Applied math 2nd Sec.

Final revision

The position vector of a moving body is given by $\vec{r} = (3\,t + 2)\,\vec{i} + (4\,t - 1)\,\vec{j}$, then the magnitude of its displacement till t = 2 sec. equals = ... length unit.

(a) 9 (b) 5 (c) 10 (d) 8

A particle moves such that its position vector $\vec{r} = (t + 1)\,\vec{i} + (t - 2)\,\vec{j}$, then the magnitude of displacement between two moments t = 2 to t = 4 equals .... length units.

(a) $2\sqrt{2}$ (b) 8 (c) $2\sqrt{10}$ (d) 6

A particle move in a straight line from a fixed point (O) such that its position vector $\overrightarrow{r}$ is given by the relation $\overrightarrow{r} = (t^2 + 3\,t + 5)\,\overrightarrow{n}$ where $\overrightarrow{n}$ is a unit vector parallel to the straight line. The average velocity after 3 seconds from the beginning of motion is .... $\overrightarrow{n}$

(a) 20 (b) $\frac{20}{3}$ (c) 6 (d) 18

The positions of a moving particle at two instants 3 seconds and 8 seconds was at A (7 , 2) and B (4 , 6) respectively

, then the average velocity of the particle = ...

(a) $3\vec{i} - 4\vec{j}$ (b) $-3\vec{i} + 4\vec{j}$ (c) $\frac{3}{5}\vec{i} - \frac{4}{5}\vec{j}$ (d) $\frac{-3}{5}\vec{i} + \frac{4}{5}\vec{j}$

A cyclist moved 6 km. to west , then 8 km. in direction of 60° north of west , then magnitude of covered displacement equals .... km.

(a) 14 (b) $2\sqrt{37}$ (c) $2\sqrt{13}$ (d) 2

A cyclist covered 60 km. towards West , then he moved 90 km. towards East , the velocity in two cases was 12 km./h , then average velocity vector is ....

(a) 12 km./h. West. (b) 12 km./h. East. (c) 2.4 km./h. East. (d) 12.5 km./h. East.

Two cars A and B moves on the same straight road in opposite directions with speeds 125 km./hr. , 75 km./hr. respectively , then the speed of car B relative to the car A = ...

(a) 50 (b) – 50 (c) 200 (d) 75

A motorcycle moves with speed 40 km./hr. in direction of a fixed unit vector $\vec{c}$, its rider watches a car , it seems to him that it moves in the opposite direction with speed 105 km./hr. , then the velocity of the car is ....

(a) $155\,\vec{c}$ (b) $-65\,\vec{c}$ (c) $65\,\vec{c}$ (d) $-155\,\vec{c}$

A moving radar car to monitor the velocity on the desert road moves with constant velocity 40 km./hr. This car observes the movement of a truck coming in the opposite direction. It seems like it is moving with velocity 120 km./hr. , then the actual velocity for the truck = ... km./hr.

(a) 160 (b) 80 (c) 120 (d) 40

Two trains A and B , the length of each is 100 m. they are moving in opposite directions with velocities 15 m./sec. and 25 m./sec. , then time taken to cross each other = …………… sec.

(a) 4 (b) 5 (c) 6 (d) 8

A particle moves in a straight line with uniform retardation of magnitude 3 m./sec^2 to become at rest after 19 seconds. , then the magnitude of the initial velocity = ·········· m./sec.

(a) 16 (b) 54 (c) 60 (d) 57

A particle started its motion with velocity 20 cm./sec. and uniform acceleration 8 cm./sec^2 in the same direction as the initial velocity , then the distance covered in the fifth second only = ... cm.

(a) 200 (b) 144 (c) 100 (d) 56

A particle moves from rest in a straight line with uniform acceleration , it covered 9 cm. at the 5^{th} second only , so acceleration = ... cm^2/s.

(a) 2 (b) 3 (c) 4 (d) 6

A body moves in a fixed direction with an initial speed and uniform acceleration. The body covers 20 m. in the third sec. then covers 60 m. in the fifth and sixth seconds , then its initial speed equals .... m./sec.

(a) 4 (b) 10 (c) 20 (d) 30

If a body fell from a height 19.6 m. above a sandy ground to embed in it a distance 14 cm. till it rests , then the acceleration of the motion of the body inside the sand = ... m./sec^2.

(a) – 1372 (b) – 9.8 (c) 19.6 (d) 1732

A body moves with initial velocity (v_o) , acceleration (a) and final velocity (v) , $v - v_o = 8$ cm./sec. , $v + v_o = 25$ cm./sec. , then $\sqrt{4as} =$ ....

(a) 10 cm./sec^2. (b) 20 cm./sec^2. (c) 20 cm./sec. (d) 50 cm./sec.

A body is projected vertically upward with speed 42 m./sec. , then its maximum height the body reach equals .... m.

(a) 65 (b) 98 (c) 84 (d) 90

A body is projected vertically up from a point on the surface on the ground to return to it after 10 sec. from the instant of projection , the initial velocity = ... m./sec.

(a) 9.8 (b) 4.9 (c) 98 (d) 49

A body started its motion with velocity 7 m./sec. and with uniform acceleration 2 m./sec^2, it covered a distance 30 metres , then the acceleration stopped to move afterwards with uniform velocity a distance 52 metres , then the total time of motion = ... second.

(a) 3 (b) 4 (c) 7 (d) 14

In the opposite figure :

A cyclist moves from (O) in a straight line then :

First : Magnitude of the average velocity during the whole journey = ·········· m./sec.

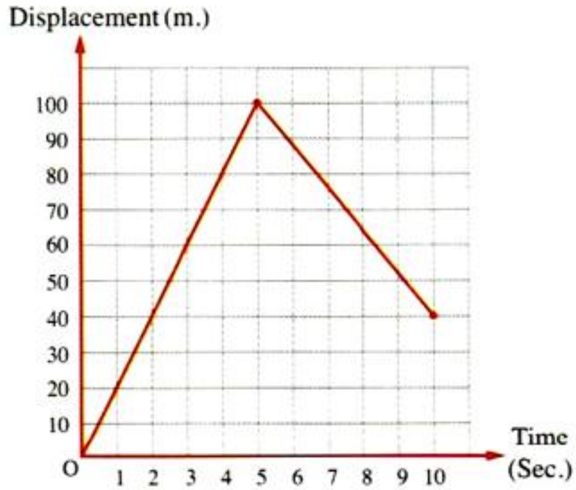
(a) 2 (b) 4

(c) 14 (d) 16

Second : The average speed during the whole journey = ·········· m./sec.

(a) 2 (b) 4

(c) 14 (d) 16



From the top of a tower its height 20 metres a particle is projected vertically upward with initial velocity 7 m./sec. , then its speed at the moment of reaching ground surface = ... m./sec.

(a) $7\sqrt{7}$ (b) 7 (c) 21 (d) $7\sqrt{5}$

From the top of a tower , a body is projected vertically upward with initial velocity 9.8 m./sec. , it reached the ground surface after 12 seconds , then the height of the tower = ... m.

(a) 490 (b) 588 (c) 498 (d) 534

A body is projected vertically upward from the top of a building 32.4 m. high with a velocity of 24 m./sec. , then the elapsed time till it reaches the ground surface = ... sec.

(a) 4 (b) 8 (c) 5 (d) 6

A body is projected horizontally against direction of wind with initial speed 15 cm./sec. to move with uniform deceleration 5 cm./sec^2, then the time elapsed till the body returned to its projected point is ....

(a) 2 (b) 3 (c) 4 (d) 6

A particle moves with initial velocity (v_o) cm./sec. , and its final velocity (v) cm./sec. , with acceleration (a = 0) , then $\frac{v^2 + v_o^2}{vv_o}$ = ...

(a) $2\ v_o$ (b) $\frac{1}{2}\ v_o$ (c) $\frac{1}{2}$ (d) 2

A body moves from rest with uniform acceleration for 20 sec. If it covers distance (K) m. in the first 10 seconds and (M) m. in the next 10 seconds , then M = ……………

(a) k (b) 2 k (c) 3 k (d) 4 k

In the opposite figure :

$\overline{AB}$ is the hour hand in a clock , if its length is 7 cm.

, then the magnitude of displacement done by the point B

when the hour hand moves from 1 o'clock to 4 o'clock = ... cm.

(a) $\frac{7}{2}\pi$ (b) 14π (c) $7\sqrt{2}$ (d) 38.5

A body moved from rest with uniform acceleration 3 m./sec.^{2} , then the covered distance during 4^{th} , 5^{th} and 6^{th} seconds = ... m.

(a) $13\frac{1}{2}$ (b) 15 (c) 45 (d) $40\frac{1}{2}$

If a particle moves such that $\frac{\text{the magnitude of the displacement}}{\text{the covered distance}} = x$, then ....

(a) $x = 1$ (b) $x > 1$ (c) $x \in [0 , 1]$ (d) $-1 < x < 1$

A body moves from rest with uniform acceleration for 20 sec. If it covers distance (s_1) in the first 10 seconds and (s_2) in the next 10 seconds then ……………

(a) $s_2 = s_1$ (b) $s_2 = 2\ s_1$ (c) $s_2 = 3\ s_1$ (d) $s_2 = 4\ s_1$

If a particle moves with initial speed (v_o) , final speed is (v) , such that : $\frac{v}{v_o} + \frac{v_o}{v} = 2$, then ....

(a) $a > 0$ (b) $a < 0$ (c) $a = 0$ (d) $1 < a \le 2$

A bullet is fired out with a velocity 50 m./sec. on a fixed target. it comes at rest after it embedded a distance 25 cm. , then the velocity with which the bullet comes out of the same target if its thickness is 16 cm. , considering that the acceleration did not change in the two cases equals ……… m./sec.

(a) 30 (b) 35 (c) 25 (d) 40

Best wishes

Mr. Michael Gamil