C

Watch Video Solution

7. A bullet moving at 20m/sec. It strikes a wooden plank and penetrates 4 cm before coming to stop. The time taken to stop is

A. 0.008 sec

B. 0.016 sec

C. 0.004 sec

D. 0.002 sec

Answer: C

Watch Video Solution

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

A. 20m

B. 40m

C. 60m

D. 80 m

Answer: D

Watch Video Solution

9. A police party is chasing a dacoit in a jeep which is moving at a constant speed v. The dacoit is on a motor cycle. When he is at a distance x from the jeep, he accelerates from rest at a constant rate α. Which of the following relations is true, if the police is able to catch the dacoit ?

A. $V^2 < \alpha X$

B. $V^2 < 2\alpha X$

C. $V^2 > 2\alpha X$

D. $V^2 = \alpha X$

Answer: C

Watch Video Solution

10. Velocity of a body moving with uniform acceleration of $3m/s^2$ is changed through 30 m/s in certain time. Average velocity of body during this time is 30 m/s. Distance covered by it during this time is

A. 300 m

B. 200 m

C. 400 m

D. 250 m

Answer: A

Watch Video Solution

11. A person in running at his maximum speed of 4 m/s to catch a train when he is 6 m from the door of the compartment the train starts to leave the station at a constant accelration of $1m/s^2$ find how long it takes him to catch up the train

A. 2 sec

B. 3 sec

C. 4 sec

D. none

Answer: A

Watch Video Solution

12. A body is moving along the $+ve$ x-axis with uniform acceleration of $-4ms^{-2}$. Its velocity at $x=0$ is $10ms^{-1}$. The time taken by the body to reach a point at $x=12m$ is

A. $(2s, 3s)$

B. $(3s, 4s)$

C. $(4s, 8s)$

D. $(1s, 2s)$

Answer: A

Watch Video Solution

13. A freely falling body takes t second to travel $(1/x)^{th}$ distance then time of descent is

A. $\frac{t}{\sqrt{x}}$

B. $t\sqrt{x}$

C. $\frac{\sqrt{x}}{t}$

D. $\frac{1}{t\sqrt{x}}$

Answer: B

Watch Video Solution

14. The distance travelled by a body during last second of its upward journey is d, when the body is projected with certain velocity vertically up. If the velocity of projection is doubled the distance travelled by the body during the last second of its upward journey is

A. $2d$

B. $4d$

C. $d/2$

D. d

Answer: D

Watch Video Solution

Watch Video Solution

15. A rocket is fired and ascends with constant vertical acceleration of $10m/s^2$ for 1 minute. Its fuel is exhausted and it continues as a free particle. The maximum altitude reached is $(g = 10m/s^2)$

A. 18 km

B. 36 km

C. 72 km

D. 108 km

Answer: B

Watch Video Solution

16. A parachutist after bailing out falls 50 m without friction. When parachute opens, it decelerates at $2m/s^2$ he reaches the ground with a speed of $3m/s$ at what height did he bail out ?

A. 91 m

B. 182 m

C. 293 m

D. 111 m

Answer: C

Watch Video Solution

17. A body thrown vertically upwards with an initial valocity u reaches maximum height in 6 s. The ratio of the distances traveled by the body in the first second the seventh second is

A. $1:1$

B. $11:1$

C. $1:2$

D. $1:11$

Answer: B

Watch Video Solution

18. A body is thrown vertically up to reach its maximum height in t seconds. The total time from the time of projection to reach a point at half of its maximum height while returning (in seconds) is

A. $\sqrt{2}t$

B. $\left(1+\frac{1}{\sqrt{2}}\right)t$

C. $\frac{3t}{2}$

D. $\frac{t}{\sqrt{2}}$

Answer: B

Watch Video Solution

19. Water drops fall from a tap on to the floor 5.0 m below at regular intervals of time. The first drop strikes the floor when the fifth drops beings to fall. The height at which the third drop will be from ground at the instant when the first drop strikes the ground is (take $= g = 10m^{-2}$)

A. 1.25 m

B. 2.15 m

C. 2.75 m

D. 3.75 m

Answer: D

Watch Video Solution

20. A boy throws n balls per second at regular time intervals. When the first ball reaches the maximum height he throws the second one vertically up. The maximum height reached by each bass is

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

B. $\frac{g}{2n^2}$

C. $\frac{g}{n^2}$

D. $\frac{g}{n}$

Answer: B

Watch Video Solution

21. A body is thrown vertically upward from a point A 125 m above the ground. It goes up to a maximum height of 250 m above the ground and passes through A on its downward journey. The velocity of the body when it is at a height of 70 m above the ground is $\left(g = 10m / s^2\right)$

A. $20m / s$

B. $50m / s$

C. $60m / s$

D. $80m / s$

Answer: C

Watch Video Solution

22. A ball is released from the top of a tower of height Hm. After $2s$ is stopped and then instantaneously released. What will be its height after next $2s$?.

A. $H-5$

B. $H-10$

C. $H-20$

D. $H-40$

Answer: D

Watch Video Solution

23. A ball dropped from 9th stair of multistoried building reaches the ground in 3 sec. in the first second of its free fall, it passes through n stare then n equal to

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

24. Two particles P and Q simultaneously start moving from point A with velocities $15m/s$ and $20m/s$ respectively. The two particles move with acceleration equal in magnitude but opposite in direction. When P overtakes Q and B then its velocity is $30m/s$ the velocity of Q at point B will be

A. $30m/s$

B. $5m/s$

C. $10m/s$

D. $15m/s$

Answer: B

Watch Video Solution

25. Two trans A and B 100 m and 60 m long are moving in opposite direction on parallel tracks. The velocity of the shorter train is 3 times that of the longer one. If the trains take 4s to cross each other, the velocities of the trains are

A. $V_A = 10ms^{-1}, V_B = 30ms^{-1}$

B. $V_A = 2.5ms^{=1}, V_B = 7.5ms^{-1}$

C. $V_A = 20ms^{-1}, V_B = 60ms^{-1}$

D. $V_A = 5ms^{-1}, V_B = 15ms^{-1}$

Answer: A

Watch Video Solution

Level 3 C.W

1. A motorist droves north for 35.0 minutes at $85.0 km / h$ and then stops for 15.0 minutes He next continues north, travelling 130 km is 2.00 hours. What is his total displacement

A. 85 km

B. 179.6 km

C. 20 km

D. 140 km

Answer: B

Watch Video Solution

2. The coordinates of a moving particle at any time t are given by $x = \alpha t^3$ and $y = \beta t^3$. The speed of the particle at time t is given by

A. $\sqrt{\alpha^2 + \beta^2}$

B. $3t\sqrt{\alpha^2 + \beta^2}$

C. $3t^2\sqrt{\alpha^2 + \beta^2}$

D. $t^2\sqrt{\alpha^2 + \beta^2}$

Answer: C

Watch Video Solution

3. The relation between time t and distance x is $t = ax^2 + bx$ where a and b` are constants. The acceleration is

A. $-2av^3$

B. $2av^2$

C. $-2abv^2$

D. $2bv^3$

Answer: A

Watch Video Solution

4. Two cars start in a race with velocities u_1 and u_2 and travel in a straight line with acceleration α and β. If both reach the finish line at the same time, the range of the race is

A. $\dfrac{2(u_1 - u_2)}{(\beta - \alpha)^2}(u_1\beta - u_2\alpha)$

B. $\dfrac{2(u_1 - u_2)}{\beta + \alpha}(u_1\alpha - u_2\beta)$

C. $\dfrac{(2u_1 - u_2)^2}{(\beta - \alpha)^2}$

D. $\dfrac{2u_1u_2}{\beta\alpha}$

Answer: A

Watch Video Solution

5. A point moves with uniform acceleration and v_1, v_2, and v_3 denote the average velocities in the three successive intervals of time $t_1. t_2$, and t_3 Which of the following Relations is correct?.

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. $(V_1 - V_2) : (V_2 - V_3) = (t_1 - t_2) : (t_2 + t_3)$

D. $(V_1 - V_2) : (V_2 - V_3) = (t_1 + t_2) : (t_2 + t_3)$

Answer: B

Watch Video Solution

6. A train starts from rest and moves with uniform acceleration α for some time and acquires a velocity v it then moves with constant velocity for some time and then decelerates at rate β and finally comes to rest at the next station. If L is distance between two stations then total time of travel is

A. $\frac{L}{V}+\frac{V}{2}\left(\frac{1}{\alpha}+\frac{1}{\beta}\right)$

B. $\frac{L}{V}-\frac{V}{2}\left(\frac{1}{\alpha}+\frac{1}{\beta}\right)$

C. $\frac{L}{V}-\frac{V}{2}\left(\frac{1}{\alpha}-\frac{1}{\beta}\right)$

D. $\frac{L}{V}+\frac{V}{2}\left(\frac{1}{\alpha}-\frac{1}{\beta}\right)$

Answer: A

Watch Video Solution

7. 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 $15S$, then

A. $S = ft$

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

C. $S = \frac{1}{72}ft^2$

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

Answer: C

Watch Video Solution

8. An express train moving at $30m/s$ reduces its speed to $10m/s$ in a distance of $240m$. If the breaking force is increased by 12.5% in the begininning find the distance that it travels before coming to rest

A. 270 m

B. 240 m

C. 210 m

D. 195 m

Answer: A

Watch Video Solution

9. For motion of an object along the x-axis the velocity v dipends on the displacement x an $v = 3x^2$-$2x$, then what is the acceleration at $x = 2m$.

A. $48ms^{-2}$

B. $80ms^{-2}$

C. $18ms^{-2}$

D. $10ms^{-2}$

Answer: B

Watch Video Solution

10. The friction of the air causes a vertical retardation equal to 10% of the acceleration due to gravity. Take $g = 10m/s^2$ the maximum height and time to reach the maximum height will be decreased by

A. $9\%, 9\%$

B. $11\%, 11\%$

C. $9\%, 10\%$

D. $11\%, 9\%$

Answer: A

Watch Video Solution

11. A parachutist after bailing out falls for 10 s without friction. When the parachute opens he descends with an acceleration of $2m/s^2$ against his direction and reached the ground with $4m/s$ from what height he has dropped himself? $(g = 10m/s^2)$

A. $500m$

B. $2496m$

C. $2996m$

D. $4296m$

Answer: C

Watch Video Solution

Watch Video Solution

12. A body is dropped from the roof of a multistoried building it passes the ceiling of the 15th storey at a speed of $20ms^{-1}$ if the height of each storey is 4m, the number of stereys in the building is $\left(takeg = 10ms^{-2}\right.$ and neglect air resistance)

A. 20

B. 25

C. 30

D. 35

Answer: A

Watch Video Solution

13. A body is projected vertically up with velocity $98ms^{1}$ after 2 s if the acceleration due to gravity of earth disappears, the velocity of the body at the end of next 3s is

A. $49ms^{-1}$

B. $49.6ms^{-1}$

C. $78.4ms^{-1}$

D. $94.7ms^{-1}$

Answer: C

Watch Video Solution

14. The velocity of a particle is $v = v_0 + gt + ft^2$. If its position is $x = 0$ at $t = 0$, then its displacement after unit time $(t = 1)$ is

A. $V_0 + 2g + 3f$

B. $V_0 + \frac{g}{2} + \frac{f}{3}$

C. $V_0 + g + f$

D. $V_0 + \frac{g}{2} + f$

Answer: B

Watch Video Solution

15. Ball A is dropped from the top of a building. At the same instant ball B is thrown vertically upwards from the ground. When the balls collide, they are moving in opposite direction and the speed of A is twice the speed of B. At what fraction of the height of the building did the collision occurs ?

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

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

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

D. $\frac{7}{3}$

Answer: B

Watch Video Solution

16. An object fals from a bridge that is 45 m above the water. It falls directly into a small row-boat moving with constant velocity that was 12 m from the point of impact when the object was released. What was the speed of the boat ? $(g = 10ms^{-2})$

A. $2m/s$

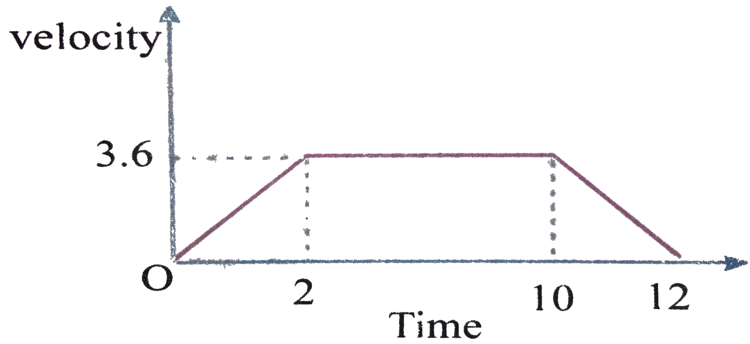
B. $3m/s$

C. $5m/s$

D. $4m/s$

Answer: D

Watch Video Solution



17.

An elevator is goind up. The variation in the velocity of the elevator is as given in the graph. What is the height to which the elevator takes the passenger

A. 3.6 m

B. 28.8 m

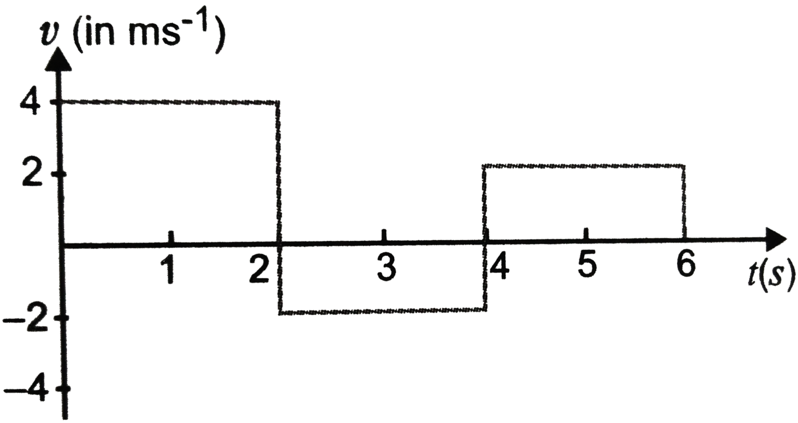
C. 36.0 m

D. 72.0 m

Answer: C

Watch Video Solution

18. The velocit-time graph of a body moving in a straight line is shown in Fig. 2 (d) . 32. Find the displacement and the distance travelled by the body in $6 \sec onds$.



A. 8,16

B. 16,8

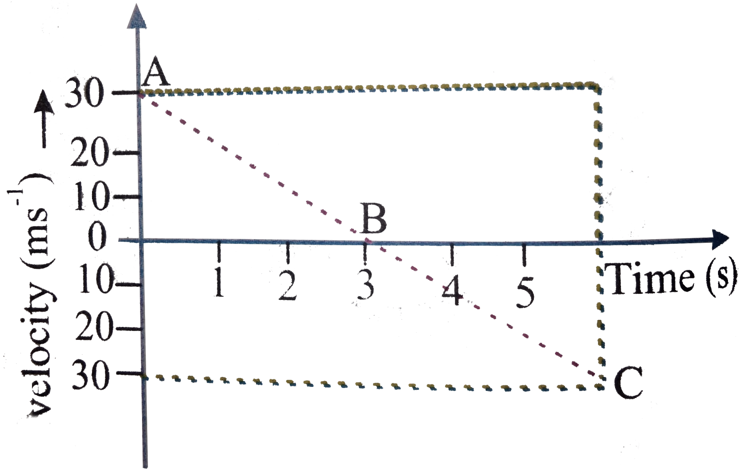
C. 16,16

D. 8,8

Answer: A

Watch Video Solution

19.



The velocity-time graph of a stone thrown vertically upward with an initial velocity of $30ms^{-1}$ is shown in the figure. The velocity in the upward direction is taken as positive and that in the downward direction as negative. What is the maximum height to which the stone rises?

A. 30 m

B. 45 m

C. 60 m

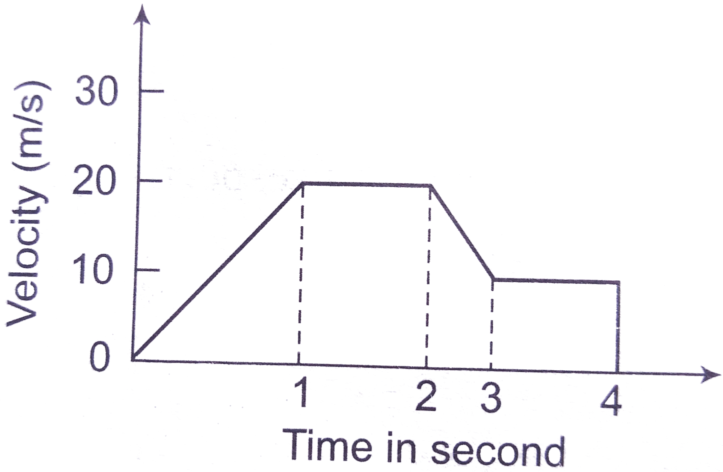
D. 90 m

Answer: B

Watch Video Solution

Watch Video Solution

20. The variation of velocity of a particle with time moving along a straight line is illustrated in the following figure. The distance travelled by the particle in four seconds is.



A. 55m

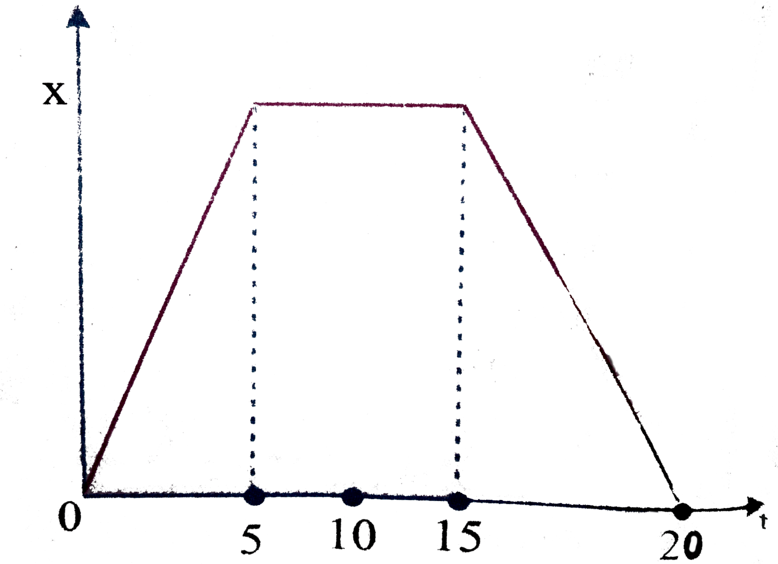
B. 30 m

C. 25 m

D. 60 m

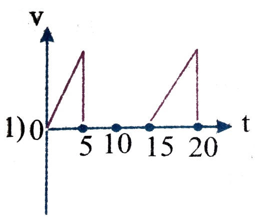
Answer: A

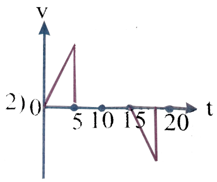
Watch Video Solution

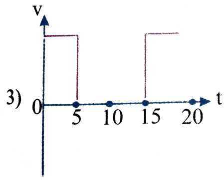


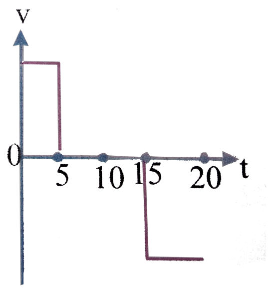
21.

Figure shows the displacement tiime (x-t) graph of a body moving in a straight line which one of the graph shown in figure represents the velocity- time (v-t) graph of the motion of the body.

A. 

B. 

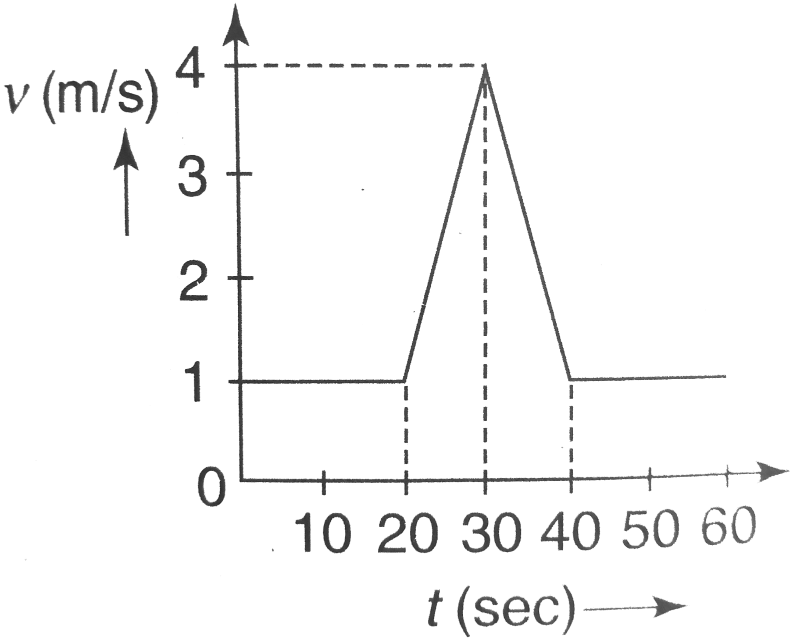
C. 

D. 

Answer: D

Watch Video Solution

22. Velocity-time graph for a moving object is shown in the figure. Total displacement of the object during the time interval when there is non-zero acceleration and retardation is.



A. 60 m

B. 50 m

C. 30 m

D. 40 m

Answer: B

Watch Video Solution

23. A car 2m long and 3m wide is moving at $10m/s$ when a bullet hits it in a direction making an angle of $\tan^{-1}(3/4)$ with the car as seen from the ground. The bullet enters one edge of the car at the corner and passes out at diagonally opposite corner. Neglecting gravity, the time for the bullet to cross the car is

A. 0.20 s

B. 0.15 s

C. 0.10 s

D. 0.5 s

Answer: A

Watch Video Solution

24. Two particles start simultaneously from the same point and move along two straight lines. One with uniform velocity v and other with a uniform acceleration a. if α is the angle between the lines of motion of two particles then the least value of relative velocity will be at time given by

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

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

C. $\frac{v}{a}\tan\alpha$

D. $\frac{v}{a}\cot\alpha$

Answer: B

Watch Video Solution

25. A jet airplance travelling at the speed of $500km^{-1}$ ejects its products of combustion at the speed of $1500kmh^{-1}$ relative to the jet plane. What is the speed of the burnt gases with respect to observer on the ground ?

A. -100 kmph

B. -1000 kmph

C. -10 kmph

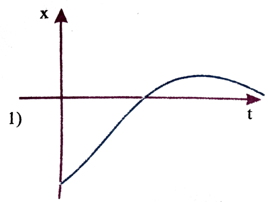
D. -11 kmph

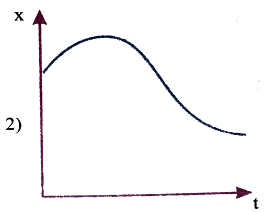
Answer: B

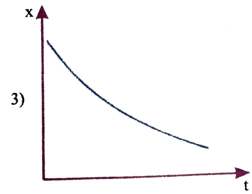
Watch Video Solution

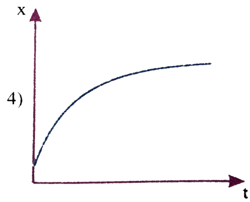
Single Type Question

1. Among the four graphs shown in the figure there is only one graph for which average velocity over the time interval (0,T) can vanish for a suitably chosen T. Which one is it ?

A. 

B. 

C. 

D. 

Answer: B

Watch Video Solution

2. A lift is coming from $8th$ floor and is just about to reach $4th$ floor. Taking ground floor as origin and positive direction upwards for all quantities, which one of the following is correct ?

A. $x < 0, v < 0, a > 0$

B. $x > 0, v < 0, a < 0$

C. $x > 0, v < 0, a > 0$

D. $x > 0, v > 0, a > 0$

Answer: A

Watch Video Solution

3. In one dimensional motion, instantaneous speed v satisfies $(0 \leq v < v_0)$.

A. The displacement in time T must always take non-negative values.

B. The dispalcement x in time T satisfies $v_0T < x < v_0T$

C. The acceleration is always a non-negative number

D. the motion has no turning points.

Answer: B

Watch Video Solution

4. If a body covers first half of its journey with uniform speed v_1 and the second half of the journey with uniform speed v_2. Then the average speed is

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

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

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

D. $\frac{L(v_1 + v_2)}{v_1 v_2}$

Answer: C

Watch Video Solution

5. The displacement of a particle is moving by $x = (t - 2)^2$ where x is in metres and t in second. The distance covered by the particle in first 4 seconds is.

A. 4m

B. 8m

C. 12 m

D. 16 m

Answer: B

Watch Video Solution

6. A body moving along a straight line traversed one third of the total distance with a velocity $4m/\sec$ in the first stretch. In the second strech the remaining distance is covered with a velocity $2m/\sec$ for some time t_0 and with $4m/s$ for the remaining time. if the average velocity is $3m/\sec$ find the time for which body moves with velocity $4m/\sec$ in second stretch:

A. $\frac{3}{2}t_0$

B. t_0

C. $2t_0$

D. $\frac{t_0}{2}$

Answer: D

Watch Video Solution

7. For motion of an object along the x-axis the velocity v depends on the displacement x as $v = 3x^2 - 2x$, then what is the acceleratiobn at $x = 2m$.

A. $48ms^{-2}$

B. $80ms^{-2}$

C. $18ms^{-2}$

D. $10ms^{-2}$

Answer: B

Watch Video Solution

8. A police party is chasing a dacoit in a jeep which is moving at a constant speed v. The dacoit is on a motor cycle. When he is at a distance x from the jeep, he accelerates from rest at a constant rate α. Which of the following relations is true, if the police is able to catch the dacoit ?

A. $v^2 \leq ax$

B. $v^2 \leq 2ax$

C. $v^2 \geq 2ax$

D. $v^2 \geq ax$

Answer: C

Watch Video Solution

9. A point moves in a straight line so its displacement x meter at time t second is given by $x^2 = 1 + t^2$. Its acceleration in ms^{-2} at time t second is .

A. $\frac{1}{x^{3/2}}$

B. $\frac{-t}{x^3}$

C. $\frac{1}{x} - \frac{t^2}{x^3}$

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

Answer: C

Watch Video Solution

10. A $2-m$ wide truck is moving with a uniform speed $v_0 = 8ms^{-1}$ along a straight horizontal road. A pedestrian starts to cross the road with a uniform speed v when the truck is $4m$ away from him, The minimum value of v so that he can cross the road safely is .

A. $2.62ms^{-1}$

B. $4.6ms^{-1}$

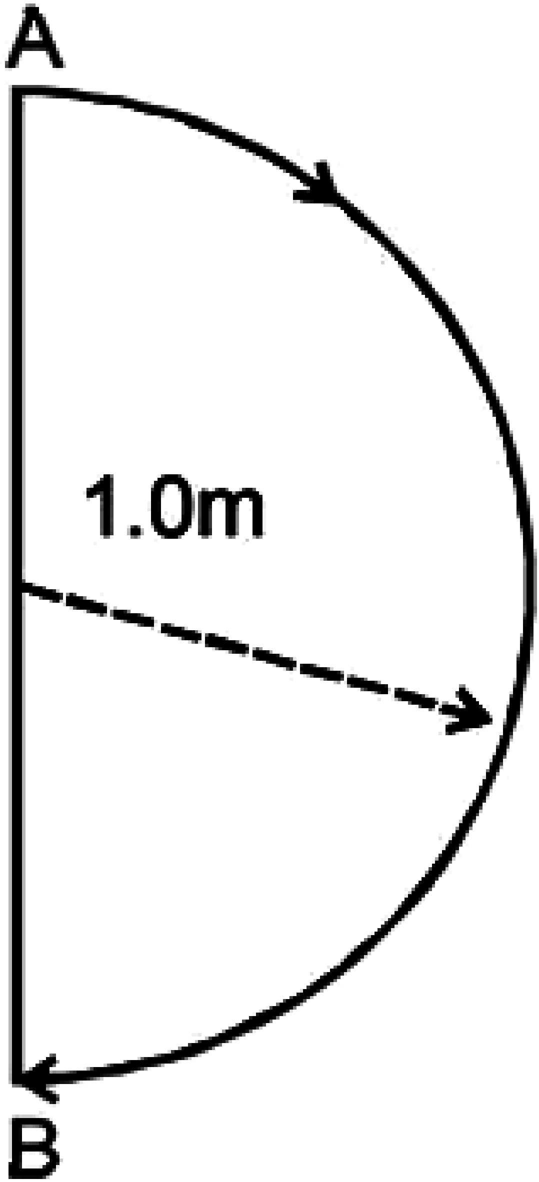
C. $3.57ms^{-1}$

D. $1.414ms^{-1}$

Answer: C

Watch Video Solution

11. In $1.0s$, a particle goes from point A to point B , moving in a semicircle of radius $1.0m$ (see figure). The magnitude of the average velocity



A. $3.14m / s$

B. $2.0m / s$

C. $1.0m / s$

D. zero

Answer: B

Watch Video Solution

12. An elecator in which a man is standing is moving upwards with a speed of $10ms^{-1}$ if the man drops a coin from a height of 2.45 m from the floor of elevator it reaches the floor of the elevator after time $(g = 9.8ms^{-2})$

A. $\sqrt{2}s$

B. $1/\sqrt{2}s$

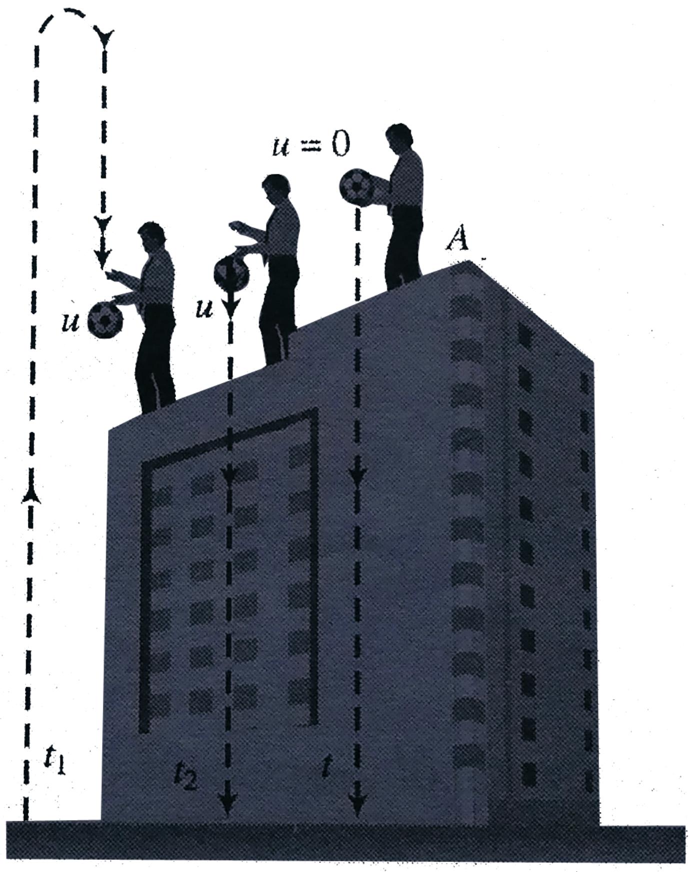
C. $2s$

D. $1/2s$

Answer: B

Watch Video Solution

13. A body is thrown vertically upwards from A. The top of a tower . It reaches the ground in time t_1. It it is thrown vertically downwards from A with the same speed it reaches the ground in time t_2, If it is allowed to fall freely from A. then the time it takes to reach the ground.



A. $t = \dfrac{t_1 + t_2}{2}$

B. $t = \dfrac{t_1 - t_2}{2}$

C. $t = \sqrt{t_1 t_2}$

D. $t = \sqrt{\frac{t_1}{t_2}}$

Answer: C

Watch Video Solution

14. A storne is dropped from the 25 th storey of a multistored building and it reaches the ground in $5s$. In the first second, it passes through how many storey of the buliding?

A. 1

B. 2

C. 3

D. none

Answer: A

Watch Video Solution

15. A body is projected upwards with a velocity u. It passes through a certain point above the ground after t_1, Find the time after which the body passes through the same point during the journey.

A. $\left(\frac{u}{g}-t_1^2\right)$

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

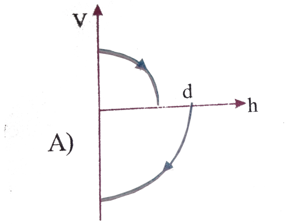
C. $3\left(\frac{u^2}{g}-t_1\right)$

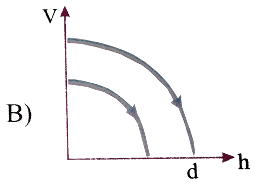
D. $3\left(\frac{u^2}{g^2}-t_1\right)$

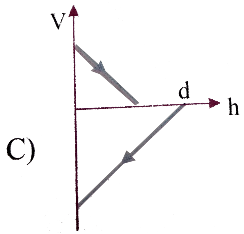
Answer: B

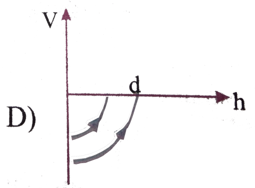
Watch Video Solution

16. A ball is dropped vertically from a height d above the ground . It hits the ground and bounces up vertically to a height $(d)/(2). Neg \le ct \in g \subset sequentmotion$ and $airresis \tan ce, itsvelocity$ $vvarieswiththeheighth$` above the ground as

A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

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

18. The deceleration exerienced by a moving motor blat, after its engine is cut-off is given by $dv/dt = -kv^3$, where k is constant. If v_0 is the magnitude of the velocity at cut-off, the magnitude of the velocity at a time t after the cut-off is.

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

B. v

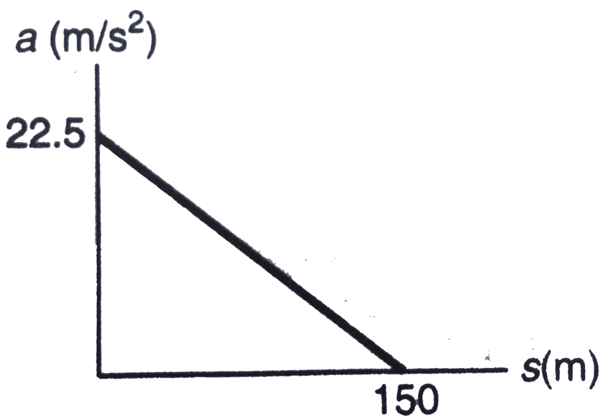
C. $v_0 e^{-kt}$

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

Answer: D

Watch Video Solution

19. The jet plane starts from rest at $s = 0$ and is subjected to the acceleration shown. Determine the speed of the plane when it has travelled 60 m.



A. $46.47m/s$

B. $36.47m/s$

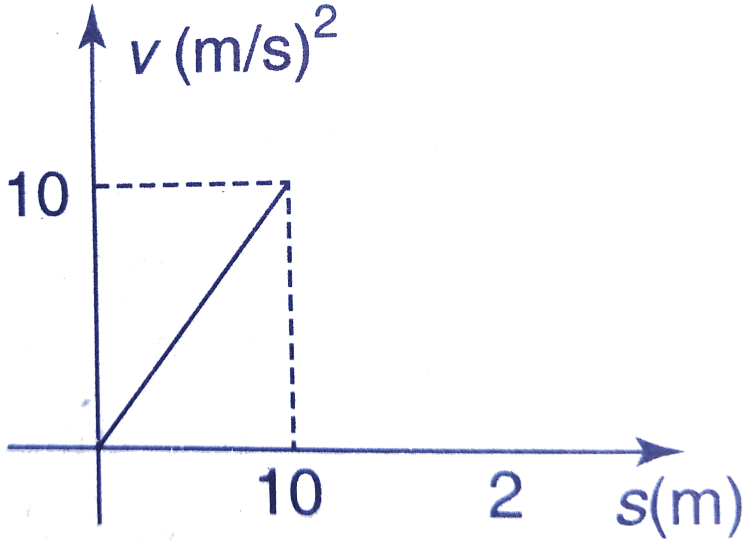
C. $26.47m/s$

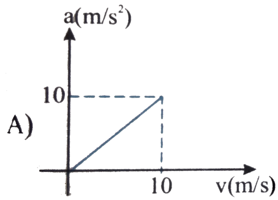
D. $16.47m/s$

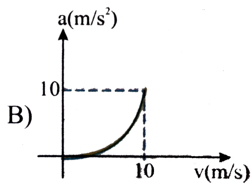
Answer: A

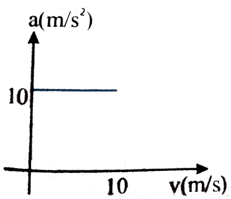
Watch Video Solution

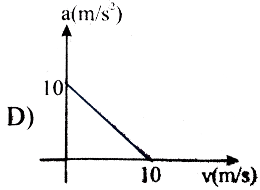
20. Velocity versus displacement graph of a particle moving in a straight line is shown in figure. Corresponding acceleration versus velocity graph will be.



A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

21. The motion of a body falling from rest in a resisting medium is described by the equation $\frac{dv}{dt} = a - bv$ where a and b are constant . The velocity at any time t is given by

A. $v = \frac{a}{b}(1 - e^{-bt})$

B. $v = \frac{b}{a}(e^{-bt})$

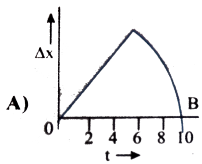
C. $v = \frac{a}{b}(1 + e^{-bt})$

D. $v = \frac{b}{a}e^{bt}$

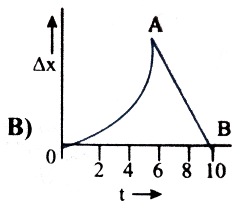
Answer: A

Watch Video Solution

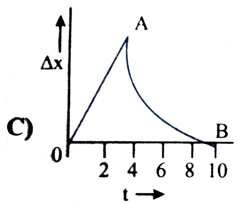
22. Two stones are thrown up simultaneously with initial speeds of u_1 and $u_2 (u_2 >_1 u_1)$. They hit the ground after 6 s and 10 s respectively. Which graph in fig. correctly represents the time variation of $\Delta x = (x_2 - x_1)$ the relative position of the second stone with respect to the first upto $t = 10$ s? Assume that the stones do not rebound after hitting the ground.



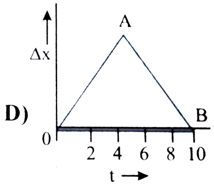
A.



B.



C.

D. 

Answer: A

Watch Video Solution

23. A cone falling with a speed v_0 strikes and penetrates the block of a packing material. The acceleration of the cone after impact is $a = g - cx^2$. Where c is a positive constant and x is the penetration distance. If maximum penetration depth is x_m then c equals

A. $\dfrac{2gx_m + v_0^2}{x_m^2}$

B. $\dfrac{2gx_m - v_0^2}{x_m^2}$

C. $\dfrac{6gx_m - 3v_0^2}{2x_m^3}$

D. $\dfrac{6gx_m + 3v_0^2}{2x_m^3}$

Answer: D

Watch Video Solution

More than One Option Question

1. At a metro station, a girl walks up a stationary escalator in time t_1 If she remains stationary on the escalator, then the escalator take her up in time t_2. The time taken by her to walk up the moving escalator will be.

A. $(t_1 + t_2)/2$

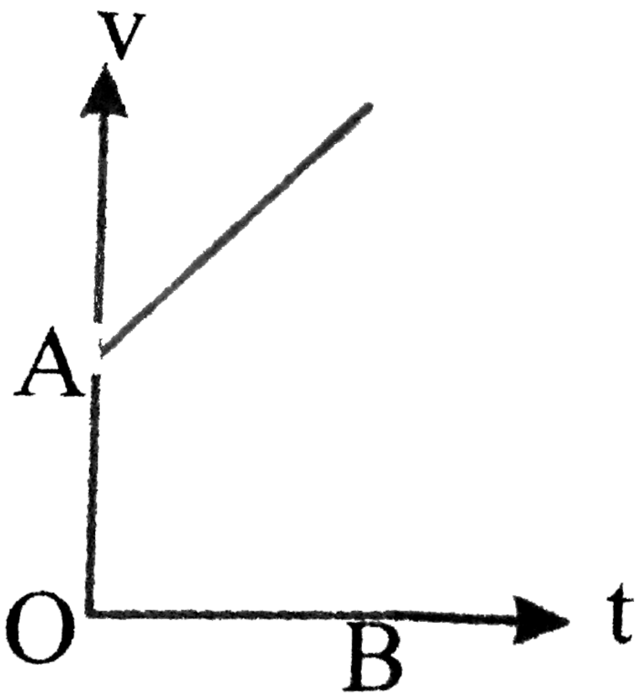
B. $t_1 t_2/(t_2 - t_1)$

C. $t_1 t_2/(t_2 + t_1)$

D. $t_1 - t_2$

Answer: C

Watch Video Solution



2.

The variation of quantity A with quantity B is plotted in the fig. Describes the motion of a particle in a straight line.

(a) Quantity B may represent time.

(b) Quantity A is velocity if motion is uniform.

(c) Quantity A is displacement if motion is uniform

(d) Quantity A is velocity if motion is uniformly accelerated.

A. Quantity B may represent time

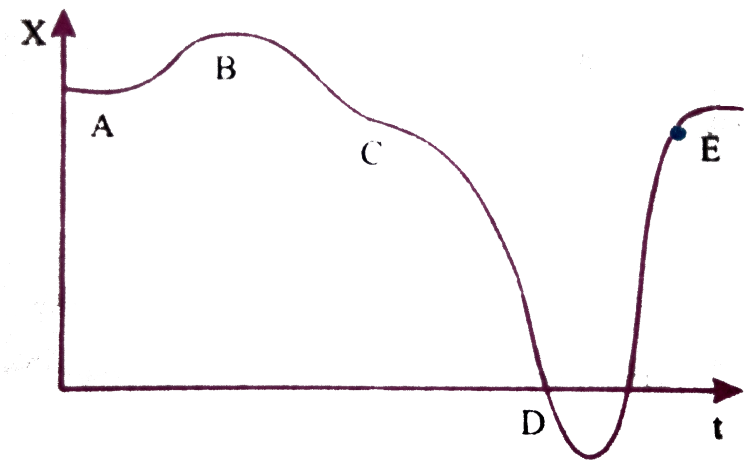
B. Quantity A is velocity if motion is uniform

C. Quantity A is displacement if motion is uniform

D. Quantity A is velocity if motion is uniformly accelerated.

Answer: A::C::D

Watch Video Solution



3.

A graph of x versus t is shown in figure. Choose correct alternative from below.

A. The particle was released from rest at $t = 0$

B. At B, the accleration $a > 0$

C. Average velocity for the motion between A and D is positive.

D. The speed at D exceeds that at E.

Answer: A::C::D

Watch Video Solution

4. For the one dimensional motion, described by $x = t - \sin t$

A. $x(t) > 0$ for all $t > 0$

B. $v(t) > 0$ for all $t > 0$

C. $a(t) > 0$ for all $t > 0$

D. $v(t)$ lies between 0 and 2

Answer: A::D

Watch Video Solution

5. A spring with one end attached to a mass and the other to a right support is stretched and released

A. Magnitude of acceleration when just releases is maximum

B. Magnitude of acceleration, when at equilibrium position is maximum

C. speed is maximum when mass is a equilibrium position.

D. Magnitude of displacement is always maximum whenever speed is minimum

Answer: A::C

Watch Video Solution

6. A ball is bouncing elastically with a speed 1 m/s between walls of a railway compartment of size 10 m in a direction perpendicular to walls. The train is moving at a constant velocity of 10 m/s parallel to the direction of motion of the ball. As seen from the ground choose the correct option

A. the direction of motion of the ball changes every 10 seconds

B. speed of ball changes every 10 seconds

C. average speed of ball over any 20 seconds interval is fixed

D. the acceleration of the ball is the same as from the train.

Answer: B::C::D

Watch Video Solution

7. A particle is thrown in vertically in upward direction and passes three equally spaced windows of equal heights. Then

A. Average speed of the particle while passing the windows satisfies the relation $u_{av_1} > u_{av_2} > u_{av_3}$

B. the time taken by the particle to cross the windows satisfies the relation $t_1 > t_2 >_t \_ (3)$

C. The magnitude of the acceleration of the particle while crossing the windows satisfies the relation $a_1 = a_2 \neq a_3$

D. the charge in the speed of the particle while crossing the windows would satisfy the relation $\Delta u_1 < \Delta u_2 < \Delta u_3$

Answer: A::B::D

Watch Video Solution

Passage Type Questions

1. A monkey climbs up a slippery pole for $3 \sec onds$ and subsequently slips for $3 \sec onda$. Its velocity at time (t) is given by $v(t) = 2t(3-t), 0 < t > 3s$ and $v(t) = -(t-30(6-t)f$ or $3 < t < 6s$. It repeats thei cycle till it reaches the height of $20s$.

(a) AT wht time is its v elocity maximum ? (b) At what time is its average velocity maximum ? (c) At what time is its accelration maximum in magnitude ? (d) How many cycles (counting fractions) are required to reach the top ?

A. 1.5 s

B. 3 sec

C. 2s

D. 5s

Answer: A

Watch Video Solution

2. A monkey climbs up a slippery pole for $3 \sec onds$ and subsequently slips for $3 \sec onda$. Its velocity at time (t) is given by $v(t) = 2t(3-t), 0 < t > 3s$ and $v(t) = -(t-30(6-t)f$ or $3 < t < 6s$. It repeats thei cycle till it reaches the height of $20s$.

(a) AT wht time is its v elocity maximum ? (b) At what time is its average velocity maximum ? (c) At what time is its accelration maximum in magnitude ? (d) How many cycles (counting fractions) are required to reach the top ?

A. 1.5 s

B. 2.3 s

C. $\frac{9}{4}s$

D. $2.5s$

Answer: C

Watch Video Solution

3. A monkey climbs up a slippery pole for $3\sec onds$ and subsequently slips for $3\sec onda$. Its velocity at time (t) is given by $v(t) = 2t(3-t), 0 < t > 3s$ and $v(t) = -(t-30(6-t)f$ or $3 < t < 6s$. It repeats thei cycle till it reaches the height of $20s$.

(a) AT wht time is its v elocity maximum ? (b) At what time is its average velocity maximum ? (c) At what time is its accelration maximum in magnitude ? (d) How many cycles (counting fractions) are required to reach the top ?

A. 1.5 s

B. 3 sec

C. $\frac{9}{4}s$

D. $2.5s$

Answer: B

Watch Video Solution

4. A monkey climbs up a slippery pole for $3\sec onds$ and subsequently slips for $3\sec onda.$ Its velocity at time (t) is given by $v(t)=2t(3-t), 0 < t > 3s$ and $v(t)=-(t-30(6-t)f$ or $3 < t < 6s$. It repeats thei cycle till it reaches the height of $20s.$

(a) AT wht time is its v elocity maximum ? (b) At what time is its average velocity maximum ? (c) At what time is its accelration maximum in magnitude ? (d) How many cycles (counting fractions) are required to reach the top ?

A. 2

B. 3

C. 5

D. 7

Answer: C

Watch Video Solution

5. A particle executes the motion described by $x(t) = x_0(1 - e^{-\gamma t}), t > \; = 0, x_0 > 0.$

(a) Where does the particle start and with what velocity ?

(b) Find maximum and minimum values of $x(t), a(t)$. Show that $x(t)$ and $a(t)$ increase with time and $v(t)$ decreases with time.

A. 0

B. x_0

C. $x_0\left(1-e^{-\gamma}\right)$

D. $x_0e^{-\gamma}$

Answer: A

Watch Video Solution

6. A particle executes the motion described by $x(t)=x_0\left(1-e^{-\gamma t}\right), t> \ =0, x_0>0.$

(a) Where does the particle start and with what velocity ?

(b) Find maximum and minimum values of $x(t), a(t)$. Show that $x(t)$ and $a(t)$ increase with time and $v(t)$ decreases with time.

A. 0

B. x_0

C. $x_0\left(1-e^{-\gamma}\right)$

D. $x_0\gamma$

Answer: D

Watch Video Solution

7. A particle executes the motion described by $x(t) = x_0(1 - e^{-\gamma t}), t > \; = 0, x_0 > 0.$

(a) Where does the particle start and with what velocity ?

(b) Find maximum and minimum values of $x(t), a(t)$. Show that $x(t)$ and $a(t)$ increase with time and $v(t)$ decreases with time.

A. x_0 and 0

B. $x_0\gamma$ and 0

C. 0 and $-x_0\gamma^2$

D. $x_0(1 - e^{-\gamma})$

Answer: A

Watch Video Solution

8. A particle exceutes the motion describes by

$x(t) = x_0(1 - e^{-\gamma t}), t \geq 0, x_0 0.$

The maximum and minimum values of $v(t)$ are

A. x_0 and 0

B. $x_0\gamma$ and 0

C. 0 and $-x_0\gamma^2$

D. $x_0^{1+e^{-\gamma}}$

Answer: B

Watch Video Solution

9. A particle executes the motion described by

$x(t) = x_0(1 - e^{-\gamma t}), t > \; = 0, x_0 > 0.$

(a) Where does the particle start and with what velocity ?

(b) Find maximum and minimum values of $x(t), a(t)$. Show that $x(t)$ and $a(t)$ increase with time and $v(t)$ decreases with time.

A. x_0 and 0

B. $x_0 \gamma$ and 0

C. 0 and $-x_0 \gamma^2$

D. $x_0 (1 - e^{-\gamma})$

Answer: C

Watch Video Solution

10. A train starts from rest with constant acceleration $a = 1m/s^2$ A passenger at a distance S from the train runs at this maximum velocity of $10m/s$ to catch the train at the same moment at which the train starts. If $S = 25.5$ m and passenger keeps running, find the time in which he will catch the train:

A. 5 sec

B. 4 sec

C. 3 sec

D. $2\sqrt{2}$ sec

Answer: C

Watch Video Solution

11. A train starts from rest with constant acceleration $a = 1m/s^2$ A passenger at a distance S from the train runs at this maximum velocity of $10m/s$ to catch the train at the same moment at which the train starts. Find the critical distance S_c for which passenger will take the ten seconds time to catch the train

A. 50 m

B. 35 m

C. 30 m

D. 25 m

Answer: A

Watch Video Solution

12. A train starts from rest with constant acceleration $a = 1m/s^2$ A passenger at a distance S from the train runs at this maximum velocity of $10m/s$ to catch the train at the same moment at which the train starts. Find the speed of the train when the passenger catches it for the critical distance:

A. $8m/s$

B. $10m/s$

C. $12m/s$

D. $15m/s$

Answer: B

Watch Video Solution

13. A body is moving with uniform velocity of $8ms^{-1}$. When the body just crossed another body, the second one starts and moves with uniform

acceleration of $4ms^{-2}$. The time after which two bodies meet will be :

A. 2s

B. 4s

C. 6s

D. 8s

Answer: B

Watch Video Solution

14. A body is moving with uniform velocity of $8ms^{-1}$. When the body just crosses another body, the second one starts and moves with uniform acceleration of $4ms^{-2}$.

The distance covered by the second body when they meet is .

A. 8 m

B. 16 m

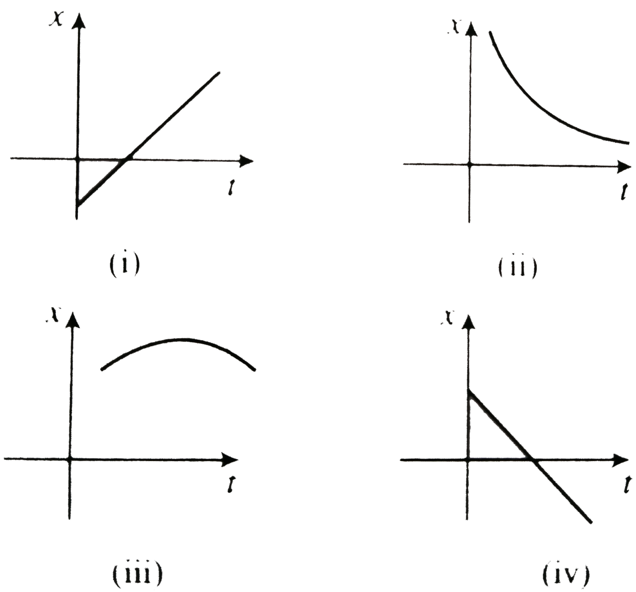
C. 24 m

D. 32 m

Answer: D

Watch Video Solution

15. Study the following graph:



The particle is moving with constant speed .

A. In graphs (i) and (iii)

B. In graphs (i) and (iv)

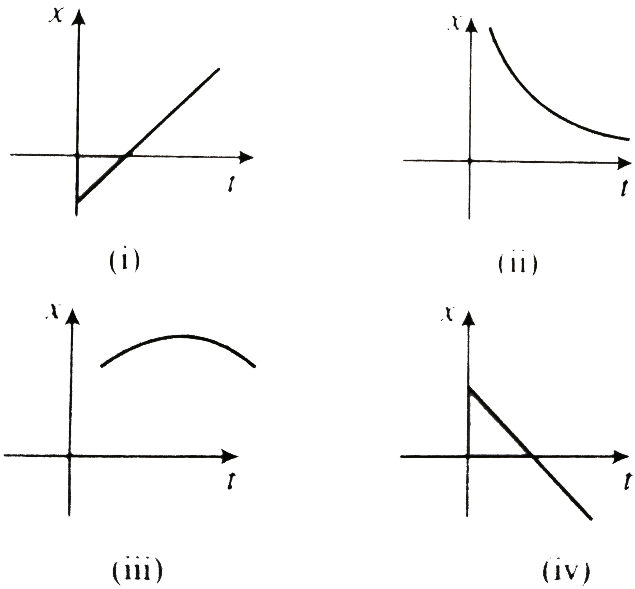
C. in graphs (i) and (ii)

D. In graphs (i)

Answer: B

Watch Video Solution

16. Study the following graph:



The particle has negative acceletation.

A. In graph (i)

B. In graph (ii)

C. In graph (ii)

D. In graph (iv)

Answer: C

Watch Video Solution

Multiple Answer Question

1. The velocity of a particle along a straight line increases according to the linear law $v = v_0 + kx$, where k is a constant. Then

A. the acceleration of the particle is $k(v_0 + kx)$

B. the particle takes a time $\frac{1}{k}\log_2\left(\frac{v_1}{v_0}\right)$ to attain a velocity v_1

C. velocity varies linearly with displacement with slope of velocity displacement curve equal to k.

D. data is insufficient to arrive at a conclusion.

Answer: A::B::C

Watch Video Solution

2. Two particles P and Q move in a straight line AB towards each other. P starts from A with velocity u_1 and an acceleration a_1 Q starts they pass each other at the midpoint of AB and arrive at the other ends of AB with equal velocities.

A. they meet at midpoint at time $t = \dfrac{2(u_2 - u_1)}{(a_1 - a_2)}$

B. The length of path specified i.e., AB is $l = \dfrac{4(u_2 - u_1)(a_1 u_2 - a_2 u_1)}{(a_1 - a_2)^2}$

C. They reach the other ends of AB with equal velocities if $(u_2 + u_1)(a_1 - a_2) = 8(a_1 u_2 - a_2 u_1)$

D. They reach the other ends of AB with equal velocities if $(u_2 - u_1)(a_1 + a_2) = 8(a_2 u_1 - a_1 u_2)$

Answer: A::B::C

Watch Video Solution

3. Which of the following statements is/are correct ?

A. If the velocity of body changes it must have some acceleration.

B. If the speed of a body changes it must have some acceleration.

C. If the body has acceleration its speed must change

D. If the body has acceleration its speed may change.

Answer: A::B::D

Watch Video Solution

4. A particle moves along a straight line its velocity dipends on time as $v = 4t - t^2$. Then for first $5s$:

A. Average velocity is $25/3ms^{-1}$

B. average speed is $10ms^{-1}$

C. Average velocity is $5/3ms^{-1}$

D. acceleration is $4ms^{-2}$ at $t=0$

Answer: C::D

Watch Video Solution

5. A particle moves with an initial v_0 and retardation alphav, where v is its velocity at any time t.

(i) The particle will cover a total distance $\frac{v_0}{\alpha}$.

(ii) The particle will come to rest after time $\frac{1}{\alpha}$.

(iii) The particle will continue to move for a very long time.

(iv) The velocity of the particle will become $\frac{v_0}{2}$ after time $\frac{1n2}{\alpha}$

A. the particle will cover a total distance $\frac{v_0}{\alpha}$

B. the particle will come to rest after time $\frac{1}{\alpha}$

C. The particle will continue to move for a long time.

D. the velocity of particle will become $\frac{v_0}{e}$ after time $\frac{1}{\alpha}$

Answer: A::C::D

Watch Video Solution

6. A particle is moving along the x-axis whose position is given by $x = 4 - 9t + \frac{t^3}{3}$. Mark the correct statement(s) in relation to its motion.

A. direction of motion is not changing at any of the instant

B. direction of motion is not changing $t = 3s$

C. for $0 < t < 3$,s the particle is slowing down

D. for $0 < t < 3$s, the particle is speeding up.

Answer: B::C

Watch Video Solution

7. A particle of mass m moves on the $x - a\xi s$ as follows : it starts from rest at $t = 0$, from the point $x = 0$, and comes to rest at $t = l$ at the point $x = 1$. No other information is available about its motion at intermediate times $(0 < t < l)$. If α denotes the instantaneous accelartion of the particle , then :

A. a cannot remain positive for all t in the interval $0 \leq t \leq 1$

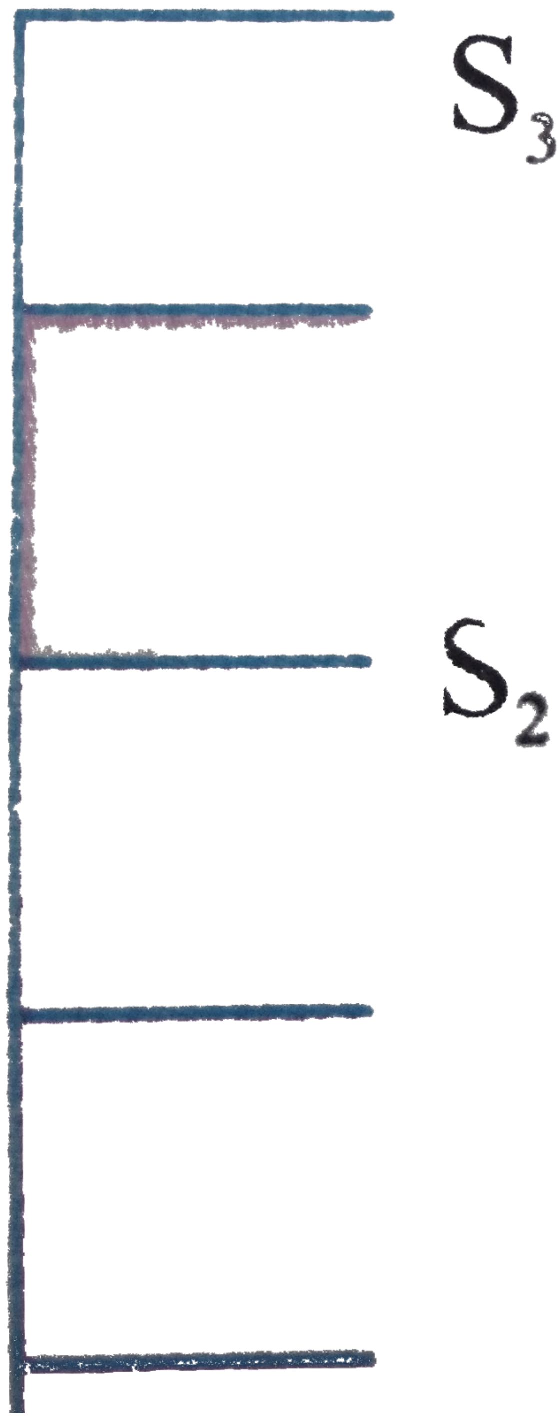
B. $|a|$ cannot excessd 2 at any point in itys path

C. $|a|$ must be ≥ 4 at some point or points in its path

D. a must change sing during the motion but no other assertion can be made with the information given.

Answer: A::C::D

Watch Video Solution


S_3
S_2

8.

S_1, S_2 and S_3 are the different sizes of windows 1,2 and 3 respectively placed in avertical plane. A particle is thrown up in that vertial plane, find the correct options:

A. average speed of the particle passing the windows may be equal if $S_1 < S_2 < S_3$

B. average speed of the particle passing the windows may be equal if $S_1 > S_2 > S_3$

C. if $S_1 = S_2 = S_3$, the change in speed of the particle while crossing the windows will satisfy $\Delta V_1 < \Delta V_2 < \Delta V_3$.

D. if $S_1 = S_2 = S_3$ the time taken by particle to cross the windows will satisfy $t_1 < t_2 < t_3$

Answer: B::C::D

Watch Video Solution

9. At $t = 0$, an arrow is fired vertically upwards with a speed of $100ms^{-1}$. A second arrow is fired vertically upwards with the same speed at $t = 5s$. Then .

A. The two bullets will be at the same height above the ground at $t = 12.5s$

B. The two bullets will reach back their starting point at $t = 20s$ and at $t = 25s$

C. The ratio fo the speeds of the first and second bulletsat $t = 20s$ will be $2:1$

D. The maximum height attained by either bullet will be 1000 m

Answer: A::B::C

Watch Video Solution

Watch Video Solution

10. From the top of a tower of height 200 m, a ball A is projected up with speed $10ms^{-1}$ and 2 s later, another ball B is projected vertically down with the same speed. Then

A. Both A and B will reach the ground simultaneously

B. Ball A will hit the ground 2 s later than B hitting the ground.

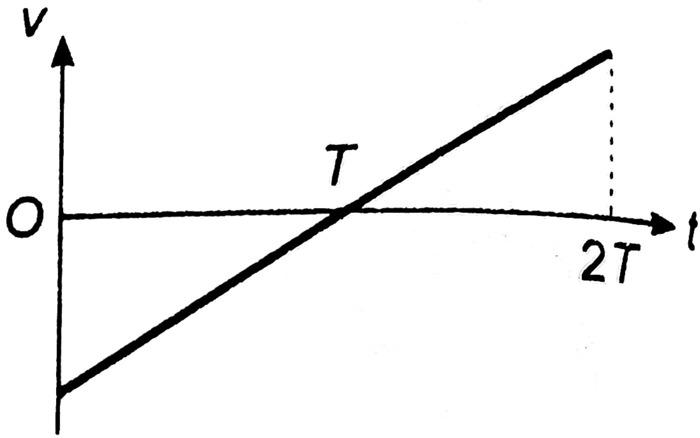
C. Both the balls will hit the ground with the same velocity

D. Both the balls will hit the ground with the different velocity.

Answer: A::C::D

Watch Video Solution

11. The figure shows the velocity (v) of a particle plotted against time (t).



A. The particle changes its direction of motion at some point

B. The acceleration of the particle remains constant.

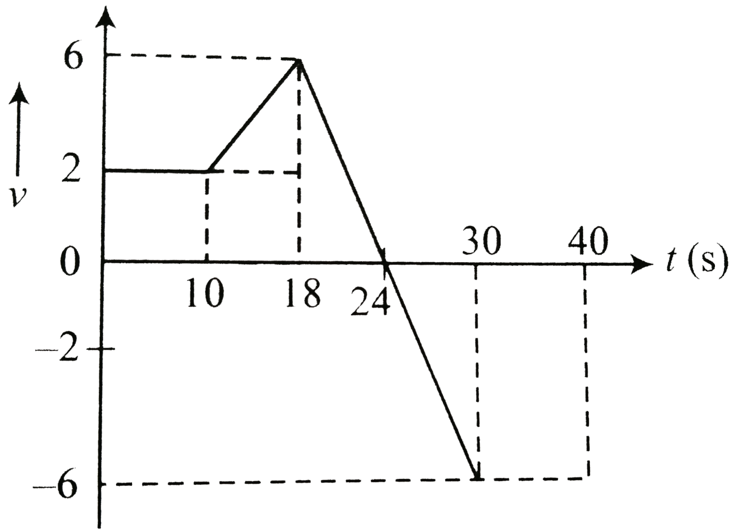
C. The displacement of the particle zero

D. The initial and final speeds of the particle are the same.

Answer: A::B::C::D

Watch Video Solution

12. A particle moves in a straight line with the velocity as shown in. At $t=0, x=-16m,$



A. The maximum value of the position coordinate of the particle is 54 m.

B. The maximum value of the position coordinate of the particle 36 m.

C. The particle is at the position of 36 m at $t=18s$.

D. The particle is at the position of 36 m at $t=30s$

Answer: A::C::D

Watch Video Solution

13. If the velocity of the particle is given by $v = \sqrt{x}$ and initially particel was at $x = 4m$ then which of the following are correct.

A. at $t = 2$ sec, the position of the particle is $x = 9m$

B. particle acceleration at $t = 2$ sec is $1m/s^2$

C. particle acceleration is $\frac{1}{2}ms^2$ through out the motion

D. particle will never go in negative direction from its starting position.

Answer: A::C::D

Watch Video Solution

14. Starting from rest a particle is first accelerated for time t_1 with constant acceleration a_1 and then stops in time t_2 with constant retardation a_2. Let v_1 be the average velocity in this case and s_1 the total displacement. In the second case it is accelerating for the same time t_1 with constant acceleration $2a_1$ and come to rest with constant retardation a_2 in time t_3. If v_2 is the average velocity in this case and s_2 the total displacement, then

A. $v_2 = 2v_1$

B. $2v_1 < v_2 < 4v_1$

C. $s_2 = 2s_1$

D. $2s_1 < s_2 < 4s_1$

Answer: A::D

Watch Video Solution

15. Two particles A and B start from rest at the origin $x = 0$ and move along a straight line such that $a_A = (6t - 3)ms^{-2}$ and $a_B = (12t^2 - 8)ms^{-2}$ where t is in seconds based on the above facts answer the following questions,

Total distance travelled by A at $t = 4$ s is

A. 40 m

B. 41 m

C. 42 m

D. 43 m

Answer: B

Watch Video Solution

16. Two particles A and B start from rest at the origin $x = 0$ and move along a straight line such that $a_A = (6t - 3)ms^{-2}$ and $a_B = (12t^2 - 8)ms^{-2}$ where t is in seconds based on the above facts answer the following questions,

Total distance travelled by B at $t = 4$ s is

A. 192 m

B. 184 m

C. 196 m

D. 200m

Answer: D

Watch Video Solution

17. Two particles A and B start from rest at the origin $x = 0$ and move along a straight line such that $a_A = (6t - 3)ms^{-2}$ and $a_B = (12t^2 - 8)ms^{-2}$ where t is in seconds based on the above facts answer the following questions,

Total distance between them at $t = 4$ s is

A. 144 m

B. 148 m

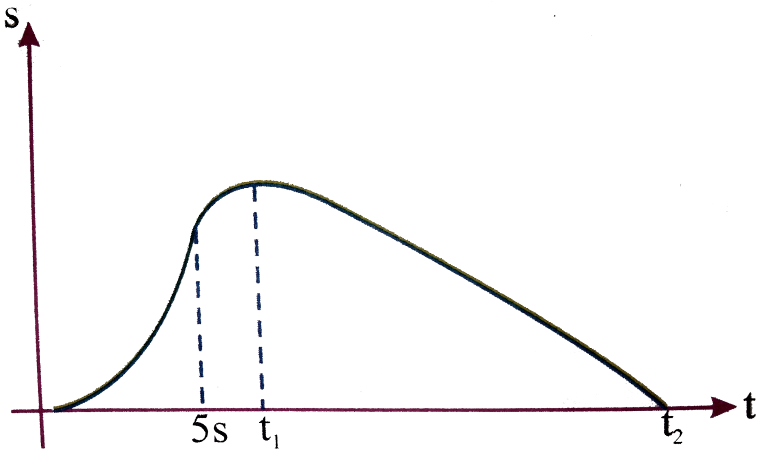
C. 152 m

D. 156 m

Answer: C

Watch Video Solution

18.



A balloon starts rising with constant acceleration $2m/s^2$ from ground at $t = 0s$. A stone is dropped at $t = 5s$. S-t graph for the given situation is shown in figure answer the following

Q. The maximum hight reached by the stone is

A. 30 m

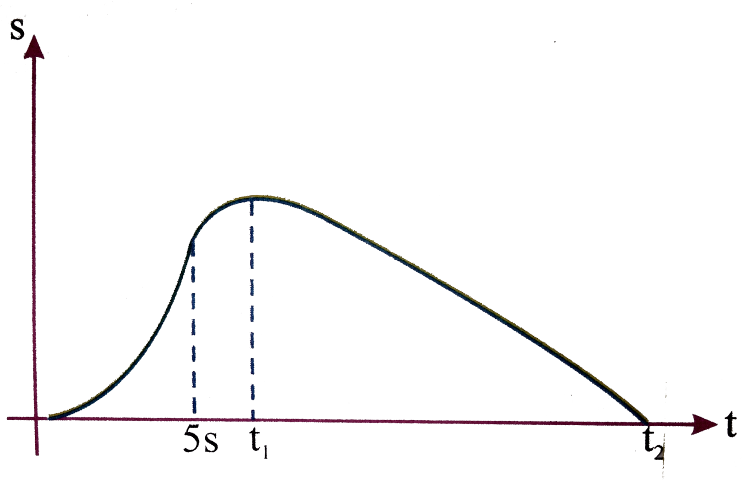
B. 40 m

C. 45 m

D. 28 m

Answer: A

Watch Video Solution



19.

A balloon starts rising with constant acceleration $2m/s^2$ from ground at $t = 0s$. A stone is dropped at $t = 5s$. S-t graph for the given situation is shown in figure answer the following

t_1 is

A. 4 s

B. 6 s

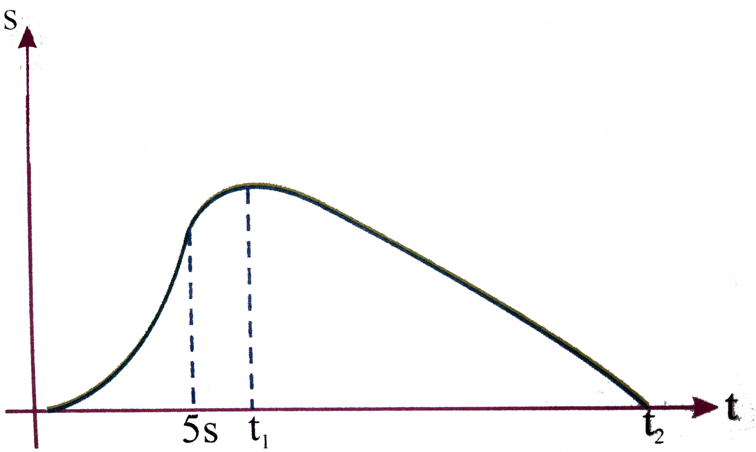
C. 2 s

D. 1 s

Answer: B

Watch Video Solution

20.



A balloon starts rising with constant acceleration $2m/s^2$ from ground at $t = 0s$. A stone is dropped at $t = 5s$. S-t graph for the given situation is shown in figure answer the following

t_2 is

A. 4 s

B. 4.45 s

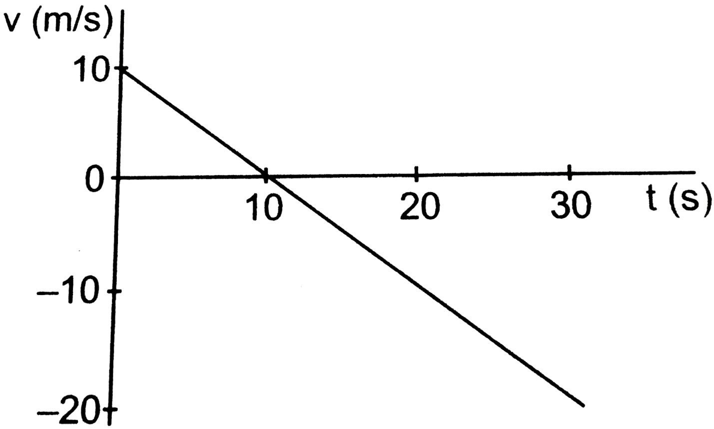
C. 3.45 s

D. 9.45 s

Answer: D

Watch Video Solution

21. The velocity time plot for a particle moving on straight line is shown in the figure.



A. The particle has a constant acceleration

B. The particle has never tuned around

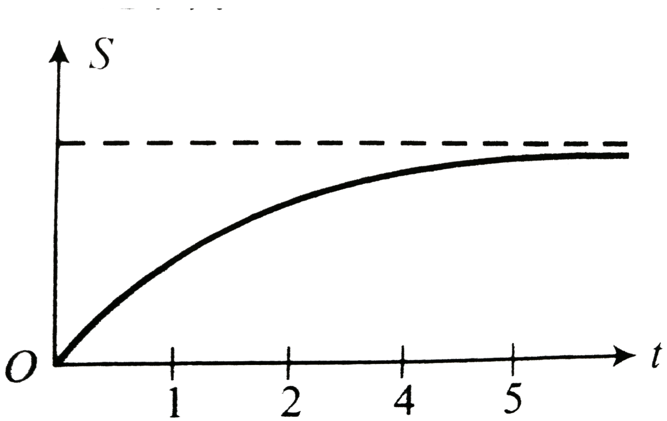
C. The particle has zero displacement

D. The average speed in the interval 0 to 10 s is the same as the average speed in the interval 10 s to 20 s.

Answer: A::D

Watch Video Solution

22. The displacement of a particle as a function of time is shown in . It indicates



A. The particle starts with a certain velocity but the motion is retarded and finally the particle stops

B. The velocity of the particle decreases

C. The acceleration of the particle is in opposite direction to the velocity

D. The particle starts with a constant velocity the motion is accelerated and finally the particle moves with another constant velocity.

Answer: A::B::C

Watch Video Solution

Integer Type Question

1. In a car race, car A takes $4s$ less than can B at the finish and passes the finishing point with a velocity v more than the car B . Assuming that the cars start form rest and travel with constant acceleration $a_1 = 4ms^{-2}$ and $a_2 = 1ms^{-2}$ respectively, find the velocity of v in m s^{-1}.

Watch Video Solution

2. A police is chasing a culprit going n a motorbike. The motorbike crosses a turning at a speed of 72 km/h.

The jeep follows it at a speed of 90 km/h, crossing the turning tenseconds latert than the bike. Assuming that they tavel at constant speeds, how far from the turning will the jeep catch up with the bike?

Watch Video Solution

3. A particle moves in a straight line such that the displacement x at any time t is given by $x = 6t^2 - t^3 - 3t - 4$. X is in m and t is in second calculate the maximum velocity (in ms^{-1}) of the particle.

Watch Video Solution

4. From a lift moving upwards with a uniform acceleration $a = 2ms^{-2}$, man throws a ball vertically upwards with a velocity $v = 12ms^{-1}$ relative to the lift. The ball comes back to the man after a time t. Find the value of t in seconds.

Watch Video Solution

5. A body is thrown up with a velocity $100ms^{-1}$ it travels 5 m in the last swecond of upward journey if the same body thrown up with velocity $200ms^{-1}$, how much distance (in metre) will it travel in the last second of its upward journey $(g = 10ms^{-2})$

Watch Video Solution

6. A train starts from station A with uniform acceleration a_1. For some distance and then goes with uniform retardation a_2 for some more distance to come to rest at station B. The distance between stations A and B is $4km$ and the train takes $1/5h$ to compete this journey. If accelerations are in km per minute unit, then show that $\frac{1}{a_1} + \frac{1}{a_2} = x$. Find the value of x.

Watch Video Solution

7. A cat, on seeing a rat at a distance $d = 5m$, starts velocity $u = 5ms^{-1}$ and moves with acceleration $\alpha = 2.5ms^{-2}$ in order to catch it, while the rat with acceleration β starts from rest. For what value of β will the cat overtake the rat?. (ms^{-2}).

Watch Video Solution

8. On a two lane road , car (A) is travelling with a speed of $36kmh^{-1}$. Tho car B and C approach car (A) in opposite directions with a speed of $54kmh^{-1}$ each . At a certain instant , when the distance (AB) is equal to (AC), both being $1km$, $(B) decides \rightarrow overtake$ A before C does , What minimum accelration of car (B) is required to avoid and accident.

Watch Video Solution

9. The accelerator of a train can produce a uniform acceleration of $0.25ms^{-2}$ and its brake can produce a retardation of $0.5ms^{-2}$ The shortest time in which the train can travel between two stations 8 km apart is x minuts and 10 s, if it stops at both stations. The value of x is.

Watch Video Solution

10. A body starts from rest with uniform acceleration. Its velocity after 2n second is v_0. The displacement of the body in last n second is $\frac{3v_0n}{\beta}$. Determine the value of β?

Watch Video Solution

11. A stone is dropped from a height h simultaneously another stone is thrown up from the ground with such a velocity so that it can reach a height of 4h. The time when two stones cross each other is $\sqrt{\left(\frac{h}{kg}\right)}$ where $k = \_\_\_\_\_$

Watch Video Solution

12. A particle moves along x-axis satisfying the equation $x = [t(- 1)(t - 2)]$ (t is in seconds and x is in meters). Find the magnitude of initial velocity of the particle in m/s.

Watch Video Solution

13. The position vertor of a particle varies with time as $\bar{r} = \overline{r_0 t}(1 - \alpha t)$ where $\bar{r}_0$ is a contant vector and α is a positive constant. The distance travelled by particle in a time interval in which particle returns to its initial position is $\frac{K r_0}{16\alpha}$. Determine the value of K?

Watch Video Solution

Single Answer Question

1. A stone is thrown vertically upwards with an initial speed u from the top of a tower, reaches the ground with a speed $3u$. The height of the tower is :

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

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

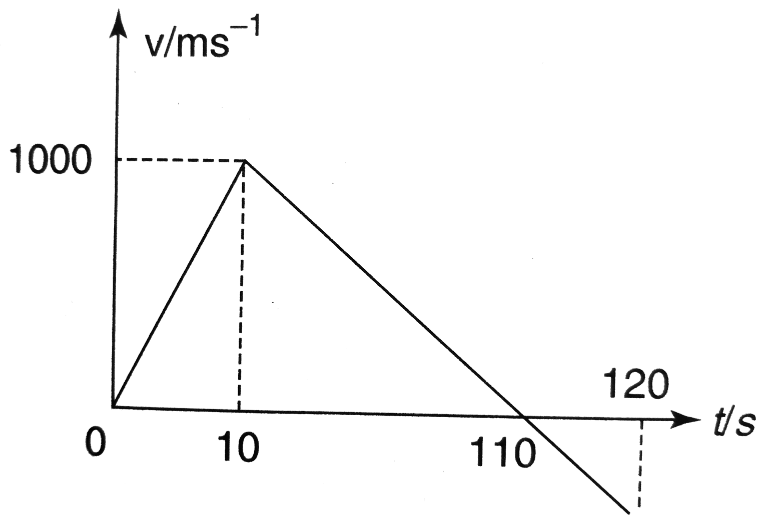
C. $\frac{4v^2}{g}$

D. $\frac{8v^2}{g}$

Answer: C

Watch Video Solution

2. The graph shown the variation of velocity of a rocket with time. Then, the maximum height attained by the rocket is.



A. 1.1 km

B. 5 km

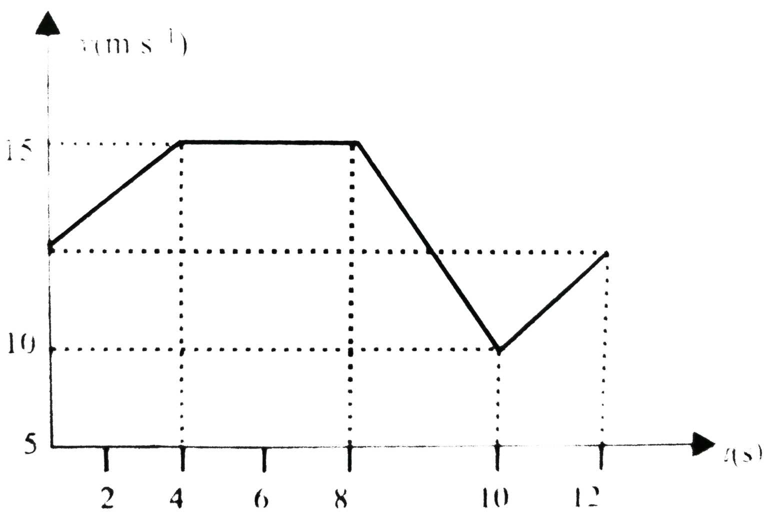
C. 55 km

D. none

Answer: C

Watch Video Solution

3. The velocity-time graph of a particle moving in a straight line is shown in the diagram. The acceleration of the particle at $t = 9s$ is.



A. zero

B. ms^{-2}

C. $-5ms^{-2}$

D. $-2ms^{-2}$

Answer: C

Watch Video Solution

4. A ball is thrown from the top of a tower in vertically upward direction. Velocity at a point h m below the point of projection is twice of the velocity at a point h m above the point of projection. Find the maximum height reached by the ball above the top of tower.

A. 2h

B. 3h

C. $(5/3)h$

D. $(4/3)h$

Answer: C

Watch Video Solution

5. A parachutist drops first freely from a plane for $10s$ and then his parachute opens out. Now he descends with a net retardation of $2.5ms^{-2}$ If he bail out of the plane at a height of $2495m$ and $g = 10ms^{-2}$, his velocity on reaching the ground will be`.

A. $5ms^{-1}$

B. $10ms^{-1}$

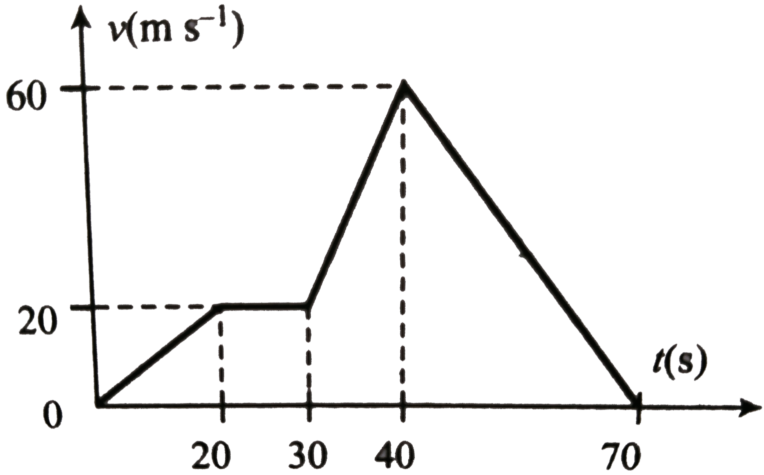
C. $15ms^{-1}$

D. $20ms^{-1}$

Answer: A

Watch Video Solution

6. The velocity-time graph of a body is given in. The maximum acceleration in ms^{-2} is .



A. 4

B. 3

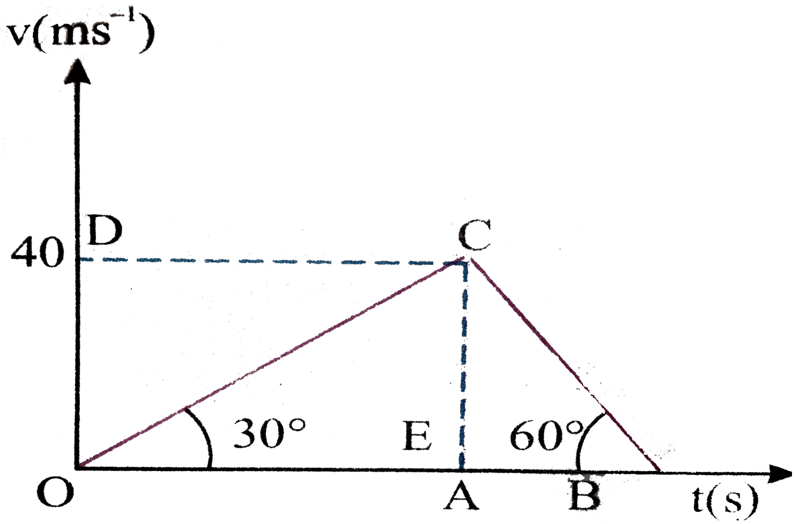
C. 2

D. 1

Answer: A

Watch Video Solution

7. The velocity-time graph of a body is shown in figure. The ratio of magnitude of average acceleration during the intervals OA and AB is



A. 1

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

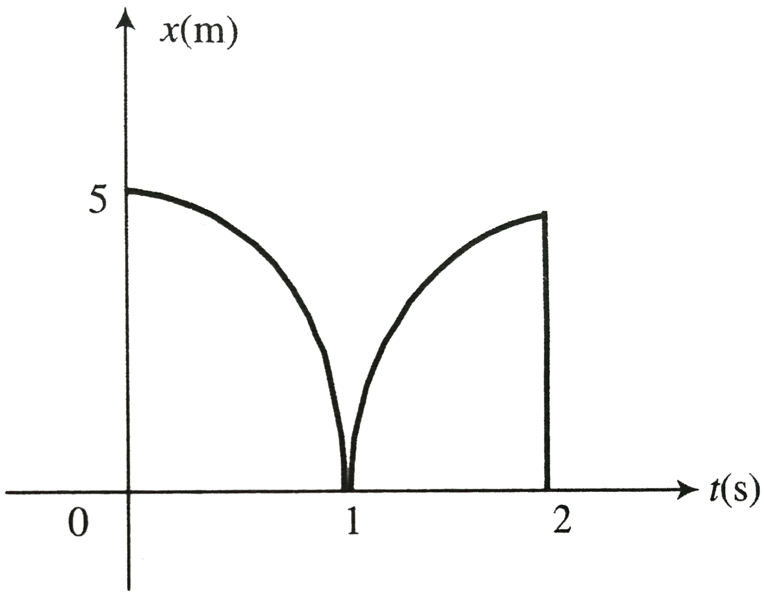
C. $\frac{1}{3}$

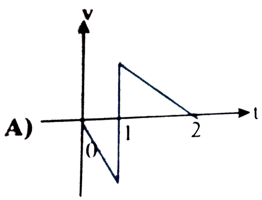
D. 3

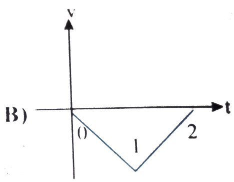
Answer: C

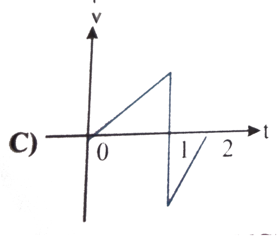
Watch Video Solution

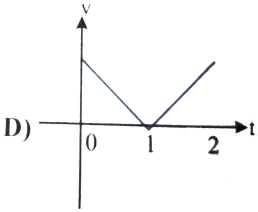
8. The displacement-time graph of a moving particle with constant acceleration is shown in. The velocity-time is given by



A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

Comprehension Question

1. An elevator car whose floor to ceiling distance is equal to $2.7m$ starts ascending with constant acceleration $1.2m/s^2$, 2 sec after the start a bolt begins falling from the ceiling of the car. Answer the following question $(g = 9.8m/s^2$

The bolt's free falls time

A. 0.3 s

B. 0.5 s

C. 0.7 s

D. 0.9 s

Answer: C

Watch Video Solution

2. An elevator car whose floor to ceiling distance is equal to $2.7m$ starts ascending with constant acceleration $1.2m/s^2$, 2 sec after the start a bolt begins falling from the ceiling of the car. Answer the following question $(g = 9.8m/s^2$

The velocity of bolt at instant it loses contact is

A. $1.2m/s$

B. $2.4m/s$

C. $4m/s$

D. $10m/s$

Answer: B

Watch Video Solution

3. An elevator car whose floor to ceiling distance is equal to $2.7m$ starts ascendiung with constant acceleration $1.2\frac{m}{s^2}$, 2 sec after the start a bolt begins falling from the ceiling of the car. Answer the following question $g = 9.8m/s^2$

Distance moved by elevator car w.r.t. ground frame during the free fall time of the bolt.

A. 1.44 m

B. 1.63m

C. 1.68m

D. 1.97m

Answer: D

Watch Video Solution

4. An elevator car whose floor to ceiling distance is equal to $2.7m$ starts ascendiung with constant acceleration $1.2\frac{m}{s^2}$, 2 sec after the start a bolt begins falling from the ceiling of the car. Answer the following question $g = 9.8m/s^2$

Distance covered by the bolt during the free fall time w.r.t. ground frame.

A. 0.7 m

B. 0.9 m

C. 1.1 m

D. 1.3 m

Answer: D

Watch Video Solution

5. The displacement by the bolt during its free fall time w.r.t. ground frame

A. 0.3 m

B. 0.7 m

C. 0.9 m

D. 1 m

Answer: B

Watch Video Solution

Level 1 H.W

1. A body moves from one corner of an equilateral Delta of side 10 cm to the same corner along the sides. Then the distance and displacement are respectively.

A. 30 cm & 10 cm

B. 30 cm & 0 cm

C. 0 cm & 30 cm

D. 30 cm & 30 cm

Answer: B

Watch Video Solution

2. For a train that travels from one station to another at a uniform speed of $40kmh^{-1}$ and returns to final station at speed of $60kmh^{-1}$ then its average speed is

A. $98km/hr$

B. $0km/hr$

C. $50km/hr$

D. $48km/hr$

Answer: D

Watch Video Solution

3. If the distance between the sun and the earth is $1.5 \times 10^{11} m$ and velocity of light is $3 \times 10^{8} m / s$, then the time taken by a light ray to reach the earth from the sun is

A. 500 s

B. 500 minutes

C. 50 s

D. $5 \times 10^{3} s$

Answer: A

Watch Video Solution

4. A body is moving with velocity $30m/s$ towards east. After $10s$ its velocity becomes $40m/s$ towards north. The average acceleration of the body is.

A. $7ms^{-2}$

B. $\sqrt{7}ms^{-2}$

C. $5ms^{-2}$

D. $1ms^{-2}$

Answer: C

Watch Video Solution

5. A body starting with a velocity v returns to its initial position after t second with the same speed, along the same line. Acceleration of the particle is

A. $\frac{-2v}{t}$

B. zero

C. $\frac{v}{2t}$

D. $\frac{t}{2v}$

Answer: A

Watch Video Solution

6. A body starting from rest moving with uniform acceleration has a displacement of $16m$ in first 4 seconds and $9m$ in first 3 seconds. The acceleration of the body is :

A. $1ms^{-2}$

B. $2ms^{-2}$

C. ms^{-2}

D. $4ms^{-2}$

Answer: B

Watch Video Solution

7. A body starts from rest and moves with constant acceleration. The ratio of distance covered by the body in nth second to that covered in n second is.

A. $\left(\frac{2}{n}-\frac{1}{n^2}\right)$

B. $\left(\frac{1}{n^2}-\frac{1}{n}\right)$

C. $\left(\frac{2}{n^2}-\frac{1}{n}\right)$

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

Answer: A

Watch Video Solution

8. A scooter acquires a velocity of $36km/h$ in 10 seconds just after the start . Calculate the acceleration of the scooter.

A. $1m/s^2$

B. $2m/s^2$

C. $1/2m/s^2$

D. $3m/s^2$

Answer: A

Watch Video Solution

9. Speeds of two identical cars are u and 4u at at specific instant. The ratio of the respective distances in which the two cars are stopped from that instant is

A. $1:1$

B. $1:4$

C. $1:8$

D. $1:16$

Answer: D

Watch Video Solution

10. A car moving aling a straight highway with speed of $126kmh^{-1}$ is brought to a stop within a distance of $200m$. What is the retardation of the car (assumed uniform) ans how doest it take fro the car to stop ?

A. $3.06ms^{-2}$

B. $4ms^{-2}$

C. $5.06ms^{-2}$

D. $6ms^{-2}$

Answer: A

Watch Video Solution

11. Two balls are projected simultaneously with the same velocity u from the top of a tower, one vertically upwards and the other vertically downwards. Their respective times of the journeys are t_1 and t_2 At the time of reaching the ground, the ratio of their final velocities is

A. $1:1$

B. $1:2$

C. $2:3$

D. $2:1$

Answer: A

Watch Video Solution

12. Two bodies are projected simultaneously with the same velocity of $19.6m/s$ from the top of a tower one vertically upwards and the other vertically downwards. As they reach the ground, the time gap is

A. 0 s

B. 2 s

C. 4 s

D. 6 s

Answer: C

Watch Video Solution

13. Two bodies begin to fall freely from the same height. The second one begins to fall τ s after the first. The time after which the 2st body begins to fall, the distance between the bodies equals to l is

A. $\frac{l}{g\tau}-\frac{\tau}{2}$

B. $\frac{g\tau}{l}+\tau$

C. $\frac{\tau}{lg}+\frac{2}{\tau}$

D. $\frac{g}{l\tau}+\frac{\tau}{2}$

Answer: A

Watch Video Solution

14. A balloon is going upwards with velocity $12m/\sec$ it releases a packet when it is at a height of 65 m from the ground. How much time the packet will take to reach the ground $\left(g = 10m/\sec^2\right)$

A. 5 sec

B. 6 sec

C. 7 sec

D. 8 sec

Answer: A

Watch Video Solution

15. A body, thrown upward with some velocity reaches the maximum height of $50m$. Another body with double the mass thrown up with double the initial velocity will reach a maximum height of

A. 100 m

B. 200 m

C. 400 m

D. 50 m

Answer: B

Watch Video Solution

16. The distance moved by a freely falling body (starting from rest) during $st, 2nd, 3rd, \ldots\ldots nth$ second of its motion are proportional to .

A. $(n-1)$

B. $(2n-1)$

C. $(n^2 - 1)$

D. $(2n - 1)/n^2$

Answer: B

Watch Video Solution

17. A body is released from the top of a tower of height h. It takes t sec to reach the ground. Where will be the ball after time $\frac{t}{2}$ sec?

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

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

C. $\frac{3h}{4}$

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

Answer: C

Watch Video Solution

18. A boy standing at the top of a tower of $20m$. Height drops a stone. Assuming $g = 10ms^{-2}$ towards north. The average acceleration of the body is.

A. $20ms^{-1}$

B. $40ms^{-1}$

C. $5ms^{-1}$

D. $10ms^{-1}$

Answer: A

Watch Video Solution

19. A ball thrown vertically upwards with an initial velocity of 1.4 m/s returns in 2s. The total dispalcement of the ball is

A. 22.4 cm

B. zero

C. 44.8 m

D. 33.6 m

Answer: B

Watch Video Solution

20. A stone is dropped from a certain height which can reach the ground in $5s$. It is stopped after $3s$ of its fall and then it is again released. The total time taken by the stone to reach the ground will be .

A. 6

B. 6.5 s

C. 7 sec

D. 7.5 s

Answer: C

Watch Video Solution

21. What are the speeds of two objects if, when they move uniformly towards each other, they get 4 m closer in each second and when they move uniformly in the same direction with the original speeds, they get 4 m closer each 10 s?

A. 2.8 m/s and 12 m/s

B. 5.2 m/s and 4.6 m/s

C. 3.2 m/s and 2.1 m/s

D. 2.2 m/s and 1.8 m/s

Answer: D

Watch Video Solution

22. Two trains, each $50m$ long, are travelling in opposite directions with velocities $10ms^{-1}$ and $15ms^{-1}$. The time of their crossing each other is.

A. 8 s

B. 4 sec

C. 2 s

D. 6 s

Answer: B

Watch Video Solution

23. A ball is dropped from the top of a building 100 m high. At the same instant another ball is thrown upwards with a velocity of $40ms^{-1}$ form the bottom of the building. The two balls will meet after.

A. 5 s

B. 2.5 s

C. 2 s

D. 3 s

Answer: B

Watch Video Solution

Level 2 H.W

1. Two particles move along x-axis in the same direction with uniform velocities $8m/s$ and $4m/s$. Initially the first particle is 21 m to the left of the origin and the second one is 7 m to the right of the origin. The two particles meet from the origin at a distance of

A. 35 m

B. 32 m

C. 28 m

D. 56 m

Answer: A

Watch Video Solution

2. A moving car possesses average velocities of $5ms^{-1}$, $10ms^{-1}$ and $15ms^{-1}$ in the first, second and third seconds respectively. What is the total distance covered by the car in these three seconds ?

A. 15 m

B. 30 m

C. 55 m

D. 45 m

Answer: B

Watch Video Solution

3. The average velocity of a body moving with uniform acceleration after travelling a distance of $3.06m$ is $0.34ms^{-1}$. If the change in velocity of the body is $0.18ms^{-1}$ during this time, its uniform acceleration is .

A. 0.01

B. 0.2

C. 0.03

D. 0.04

Answer: B

Watch Video Solution

4. If a body looses half of its velocity on penetrating 3 cm in a wooden block, then how much will it penetrate more before coming to rest?

A. 1 cm

B. 2 cm

C. 3 cm

D. 4 cm

Answer: A

Watch Video Solution

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

A. 12 m

B. 18 m

C. 24 m

D. 6 m

Answer: C

Watch Video Solution

6. A particle moving with a constant acceleration describes in the last second of its motion 36% of the whole distance. If it starts from rest

how long is the particle in motion and through what distance does it moves if it describes 6 cm in the first sec.

A. 5 s, 150 cm

B. 10s, 150 cm

C. 15 s , 100 cm

D. 20 s, 200cm

Answer: A

Watch Video Solution

7. A bus starts from rest with a constant acceleration of $5m/s^2$ at the same time a car travelling with a constant velocity $50m/s$ over takes and passes the bus. How fast is the bus travelling when they are side by side?

A. $10m/s$

B. $50m/s$

C. $100m/s$

D. $150m / s$

Answer: C

Watch Video Solution

8. A particle moving with uniform retardation covers distances 18 m, 14 m and 10 m in successive seconds. It comes to rest after travelling a further distance of

A. 50 m

B. 8 m

C. 12 m

D. 42 m

Answer: B

Watch Video Solution

9. The splash of sound was heard $5.35s$ after dropping a stone into a well 122.5 m deep. Velocity of sound in air is

A. $350cm/s$

B. $350m/s$

C. $392cm/s$

D. $0cm/s$

Answer: B

Watch Video Solution

10. Two stones are thrown vertically upwards with the same velocity of $49m/s$. If they are thrown one after the other with a time lapse of 3 second, height at which they collide is

A. 58.8 m

B. 111.5 m

C. 117.6 m

D. 122.5 m

Answer: B

Watch Video Solution

11. A stone projected upwards with a velocity u reaches two points P and Q separated by a distance h with velocities $u/2$ and $u/3$. The maximum height reached by it is

A. $\frac{9h}{5}$

B. $\frac{18h}{5}$

C. $\frac{36h}{5}$

D. $\frac{72h}{5}$

Answer: C

Watch Video Solution

12. A ball is dropped from the top of a building the ball takes 0.5 s to fall past the 3 m length of a window at certain distance from the top of the building speed of the ball as it crosses the top edge of the window is $(g = 10m / s^2)$

A. $3.5ms^{-1}$

B. $8.5ms^{-1}$

C. $5ms^{-1}$

D. $12ms^{-1}$

Answer: A

Watch Video Solution

13. A body thrown vertically up with a velocity u reaches the maximum height h after T second. Correct statement among the following is

A. at a height $h / 2$ from the ground its velocity is $u / 2$

B. at a time T its velocity is u

C. at a time $2T$ its velocity is $-u$

D. at a time $2T$ its velocity is $-6u$

Answer: C

Watch Video Solution

14. A ball is projected vertically upwards with a velocity of $25ms^{-1}$ from the bottom of a tower. A boy who is standing at the top of a tower is unable to catch the ball when it passes him in the upward direction. But the ball again reaches him after 3 sec when it is falling. Now the boy catches it then the height of the tower is $(g = 10ms^{-2})$

A. 5m

B. 10 m

C. 15 m

D. 20 m

Answer: D

Watch Video Solution

15. A person sitting on the top of a tall building is dropping balls at regular intervals of one second. Find the positions of the 3rd, 4th and 5th ball when the 6th ball is being dropped.

A. 4.9 m, 19.6 m, 44.1 m

B. 4.9 m, 14.7, 24.5 m

C. 441 m, 19.6 m, 4.9 m

D. 24.5 m, 14.7 m, 4.9 m

Answer: C

Watch Video Solution

16. A stone projected vertically up from the ground reaches a height y in its path at t_1 seconds and after further t_2 seconds reaches the ground. The height y is equal to

A. $\frac{1}{2}g(t_1+t_2)$

B. $\frac{1}{2}g(t_1+t_2)^2$

C. $\frac{1}{2}gt_1t_2$

D. gt_1t_2

Answer: C

Watch Video Solution

17. A person standing on the edge of a well throws a stone vertically upwards with an initial velocity $5ms^{-1}$. The stone gone up, comes down and falls in the well making a sound. If the person hears the sound 3 seconds after throwing the the depth of water (neglect time travel for the sound and take $g=10ms^{-2}$)

A. 1.25 m

B. 21.25 m

C. 30 m

D. 32.5 m

Answer: C

Watch Video Solution

18. A ball is thrown vertically upwards with a speed of $10m/s$ from the top of a tower 200 m height and another is thrown vertically downwards with the same speed simultaneously. The time difference between them on reaching the ground is $(g = 10m/s^2)$

A. 12 s

B. 6 s

C. 2 s

D. 1 s

Answer: C

Watch Video Solution

19. A body is projected vertically upwards with a velocity u it crosses a point in its journey at a height h twice just after 1 and 7 seconds. The value of u in ms^{-1} is $\left(g = 10ms^{-2}\right)$

A. 50

B. 40

C. 30

D. 20

Answer: B

Watch Video Solution

20. A stone thrown vertically up from the ground reaches a maximum height of 50 m in 10s. Time taken by the stone to reach the ground from maximum height is

A. 5 s

B. 10 s

C. 20 s

D. 25 s

Answer: B

Watch Video Solution

21. A freely falling body travels-- of total distance in 5th second

A. $8\ \%$

B. $12\ \%$

C. $25\ \%$

D. $36\,\%$

Answer: D

Watch Video Solution

22. A body is projected upwards with a velocity u. It passes through a certain point above the ground after t_1, Find the time after which the body passes through the same point during the journey.

A. $\left(\frac{u}{g}-t_1^2\right)$

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

C. $3\left(\frac{u^2}{g}-t_1\right)$

D. $3\left(\frac{u^2}{g^2}-t_1\right)$

Answer: B

Watch Video Solution

23. A boy throws a ball in air in such a manner that when the ball is at its maximum height he throws another ball. If the balls are thrown with the time difference 1 second, the maximum height attained by each ball is

A. 9.8 m

B. 19.6 m

C. 4.9 m

D. 2.45 m

Answer: C

Watch Video Solution

24. Two cars are travelling in the same direction with a velocity of 60 kmph. They are separated by a distance of 5 km. A truck moving in opposite direction meets the two cars in a time interval of 3 minute. The velocity of the truck Is (in kmph).

A. 20

B. 30

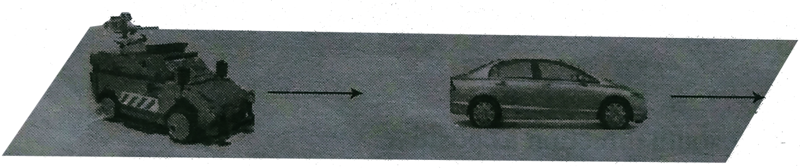
C. 40

D. 60

Answer: C

Watch Video Solution

25. A police van moving on a highway with a speed of $30kmh^{-1}$ Fires a bullet at a thief's car speeding away in a same direction with a speed of $192kmh^{-1}$. If the muzzle speed of the buller is $150ms^{-1}$, with what speed does the bullet hit thief's car? .



A. $25m/s$

B. $50m/s$

C. $75m/s$

D. $105m/s$

Answer: D

Watch Video Solution

26. Two cars are moving in the same direction with the same speed $30km/hr$. They are separated by a distance of $5km$, the speed of a car moving in the opposite direction of it meets these two cars at an interval of 4 minutes, will be.

A. 60 kmph

B. 5 kmph

C. 30 kmph

D. 45 kmph

Answer: D

Watch Video Solution

27. A body is projected upwards with a velocity u. It passes through a certain point above the ground after t_1, Find the time after which the body passes through the same point during the journey.

A. $\left(\frac{u}{g} - t_1^2\right)$

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

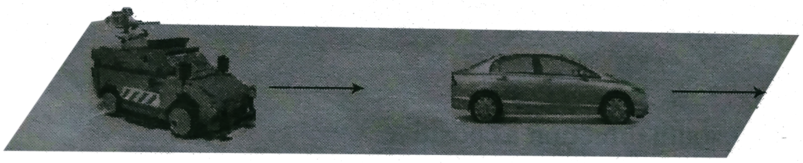
C. $3\left(\frac{u^2}{g} - t_1\right)$

D. $3\left(\frac{u^2}{g^2} - t_1\right)$

Answer: B

Watch Video Solution

28. A police van moving on a highway with a speed of $30kmh^{-1}$ Fires a bullet at a thief's car speeding away in a same direction with a speed of $192kmh^{-1}$. If the muzzle speed of the buller is $150ms^{-1}$, with what speed does the bullet hit thief's car? .



A. $25m/s$

B. $50m/s$

C. $75m/s$

D. $105m/s$

Answer: D

Watch Video Solution

29. Two cars are moving in the same direction with the same speed $30km/hr$. They are separated by a distance of $5km$, the speed of a car moving in the opposite direction of it meets these two cars at an interval of 4 minutes, will be.

A. 60 kmph

B. 5 kmph

C. 30 kmph

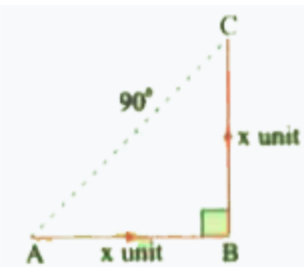
D. 45 kmph

Answer: D

Watch Video Solution

Illustration

1. A person moves on a track ABC as shown in figure $(\angle B = 90^\circ)$. Find distance and magnitude of displacement.



Watch Video Solution

2. A person moves on a circular track of radius R = 10 m in anticlockwise sense, along ACB such that $\angle AOB = 120^\circ$. Find distance traversed and magnitude of displacement.

Watch Video Solution

3. For a man who walks 720 m at a uniform speed of 2m/s, then runs at a uniform speed of 4 m/s for 5 minute and then again walks at a speed of 1 m/s for 3 minutes. His average velocity

Watch Video Solution

4. A particle is at $x =_5 m$ at $t = 0, x = -7m$ at $t = 6s$ and $x = +2m$ at $t = 10s$, find the average velocity of the particle during the interval (a) $t = 0$ to $t = 6s$, (b) $t = 6s$ to $t = 10s$, (c) $t = 0$ to $t = 10s$

Watch Video Solution

5. A particle traversed on third of the distance with a velocity v_0, the remaining part of the distance was covered with velocity v_1 for half the time and with a velocity v_2 for the remaining half of time. Assuming motion to be rectilinear, find the the mean velocity of the particle averaged over the whole time of motion.

Watch Video Solution

6. Two trains, each travelling with a speed of $37.5 kmh^{-1}$ are approaching each other on the same straight track. A bird that can fly at $60 kmh^{-1}$ flies off from one train when they are 90 km apart and heads directly for the other train. On reaching the other train, it flies back to the first and so on. total distance covered by the bird before trains collide is

Watch Video Solution

7. On a two - lane road, car A is travelling with a speed of 36 kmph. Two cars B and C approach car A in opposite direction with a speed of 54 kmph each. At a certain instant, when the distance AB is equal to AC both being 1 km, B decides to overtake A before C does. What minimum acceleration of car B is required to avoid an accident ?

Watch Video Solution

8. A particle has an initial velocity $3\hat{i} + 4\hat{j}$ and an accleration of $0.4\hat{i} + 0.3\hat{j}$. Its speed after 10s is

Watch Video Solution

9. A body covers 100 cm in first 2 seconds and 128 cm in the next four seconds moving with constant acceleration. Find the velocity of the body at the end of 8 sec?

Watch Video Solution

10. A car starts from rest and moves with uniform acceleration a, At the same instant from the same point a bike crosses with a uniform velocity u. When and there will they meet ? What is the velocity of car with respect to the bike at the time of meeting?

Watch Video Solution

11. In a car race, A takes a time of t s, less than car B at the finish and passes the finishing point with a velocity v more than car B. Assuming that the cars start from rest and travel with constant accelerations a_1 and a_2. Respectively, show that $v = \sqrt{a_1 a_2} t$.

Watch Video Solution

12. An α particle travels inside a strainght hollow tube 2m long of a particle acceleration under uniform acceleration. How long is the particle in the tube if it enters at a speed of $1000 m/s$ and leaves at $9000 m/s$. What is its acceleration during this interval?

Watch Video Solution

13. A car starts from rest and moves with uniform acceleration of 5 m/s^2 for 8 sec. If the acceleration ceases after 8 seconds then find the distance covered in 12s starting from rest.

Watch Video Solution

14. A car is moving with a velocity of $40m/s$. the driver sees a stationary truck ahead at a distance of 200 m. After some reaction time Δt the breaks are applied producing a (reaction) retardation of $8m/s^2$. What is the maximum reaction time to avoid collision ?

Watch Video Solution

15. Two trains one traveling at 54 kmph and the other at 72 kmph are headed towards one another along a straight track. When they are $1/2$ km apart, both drivers simultaneously see the other train and apply their brakes. If each train is decelerated at the rate of $1m/s^2$, will there be a collision ?

Watch Video Solution

16. A car accelerates from rest at the rate of $1m/s^2$ for 5 seconds and then retards at the same rate till it comes to rest. Draw the x-t, v-t and a-t graphs

Watch Video Solution

17. A ball is thrown vertically upwards with a speed of 9.8 m/s from the ground. Draw the x-t, v-t and a-t graph for its motion.

Watch Video Solution

18. A train travels in 3 minutes a distance of 3.15 km from rest at one station to rest at another station. It is uniformly accelerated for the 1st

30 seconds and uniformly retarded for the last 15 seconds, the speed being constant for the remaining time. Find the maximum velocity, acceleration and retardation. Use v-t graph to solve th problem.

View Text Solution

19. A car acceleration form rest at a constant rate α for some time, after which it decelerates at a constant rate β, to come to rest. If the total time elapsed is t evaluate (a) the maximum velocity attained and (b) the total distance travelled.

Watch Video Solution

20. A ball thrown up from the ground reaches a maximum height of $20m$

Find:

a. Its initial velocity.

b. The time taken to reach the highest point.

c. Its velocity just before hitting the ground.

d. Its displacement between $0.5m$ above the ground.

Watch Video Solution

21. A ballon starting from the ground has been ascending vertically at a uniform veloctiy for 4.5 sec and a stone let fall from it reaches the ground in 7 sec. Find the velocity of the ballon and its heigth when the stone was let fall.

Watch Video Solution

22. Drops of water fall at regular intervals from the roof of a building of height $h = 16m$. The first drop striking the ground at the same moment as the fifth drop is ready to leave from the roof. Find the distance between the successive drops.

Watch Video Solution

23. A body falls freely from a height of 125 m $\left(g = 10m / s^2\right)$. After 2 sec gravity ceases to act find time taken by it to reach the ground?

Watch Video Solution

24. A parachutist drops freely from an aeroplane for 10 seconds before the parachute opens out. Then he descends with a net retardation of $2m/s^2$. His velocity when he reaches the ground is $8m/s$ find the height at which he gets out of the aeroplane?

Watch Video Solution

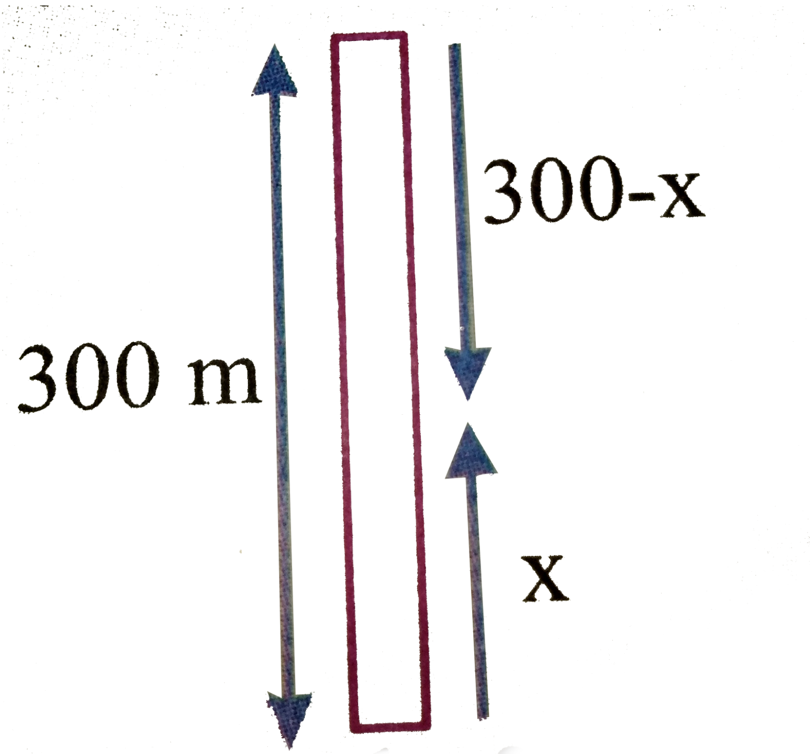
25. IF a freely falling body covers halfs of its total distance in the last second of its journey. Find its time of fall

Watch Video Solution

26. A body is projected vertically up with a velocity u. its velocity at half of its maximum height and at $3/4th$ of its maximum height are.

Watch Video Solution

27.



A stone is allowed to fall from the top of a tower 300 m height and at the same time another stone is projected vertically up from the ground with a velocity $100 m / s$. Find when and where the two stones meet?

Watch Video Solution

28. A ball is dropped from certain height above the ground. After 5s, the ball passes through a plane of glass held horizontally and

instantaneously loses 20% of its velocity. If the ball takes 2 more seconds to reach the ground the height of the glass above the ground is

Watch Video Solution

29. A ball is thrown from the top of a tower in vertically upward direction. Velocity at a point h m below the point of projection is twice of the velocity at a point h m above the point of projection. Find the maximum height reached by the ball above the top of tower.

Watch Video Solution

30. From a tower of height H, a particle is thrown vertically upwards with a speed u. The time taken by the particle, to hit the ground, is n times that taken by it to reach the highest point of its path. The relation between H, u and n is

Watch Video Solution

31. A balloon starts from rest moves vertically upwards with an acceleration $(g/8)ms^{-2}$ a stone falls from the balloon after 8 s from the start. Further time taken by the stone to reach the ground is: $(g = 9.8ms^{-2})$

Watch Video Solution

32. A passenger is standing d metres away from a bus. The bus begins to move eith constat acceleration `a. To catch the bus the passenger runs at a constant speed (v) towards the bus, at what minimum speed he must have ,so that he may catch the bus.

Watch Video Solution

33. Two trains, each travelling with a speed of $37.5kmh^{-1}$ are approaching each other on the same straight track. A bird that can fly at $60kmh^{-1}$ flies off from one train when they are 90 km apart and heads directly for the other train. On reaching the other train, it flies back to the first and so on. total distance covered by the bird before trains collide is

Watch Video Solution

34. On a two - lane road, car A is travelling with a speed of 36 kmph. Two cars B and C approach car A in opposite direction with a speed of 54 kmph each. At a certain instant, when the distance AB is equal to AC both being 1 km, B decides to overtake A before C does. What minimum acceleration of car B is required to avoid an accident ?

Watch Video Solution

EVALUATE YOUR SELF - 1

1. A man goes 10 m towards North, then 20 m towards east then displacement is

A. 22.5 m

B. 25 m

C. 25.5 m

D. 30 m

Answer: A

Watch Video Solution

2. A train has a speed of $60km/h$ for the first one hour and $40\frac{k}{h}$ for the next half hour. Its average speed in km/h is

A. 50

B. 53.33

C. 48

D. 70

Answer: B

Watch Video Solution

3. A bus travels 1st 150 km is one dimensional motion with 25 kmph, next 200 km with 50 kmph. What must its speed in last 150 km such that the net average speed for 500 km is 20 km/h

A. 10 kmph

B. 15 kmph

C. 20 kmph

D. 25 kmph

Answer: A

Watch Video Solution

4. A particle travels 1st half of its total distance with a speed V_1, next one fourth with V_2 and rest with V_3. Its average speed for entire one dimensional motion in terms of V_1, V_2 and V_3 is

A. $\dfrac{4V_1V_2V_3}{2V_1+V_2+V_3}$

B. $\dfrac{4V_1V_2V_3}{2V_2V_3+V_1V_2+V_1V_3}$

C. $\dfrac{2V_1+V_2+V_3}{4}$

D. None of these

Answer: B

Watch Video Solution

5. A particle moving in a straight line covers half the distance with speed of $3m/s$. The half of the distance is covered in two equal intervals with speed of $4.5m/s$ and $7.5m/s$ respectively. The average speed of the particle during this motion is :

A. 4.0 m/s

B. 5.0 m/s

C. 5.5 m/s

D. 4.8 m/s

Answer: A

Watch Video Solution

6. The numerical ratio of displacement to the distance covered is always

A. Always $<$ 1

B. Always = 1

C. Always $>$ 1

D. ≤ 1

Answer: D

Watch Video Solution

7. A man walks 30 m towards north, then 20 m, towards east and in the last $30\sqrt{2}$ m towards south - west. The displacement from origin is :

A. 10m towards west

B. 10 m towards east

C. $60\sqrt{2}$ m towards north west

D. $60\sqrt{2}$ m towards east north

Answer: A

Watch Video Solution

8. A man walks for some time 't' with velocity(v) due east. Then he walks for same time 't' with velocity (v) due north. The average velocity of the man is:-

A. 2v

B. $\sqrt{2}v$

C. v

D. $\frac{v}{\sqrt{2}}$

Answer: D

Watch Video Solution

9. A partical is moving along a circular path of radius $5m$ and with uniform speed $5m/s$. What will be the avarage acceleration when the partical completes half revoluation?

A. Zero

B. $10ms^{-2}$

C. $10\pi ms^{-2}$

D. $\frac{10}{\pi}ms^{-2}$

Answer: D

Watch Video Solution

10. A drunkard is walking along a straight road. He takes five steps forward and three steps backward and so on. Each step is $1m$ long and takes $1s$. There is a pit on the road $11m$, away from the starting point. The drunkard will fall into the pit after.

A. 29s

B. 21 s

C. 37 s

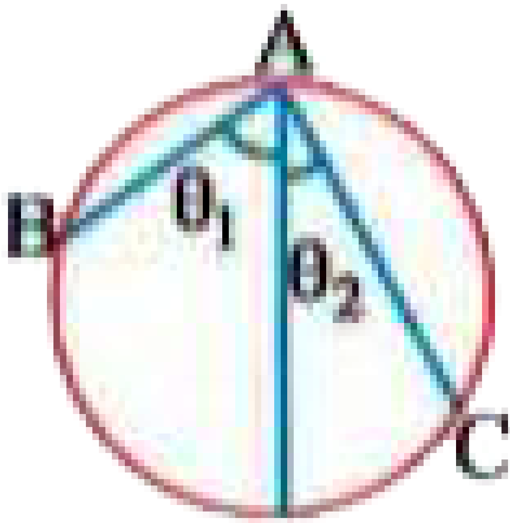
D. 31 s

Answer: A

Watch Video Solution

EVALUATE YOUR SELF - 2

1. Two beads are released from A simultaneoulsy to slide along smooth AB and AC. Find the ratio of time taken by them to reach B and C respectively



A. $2:1$

B. $3:1$

C. $1:1$

D. $4:1$

Answer: C

Watch Video Solution

2. A particle starts from rest with uniform acceleration and covers 26m in 7th second find its displacement in 9th sec

A. 38 m

B. 34 m

C. 32 m

D. 30 m

Answer: B

Watch Video Solution

3. A car moving with a speed v is stopped by applying brakes with in a distance s and time t. If it would have been travelling with Kv then by applying same breaking force it can be stopped with in

A. ks, kt

B. k^2s, k^2t

C. $k^2 s,\ kt$

D. $ks,\ k^2 t$

Answer: C

Watch Video Solution

4. A particle experience constant acceleration for 20 seconds after starting from rest. If it travels a distance s_1 in the first 10 seconds and distance s_2 in the next 10 seconds, then

A. $s_2 = s_1$

B. $2s_2 = s_1$

C. $s_2 = 3s_1$

D. $s_2 = 4s_1$

Answer: C

View Text Solution

5. If $u = 12m/s, a = -3m/s^2$ find t at which v = 0 and displacement between 2s and 5s

A. 1s, 3m

B. 2s, 1m

C. 4s, 4m

D. 4s, 4.5m

Answer: D

Watch Video Solution

6. A particle in one dimension motion has a constant retardation. It returns to the starting point after 10s. The position after 3s is equal to the position after .... Sec.

A. 2

B. 7

C. 9

D. 11

Answer: B

Watch Video Solution

7. A body starts from rest and travels a distance x with uniform acceleration, then it travels a distance 2x with uniform speed, finally it travels a distance 3x with uniform retardation and comes to rest. If the complete motion of the particle is along a straight line, then the ratio of its average velocity to maximum velocity is

A. $\frac{6}{7}$

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

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

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

Answer: C

Watch Video Solution

8. An engine of a train moving with uniform acceleration passes an electric pole with velocity 6 m/s and the last compartment with velocity 8 m/s. The middle point of the train passes the same pole with a velocity of :-

A. $\sqrt{14}$ m/s

B. 5 m/s

C. 50 m/s

D. 7 m/s

Answer: D

Watch Video Solution

9. Engine of a train that is moving with unifrom acceleration passes a pole with speed u while the last compartment passes the pole with speed 'v'. The middle point of the train passes the given pole with speed:

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

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

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

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

Answer: C

Watch Video Solution

10. A particle experiences a constant acceleration for 20 sec after starting from rest. If it travels distance S_1 in the first 10 sec and a distance S_2 in the next 10 sec, Then

A. $S_1 = S_2$

B. $S_1 = S_2/3$

C. $S_1 = S_2/2$

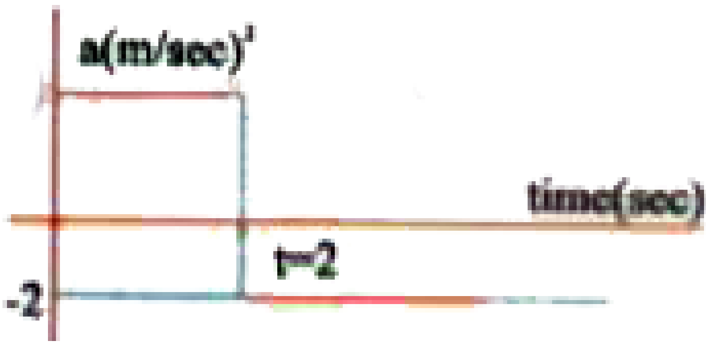
D. $S_1 = S_2/4$

Answer: B

Watch Video Solution

EVALUATE YOUR SELF - 3

1. The acceleration-time graph of a particle moving along a straight line is as shown in figure. At what time the particle acquires its initial velocity ?



A. 12 sec.

B. 6 sec.

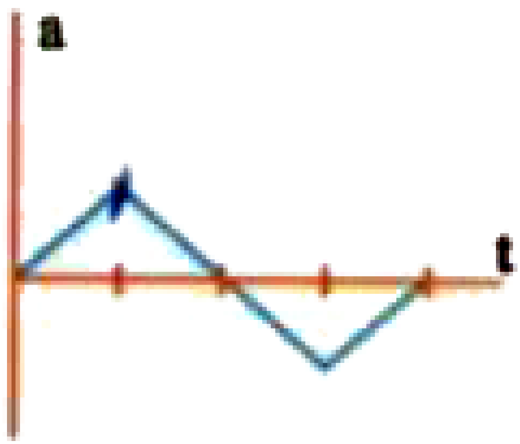
C. 8 sec.

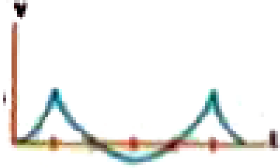
D. 16 sec.

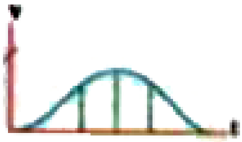
Answer: B

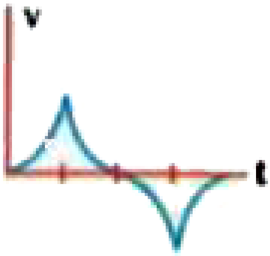
Watch Video Solution

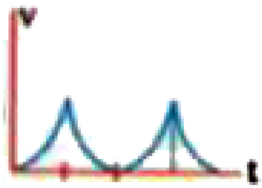
2. Which of the following v Vs t graph are correct representation for the acceleration Vs time graph shown below



A. 

B. 

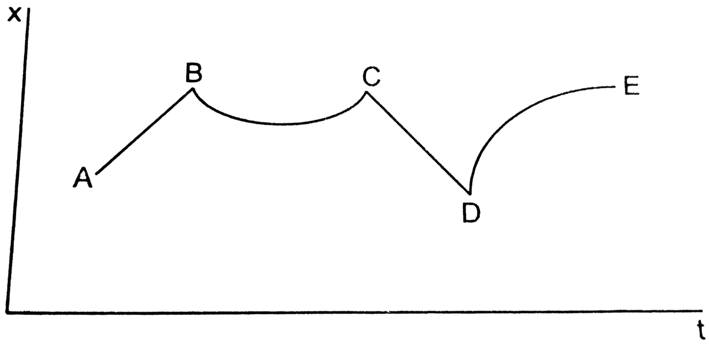
C. 

D. 

Answer: B

Watch Video Solution

3. Figure shows the displacement of a particle going along the X-axis as a function of time. The force acting on the particle is zero in the region



A. a, b

B. a, c

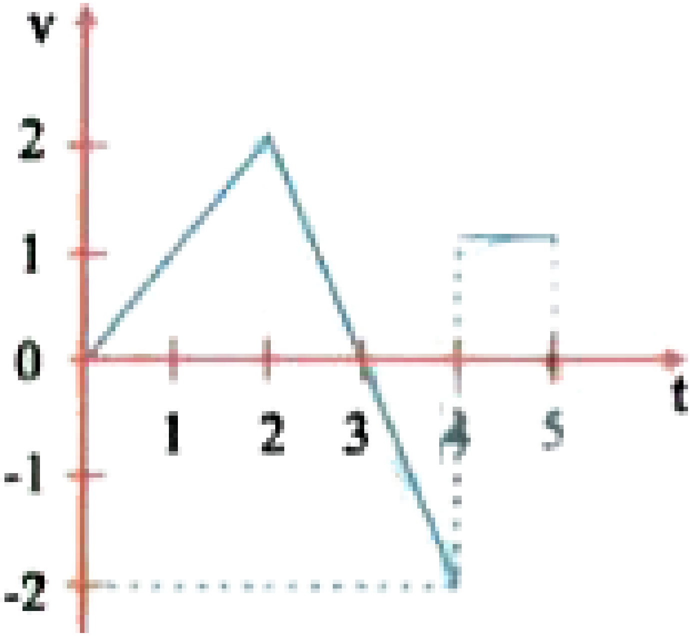
C. b, d

D. c,d

Answer: B

Watch Video Solution

4. The velocity versus time graph of a body moving along a straight line is as shown in figure. The ratio of displacement and distance covered body in 5 second is :-



A. $2:3$

B. $3:5$

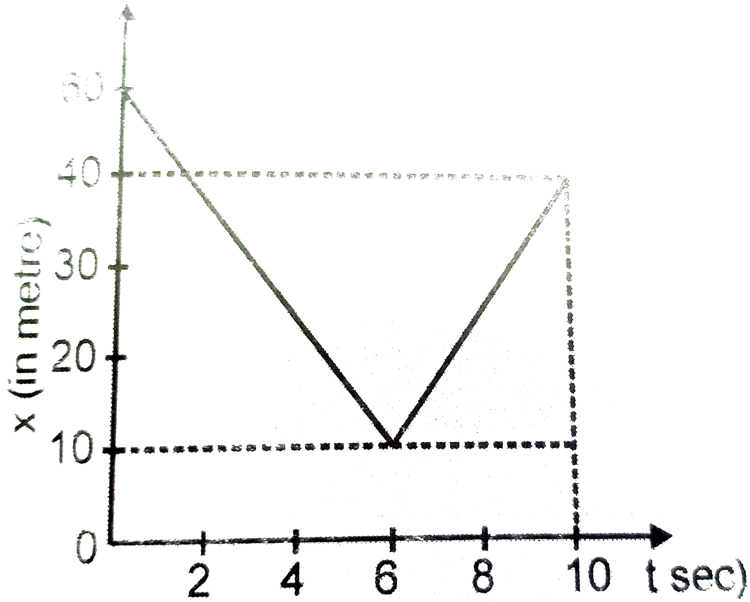
C. $1:1$

D. $1:5:5$

Answer: B

Watch Video Solution

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



A. 2 ms^{-1}

B. 4 ms^{-1}

C. 6 ms^{-1}

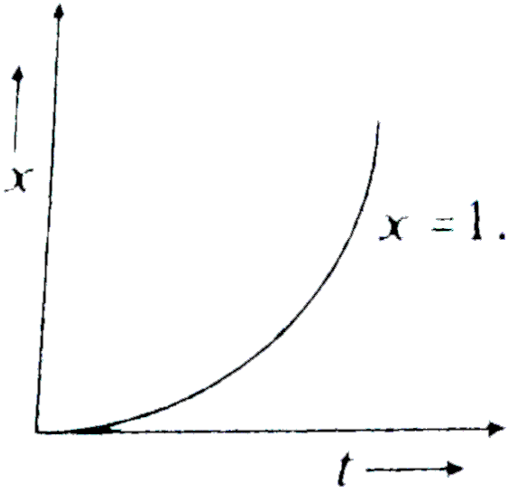
D. 8 ms^{-1}

Answer: A

Watch Video Solution

Watch Video Solution

6. Figure given shows the distance - time graph of the motion of a car. It follows from the graph that the car is



A. At rest

B. In uniform motion

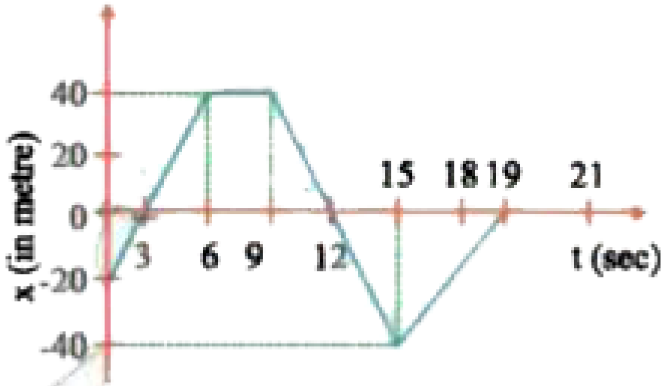
C. Retarded

D. Accelerated

Answer: D

Watch Video Solution

7. A person walks along an east-west street and a graph of his displacement from home is shown in figure. His average velocity for the whole time interval is :-



A. 1.05 ms^{-1}

B. 23 ms^{-1}

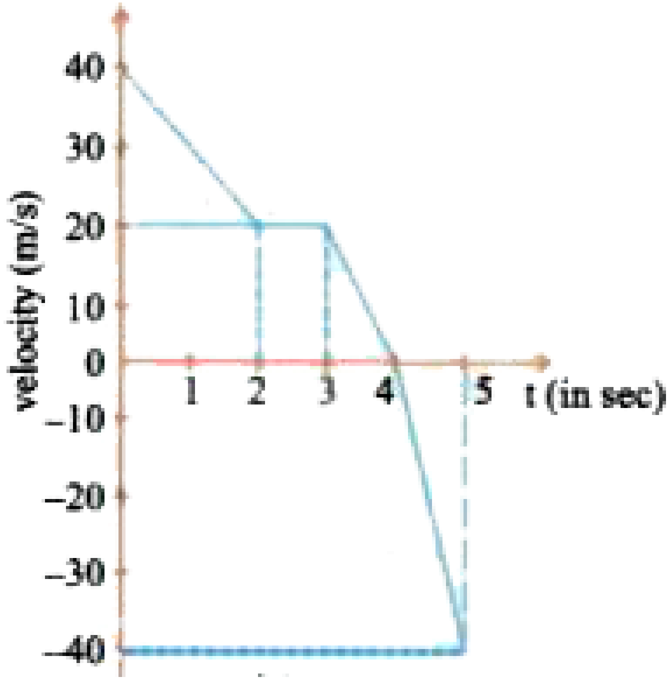
C. 8.4 ms^{-1}

D. None of above

Answer: A

Watch Video Solution

8. In the following velocity time graph of a body the distance travelled by the body and its displacement during 5 second in meter will be : -



A. 75, 75

B. 110, 70

C. 110, 110

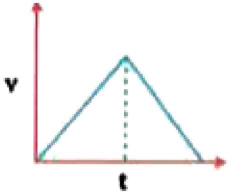
D. 110, 40

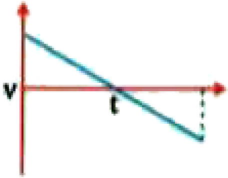
Answer: B

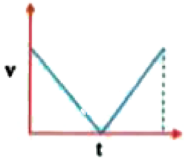
Watch Video Solution

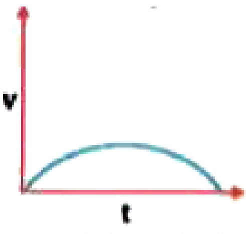
Watch Video Solution

9. A body is projected vertically upward from the surface of the earth, then the velocity-time graph is:-

A. 

B. 

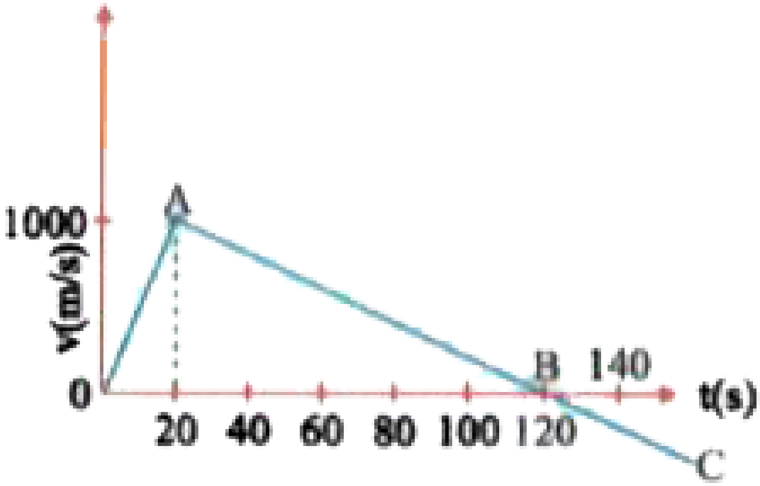
C. 

D. 

Answer: B

Watch Video Solution

10. A rocket is launched upward from the earth surface whose velocity time graph shown in figure. Then maximum height attained by the rocket is :-



A. 1 km

B. 10 km

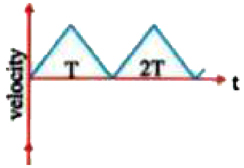
C. 20 km

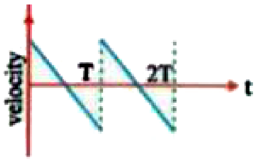
D. 60 km

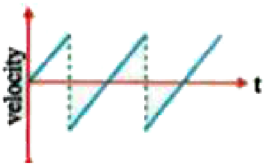
Answer: D

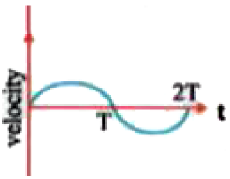
Watch Video Solution

11. A ball is dropped from the certain height on the surface of glass. It is collide elastically the comes back to initial position. If this process it repeated then velocity time graph is:-

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

EVALUATE YOUR SELF - 4

1. A ballon is ascending with a constant velocity of 20 m/s. A particle is dropped from it when its height was 60m above the ground. Find if $(g = 10m / s^2)$. The time of flight of particle

A. 4 s

B. 5s

C. 3s

D. 6s

Answer: D

Watch Video Solution

2. A person throws balls into the air one after the other at an interval ofone second. The next ball is thrown when the velocityof the ball thrown earlier is zero. To what height the ball rise:

A. 2 m

B. 5 m

C. 8 m

D. 10 m

Answer: B

Watch Video Solution

3. A stone is thrown vertically upwards with an initial speed u from the top of a tower, reaches the ground with a speed $3u$. The height of the tower is :

A. $\frac{3u^2}{g}$

B. $\frac{4u^2}{g}$

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

D. $\dfrac{9u^2}{g}$

Answer: B

Watch Video Solution

4. A stone falls from a ballon that id descending at a uniform rate of 12m/s. The displacement of the stone from the point of release after 10 sec is

A. 490 m

B. 510 m

C. 610 m

D. 725 m

Answer: C

Watch Video Solution

5. An object projected upward acquires a velocity of 9.8 ms^{-1}, when it reaches half of the maximum height, The maximum height reached is :-

A. 4.9 m

B. 7.8 m

C. 8.8 m

D. 9.8 m

Answer: D

Watch Video Solution

6. A rocket is fired vertically from the ground. It moves upwards with a constant acceleration $10m/s^2$ after 30 sec the fuel is finished. After what time from the instant of firing the rocket will attain the maximum height? $g = 10m/s^2$:-

A. 130 s

B. 45 s

C. 60 s

D. 75 s

Answer: B

Watch Video Solution

7. A body is projected upwards with a velocity u. It passes through a certain point above the ground after t_1, Find the time after which the body passes through the same point during the journey.

A. $\left(\frac{u}{g}-t_1^2\right)$

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

C. $3\left(\frac{u^2}{g}-t_1\right)$

D. $3\frac{u^2}{g^2}-t_1\Big)$

Answer: B

Watch Video Solution

8. A body is released from the top of a tower of height h. It takes t sec to reach the ground. Where will be the ball after time $\frac{t}{2}$ sec?

A. At $\frac{H}{2}$ metres from ground

B. At $\frac{H}{4}$ metres from ground

C. At $\frac{3H}{4}$ metre from the ground

D. At $\frac{H}{6}$ metres from the ground

Answer: C

Watch Video Solution

9. A body dropped from the top of tower covers a distance 9 x in the last second of its journey, where x is the distance covered in the first second. How much time does it take to reach the ground.

A. 3 s

B. 4s

C. 5s

D. 6s

Answer: B

Watch Video Solution

10. Two balls are dropped from different heights at different instants. Seconds ball is dropped 2 sec. after the first ball. If both balls reach the ground simultaneousl after 5 sec. of dropping the first ball. then the difference of initial heights of the two balls will be :- $\left(g = 9.8m / s^2\right)$

A. 58.8 m

B. 78.4 m

C. 98.0 m

D. 117. 6 m

Answer: B

Watch Video Solution

C.U.Q (DISTANCE AND DISPLACEMENT)

1. The numerical ratio of displacement to the distance covered is always

A. always less than 1

B. always greater than 1

C. always equal to 1

D. may be less than 1 or equal to one

Answer: D

Watch Video Solution

2. The location of a particle is changed. What can we say about the displacement and distance covered by the particle?

A. Both cannot be zero

B. One of the two may be zero

C. Both must be zero

D. Both must be equal

Answer: A

Watch Video Solution

3. Consider the motion of the tip of the minute hand of a clock. In one hour

(a) the displacement is zero

(b) the distance covered is zero

(c) the average speed is zero

(d) the average velocity is zero

A. a & b are correct

B. a, b & c are correct

C. a & d are correct

D. b, c & d are correct

Answer: C

View Text Solution

C.U.Q (SPEED AND VELOCITY)

1. The ratio of the numerical values of the average velocity and average speed of a body is always.

A. always less than one

B. always equal to one

C. always more than one

D. equal to or less than one.

Answer: D

Watch Video Solution

2. If a particle moves in a circle describing equal angles in equal intervals of time, then the velocity vector.

A. remains constant.

B. changes in magnitude.

C. changes in direction.

D. changes both in magnitude and direction.

Answer: C

Watch Video Solution

3. In which of the following exmples of motion, can the body be considered approxinmately a point object :

(a) a railway carriage moving without jerks between two two stations.

(b) a mondey sistting on top of a man cycling smoothly on a circulat track. (c) a spinning cricket ball that turns sharply on hitting the round .

(d) a tumbling beake theat has slopped off the edge of a table ?

A. a,b

B. b,c

C. a,c

D. b,d

Answer: A

Watch Video Solution

4. An object may have

(a). Varying speed without having varying velocity

(b). Varying velocity without having varying speed

(c). Non zero acceleration without having varying velocity

(d). Non zero acceleration without having varying speed.

A. a.b & c are correct

B. b & d are correct

C. a, b & d are correct

D. a & d are correct

Answer: B

Watch Video Solution

5. The distance travelled by a particle in a straight line motion is directly proportional to $t^{1/2}$, where t is the time elapsed.

A. Increasing acceleration

B. Decreasing acceleration

C. Increasing retardation

D. Decreasing retardation

Answer: D

Watch Video Solution

C.U.Q (ACCELERATION)

1. If a body starts from rest, the time in which it covers a particular displacement with uniform acceleration is :

A. inversely proportional to the square root of the displacement

B. inverely proportional to the displacement

C. directly proportional to the displacement

D. directly proportional to the square root of the displacement

Answer: D

Watch Video Solution

2. Check up only the correct statement in the following.

A. A body has a constant velocity and still it can have a varying speed

B. A body has a constant speed but it can have a varying velocity

C. A body having constant speed cannot have any acceleration.

D. None of these.

Answer: B

Watch Video Solution

3. When the speed of the car is v, the minimum distance over which it can be stopped is x. If the speed becomes nv, what will be the minimum distance over which it can be stopped during same time:

A. s/n

B. ns

C. s/n^2

D. $n^2 s$

Answer: D

Watch Video Solution

4. The distance covered by a moving body is directly proportional to the square to the time. The acceleration of the body is

A. increasing

B. decreasing

C. zero

D. constant

Answer: D

Watch Video Solution

5. Mark the incorrect statement for a particle going on a straight line.

A. If the velocity and acceleration have opposite sign, then the object is slowing down.

B. IF the position and velocity have opposite sign, then the particle is moving towards the origin.

C. If the velocity is zero at an instant, then the acceleration should also be zero at that instant.

D. If the velocity is zero for a time interval, then the acceleration is zero at any instant within the time interval.

Answer: C

Watch Video Solution

C.U.Q (MOTION UNDER GRAVITY)

1. B_1,B_2, and B_3, are three balloons ascending with velocities v, $2v$, and $3v$, respectively, If a bomb is dropped from each when they are at the same height, then.

A. bomb from B_1 reaches ground first

B. bomb from B_2 reaches ground first

C. bomb from B_3 reaches ground first

D. they reach the ground simultaneously

Answer: A

Watch Video Solution

2. The distance moved by a freely falling body (starting from rest) during $st, 2nd, 3rd, \ldots\ldots nth$ second of its motion are proportional to .

A. even numbers

B. odd numbers

C. all integral numbers

D. squares of integral numbers

Answer: B

Watch Video Solution

3. To reach the same height on the moon as on the earth, a body must be projected up with

A. higher velocity on the moon

B. lower velocity on the moon.

C. same velocity on the moon and earth.

D. it depends on the mass of the body.

Answer: B

Watch Video Solution

4. At the maximum height of a body thrown vertically up

A. velocity is not zero but acceleration is zero.

B. acceleration is not zero but velocity is zero.

C. both acceleration and velocity are zero.

D. both acceleration and velocity are not zero.

Answer: B

Watch Video Solution

5. A ball is dropped freely while another is thrown vertically downward with an initial velocity v from the same point simultaneously. After t second they are separated by a distance of

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

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

C. $vt + \frac{1}{2} >^2$

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

Answer: C

Watch Video Solution

6. The average velocity of a freely falling body is numerically equal to half of the acceleration due to gravity. The velocity of the body as it reaches the ground is

A. g

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

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

D. $\sqrt{2}$ g

Answer: A

Watch Video Solution

7. Two bodies of different masses are dropped simultaneously from the top of a tower. If air resistance is proportional to the mass of the body then,

A. the heavier body reaches the ground earlier.

B. the higher body reaches the ground earlier.

C. both the bodies reach the ground simultaneously.

D. cannot be decided.

Answer: C

Watch Video Solution

8. A man standing in a lift falling under gravity releases a ball from his hand. As seen by him the ball

A. falls down

B. remains stationary

C. goes up

D. executes SHM

Answer: B

Watch Video Solution

9. A particle is dropped from certain height. The time taken by it to fall through successive distance of 1 m each will be

A. all equal, being equal to $\sqrt{2/g}$ second

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

C. in the ratio of the difference in the square roots of the integers, i.e., $\sqrt{1}, (\sqrt{2}-\sqrt{21}), (\sqrt{3}-\sqrt{2}), (\sqrt{4}-\sqrt{3}), ...$

D. in the ratio of the reciprocals of the square roots of the integers, i.e., $\frac{1}{\sqrt{1}}, \frac{1}{\sqrt{2}}, \frac{1}{\sqrt{3}}, ...$

Answer: C

Watch Video Solution

10. A body, freely falling under gravity will have uniform

A. speed

B. velocity

C. momentum

D. acceleration

Answer: D

Watch Video Solution

11. A person standing near the edge of the top of a building throws two balls A and B. The ball A is thrown vertically upward and B is thrown vertically downward with the same speed. The ball A hits the ground with speed v_A and the ball B hits the ground wiht a speed v_B. We have

A. $V_A < V_B$

B. $V_A < V_B$

C. $V_A = V_B$

D. the relation between V_A and V_B depends on height of the building above the ground

Answer: C

Watch Video Solution

12. A lift is coming from $8th$ floor and is just about to reach $4th$ floor. Taking ground floor as origin and positive direction upwards for all quantities, which one of the following is correct ?

A. $x < 0, v < 0, a < 0$

B. $x > 0, v < 0, a < 0$

C. $x > 0, v < 0, a > 0$

D. $x > 0, v > 0, a < 0$

Answer: A

Watch Video Solution

13. v36.3

A. $\sqrt{gh}2)$

B. $\sqrt{\frac{gh}{2}}$

C. $\sqrt{2gh}$

D. $2\sqrt{h}$

Answer: B

Watch Video Solution

14. A body falls freely from a height 'h' after two seconds if acceleration due to gravity is reversed the body

A. Continues to fall down

B. falls down retardation & goes up again with acceleration

C. falls down with uniform velocity

D. raises up with acceleration

Answer: B

Watch Video Solution

15. In the above problem if we assume that gravity disappears instead of getting reversed, the body

A. Continues to fall down

B. falls down with acceleration

C. falls down & floats

D. falls down with decelaration

Answer: A

Watch Video Solution

16. In the case of a body freely falling from small height

A. the changes of position are equal in equal intervals of time

B. the changes of velocity are equal in unequal intervals of time

C. the changes of acceleration is zero in equal or unequal intervals of time

D. None

Answer: C

Watch Video Solution

17. A hydrogen balloon released on the moon would

A. move up with acceleration 9.8 ms^{-2}

B. move down with acceleration 9.8 ms^{-2}

C. move down with acceleration $\frac{9.8}{6} ms^{-2}$

D. neither move up nor move down

Answer: C

Watch Video Solution

18. A freely falling body travelled x m in n^{th} second. Then distance travelled in $n-1^{\text{th}}$ second is

A. x

B. x + g

C. x -g

D. 2x + 3g

Answer: C

Watch Video Solution

19. A body falls from a height 'h'. In absence of air resistance time of descent of body is

A. $\sqrt{\frac{2h}{g}}$

B. $\sqrt{\frac{2h}{g-a}}$

C. $\sqrt{\frac{2h}{g \pm a}}$

D. $\frac{h}{g}$

Answer: A

Watch Video Solution

20. A body is projected up with a velocity 50 ms^{-1} after one second if acceleration due to gravity disappears then body

A. floats in air

B. continue to move up with constant velocity

C. continue to move up with acceleration

D. goes up and falls down

Answer: B

Watch Video Solution

21. A stone is released from an elevator going up with an acceleration a. The acceleration of the stone after the release is

A. a upward

B. (g-a) upward

C. (g-a) down ward

D. g down ward

Answer: D

Watch Video Solution

22. From the top of a tower a body A is thrown up vertically with velocity u and another body B is thrown vertically down with the same velocity u. If v_A and V_B are their velocities when they reach the ground and t_A and t_B are their times of flight, then

A. $V_A = V_B$ and $t_A = t_B$

B. $V_A = V_B$ and $t_A > t_B$

C. $V_A = V_B$ and $t_A = t_B$

D. $V_A < V_B$ and $t_A < t_B$

Answer: B

Watch Video Solution

23. At the maximum height of a body thrown vertically up

A. velocity is not zero but acceleration is zero.

B. acceleration is not zero but velocity is zero.

C. both acceleration and velocity are zero.

D. both acceleration and velocity are not zero.

Answer: B

Watch Video Solution

24. A body thrown vertically up with a velocity u reaches the maximum height h after T second. Correct statement among the following is

A. At a height $\frac{h}{2}$ from the ground its velocity is $\frac{u}{2}$

B. At a time T its velocity is u

C. At a time 2T its velocity is u directed

D. none of the above

Answer: C

Watch Video Solution

25. A balloon raises up with uniform velocity 'u' A body is dropped from balloon. The time of descent for the body is given by is

A. $\sqrt{\frac{2h}{g}}$

B. $h = ut + \frac{1}{2} >^2$

C. $h = -ut + \frac{1}{2} >^2$

D. $-h = ut + \frac{1}{2} >^2$

Answer: C

Watch Video Solution

26. In the above problem if body is thrown down with velocity 'u' equation for the descent time is

A. $h = \frac{1}{2} >^2$

B. $h = ut + \frac{1}{2} >^2$

C. $-h = -ut + \frac{1}{2} >^2$

D. $-h = ut + \frac{1}{2} >^2$

Answer: B

Watch Video Solution

27. From the top of a tower two bodies are projected with the same initial speed of 40 ms^{-1}, first body vertically upwards and second body vertically downwards. A third body is freely released from the top of the tower. If their respective times of flights are T_1, T_2 and T_(3)` identify the correct descending order of the time of flights

A. T_1, T_2, T_3

B. T_2, T_3, T_1

C. T_2, T_1, T_3

D. T_1, T_3, T_2

Answer: D

Watch Video Solution

C.U.Q (GRAPHS)

1. Choose the correct statement

A. The area of displacement - time graph gives velocity.

B. The slope of velocity - time graph gives acceleration.

C. The slope of displacement - time graph gives acceleration

D. The area of velocity - time graph gives average velocity.

Answer: B

Watch Video Solution

2. Velocity-time graph of a body thrown vertically up is

A. a straight line

B. a parabola

C. a hyperbola

D. circle

Answer: A

Watch Video Solution

3. Velocity-displacement graph of a freely falling body is

A. straight line passing through the origin

B. straight line intersecting 'x' and 'y' axes

C. parabola

D. hyperbola

Answer: C

Watch Video Solution

4. Displacement-time graph of a body projected vertically up is

A. a straight line

B. a parabola

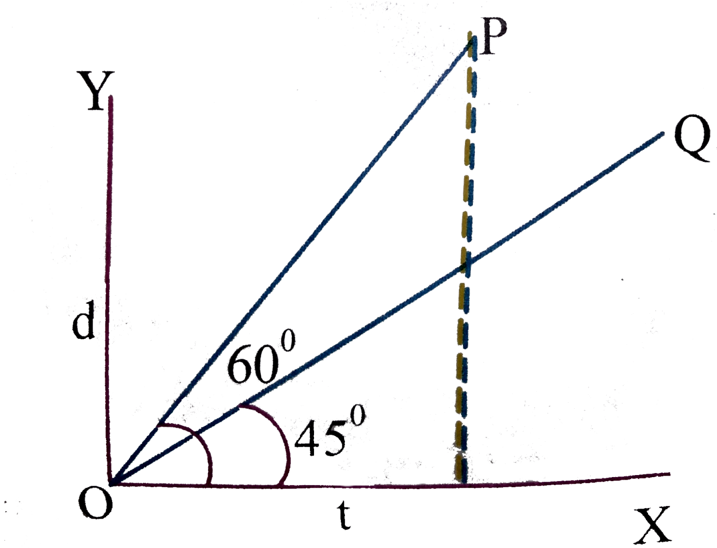
C. a hyperbola

D. a circle

Answer: B

Watch Video Solution

5.



The displacement-time graphs of two bodies A and B are OP and OQ respectively. If $\angle POX$ is 60° and $\angle QOX$ is 45° the ratio of the velocity of A to that of B is

A. $\sqrt{3} : \sqrt{2}$

B. $\sqrt{3} : 1$

C. $1 : \sqrt{3}$

D. $3 : 1$

Answer: B

Watch Video Solution

6. If the distance travelled by a particle and corresponding time be laid off along y and x axes respectively, then the correct statement of the following is

A. the curve may lie in fourth quadrant

B. the curve lies in first quadrant

C. the curve exhibits peaks corresponding to maxima

D. the curve may drop as time passes

Answer: B

Watch Video Solution

7. In relation to a velocity-time graph

A. the curve can be a circle

B. the area under the curve and above the time axis between any two instants give the average acceleration

C. the slope at any instant give the rate of change of acceleration at that instant

D. the area under the curve and above the time axis gives the displacement

Answer: D

Watch Video Solution

8. The displacment-time graph of a particle moving with respect to a reference point is a straight line

A. the reference point is stationary with zero velocity

B. the acceleration of the object is zero

C. body moves with uniform velocity

D. all the above

Answer: D

Watch Video Solution

9. For a uniform motion.

A. the velocity - time graph is a straight line parallel to time axis

B. the position - time graph is a parabola

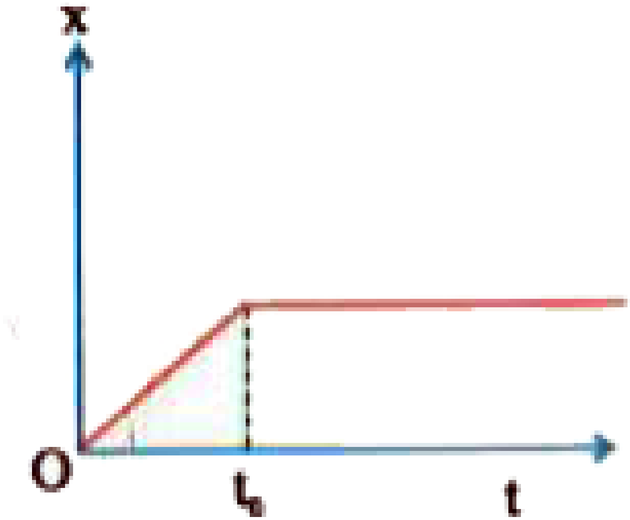
C. the acceleration - time graph is a straight line inclined with time axis

D. the position - time graph is a straight line

Answer: A

Watch Video Solution

10. Figure show the displacement - time graph of a particle moving on the x-axis



A. the particle is continuously going in positive X direction

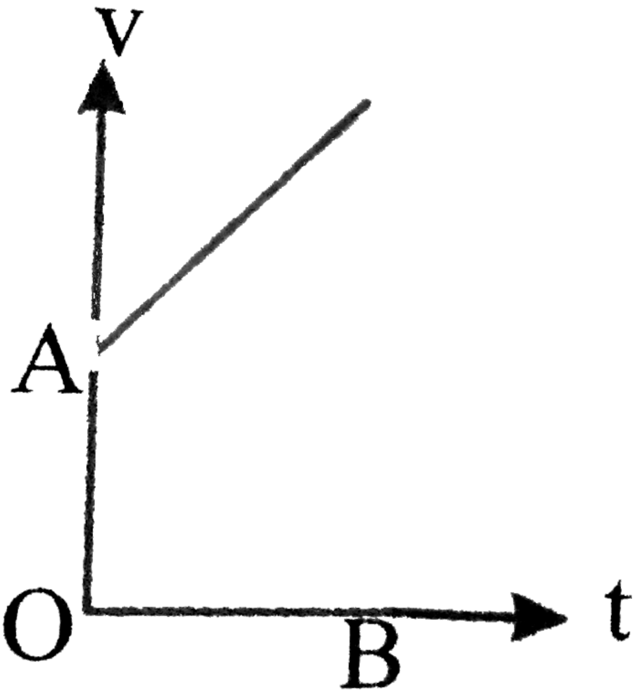
B. the particle is at rest

C. the velocity increases up to a time t_0 and then becomes constant.

D. the particle moves at constant velocity up to a time t_0 and then stops.

Answer: D

Watch Video Solution



11.

The variation of quantity A with quantity B is plotted in the fig. Describes the motion of a particle in a straight line.

(a) Quantity B may represent time.

(b) Quantity A is velocity if motion is uniform.

(c) Quantity A is displacement if motion is uniform

(d) Quantity A is velocity if motion is uniformly accelerated.

A. a, c, d

B. b, c, d

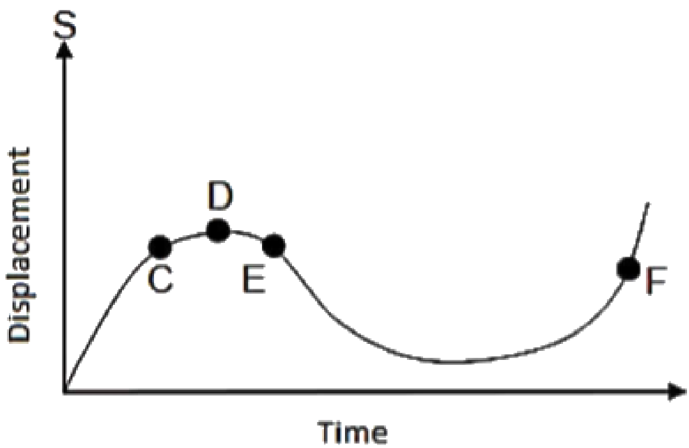
C. a,b

D. c, d

Answer: A

Watch Video Solution

12. The displacement time graph of a moving particle is shown below



The instantaneous velocity of the particle is negative at the point

A. D

B. F

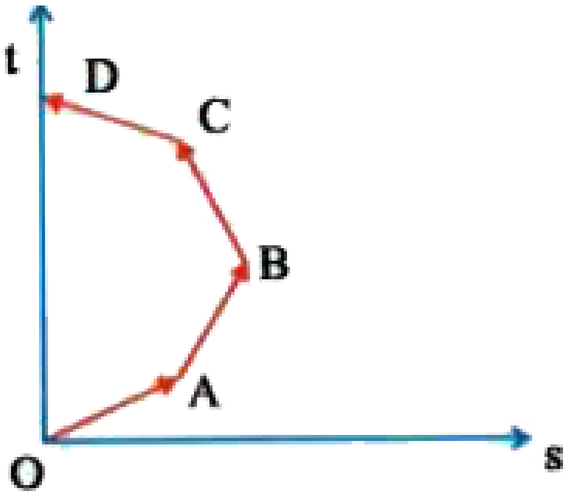
C. C

D. E

Answer: D

Watch Video Solution

13. Which of the following option is correct for havin a straight line motion represented by displacement - time graph.



A. The object moves with constantly increasing velocity from O to A then it moves with constant velocity

B. Velocity of the object increases uniformly

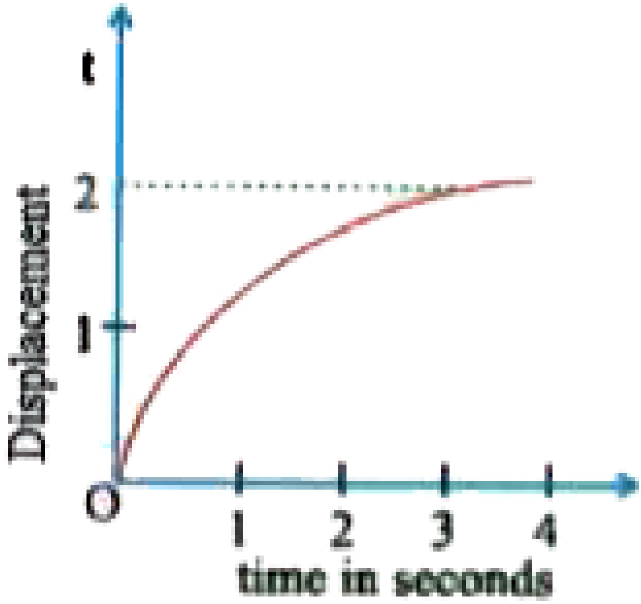
C. Average velocity is zero.

D. The graph shown is impossible.

Answer: C

View Text Solution

14. The displacement of a particle as a function of time is shown in the figure. The figure shows that



A. the particle starts with certain velocity but the motion is retarded and finally the particle stops

B. the velocity of the particle is constant through out

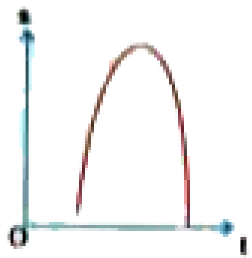
C. the acceleration of the particle is constant throughout

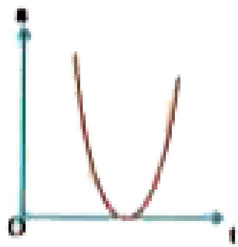
D. the particle starts with constant velocity, then motion is accelerated and finally the particle moves with another constant velocity.

Answer: A

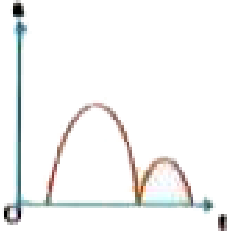
Watch Video Solution

15. A uniform moving cricket ball is turned back by hitting it with a bat for a very short time interval. Show the variation of its acceleration with time. (Take acceleration in the back ward direction as positive).

A. 

B. 

C. 

D. 

Answer: A

Watch Video Solution

16. A small body is dropped from a rising balloon. A person A stands on ground, while another person B is on the balloon. Immediately, after the body is released, Choose the correct statement :

A. A and B both feel that the body is coming (going down.

B. A and B, both feel that body is coming up.

C. A feels that the body is coming down, while B feels that the body is going up

D. A feels that the body is going up, while B feels that the body is going down.

Answer: D

Watch Video Solution

C.U.Q (RELATIVE VELOCITY)

1. Seeta is moving due east with a velocity of $V_1 m / s$ and Geeta is moving due west with velocity of $V_2 m / s$. The velocity of Seeta with respect to Geeta is

A. $v_1 + v_2$ due east

B. $v_1 - v_2$ due east

C. $v_1 - v_2$ due west

D. $v_1 + v_2$ due west

Answer: A

Watch Video Solution

EXERCISE - I - (C.W) (DISPLACEMENT AND DISTANCE)

1. A body is moving along the circumference of a circle of radius R and completes half of the revolution. Then the ratio of its displacement to distance is

A. $\pi : 2$

B. $2 : 1$

C. $2 : \pi$

D. $1 : 2$

Answer: C

Watch Video Solution

2. A body completes one round of a circle of radius R in 20 second. The displacement of the body after 45 seconds is

A. $\dfrac{R}{\sqrt{2}}$

B. $\sqrt{2}R$

C. $2\sqrt{R}$

D. $2R$

Answer: B

Watch Video Solution

EXERCISE - I - (C.W) (SPEED AND VELOCITY)

1. If a body covers first half of its journey with uniform speed v_1 and the second half of the journey with uniform speed v_2. Then the average speed is

A. $v_1 + v_2$

B. $\frac{2v_1v_2}{v_1 + v_2}$

C. $\frac{v_1v_2}{v_1 + v_2}$

D. v_1v_2

Answer: B

Watch Video Solution

2. A car is moving along a straight (OP). It moves from $O \to P$ in $18 \sec onds$ amd retuns from $P \to Q$ in 6 seconds, $where$OP=360 m and OQ=240 m What are the car the average velcoty and average speed of the car in going (a) from $O \to P$ and back to Q ?

A. $10ms^{-1}$, $20ms^{-1}$

B. $20ms^{-1}$, $10ms^{-1}$

C. $10ms^{-1}$, $10ms^{-1}$

D. $20ms^{-1}$, $20ms^{-1}$

Answer: A

Watch Video Solution

3. For body moving with uniform acceleration a, initial and final velocities in a time interval t are u and v respectively. Then its average velocity in the time interval t is

A. $(v + at)$

B. $\left(v - \frac{at}{2}\right)$

C. $(v - at)$

D. $\left(u - \frac{at}{2}\right)$

Answer: B

Watch Video Solution

EXERCISE - I - (C.W) (ACCELERATION)

1. A body moves with a velocity of $3m/s$ due east and then turns due north to travel with the same velocity. If the total time of travel is 6s. The acceleration of the body is

A. $sqrT(3)m/s^2$ towards north west

B. $\frac{1}{\sqrt{2}}m/s^2$ towards north west

C. $\sqrt{2}m/s^2$ towards north east

D. all the above

Answer: B

Watch Video Solution

2. If a body travels 30 m in an interval of 2 s and 50 m in the next interval of 2s. Then the acceleration of the body is

A. $10m/s^2$

B. $5m/s^2$

C. $20m/s^2$

D. $25m/s^2$

Answer: B

Watch Video Solution

3. A bullet travelling horizontally looses $1/20^{th}$ of its velocity while piercing a wooden plank. Then the number of such planks required to stop the bullet is

A. 6

B. 9

C. 11

D. 13

Answer: C

Watch Video Solution

4. If $S_n = 2 + 0.4n$ find initial velocity and acceleration

A. 2.2 units, 0.4 units

B. 2.1 units, 0.3 units

C. 1.2 units,0.4 units

D. 2.2 units, 0.3 units

Answer: A

Watch Video Solution

5. A particle starts moving from rest under uniformacceleration. It travels a distance x in the first two seconds anda distance of y in the next two seconds. If y = nx, then n=

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

6. 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 $100cm$, then its velocity after t seconds, in cm/s, is.

A. 20

B. 30

C. 80

D. 50

Answer: D

Watch Video Solution

7. A particle is moving with uniform acceleration along a straight line ABC. Its velocity at A and B are 6 m/s and 9 m/s respectively if $AB:BC = 5:16$ then its velocity at C is

A. 9.6 m/s

B. 12 m/s

C. 15 m/s

D. 21.5 m/s

Answer: C

Watch Video Solution

8. A car moving on a straight road accelerated from a speed of $4.1m/s$ to a speed of $6.9m/s$ in 5.0 s. Then its average acceleration is

A. 0.5 m/s^2

B. $0.6m/s^2$

C. 0.56 m/s^2

D. 0.65 m/s^2

Answer: C

Watch Video Solution

EXERCISE - I - (C.W) (MOTION UNDER GRAVITY)

1. A body projected vertically upwards with a velocity of $19.6m/s$ reaches a height of 19.8 m on earth. If it is projected vertically up with the same velocity on moon, then the maximum height reached by it is

A. 19.18 m

B. 3.3 m

C. 9.9 m

D. 118.8 m

Answer: D

Watch Video Solution

2. A ball is thrown straight upward with a speed v from a point h meter above the ground. The time taken for the ball to strike the ground is

A. $\frac{v}{g}\left[1+\sqrt{1+\frac{2hg}{v^2}}\right]$

B. $\frac{v}{g}\left[1-\sqrt{1+\frac{2hg}{v^2}}\right]$

C. $\frac{v}{g}\left[1-\sqrt{1-\frac{2hg}{v^2}}\right]$

D. $\frac{v}{g}\left[2+\sqrt{1-\frac{2hg}{v^2}}\right]$

Answer: A

Watch Video Solution

3. A ball is dropped on the floor from a height of 10m. It rebounds to a height of 2.5 m if the ball is in contact with floor for 0.01 s then the average acceleration during contact is nearly

A. $500\sqrt{2}m/s^2$ upwards

B. $1800\sqrt{2}m/s^2$ downwards

C. $1500\sqrt{2}m/s^2$ upwards

D. $1500\sqrt{2}m/s^2$ downwards

Answer: C

Watch Video Solution

4. A body falling from rest has a velocity v after it falls through a distanc.e h. The distance it has to fall down further, for its velocity to become double, is ..... times h

A. 5

B. 1

C. 2

D. 3

Answer: D

Watch Video Solution

EXERCISE - I - (C.W) (RELATIVE VELOCITY)

1. A ball A is dropped from a building of height $45m$. Simultaneously another ball B is thrown up with a speed $40m/s$. Calculate the relative speed of the balls as a function of time.

A. 20 ms^{-1}

B. 40 ms^{-1}

C. 30 ms^{-1}

D. 0 ms^{-1}

Answer: D

Watch Video Solution

2. Two cars 1 & 2 starting from rest are moving with speeds V_1 and $V_2 m/s (V_1 > V_2)$. Car 2 is ahead of car 1 by S meter when the driver of the car 1 sees car 2. What minimum retardation should be given to car 1 to avoid collision.

A. $\frac{v_1 - v_2}{s}$

B. $\frac{v_1 + v_2}{s}$

C. $\frac{(v_1 + v_2)^2}{2s}$

D. $(v_1 - v_2)^2 \frac{)}{2s}$

Answer: D

Watch Video Solution

3. Two cars are travelling towards each other on a straight road at velocities $15 m/s$ and $16 m/s$ respectively. When they are 150 m apart both the drivers apply the brakes and the car decelerate at $3 m/s^2$ and

$4m / s^2$ until they stop. Separation between the cars when they come to rest is

A. 86. 5 m

B. 89.5 m

C. 85. 5 m

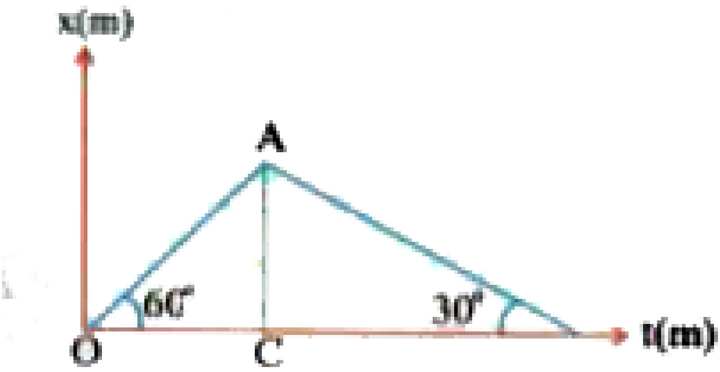
D. 80. 5 m

Answer: D

Watch Video Solution

EXERCISE - I - (C.W) (GRAPHS)

1. In displacement time graph, two straight lines make angles 60° and 30° with time axis. The ratio of mangnitudes of the velocities represented by them is



A. $1:2$

B. $1:3$

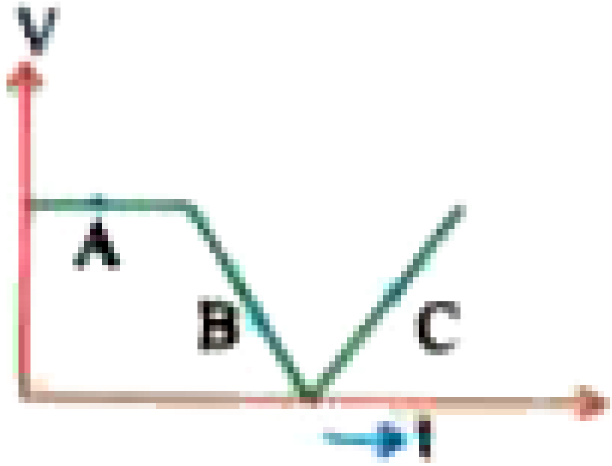
C. $2:1$

D. $3:1$

Answer: D

Watch Video Solution

2. The veloctiy - time graph of a body is shown in the fig. It implies that at point B.



A. The force is zero

B. There is a force towards motion

C. There is a force which opposes motion

D. There is only gravitational force

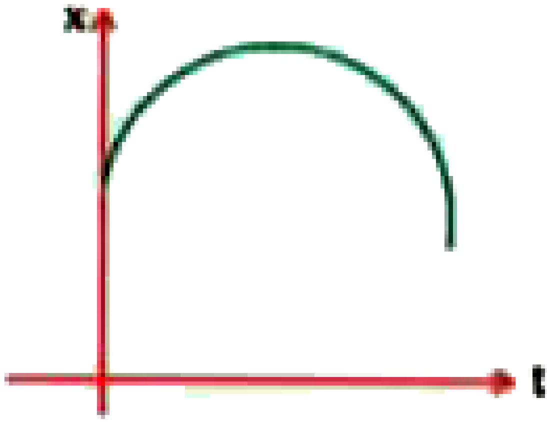
Answer: C

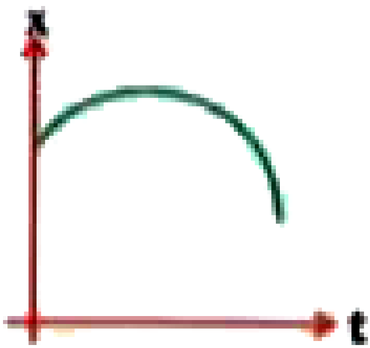
Watch Video Solution

3. The x-t curve shown in the figure provides following position

x_0 = Initial position

v_0 = initial velocity , a = acceleration





A. $x_0 \neq 0,\, v_0 > 0$, a is -ive

B. $x_0 \neq 0,\, v_0 > 0$, a is +ive

C. $x_0 \neq 0, v_0 < 0$, a is +ive

D. $x_0 \neq 0, v_0 < 0$, a is -ive

Answer: A

Watch Video Solution

EXERCISE - I - (H.W) (DISPLACEMENT AND DISTANCE)

1. A body moves from one corner of an equilateral Delta of side 10 cm to the same corner along the sides. Then the distance and displacement are respectively.

A. 30 cm & 10 cm

B. 30 cm & 0 cm

C. 0 cm & 30 cm

D. 30 cm & 30 cm.

Answer: B

Watch Video Solution

EXERCISE - I - (H.W) (SPEED AND VELOCITY)

1. For a train that travels from one station to another at a uniform speed of $40kmh^{-1}$ and returns to initial station at speed of $60kmh^{-1}$ then its average speed is

A. 98 km/hr

B. 0 km/hr

C. 50 km/hr

D. 48 km/hr

Answer: D

Watch Video Solution

2. If the distance between the sun and the earth is $1.5 \times 10^{11} m$ and velocity of light is $3 \times 10^{8} m / s$, then the time taken by a light ray to reach the earth from the sun is

A. 500 s

B. 500 minutes

C. 50 s

D. $5 \times 10^{3} s$

Answer: A

Watch Video Solution

EXERCISE - I - (H.W) (ACCELERATION)

1. A body is moving with velocity $30 m / s$ towards east. After $10 s$ its velocity becomes $40 m / s$ towards north. The average acceleration of the body is.

A. $7ms^{-2}$

B. $\sqrt{7}ms^{-2}$

C. $5ms^{-2}$

D. $1ms^{-2}$

Answer: C

Watch Video Solution

2. A body starting with a velocity v returns to its initial position after t second with the same speed, along the same line. Acceleration of the particle is

A. $\frac{-2v}{t}$

B. zero

C. $\frac{V}{2t}$

D. $\frac{t}{2v}$

Answer: A

Watch Video Solution

3. A body starting from rest moving with uniform acceleration has a displacement of $16m$ in first 4 seconds and $9m$ in first 3 seconds. The acceleration of the body is :

A. $1ms^{-1}$

B. $2ms^{-2}$

C. $3ms^{-2}$

D. $4ms^{-2}$

Answer: B

Watch Video Solution

4. A body starts from rest and moves with constant acceleration. The ratio of distance covered by the body in nth second to that covered in n second is.

A. $\left(\frac{2}{n} - \frac{1}{n^2}\right)$

B. $\left(\frac{1}{n^2} - \frac{1}{n}\right)$

C. $\left(\frac{2}{n^2} - \frac{1}{n}\right)$

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

Answer: A

Watch Video Solution

5. A bus accelerates uniformly from rest and acquires a speed of 36kmph in 10s. The acceleration is

A. $1m/s^2$

B. $2m/s^2$

C. $1/2m/s^2$

D. $3m/s^2$

Answer: A

Watch Video Solution

6. Speeds of two identical cars are u and 4u at at specific instant. The ratio of the respective distances in which the two cars are stopped from that instant is

A. $1:1$

B. $1:4$

C. $1:8$

D. $1:16$

Answer: D

Watch Video Solution

7. A car moving aling a straight highway with speed of $126 kmh^{-1}$ is brought to a stop within a distance of $200m$. What is the retardation of the car (assumed uniform) ans how doest it take fro the car to stop ?

A. $3.06 ms^{-2}$

B. $4 ms^{-2}$

C. $5.06 ms^{-2}$

D. $6 ms^{-2}$

Answer: A

Watch Video Solution

EXERCISE - I - (H.W) (MOTION UNDER GRAVITY)

1. Two balls are projected simultaneously with the same velocity u from the top of a tower, one vertically upwards and the other vertically downwards. Their respective times of the journeys are t_1 and t_2 At the time of reaching the ground, the ratio of their final velocities is

A. $1:1$

B. $1:2$

C. $2:3$

D. $2:1$

Answer: A

Watch Video Solution

2. Two bodies are projected simultaneously with the same velocity of $19.6m/s$ from the top of a tower one vertically upwards and the other vertically downwards. As they reach the ground, the time gap is

A. 0 s

B. 2 s

C. 4 s

D. 6 s

Answer: C

Watch Video Solution

3. Two bodies begin to fall freely from the same height. The second one begins to fall τ s after the first. The time after which the 2^{nd} body begins to fall, the distance between the bodies equals to l, is

A. $\dfrac{l}{g\tau}+\dfrac{\tau}{2}$

B. $\dfrac{g\tau}{l}+\tau$

C. $\dfrac{\tau}{lg}+\dfrac{2}{\tau}$

D. $\dfrac{g}{l\tau}+\dfrac{\tau}{2}$

Answer: A

Watch Video Solution

4. A balloon is going upwards with velocity $12m/\sec$ it releases a packet when it is at a height of 65 m from the ground. How much time the packet will take to reach the ground $(g = 10m/\sec^2)$

A. 5 sec

B. 6 sec

C. 7 sec

D. 8 sec

Answer: A

Watch Video Solution

5. A body, thrown upward with some velocity reaches the maximum height of $50m$. Another body with double the mass thrown up with double the initial velocity will reach a maximum height of

A. 100 m

B. 200 m

C. 400 m

D. 50 m

Answer: B

Watch Video Solution

6. The distance moved by a freely falling body (starting from rest) during $st, 2nd, 3rd, \ldots\ldots nth$ second of its motion are proportional to .

A. (n-1)

B. (2n-1)

C. $(n^2 - 1)$

D. $(2n - 1)/n^2$

Answer: B

Watch Video Solution

7. A body released from height 'h' takes time 't' to reach ground. After time t/2. Its height from the ground is

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

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

C. $\frac{3h}{4}$

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

Answer: C

Watch Video Solution

8. A boy standing at the top of a tower of 2 m height drops a stone. Assuming $g = 10ms^{-2}$, the velocity with which it hits the ground is

A. $20ms^{-1}$

B. $40ms^{-1}$

C. $5ms^{-1}$

D. $10ms^{-1}$

Answer: A

Watch Video Solution

9. A ball thrown vertically upwards with an initial velocity of 1.4 m/s returns in 2s. The total displacement of the ball is

A. 22.4 cm

B. zero

C. 44.8 m

D. 33.6 m

Answer: B

Watch Video Solution

10. A stone is dropped from a certain height which can reach the ground in $5s$. It is stopped after $3s$ of its fall and then it is again released. The total time taken by the stone to reach the ground will be .

A. 6s

B. 6.5 s

C. 7s

D. 7.5 s

Answer: C

Watch Video Solution

EXERCISE - I - (H.W) (RELATIVE VELOCITY)

1. What are the speeds of two objects if, when they move uniformly towards each other, they get 4 m closer in each second and when they move uniformly in the same direction with the original speeds, they get 4 m closer each 10 s?

A. 2.8 m/s and 12 m/s

B. 5.2 m/s and 4.6 m/s

C. 3.2 m/s and 2.1 m/s

D. 2.2 m/s and 1.8 m/s

Answer: D

Watch Video Solution

2. Two trains are each 50 m long moving parallel towards each other at speeds $10ms^{-1}$ and $15ms^{-1}$ respectively, at what time will they pass each other ?

A. 8 s

B. 4 s

C. 2 s

D. 6 s

Answer: B

Watch Video Solution

3. A ball is dropped from the top of a building 100 m high. At the same instant another ball is thrown upwards with a velocity of $40ms^{-1}$ from the bottom of the building. The two balls will meet after.

A. 5 s

B. 2.5 s

C. 2s

D. 3 s

Answer: B

Watch Video Solution

EXERCISE-II-(C.W) (DISPLACEMENT AND DISTANCE)

1. A person moves 30m north and then 20 m towards east and finally $30\sqrt{2}$m in south-west direction. The displacement of the person from the origin will be

A. 10 malong north

B. 10m along south

C. 10m along west

D. zero

Answer: C

Watch Video Solution

EXERCISE-II-(C.W) (SPEED AND VELOCITY)

1. If a car covers $\frac{2}{(5)^{th}}$ of the total distance with v_1 speed and $\frac{3}{(5)^{th}}$ distance with v_2. Then average speed is

A. $\frac{1}{2}\sqrt{v_1 v_2}$

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

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

D. $\frac{5v_1 v_2}{3v_1 + 2v_2}$

Answer: D

Watch Video Solution

2. Four particles A, B, C and D are situated at the cornerst of a square $ABCD$ of side $aatt - 0$. Each of particles moves with constant speed (v). A always has its velocity along AB, B along BC, C along $CB\sim$ and D along DA. At what time will these particles meet each other ?

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

B. $\frac{\sqrt{2}d}{v}$

C. $\frac{d}{2v}$

D. $\frac{d}{\sqrt{2}v}$

Answer: A

Watch Video Solution

3. A man walks on a straight road from his home to a market $2.5km$ away with a speed of $5km/h$. Finding the market closed, he instantly turns and walks back with a speed of $7.5km/h$. What is the (a) magnitude of average velocity and (b) average speed of the man, over the interval of time (i) 0 to 30 min `. (ii) 0 to 50 min (iii) 0 to 40 min ?

A. 0, 4

B. 0, 6

C. 0, 8

D. 0, 12

Answer: B

Watch Video Solution

EXERCISE-II-(C.W) (ACCELERATION)

1. A starts from rest and moves with acceleration a_1. Two seconds later B starts from rest and moves with an acceleration a_2. If the displacement of A in the 5^{th} second is the same as that of B in the same interval, the ratio of a_1 to a_2 is

A. $9:5$

B. $5:9$

C. $1:1$

D. $1:3$

Answer: B

Watch Video Solution

2. A body travels 200 cm in the first two seconds and 220 cm in the next 4 seconds with deceleration. the velocity of the body at the end of the 7^{th} second is

A. 20 cm/s

B. 15 cm/s

C. 10 cm/s

D. 0 cm/s

Answer: C

Watch Video Solution

3. A bullet moving at 20m/sec. It strikes a wooden plank and penetrates 4 cm before coming to stop. The time taken to stop is

A. 0.008 sec

B. 0.016 sec

C. 0.004 sec

D. 0.002 sec

Answer: C

Watch Video Solution

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

A. 20 m

B. 10 m

C. 60 m

D. 80 m

Answer: D

Watch Video Solution

5. A police party is moving in a jeep at a constant speed v. They saw a thief at a distance x on a motorcycle which is at rest. The moment the police saw the thief, the thief started at constant acceleration a. Which of the following relations is true if the police is able to catch the thief?

A. $V^2 < \alpha X$

B. $V^2 < 2\alpha X$

C. $V^2 > 2\alpha X$

D. $V^2 = \alpha X$

Answer: C

Watch Video Solution

6. Velocity of a body moving with uniform acceleration of $3m/s^2$ is changed through 30 m/s in certain time. Average velocity of body during

this time is 30 m/s. Distance covered by it during this time is

A. 300 m

B. 200 m

C. 400 m

D. 250 m

Answer: A

Watch Video Solution

7. A person is running at his maximum speed of 4 m/s to catch a train when he is 6 m from the door of the compartment, the train starts to leave the station at a constant acceleration of $1m/s^2$, find how long it takes him to catch up the train.

A. 2sec

B. 3 sec

C. 4sec

D. none

Answer: A

Watch Video Solution

8. A body is moving along the $+ve$ x-axis with uniform acceleration of $-4ms^{-2}$. Its velocity at $x=0$ is $10ms^{-1}$. The time taken by the body to reach a point at $x=12m$ is

A. (2s, 3s)

B. (3s, 4s)

C. (4s, 8s)

D. (1s, 2s)

Answer: A

Watch Video Solution

9. A train accelerating uniormly from rest attains a maximum speed of $40ms^{-1}$ in $20s$. It travels at this speed for $20s$ and is brought to rest with uniform retardation i further $40s$. What is the average velocity during this period?

A. 80/3 ms^{-1}

B. 25 ms^{-1}

C. 40 ms^{-1}

D. 30 ms^{-1}

Answer: C

Watch Video Solution

10. The ratio of the distance through which a body falls in 4th, 5th and 6th second is starting from rest

A. $7:9:11$

B. $4:5:6$

C. $5:7:9$

D. $6:8:10$

Answer: C

Watch Video Solution

11. A car acceleration from rest at a constant rate $2m/s^2$ for some time. Then, it retards at a constant rate of $4m/s^2$ and comes to rest. If it remains motion for 3 second, then the maximum speed attained by the car is:-

A. 2 m/s

B. 3 m/s

C. 4 m/s

D. 6 m/s

Answer: C

Watch Video Solution

Watch Video Solution

12. The area of the acceleration-displacement curve of a body gives

A. impulse

B. change in momentum per unit mass

C. change in KE per unit mass

D. total change is energy

Answer: C

Watch Video Solution

EXERCISE-II-(C.W) (MOTION UNDER GRAVITY)

1. A freely falling body takes t second to travel $(1/x)^{th}$ distance then time of descent is

A. $\frac{t}{\sqrt{x}}$

B. $t\sqrt{x}$

C. $\frac{\sqrt{x}}{t}$

D. $\frac{1}{t\sqrt{x}}$

Answer: B

Watch Video Solution

2. The distance travelled by a body during last second of its upward journey is d, when the body is projected with certain velocity vertically up. If the velocity of projection is doubled, the distance travelled by the body during the last second of its upward journey is

A. 2d

B. 4d

C. d/2

D. d

Answer: D

Watch Video Solution

3. A rocket is fired and ascends with constant vertical acceleration of $10m/s^2$ for 1 minute. Its fuel is exhausted and it continues as a free particle. The maximum altitude reached is $(g = 10m/s^2)$

A. 18 km

B. 36 km

C. 72 km

D. 108km

Answer: B

Watch Video Solution

4. A parachutist after bailing out falls 50m without friction. When parachute opens, it decelerates at $2m/s^2$. He reaches the ground with a speed of $3m/s$. At what height, did the bail out?

A. 91 m

B. 182 m

C. 293 m

D. 111 m

Answer: C

Watch Video Solution

5. A body thrown vertically upwards with an initial valocity u reaches maximum height in 6 s. The ratio of the distances traveled by the body in the first second the seventh second is

A. $1:1$

B. $11:1$

C. $1:2$

D. $1:11$

Answer: B

Watch Video Solution

6. A body is thrown vertically up to reach its maximum height in t seconds. The total time from the time of projection to reach a point at half of its maximum height while returning (in seconds) is

A. $\sqrt{2}t$

B. $\left(1+\frac{1}{\sqrt{2}}\right)$

C. $\frac{3t}{2}$

D. $\frac{t}{\sqrt{2}}$

Answer: B

Watch Video Solution

7. Water drops fall from a tap on to the floor 5.0 m below at regular intervals of time. The first drop strikes the floor when the fifth drops beings to fall. The height at which the third drop will be from ground at the instant when the first drop strikes the ground is (take$g = 10m^{-2}$)

A. 1.25 m

B. 2.15 m

C. 2.75 m

D. 3.75 m

Answer: D

Watch Video Solution

8. A boy throws n balls per second at regular time intervals. When the first ball reaches the maximum height, he throws the second one vertically up. The maximum height reached by each ball is

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

B. $\frac{g}{2n^2}$

C. $\frac{g}{n^2}$

D. $\frac{g}{n}$

Answer: B

Watch Video Solution

9. A body is thrown vertically upward from a point A 125 m above the ground. It goes up to a maximum height of 250 m above the ground and passes through A on its downward journey. The velocity of the body when it is at a height of 70 m above the ground is $\left(g = 10m/s^2\right)$

A. 20 m/s

B. 50 m/s

C. 60 m/s

D. 80 m/s

Answer: C

Watch Video Solution

10. A ball is released from the top of a tower of height Hm. After $2s$ is stopped and then instantaneously released. What will be its height after next $2s$?.

A. H-5

B. H-10

C. H-20

D. H-40

Answer: D

Watch Video Solution

11. A ball dropped from 9th stair of multi storied building reaches the ground in 3 sec. In the first second of its free fall, it passes through n stairs then n equal to

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

EXERCISE-II-(C.W) (RELATIVE VELOCITY)

1. Two particles P and Q simultaneously start moving from point A with velocities $15m/s$ and $20m/s$ respectively. The two particles move with acceleration equal in magnitude but opposite in direction. When P overtakes Q at point B then its velocity is $30m/s$, the velocity of Q at point B will be

A. 30 m/s

B. 5m/s

C. 10m/s

D. 15 m/s

Answer: B

Watch Video Solution

2. Two trains A and B 100 m and 60 m long are moving in opposite direction on parallel tracks. The velocity of the shorter train is 3 times that of the longer one. If the trains take 4s to cross each other, the velocities of the trains are

A. $v_A = 10ms^{-1}, v_B = 30ms^{-1}$

B. $v_A = 2.5ms^{-1}, v_B = 7.5ms^{-1}$

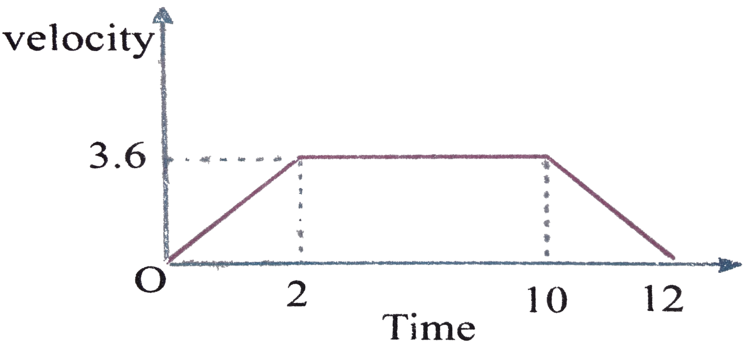
C. $v_A = 20ms^{-1}, v_B = 60ms^{-1}$

D. $v_A = 5ms^{-1}, v_B = 15ms^{-1}$

Answer: A

Watch Video Solution

EXERCISE-II-(C.W) (GRAPHS)



1.

An elevator is going up. The variation in the velocity of the elevator is as given in the graph. What is the height to which the elevator takes the passenger?

A. 3.6 m

B. 28.8 m

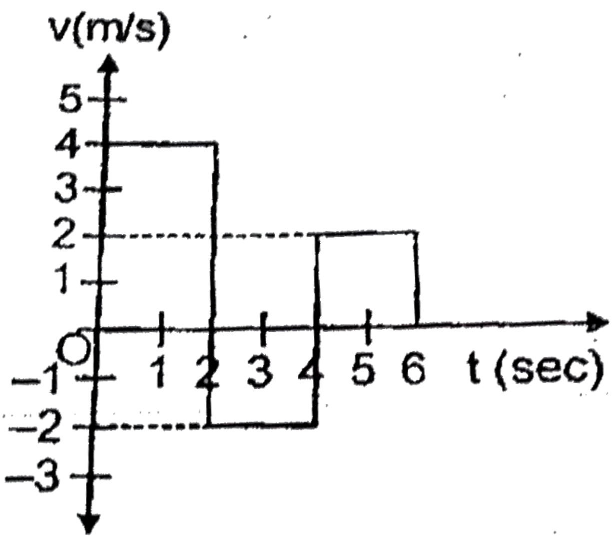
C. 36.0 m

D. 72.0 m

Answer: C

Watch Video Solution

2. The velocity-time graph of a body moving in a straight line is shown in the figure.



A. 8,16

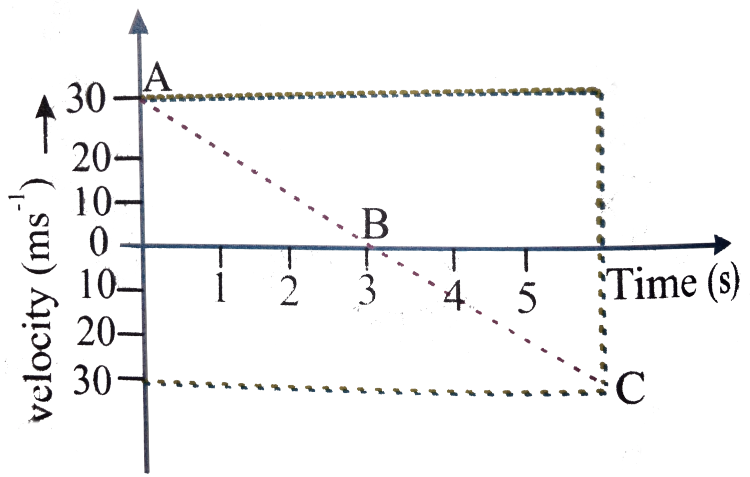
B. 16,8

C. 16,16

D. 8,8

Answer: A

Watch Video Solution

3. 

The velocity-time graph of a stone thrown vertically upward with an initial velocity of $30ms^{-1}$ is shown in the figure. The velocity in the upward direction is taken as positive and that in the downward direction as negative. What is the maximum height to which the stone rises?

A. 30 m

B. 45 m

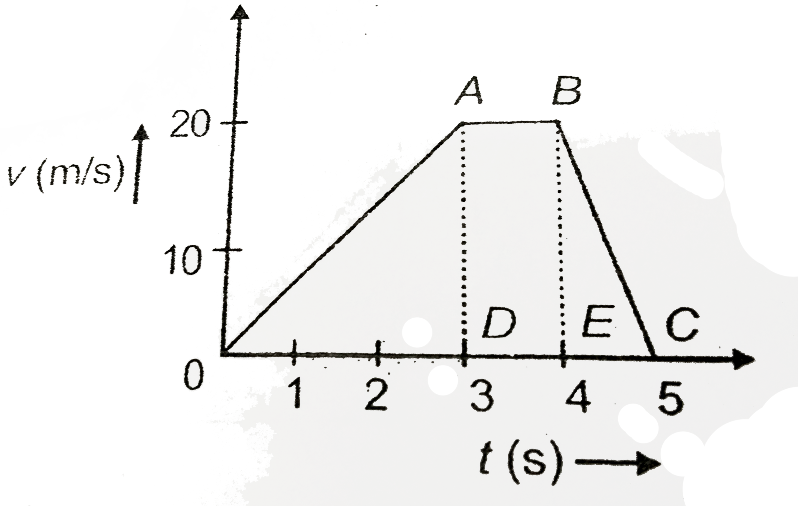
C. 60 m

D. 90 m

Answer: B

Watch Video Solution

4. The variation of velocity of a particle moving along a straight line is as shown in the figure given below. The distance travelled by the particle in 5 s is



A. 55 m

B. 30 m

C. 25 m

D. 60 m

Answer: A

Watch Video Solution

5.

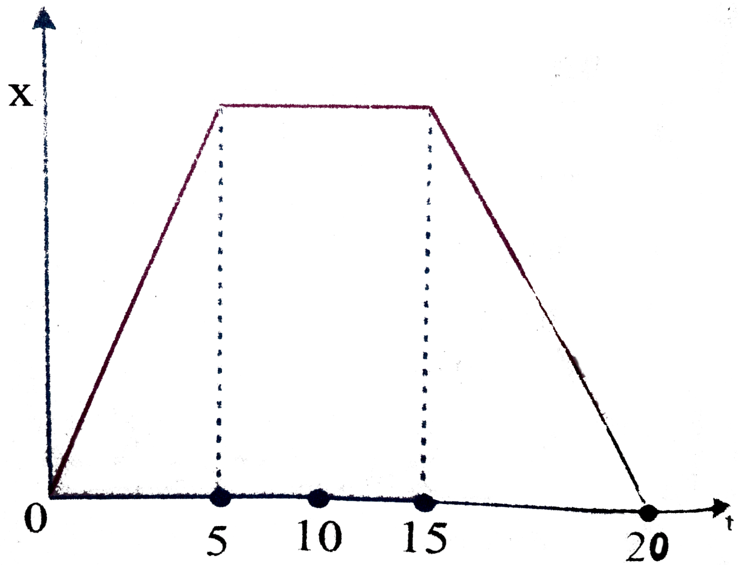
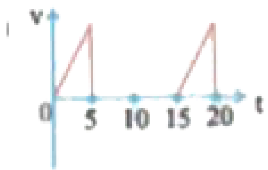
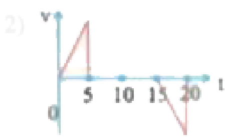


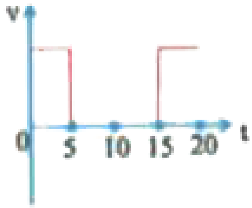
Figure shows the displacement time (x-t) graph of a body moving in a straight line which one of the graph shown in figure represents the velocity- time (v-t) graph of the motion of the body.

A.

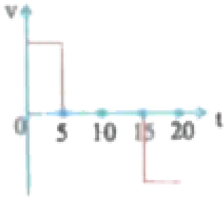


B.





C.



D.

Answer: D

Watch Video Solution

6. Velocity-time (v-t) graph for a moving object is shown in the figure. Total displacement of the object during the time interval when there is non-zero acceleration and retardation is

A. 60 m

B. 50 m

C. 30 m

D. 40 m

Answer: B

View Text Solution

EXERCISE-II-(H.W) (DISTANCE SPEED VELOCITY AND ACCELERATION)

1. The velocity v and displacement r of a body are related as $v^2 = kr$, where k is a constant. The acceleration of the body is

A. $\sqrt{kr}$

B. $kr^{3/2}$

C. k/2

D. $\sqrt{k} \times r$

Answer: C

Watch Video Solution

2. A particle located at $x = 0$ at time $t = 0$, starts moving along with the positive $x - direction$ with a velocity 'v' that varies as $v = a\sqrt{x}$. The displacement of the particle varies with time as

A. $\alpha^2 t^2$

B. $\frac{\alpha^2 t^2}{2}$

C. $\frac{\alpha^2 t^2}{4}$

D. None

Answer: C

Watch Video Solution

3. For a particle displacement time relation is $t = \sqrt{x} + 3$. Its displacement when its velocity is zero -

A. 2m

B. 4m

C. 0

D. None of these

Answer: C

Watch Video Solution

4. Two particles move along x-axis in the same direction with uniform velocities $8m/s$ and $4m/s$. Initially the first particle is 21 m to the left of the origin and the second one is 7 m to the right of the origin. The two particles meet from the origin at a distance of

A. 35 m

B. 32 m

C. 28 m

D. 56 m

Answer: A

Watch Video Solution

5. A moving car possesses average velocities of $5ms^{-1}$, $10ms^{-1}$, and $15ms^{-1}$, in the first, second, and third seconds, respectively. What is the total distance covered by the car in these $3s$.?

A. 15m

B. 30 m

C. 55m

D. 45m

Answer: B

Watch Video Solution

EXERCISE-II-(H.W) (ACCELERATION)

1. The average velocity of a body moving with uniform acceleration after travelling a distance of $3.06m$ is $0.34ms^{-1}$. If the change in velocity of the body is $0.18ms^{-1}$ during this time, its uniform acceleration is .

A. 0.01

B. 0.02

C. 0.03

D. 0.04

Answer: B

Watch Video Solution

2. If a body looses half of its velocity on penetrating 3 cm in a wooden block, then how much will it penetrate more before coming to rest?

A. 1 cm

B. 2 cm

C. 3 cm

D. 4 cm

Answer: A

Watch Video Solution

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

A. 12m

B. 18 m

C. 24 m

D. 6 m

Answer: C

Watch Video Solution

4. A particle moving with a constant acceleration describes in the last second of its motion 36% of the whole distance. If it starts from rest how long is the particle in motion and through what distance does it moves if it describes 6 cm in the first sec.

A. 5s, 150 cm

B. 10s, 150 cm

C. 15s, 100 cm

D. 20s, 200 cm

Answer: A

Watch Video Solution

5. A bus starts from rest with a constant acceleration of $5m/s^2$ at the same time a car travelling with a constant velocity $50m/s$ over takes and passes the bus. How fast is the bus travelling when they are side by side?

A. 10 m/s

B. 50 m/s

C. 100 m/s

D. 150 m/s

Answer: C

Watch Video Solution

6. A particle moving with uniform retardation covers distances 18 m, 14 m and 10 m in successive seconds. It comes to rest after travelling a further distance of

A. 50 m

B. 8 m

C. 12 m

D. 42 m

Answer: B

Watch Video Solution

EXERCISE-II-(H.W) (MOTION UNDER GRAVITY)

1. The splash of sound was heard $5.35s$ after dropping a stone into a well 122.5 m deep. Velocity of sound in air is

A. 350 cm/s

B. 350 m/s

C. 392 cm/s

D. 0 cm/s

Answer: B

Watch Video Solution

2. Two stones are thrown vertically upwards with the same velocity of $49m/s$. If they are thrown one after the other with a time lapse of 3 second, height at which they collide is

A. 58.8 m

B. 111.5 m

C. 117.6

D. 122.5 m

Answer: B

Watch Video Solution

3. A stone projected upwards with a velocity u reaches two points P and Q separated by a distance h with velocities $u/2$ and $u/3$. The maximum height reached by it is

A. $\frac{9h}{5}$

B. $\frac{18h}{5}$

C. $\frac{36h}{5}$

D. $\frac{72h}{5}$

Answer: C

Watch Video Solution

4. A ball is dropped from the top of a building the ball takes 0.5 s to fall past the 3 m length of a window at certain distance from the top of the building. Speed of the ball as it crosses the top edge of the window is $(g = 10m/s^2)$

A. 3.5 ms^{-1}

B. 8.5 ms^{-1}

C. 5 ms^{-1}

D. 12 ms^{-1}

Answer: A

Watch Video Solution

5. A body thrown vertically up with a velocity u reaches the maximum height h after T second. Correct statement among the following is

A. at a height h/2 from the ground its velocity is u//2

B. at a time 'T' its velocity is 'u'

C. at a time '2T' its velocity is 'u'

D. at a time '2T' its velocity is '-6u'

Answer: C

Watch Video Solution

6. A ball is projected vertically upwards with a velocity of $25ms^{-1}$ from the bottom of a tower. A boy who is standing at the top of a tower is unable to catch the ball when it passes him in the upward direction. But the ball again reaches him after 3 sec when it is falling. Now the boy catches it then the height of the tower is $(g = 10 ms^{-2})$

A. 5 m

B. 10 m

C. 15 m

D. 20 m

Answer: D

Watch Video Solution

7. A person sitting on the top of a tall building is dropping balls at regular intervals of one second. Find the positions of the 3rd, 4th and 5th ball when the 6th ball is being dropped.

A. 4.9m, 19.6m,44.1 m

B. 4.9 m, 14.7m,24.5 m

C. 44.1 m, 19.6m, 4.9m

D. 24.5m, 14.7m, 4.9 m

Answer: C

Watch Video Solution

8. A stone projected vertically up from the ground reaches a height y in its path at t_1 seconds and after further t_2 seconds reaches the ground. The height y is equal to

A. $\frac{1}{2}g(t_1 + t_2)$

B. $\frac{1}{2}g(t_1 + t_2)^2$

C. $\frac{1}{2} >_1 t_2$

D. $>_1 t_2$

Answer: C

Watch Video Solution

9. A person standing on the edge of a well throws a stone vertically upwards with an initial velocity $5ms^{-1}$. The stone gone up, comes down and falls in the well making a sound. If the person hears the sound 3 seconds after throwing the stone. The depth of water is (neglect time travel for the sound and take $g = 10ms^{-2}$)

A. 1.25 m

B. 21.25 m

C. 30 m

D. 32.5 m

Answer: C

Watch Video Solution

10. A ball is thrown vertically upwards with a speed of $10m/s$ from the top of a tower 200 m height and another is thrown vertically downwards with the same speed simultaneously. The time difference between them on reaching the ground is $(g = 10m/s^2)$

A. 12s

B. 6s

C. 2s

D. 1s

Answer: C

Watch Video Solution

11. A body is projected vertically upwards with a velocity u. It crosses a point in its journey at a height h twice just after 1 and 7 seconds. The value of u in ms^{-1} is $(g = 10ms^{-2})$

A. 50

B. 40

C. 30

D. 20

Answer: B

Watch Video Solution

12. A stone thrown vertically up from the ground reaches a maximum height of 50 m in 10s. Time taken by the stone to reach the ground from maximum height is

A. 5s

B. 10 s

C. 20 s

D. 25 s

Answer: B

Watch Video Solution

13. A freely falling body travels __________ of total distance in 5th second

A. 0.08

B. 0.12

C. 0.25

D. 0.36

Answer: D

Watch Video Solution

14. A body is projected upwards with a velocity u. It passes through a certain point above the ground after t_1, Find the time after which the body passes through the same point during the journey.

A. $\left(\frac{u}{g} - t_2^2\right)$

B. $\left(\frac{u}{g} - t_1\right)$

C. $3\left(\frac{u^2}{g} - t_1\right)$

D. $3\left(\frac{u^2}{g} - t_1\right)$

Answer: B

Watch Video Solution

15. A boy throws a ball in air in such a manner that when the ball is at its maximum height he throws another ball. If the balls are thrown with the time difference 1 second, the maximum height attained by each ball is

A. 9.8 m

B. 19.6 m

C. 4.9 m

D. 2.45 m

Answer: C

Watch Video Solution

EXERCISE-II-(H.W) (RELATIVE VELOCITY)

1. Two cars are travelling in the same direction with a velocity of 60 kmph. They are separated by a distance of 5 km. A truck moving in opposite direction meets the two cars in a time interval of 3 minute. The velocity of the truck Is (in kmph).

A. 20

B. 30

C. 40

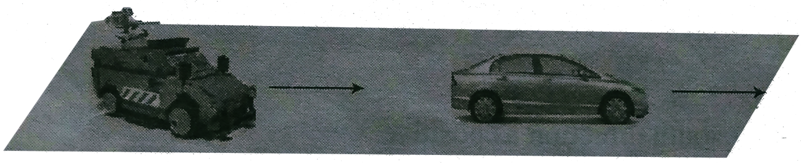
D. 60

Answer: C

Watch Video Solution

2. A police van moving on a highway with a speed of $30kmh^{-1}$ Fires a bullet at a thief's car speeding away in a same direction with a speed of

$192 kmh^{-1}$. If the muzzle speed of the buller is $150 ms^{-1}$, with what speed does the bullet hit thief's car? .



A. 25m/s

B. 50m/s

C. 75m/s

D. 105m/s

Answer: D

Watch Video Solution

3. Two cars are moving in the same direction with the same speed $30 km/hr$. They are separated by a distance of $5 km$, the speed of a car moving in the opposite direction of it meets these two cars at an interval of 4 minutes, will be.

A. 60 kmph

B. 5 kmph

C. 30 kmph

D. 45 kmph

Answer: D

Watch Video Solution

EXERCISE-II-(H.W) (GRAPHS)

1. The area of the acceleration-displacement curve of a body gives

A. impulse

B. change in momentum per unit mass

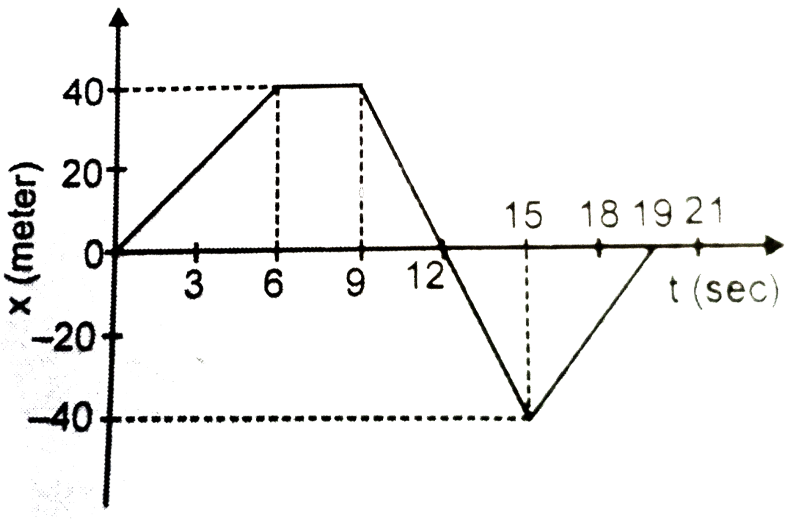
C. change in KE per unit mass

D. total change is energy

Answer: C

Watch Video Solution

2. A person walks along an east-west street and a graph of his displacement from home is shown in figure. His average velocity for the whole time interval is:-



A. $8 \text{ m } \min^{-1}$

B. $5 \text{ m } \min^{-1}$

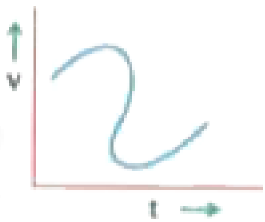
C. $\frac{8}{3} \text{ m } \min^{-1}$

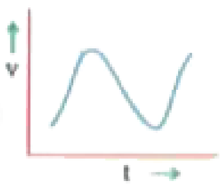
D. 2 m $\min^{-1}$

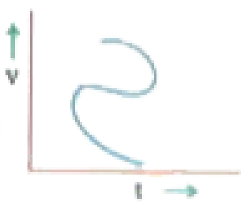
Answer: B

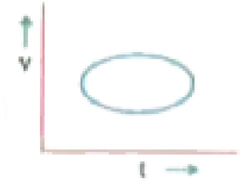
Watch Video Solution

3. Which of the following velocity-time graphs shows a realistic situation for a body in motion ?

A. 

B. 

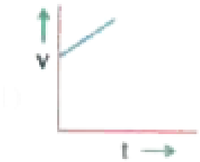
C. 

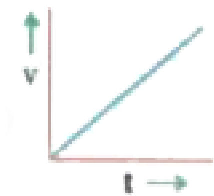
D. 

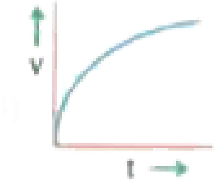
Answer: B

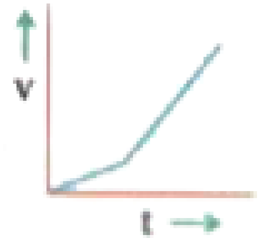
Watch Video Solution

4. A body starting from rest moves along a straight line with a constant acceleration. The variation of speed (v) with distance (s) is represented by the graph:

A. 

B. 

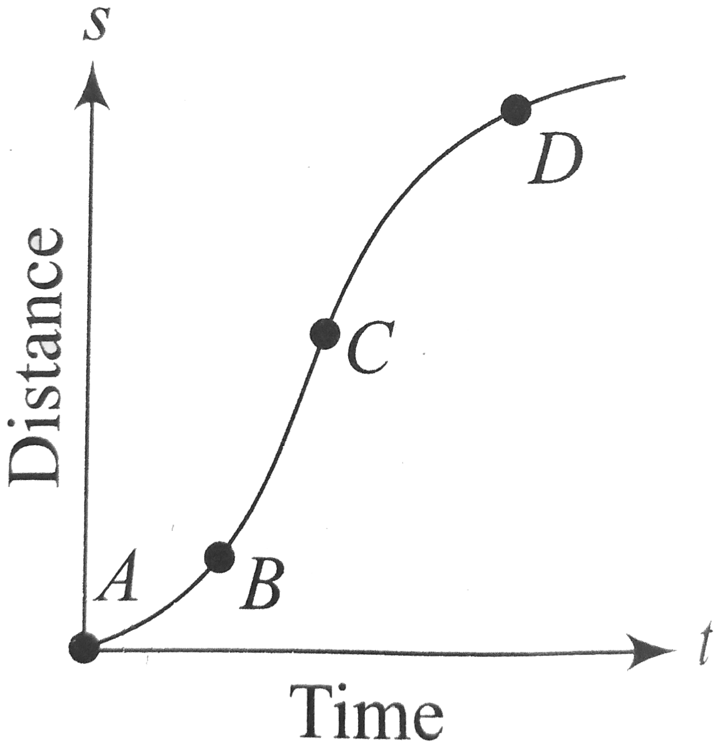
C. 

D. 

Answer: C

Watch Video Solution

5. A particle shows distance-time curve as given in this figure. The maximum instantaneous velocity of the particle is around the point.



A. B

B. C

C. D

D. A

Answer: B

Watch Video Solution

EXERCISE III

1. A particle moves along a straight line OX. At a time t (in seconds) the distance x (in metre) of the particle is given by $x = 40 + 12t - t^3$. How long would the particle travel before coming to rest ?

A. 1) 24m

B. 2) 40m

C. 3) 56m

D. 4) 16m

Answer: C

Watch Video Solution

2. Two bodies A (of mass $1kg$) and B (of mass $3kg$) are dropped from heights of $16m$ and $25m$. Respectively. The ratio of the time taken to reach the ground is :

A. 1) 5/6

B. 2) 12/5

C. 3) 5/12

D. 4) 4/5

Answer: D

Watch Video Solution

3. A car moves from X to Y with a uniform speed v_u and returns to Y with a uniform speed v_d. The average speed for this round trip is :

A. 1) $\dfrac{2V_dV_u}{V_d + V_u}$

B. 2) $\sqrt{V_uV_d}$

C. 3) $\dfrac{V_dV_u}{V_d + V_u}$

D. 4) $\dfrac{V_d + V_u}{2}$

Answer: A

Watch Video Solution

4. A particle moving along x-axis has acceleration f, at time t, given by $f = f_0\left(1 - \frac{t}{T}\right)$, where f_0 and T are constant.

The particle at $t = 0$ has zero velocity. In the time interval between $t = 0$ and the instant when $f = 0$, the particle's velocity (v_x) is :

A. 1) $f_0 T$

B. 2) $\frac{1}{2} f_0 T^2$

C. 3) $f_0 T^2$

D. 4) $\frac{1}{2} f_0 T$

Answer: D

Watch Video Solution

5. The distance travelled by a particle starting from rest and moving with an acceleration $\frac{4}{3} ms^{-2}$, in the third second is.

A. 1) 6m

B. 2) 4m

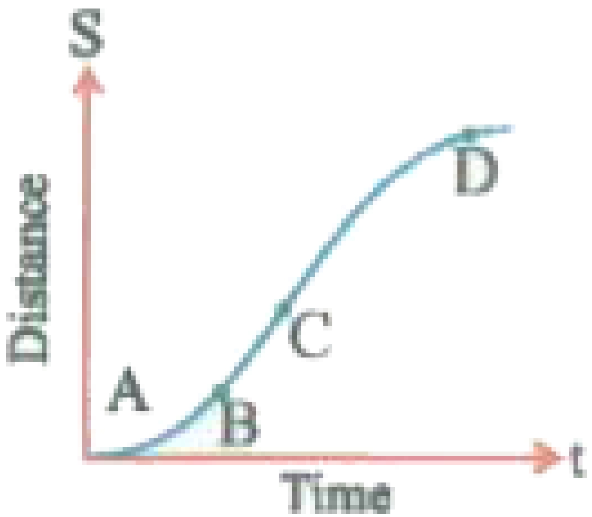
C. 3) $\frac{10}{3}m$

D. 4) $\frac{19}{3}m$

Answer: C

Watch Video Solution

6. A particle shows distance time curve as glven in this figure. The maximum instanta - neous velocity of the particle is around the point



A. 1) B

B. 2) C

C. 3) D

D. 4) A

Answer: B

Watch Video Solution

7. A particle moves in a straight line with a constant acceleration. It changes its velocity from $10ms^{-1}$ to $20ms^{-1}$ while passing through a distance $135m$ in t seconds. The value of t is.

A. 1) 10

B. 2) 1.8

C. 3) 12

D. 4) 9

Answer: D

Watch Video Solution

8. A bus is moving with a speed of $10ms^{-1}$ on a straight road. A scooterist wishes to overtake the bus in 100 s. If the bus is at a distance of 1 km from the scooteritst with what speed should the scooterist chase the bus?

A. 1) $20ms^{-1}$

B. 2) $40ms^{-1}$

C. 3) $25ms^{-1}$

D. 4) $10ms^{-1}$

Answer: A

Watch Video Solution

9. A particle starts its motion from rest under the action of a constant force. If the distance covered in first $10s$ is s_1 and the covered in the first $20s$ is s_2, then.

A. 1) $s_2 = 2s_1$

B. 2) $s_2 = 3s_1$

C. 3) $s_2 = 4s_1$

D. 4) $s_2 = s_1$

Answer: C

Watch Video Solution

10. A ball is droped from a high rise platform $t = 0$ starting from rest. After $6s$ another ball is thrown downwards from the same platform with a speed v. The two balls meet at $t = 18s$. What is the value of v ?

A. 1) $75ms^{-1}$

B. 2) $55ms^{-1}$

C. 3) $40ms^{-1}$

D. 4) $60ms^{-1}$

Answer: A

Watch Video Solution

11. A particle move a distance x in time t according to equation $x = (t+5)^{-1}$. The acceleration of particle is alphaortional to.

A. 1) $(\text{velocity})^{3/2}$

B. 2) $(\text{distance})^{2}$

C. 3) $(\text{distance})^{-2}$

D. 4) $(\text{velocity})^{2/3}$

Answer: A

Watch Video Solution

12. A body is moving with velocity $30m/s$ towards east. After $10s$ its velocity becomes $40m/s$ towards north. The average acceleration of the body is.

A. 1) $7m/s^2$

B. 2) $\sqrt{7}m/s^2$

C. 3) $5m/s^2$

D. 4) $1m/s^2$

Answer: C

Watch Video Solution

13. A particle covers half of its total distance with speed v_1 and the rest half distance with speed v_2. Its average speed during the complete journey is.

A. 1) $\dfrac{V_1V_2}{V_1+V_2}$

B. 2) $\dfrac{2V_1V_2}{V_1+V_2}$

C. 3) $\dfrac{V_1^{\ 2}V_2^{\ 2}}{V_1+V_2}$

D. 4) $\dfrac{V^1+V_2}{2}$

Answer: B

Watch Video Solution

14. The motion of a particle along a straight line is described by equation : $x = 8 + 12t - t^3$ where x is in metre and t in second. The retardation of the particle when its velocity becomes zero is.

A. 1) $12ms^{-2}$

B. 2) $24ms^{-2}$

C. 3) $Zero$

D. 4) $6ms^{-2}$

Answer: A

Watch Video Solution

15. A stone falls freely under gravity. It covered distances h_1, h_2 and h_3 in the first 5 seconds. The next 5 seconds and the next 5 seconds respectively. The relation between h_1, h_2 and h_3 is :

A. 1) $h_1 = 2h_2 = 3h_3$

B. 2) $h_1 = \frac{h_2}{3} = \frac{h_3}{5}$

C. 3) $h_2 = 3h_1 \text{ and } h_3 = 3h_2$

D. 4) $h_1 = h_2 = h_3$

Answer: B

Watch Video Solution

16. A particle of unit mass undergoes one-dimensional motion such that its velocity varies according to

$v(x) = \beta x^{-2n}$

where β and n are constant and x is the position of the particle. The acceleration of the particle as a function of x is given by.

A. 1) $-2n\beta^2 x^{-2n-1}$

B. 2) $-2n\beta^2 x^{-4n-1}$

C. 3) $-2n\beta^2 x^{-2n+1}$ 4) $-2n\beta^2 e^{-4n+1}$

D. 3) $-2n\beta^2 x^{-2n+1}$ 4) $-2n\beta^2 e^{-4n+1}$

Answer: B

Watch Video Solution

17. Two cars P and Q start from a point at the same time in a straight line and their position are represented by $x_p(t) = at + bt^2$ and $x_Q(t) = ft - t^2$. At what time do the cars have the same velocity ?

A. 1) $\dfrac{a-f}{1+b}$

B. 2) $\dfrac{a+f}{2(b-1)}$

C. 3) $\dfrac{a+f}{2(1+b)}$

D. 4) $\dfrac{f-a}{2(1+b)}$

Answer: D

Watch Video Solution

18. If the velocity of a particle is $v = At + Bt^2$, where A and B are constant, then the distance travelled by it between $1s$ and $2s$ is :

A. 1) $\dfrac{2}{3}A + \dfrac{7}{3}B$

B. 2) $\dfrac{A}{2}\dfrac{B}{3}$

C. 3) $\dfrac{3}{2}A + \dfrac{4}{B}$

D. 4) $3A + 7B$

Answer: A

Watch Video Solution

19. A particle covers 150m in 8th second starting from rest its acceleration is

A. 1) $15ms^{-2}$

B. 2) $20ms^{-2}$

C. 3) $10ms^{-2}$

D. 4) $8ms^{-2}$

Answer: B

Watch Video Solution

20. Two spheres of same size , one of mass $2kg$ and another of mass $4kg$ are dropped simultaneously from the top of a $72m$ high tower. When they are $1m$ above the ground, the two spheres have the same:

A. 1) momentum

B. 2) kinetic energy

C. 3) potential energy

D. 4) acceleration

Answer: B

Watch Video Solution

21. 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 f/ 2 to come to rest. If the total distance travelled is 15 s, then

A. 1) S=ft

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

C. 3) $S = \frac{1}{6}ft^2$

D. 4) `S=frac(1)(4)ft^(2)

Answer: C

Watch Video Solution

22. A parachutist after bailing out falls 50m without friction. When parachute opens, it decelerates at $2m/s^2$. He reaches the ground with a speed of $3m/s$. At what height, did the bail out?

A. 1) 91m

B. 2) 182 m

C. 3) 293 m

D. 4) 111 m

Answer: A

Watch Video Solution

23. The displacement of a particle starting from rest (at $t = 0$) is given by $s = 6t^2 - t^3$. The time in seconds at which the particle will attain zero velocity again, is

A. 1) 2

B. 2) 4

C. 3) 6

D. 4) 8

Answer: B

Watch Video Solution

24. A particle is thrown vertically upward. Its velocity at half of the height is 10 m/s. Then the maximum height attained by it : -

$(g = 10m/s^2)$

A. 1) 16 m

B. 2) 10 m

C. 3) 8 m

D. 4)18 m

Answer: B

Watch Video Solution

25. A man throws balls with the same speed vertically upwards one after the other at an interval of 2s. What should be the speed of the throw so that more than two balls are in the sky at any time ? (Given $g = 9.8m/s^2$)

A. 1) $(\text{Any speed less than})19.6ms^{-1}$

B. 2) $(\text{Only with speed})19.6ms^{-3}$

C. 3) $(\text{More than})19.6ms^{-4}$

D. 4) $(\text{At least})9.8ms^{-1}$

Answer: C

Watch Video Solution

EXERCISE IV

1. Two bodies of different masses m_a and m_b are dropped from two different heights, viz, a and b. The ratio of time taken by the two to drop through these distance is:

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

B. $(a^2)(b^2$

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

D. ab

Answer: C

Watch Video Solution

2. A car is moving with an intial velocity $2v_{\circ}$. It increase its velocity to $4V_{\circ}$ 't' seconds . The realation which decribes the distance covered on t seconds (consderiong uniformly accelaerated motion) is

A. $x = 3v_0t$

B. $x = 2v_0t$

C. $x = v_0t$

D. $x = \frac{V_0t}{2}$

Answer: A

Watch Video Solution

3. A car is moving with a constant accelaration of $4_{m/s^2}$. On seeing a person infront of it the driver suddenly applies a brake . IF the car is moving with a velolcity of $20_{m/s}$ at the moment when driver sees the person and the reaction time of the driver is 2s, then the distance it travels after the movement it sees the person and the just before applying the break is

A. 48m

B. 40m

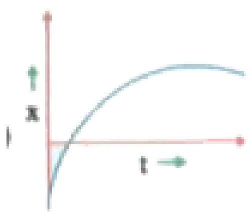
C. 8M

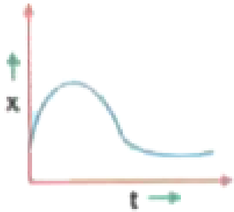
D. `45m

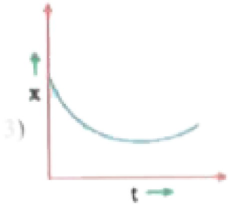
Answer: A

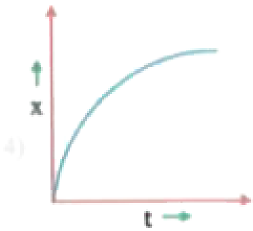
Watch Video Solution

4. Among the four graphs shown in the figure there is only one graph for which average velocity over the time interval (0,T) can vanish for a suitably chosen T. Which one is it ?

A. 

B. 

C. 

D. 

Answer: B

Watch Video Solution

5. A goods train 100 m long is moving towards north with a velocity of $10_{ms^{-1}}$ Abird also flies due north with a velocity 15 parallel to the train. The time taken by the bird to overtaken the train is

A. `10s

B. 20s

C. 4s

D. 40s

Answer: B

Watch Video Solution

6. The velocity of a moving particle is given by the equation $v = (5 - t^2)$ The average acceleration of the particle between the 2nd and 3rd seconds is

A. $-5ms^{-2}$

B. $2ma^{-2}$

C. $4ms^{-2}$

D. $-4ms^{-2}$

Answer: A

Watch Video Solution

7. A lift is coming from $8th$ floor and is just about to reach $4th$ floor. Taking ground floor as origin and positive direction upwards for all quantities, which one of the following is correct ?

A. x lt0, v lt0, agt 0

B. xgt 0, v lt0, a lt0

C. xgt 0, v lt0, agt

D. xgt 0, vgt 0, a lt 0

Answer: A

Watch Video Solution

8. The displacement y (in metre) of a body varies with time t (in seconds) as $y = -\frac{2}{3}t^2 16t + 2.$ The body comes to rest in a time

A. 8s

B. 10s

C. 12s

D. 14s

Answer: C

View Text Solution

9. A particle moves for 8s. It first accelerates from rest and then retards to rest. If the re tardation be 3 times the acceleration, then 1 time for which it accelerates will be

A. 2s

B. 3s

C. 4s

D. 6s

Answer: D

Watch Video Solution

10. Water drops fall at regular intervals from a roof. At an instant when a drop is about to leave the roof, the separations between 3 successive drops below the roof are in the ratio

A. 1:2:3

B. 1:4:9

C. 1:3:5

D. 1:5:13

Answer: B

Watch Video Solution

11. In one dimensional motion, instantaneous speed y satisfies the condition 0 3) the acceleration is always a 1 - negative number 4) the motion has no turning points

A. the displacement in time T must always take non- negative values

B. the displacement in time T satistics : $-v_0T < x < v_0T$

C. the acceleration is always a non - negative number

D. the motion has no turning points

Answer: B

View Text Solution

12. The distance travelled by a particle in a straight line motion is directly proportional to $t^{1/2}$, where t is the time elapsed.

A. increasing acceleration

B. decrease accelration

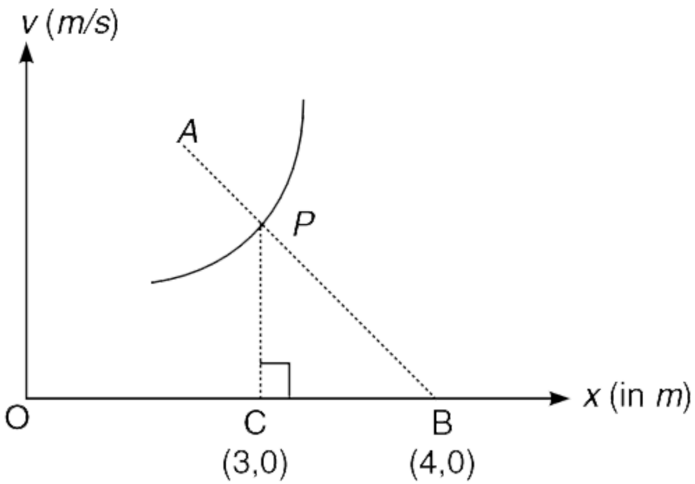
C. increasing retardation

D. decreasing reatardation

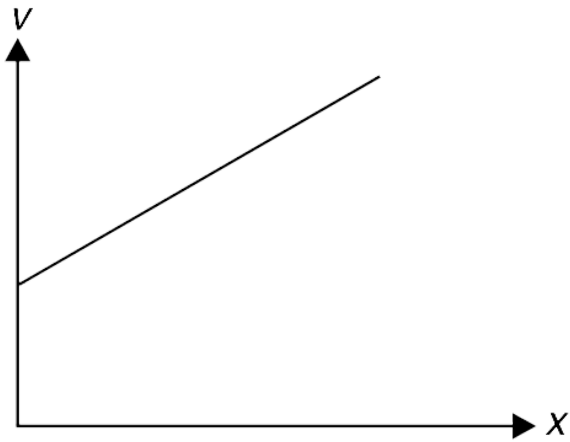
Answer: D

Watch Video Solution

13. (a) A particle is moving along the x axis and its velocity vs position graph is as shown. Is the acceleration of the particle increasing, decreasing or remains constant?



(b) A particle is moving along x axis and its velocity (v) vs position (x) graph is a curve as shown in the figure. Line APB is normal to the curve at point P. Find the instantaneous acceleration of the particle at $x = 3.0m$.



A. x - component of its velocity must be positive

B. x - component of its velocity must be negative

C. it may be speeding up

D. it may be slowing down

Answer: C

Watch Video Solution

14. At a metro station, a girl walks up a stationary escalator in time t_1 If she remains stationary on the escalator, then the escalator take her up in time t_2. The time taken by her to walk up the moving escalator will be.

A. $(t_1 + t_2)$/(2)`

B. $\dfrac{t_1 t_2}{(t_1 - t_1)}$

C. $\dfrac{t_1 t_2}{(t_1 + t_1}$

D. $t_1 - t_2$

Answer: C

Watch Video Solution

15. . An elevator, whose floor to the ceiling dis tance is 2.50m, starts ascending with a con stant acceleration of 1.25 ms - 2. One second after the start, a bolt begins falling from the ceiling of elevator. The free fall time of the bolt is $\left[gg = 10ms^{-2}\right]$

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

B. 1s

C. $\frac{2}{3}s$

D. $\frac{3}{4}s$

Answer: C

Watch Video Solution

16. B_1,B_2, and B_3, are three balloons ascending with velocities v, $2v$, and $3v$, respectively, If a bomb is dropped from each when they are at the same height, then.

A. bomb from B, reaches the ground first

B. bomb from B, reaches the ground first

C. bomb from B, reaches the ground first

D. they reach the ground simultaneously

Answer: A

Watch Video Solution

17. A tennis ballis dropped on to the floor from a height of 4m. It rebounds to a height of 2m. If the ball is in contact with the floor for 1 $2 \times 10^{-3} s$, its average acceleration during

A. 0

B. $1260 ms^{-2}$

C. $980 ms^{-2}$

D. $600 ms^{-2}$

Answer: B

View Text Solution

18. A ball of mass m is thrown upward with a velocity v. If air exerts an average resisting force F, the velocity with which the ball returns to the thrower is

A. $u\frac{\sqrt{W}}{W+F}$

B. $u\frac{\sqrt{W}}{W-F}$

C. $u\frac{\sqrt{W+F}}{W-F}$

D. $u\frac{\sqrt{W-F}}{W+F}$

Answer: D

Watch Video Solution

19. A self-propelled vehicle of mass m, whose engine delivers a constant power P, has an acceleration $a = (P/mv)$. (Assume that there is no friction). In order to increase its velocity from v_1 to v_2, the distan~e it has to travel will be:

A. $\frac{m}{3p}\left(V_2^1 - V_1^3\right)$

B. $\frac{3p}{m}\left(v_2^2 - V_1^2\right.$

C. $\frac{m}{3p}\left(V_1^2 - V_1\right)$

D. $\frac{m}{3p}\left(V_1^2 - V_1\right)$

Answer: A

Watch Video Solution

20. An electron along the x - axis has a position given by $x = 20te^{-t}m$ where t is in second. The distance of the electron from the origin when it momentarily stops, is

A. 120m

B. 20m

C. $\frac{20}{e}m$

D. zero

Answer: C

Watch Video Solution

21. A motorist droves north for 35.0 minutes at $85.0 km / h$ and then stops for 15.0 minutes. He next continues north, travelling 130 km in 2.00 hours. What is his total displacement?

A. 85km

B. 179.6km

C. 20km

D. 140km

Answer: B

Watch Video Solution

22. The coordinates of a moving particle at any time t are given by $x = \alpha t^3$ and $y = \beta t^3$. The speed of the particle at time t is given by

A. $\sqrt{\alpha}^2 + \beta^2$

B. $3t\sqrt{\alpha}^2 + \beta^2$

C. $3t^2\sqrt{\alpha}^2 + \beta^2$

D. $t^2\sqrt{\alpha}^2 + \beta^2$

Answer: C

Watch Video Solution

23. The relation between time t and distance x is $t = ax^2 + bx$ where a and b` are constants. The acceleration is

A. -2av^(3)`

B. $2av^2$

C. $-2abv^2$

D. $2bv^3$

Answer: A

Watch Video Solution

24. Two cars start in a race with velocities u_1 and u_2 and travel in a straight line with acceleration α and β. If both reach the finish line at the same time, the range of the race is

A. $\left(2\frac{u_1 - u_2}{(\beta - \alpha)^2}\right)(u_1\beta - u_2\alpha)$

B. $2\frac{u_1 - u_2}{\beta + \alpha}(u_1\alpha - u_2\beta)$

C. $2\frac{(u_1 - u_2)^2}{(\beta - \alpha)^2}\Big)$

D. $(2u_1u_2)$/(beta alpha)`

Answer: A

Watch Video Solution

25. A point moves with uniform acceleration and $v_1, v_2,$ and v_3 denote the average velocities in the three successive intervals of time $t_1.\ t_2,$ and t_3 Which of the following Relations is correct?.

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. $(V_1 - V_2 : (V_2 - V_3 = (t_1 - t_2) : (t_2 + t_3)$

D. $(V_1 - V_2 : (V_2 - V_3 = (t_1 + t_2) : (t_2 - t_3)$

Answer: B

Watch Video Solution

26. A train starts from rest and moves with uniform acceleration α for some time and acquires a velocity v. It then moves with constant velocity for some time and then decelerates at rate β and finally comes to rest at the next station. If L is distance between two stations then total time of travel is

A. $\frac{L}{v}+\frac{v}{2}\left(\frac{1}{\alpha}+\frac{1}{\beta}\right)$

B. $\frac{L}{v}-\frac{v}{2}\left(\frac{1}{\alpha}+\frac{1}{\beta}\right)$

C. $\frac{L}{v}-\frac{v}{2}\left(\frac{1}{\alpha}-\frac{1}{\beta}\right)$

D. $\frac{L}{v}+\frac{v}{2}\left(\frac{1}{\alpha}-\frac{1}{\beta}\right)$

Answer: A

Watch Video Solution

27. 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 f/ 2 to come to rest. If the total distance travelled is 15 s, then

A. S = ft

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

C. $S=\frac{1}{72}ft^2$

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

Answer: C

Watch Video Solution

28. An express train moving at $30m/s$ reduces its speed to $10m/s$ in a distance of $240m$. If the breaking force is increased by 12.5% in the beginning find the distance that it travels before coming to rest

A. 270m

B. 240m

C. 210m

D. 195m

Answer: A

Watch Video Solution

29. For motion of an object along the x-axis the velocity v depends on the displacement x as $v = 3x^2 - 2x$, then what is the acceleration at $x = 2m$.

A. $48ms^{-2}$

B. $80ms^{-2}$

C. $18ms^{-2}$

D. $10ms^{-2}$

Answer: B

Watch Video Solution

30. The friction of the air causes a vertical retardation equal to 10% of the acceleration due to gravity. Take $g = 10m/s^2$ the maximum height and time to reach the maximum height will be decreased by

A. `9%, 9%

B. 11%, 11%

C. 9%, 10%

D. 11%, 9%

Answer: A

Watch Video Solution

31. A parachutist after bailing out falls for 10 s without friction. When the parachute opens he descends with an acceleration of $2m/s^2$ against his direction and reached the ground with $4m/s$ from what height he has dropped himself? $(g = 10m/s^2)$

A. 500m

B. 2496m

C. 2996m

D. 4296m

Answer: C

Watch Video Solution

32. A body is dropped from the roof of a multi storied building. It passes the ceiling of the 15th storey at a speed of $20ms^{-1}$. If the height of each storey is 4m, the number of storeys in the building is $(take g = 10ms^{-2}$ and neglect air resistance)

A. 20

B. 25

C. 30

D. 35

Answer: A

Watch Video Solution

33. A body is projected vertically up with velocity $98ms^{1}$. After $2s$ if the acceleration due to gravity of earth disappears, the velocity of the body at the end of next $3s$ is

A. $49ms^{-1}$

B. $49.6ms^{-1}$

C. $78.4ms^{-1}$

D. $94.7ms^{-1}$

Answer: C

Watch Video Solution

34. The velocity of a particle is $v = v_0 + gt + ft^2$. If its position is $x = 0$ at $t = 0$, then its displacement after unit time $(t = 1)$ is.

A. $V_0 + 2g + 3f$

B. $V_0 + \frac{g}{2} + \frac{f}{3}$

C. $V_0 + g + f$

D. $V_0 + \frac{g}{2} + f$

Answer: B

Watch Video Solution

35. Ball A is dropped from the top of a building. At the same instant ball B is thrown vertically upwards from the ground. When the balls collide, they are moving in opposite direction and the speed of A is twice the speed of B. At what fraction of the height of the building did the collision occurs ?

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

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

C. (5)/(3)`

D. $\frac{7}{3}$

Answer: B

Watch Video Solution

36. An object falls from a bridge that is 45 m above the water. It falls directly into a small row-boat moving with constant velocity that was 12 m from the point of impact when the object was released. What was the speed of the boat ? $(g = 10ms^{-2})$

A. $2m/s$

B. $3m/s$

C. $5m/s$

D. $4m/s$

Answer: D

Watch Video Solution