YAKEEN NEET 2.0

2026

Kinematics - - -

Motion in a straight line

PHYSICS | Lecture - 10

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Todays Goal

practice questions on equation of motion

If $\vec{a}$ is const.

- $v = u + at$
- $s = ut + \frac{1}{2}at^2$
- $v^2 = u^2 + 2as$
- *** $S_{nth} = u + \frac{1}{2}(2n-1)a$
- $\langle v \rangle = \frac{u_i + v}{2}$

a const

* 9th class draft physics.
* ∫ based qty

$u \longrightarrow$ initial velocity
$v \longrightarrow$ final velocity
$a \longrightarrow$ acc.
$t \longrightarrow$ time
$S \longrightarrow$ Displacement
$S_{nth} \longrightarrow$ Displacement in n^{th} second.

Skc , $u, v, a, S \longrightarrow$ with sign put karna hai

$a = v\frac{dv}{dx}$

$a = \sqrt{v}$

Diff + Integration

all together with graph

$$S_{n^{th}} = u + \frac{1}{2}(2n-1)a$$

Q $u = +20$

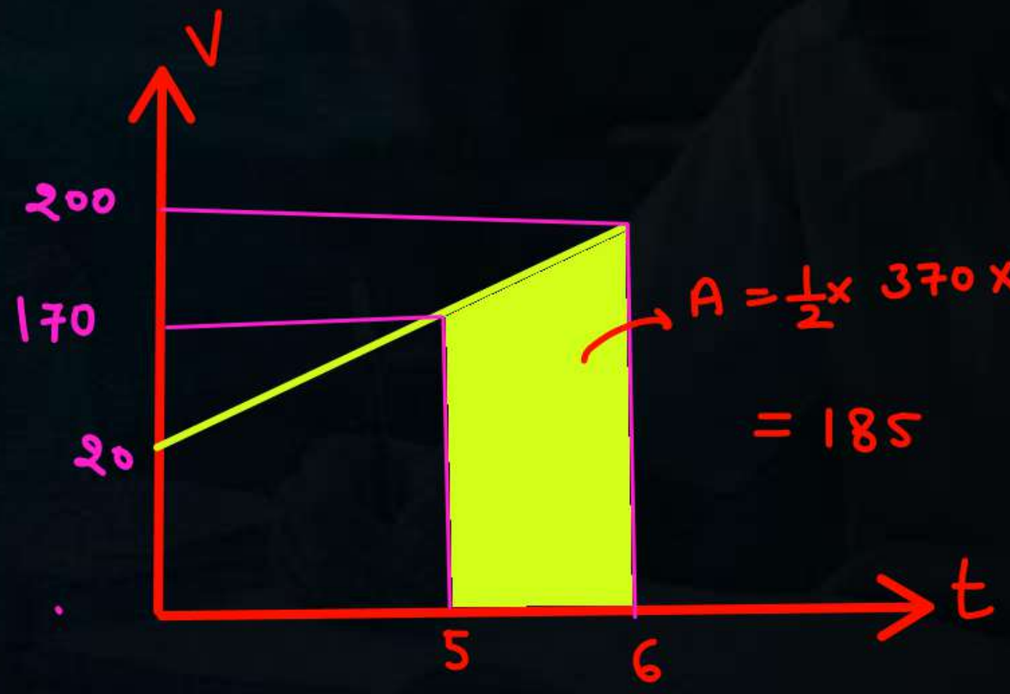
$a = +30$

find displacement in 6^{th} sec.

Sol' $S = 20 + \frac{1}{2}(2\times6-1)\times 30$

$= 20 + 11\times15$

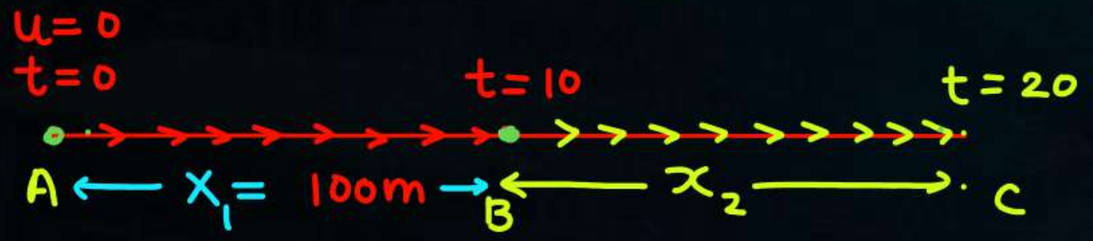
$S = 185$.



1

Q A particle start motion from rest s.t it travel 100m in first 10 sec. find how much it will travel in next 10 sec.

Sol^n



$t=0 \xrightarrow{A \to B} t=10$

$X_1 = ut + \frac{1}{2}at^2$

$100 = 0 + \frac{1}{2} \times a \times 10^2$

$a = 2$ — (1)

$A \longrightarrow C$

$t=0 \longrightarrow t=20$

$S = AC = ut + \frac{1}{2}at^2$

$100 + X_2 = 0 + \frac{1}{2} \times a \times 20^2$ — (2)

$100 + X_2 = \frac{1}{2} \times 2 \times 20^2$

$\therefore \boxed{X_2 = 300}$

Short cut

$X_1 : X_2 \equiv 1 : 3$

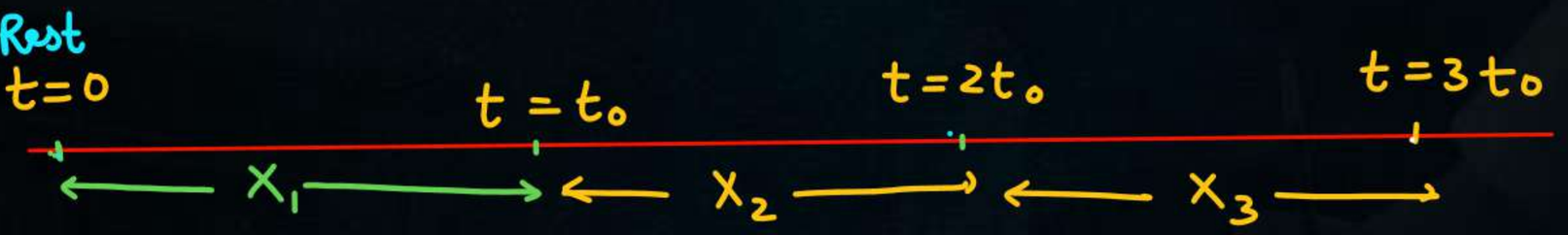
$\frac{100}{X_2} = \frac{1}{3}$

$\boxed{X_2 = 300}$

3-4 qus NEET PYQ

Q 2

A particle start motion from rest, s.t acc is const & in first t_0 time its displacement is X_1 & in next t_0 time its displacement is X_2 and in in next t_0 time is X_3. find $X_1 : X_2 : X_3$



Sol^n

$$X_1 = 0 + \frac{1}{2} a t_0^2 \quad — ①$$

$$X_1 + X_2 = 0 + \frac{1}{2} \cdot a (2t_0)^2 \quad — ②$$

$$X_1 + X_2 + X_3 = 0 + \frac{1}{2} \cdot a (3t_0)^2 \quad — ③$$

$$X_1 = \frac{1}{2} a t_0^2$$

② − ① $\quad X_2 = \frac{1}{2} a \, 3t_0^2$

③ − ② $\quad X_3 = \frac{1}{2} a \, 5t_0^2$

$$X_1 : X_2 : X_3 \Rightarrow 1 : 3 : 5$$

3-4 qus NEET PYQ

Q A particle start motion from rest, s.t acc is const & in first 1 sec its displacement is X_1 & in next 1 sec its displacement is X_2 and in in next 1 sec is X_3. find $X_1 : X_2 : X_3$

Sol^n

$$(S_{n^{th}})_{1^{st}\ sec} : (S_{n^{th}})_{2^{nd}\ sec.} : (S_{n^{th}})_{3^{rd}\ sec} \equiv 1 : 3 : 5$$

NEET (3-4) ques

SKC

अगर particle rest से (a=const) motion start करे तो

हर t_0 time के successive interval में $x_1 : x_2 : x_3 \cdots = 1 : 3 : 5 :$

$$S_{\substack{1^{st} \\ sec}} : S_{\substack{2^{nd} \\ sec}} : S_{3^{rd}\,sec} \equiv 1 : 3 : 5$$

$$x_1 = 0 + \frac{1}{2} a t_0^2 \quad \text{— ①}$$

$$x_1 + x_2 = 0 + \frac{1}{2} \cdot a (2t_0)^2 \quad \text{— ②}$$

$$x_1 + x_2 + x_3 = 0 + \frac{1}{2} \cdot a (3t_0)^2 \quad \text{— ③}$$

Sol:

$$x_1 + x_2 = \frac{1}{2} a (2t_0)^2$$

$$- \quad x_1 = 0 + \frac{1}{2} a t_0^2$$

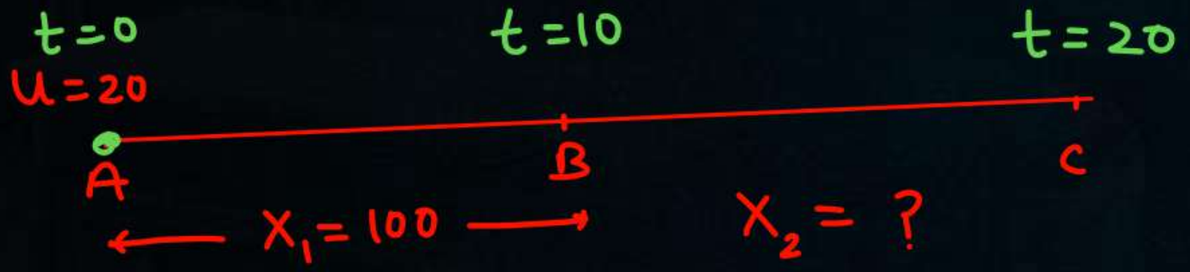
$$x_2 = \frac{1}{2} a (2t_0)^2 - \frac{1}{2} a t_0^2$$

$$= \frac{a}{2} \left[4t_0^2 - t_0^2 \right) = \frac{3}{2} a t_0^2$$

$\therefore$

4 Q A particle start motion with 20m/s s.t it travel 100m in first 10 sec. find how much it will travel in next 10 sec. ($a \to$ const)

Sol^n



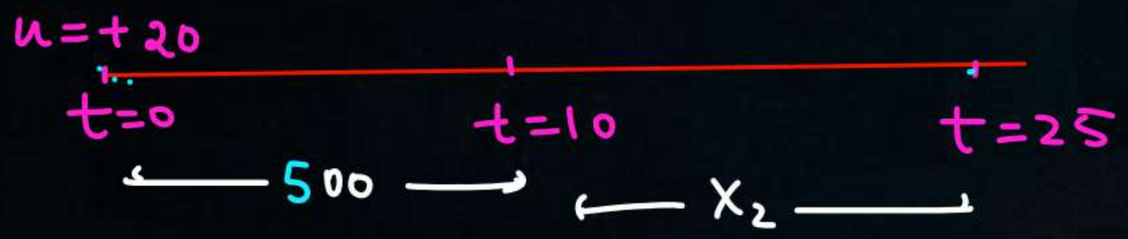
$$100 = 20 \times 10 + \frac{1}{2} \times a \times 10^2 \qquad a = \checkmark$$

$$100 + X_2 = 20 \times 20 + \frac{1}{2} \times a \times 20^2$$

Q 5

A particle start motion from origin with velocity 20 m/s st in first 10 sec its displacement is 500 and in next 15 sec it travel X_2. find X_2 ($a \rightarrow$ const)

Sol

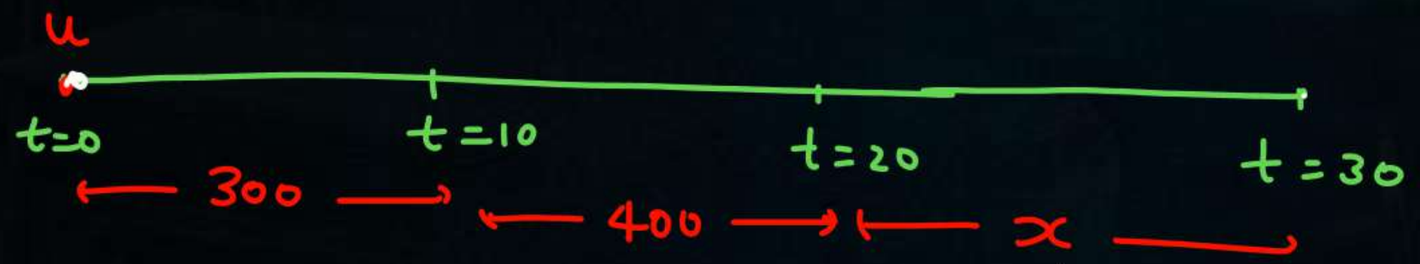


$$500 = 20 \times 10 + \frac{1}{2} \times a \times 10^2$$

$$500 + X_2 = 20 \times 25 + \frac{1}{2} \times a \times 25^2$$

6 Q A particle travel 300 m in first 10 sec and 400 m in next 10 sec. how much it will travel in next 10 sec.

Sol^n



$$300 = u \times 10 + \frac{1}{2} \times a \times 10^2$$

$$700 = u \times 20 + \frac{1}{2} \times a \times 20^2$$

Solve & get $u = \checkmark$, $a = \checkmark$

$$700 + x = u \times 30 + \frac{1}{2} a (30)^2$$

7 Q A particle travel 300 m in first 10 sec and 400 m in next 5 sec. how much it will travel in next 10 sec.

Soln

$$300 = u \times 10 + \frac{1}{2} a \times 10^2$$

$$700 = u \times 15 + \frac{1}{2} \times a \times (15)^2$$

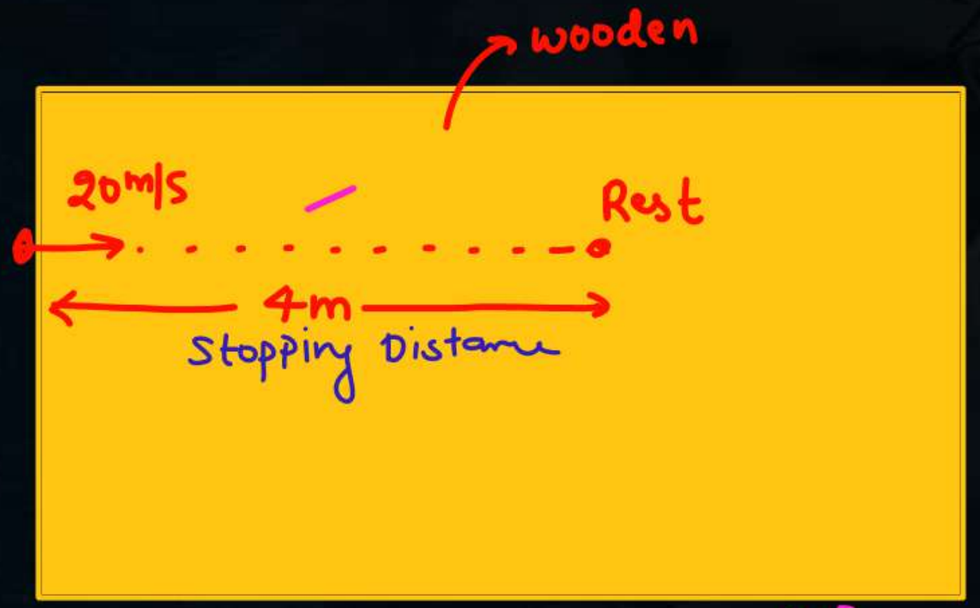
$$700 + x = u \times 25 + \frac{1}{2} \times a \times (25)^2$$

$u =$ ✓

$a =$ ✓

Q Don't write

A bullet enter inside solid wooden box with velocity 20m/s. & Comes to at rest after penetrating 4m. Find



① retartation

$0^2 = (20)^2 - 2a \times 4$

$a = \frac{(20)^2}{8} = 50$ (peechu) $\quad \vec{a} = -50\hat{i}$

$x = \frac{u^2}{2a} = \frac{(20)^2}{2 \times a}$

$4 = \frac{(20)^2}{2 \times a}$

$a = 50$

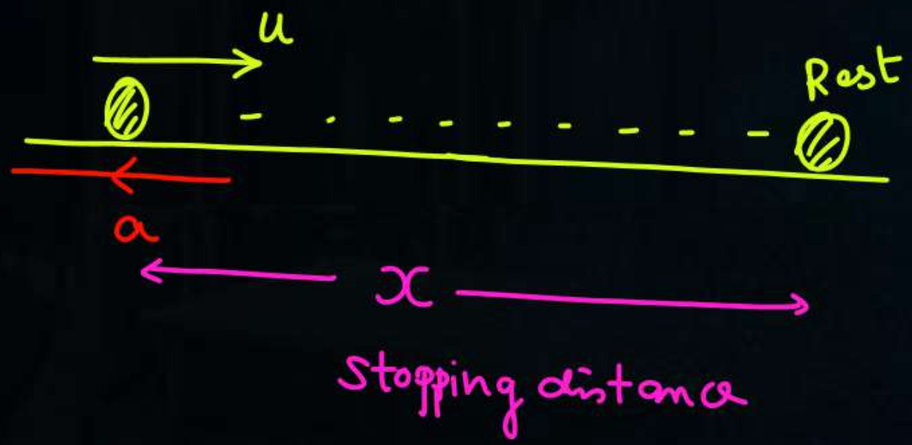
② when bullet will comes to at rest.

$v = u + at$

$0 = 20 - 50t$

$t = .4$ sec

Stopping Distance



$v^2 = u^2 + 2ax$

$0 = u^2 - 2ax$

$$x = \frac{u^2}{2a}$$

→ Bored guy

Stopping distance $x = \frac{u^2}{2a}$

→ when $a \to$ const

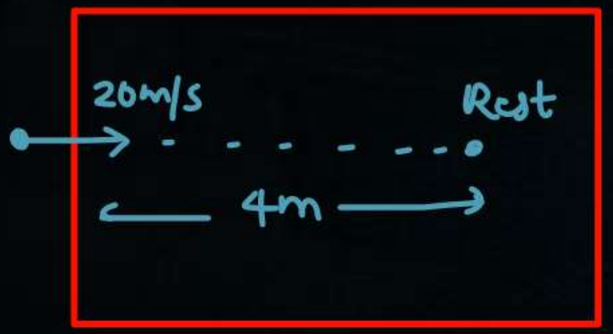
$v_f = 0$ (Rest)

Stopping distance $x = \frac{u^2}{2a}$

Last ही

Type of ques.

① Wooden + bullet

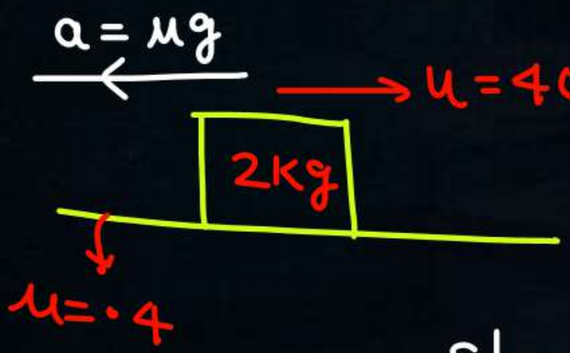


$x = 4 = \frac{20^2}{2a}$

② Driver is driving a car with 50m/s apply break s.t $a = -10\ m/s^2$ find stopping dist.

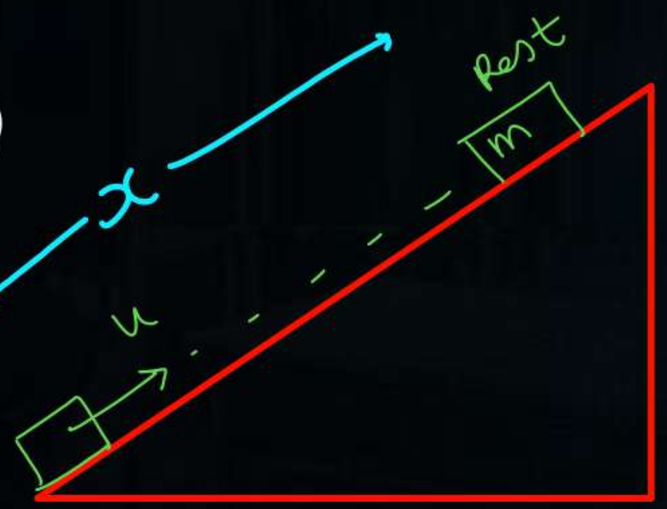
$$x = \frac{u^2}{2a} = \frac{(50)^2}{2 \times 10} = \frac{2500}{20} = 125$$

③



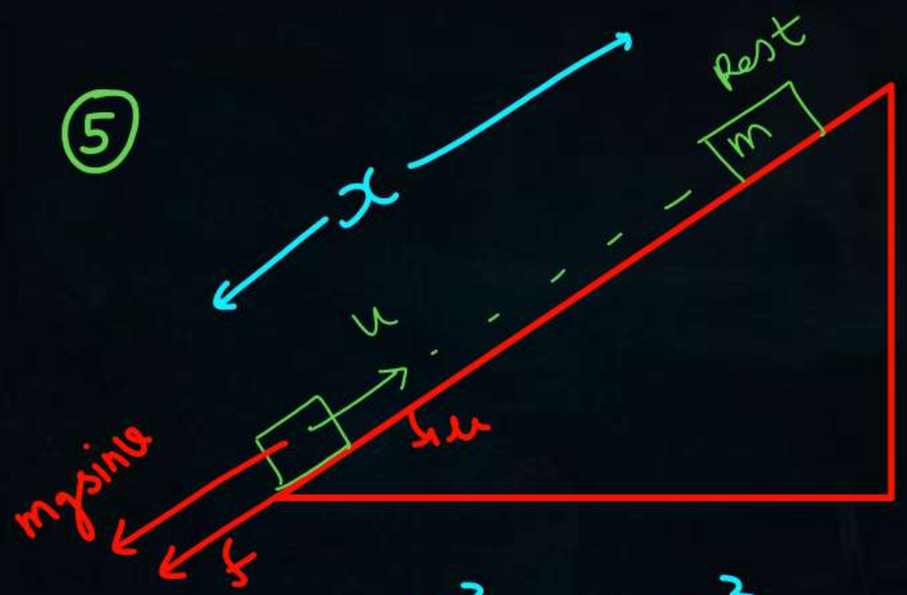
Stopping dist. $= \frac{u^2}{2a} = \frac{u^2}{2\mu g}$

④



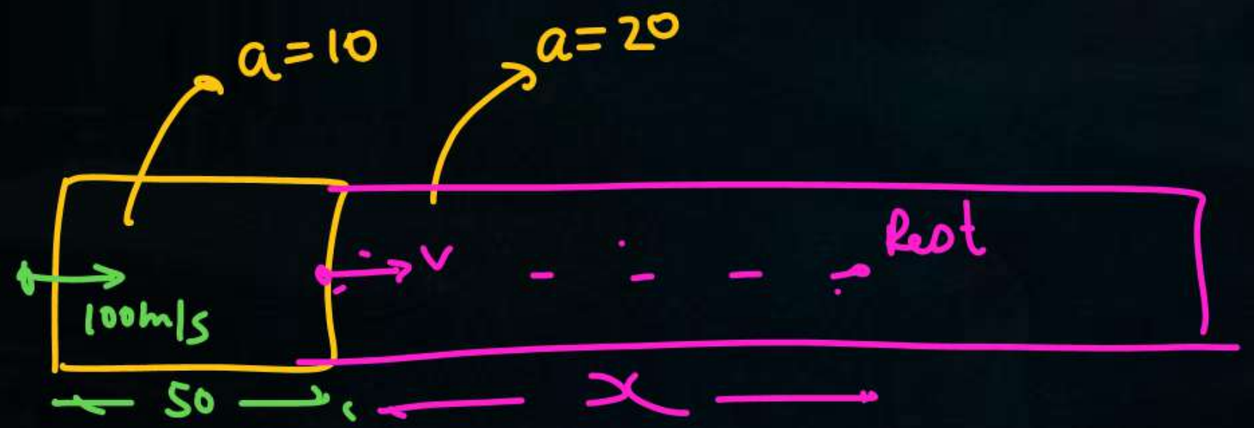
$$x = \frac{u^2}{2a} = \frac{u^2}{2g\sin\theta}$$

⑤



$$x = \frac{u^2}{2a} = \frac{u^2}{2(g\sin\theta + \mu g\cos\theta)}$$

NLM में padhenge



$V^2 = 100^2 - 2 \times 10 \times 50$

$V^2 = 10000 - 1000$

$V = \sqrt{9000}$

$0^2 = 9000 - 2 \times 20 \times x$

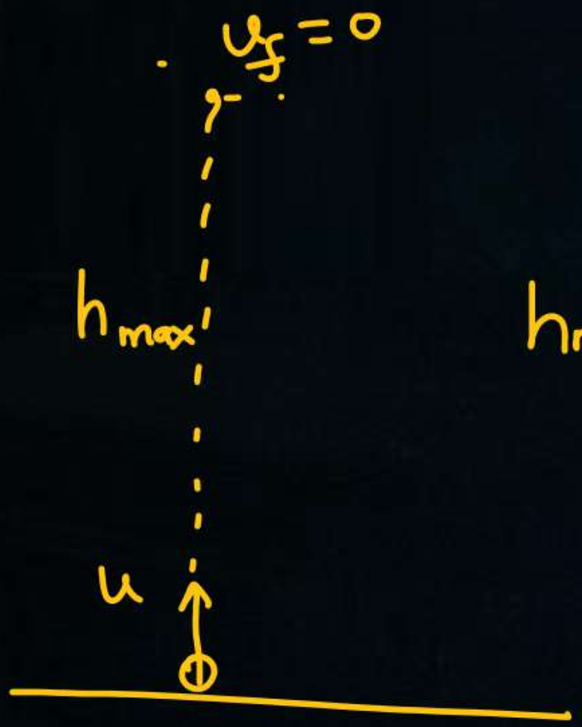
(6)

$x = \frac{u^2}{2a}$ ✗ $a \to$ const ✗

$\frac{1}{2}mu^2 + \frac{kQ_1(-Q_2)}{r}$

$= 0 + \frac{kQ_1(-Q_2)}{r+x}$

(7)



$$h_{max} = \frac{u^2}{2a} = \frac{u^2}{2g}$$

SSSQ

Q

A particle start motion from rest from $x=0$, initially having acc $+10\,m/s^2$ for six second. Then it move with const velocity for next four sec. After that acc of particle become $-15\,m/s^2$ for next 10sec. And then it travel with zero acc for next three second.

Draw ① x-t (graph)
② distance-time graph

} with proper Data

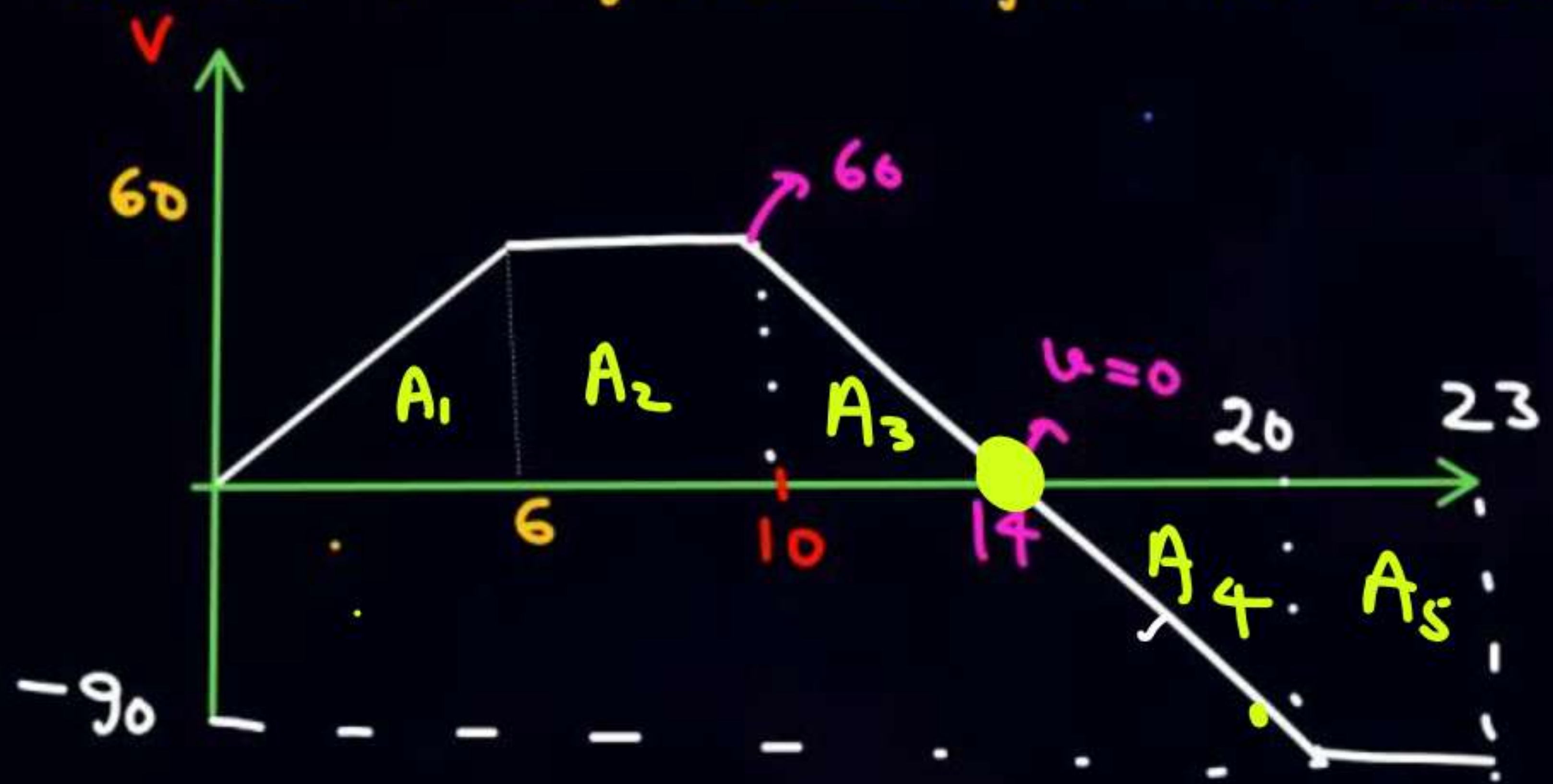
Displacement

SSSQ

$A_1 = \frac{1}{2} 6 \times 60 = 180$ $\quad A_3 = \frac{1}{2} \times 60 \times 4 = 120$

$A_2 = 240$

Q (Adv. level) A particle start motion from rest from $x=0$, initially having acc $+10 m/s^2$ for six second. Then it move with const velocity for next four sec. After that acc of particle become $-15 m/s^2$ for next 10 sec. And then it travel with zero acc for next three second.



$\frac{1}{2} \times (14+4) \times 60$

$- \frac{1}{2}(9+3) \times 90$

$= 540 - 540$
$= 0$

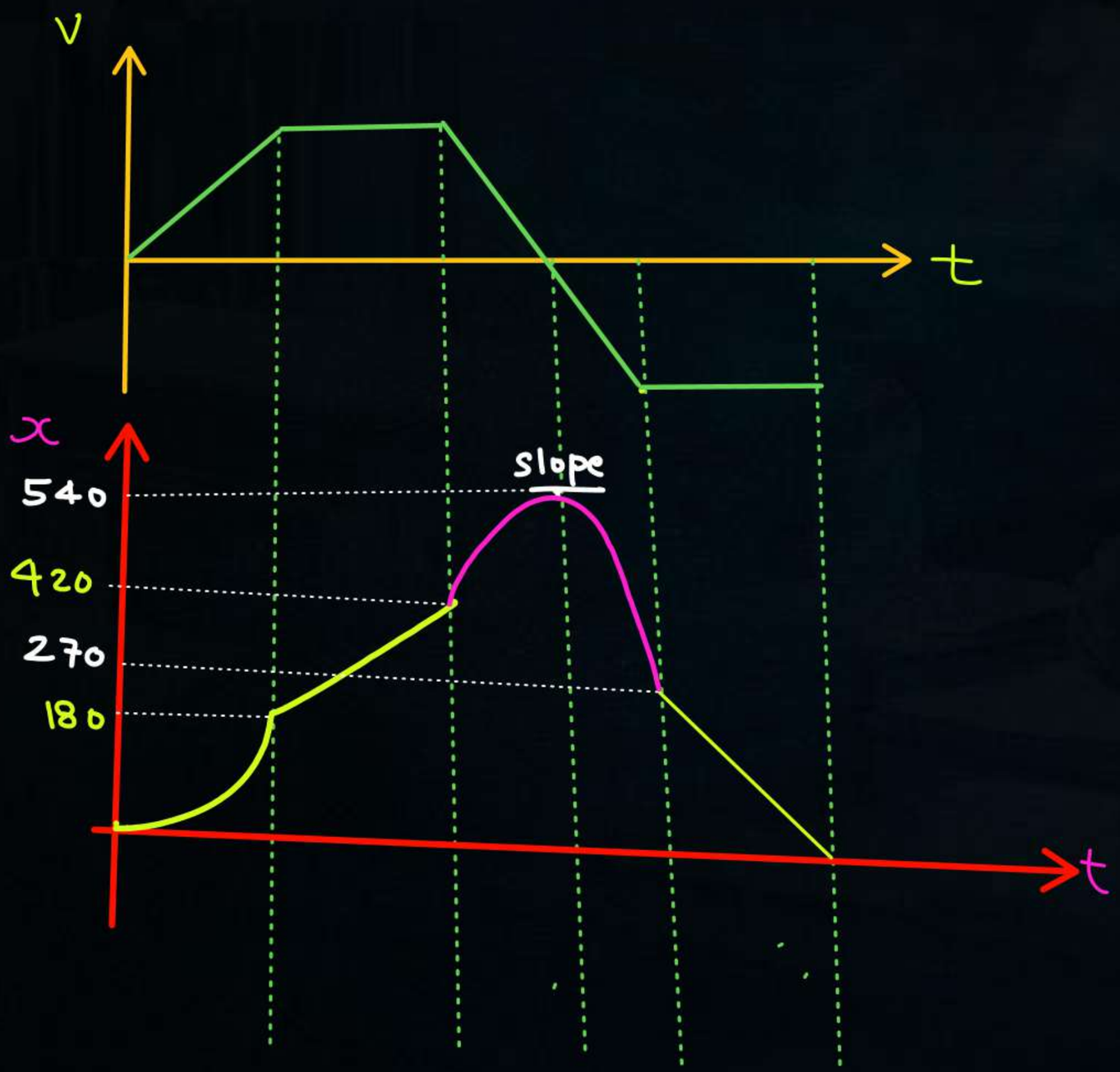
Distance $= \underline{1080}$

$\langle speed \rangle = \frac{1080}{23}$

Displacement

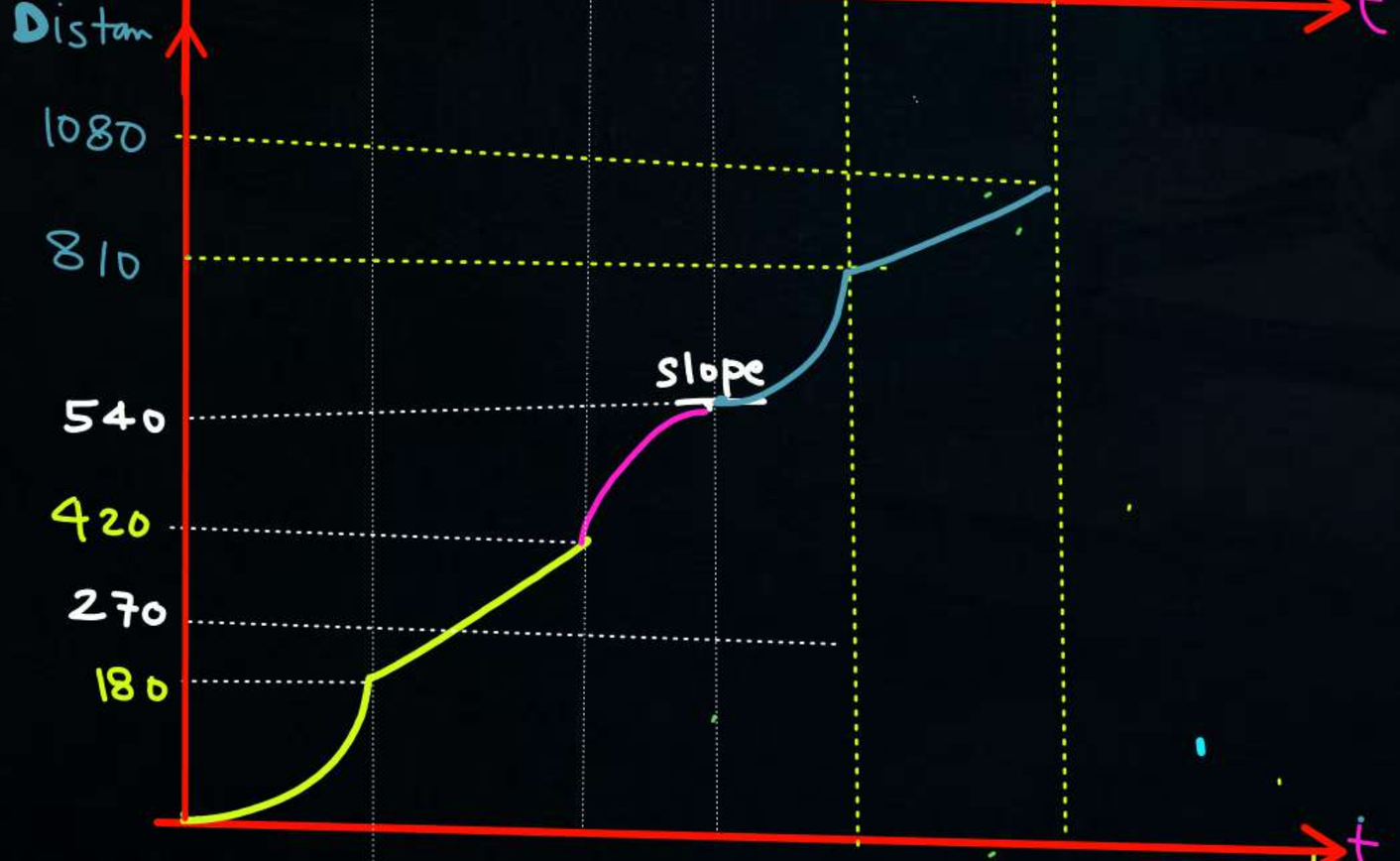
$A_4 = \frac{1}{2} \times 6 \times 90$

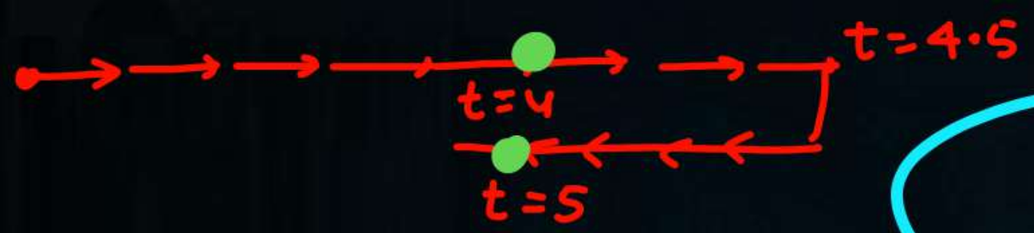
$= 270$


V
t
x
slope
540
420
270
180
t

Soln.

$$\begin{array}{r} 540 \\ +\ 270 \\ \hline 810 \end{array}$$





Displacement

$S = u + \frac{1}{2}(2n-1)a$

$S = 45 - \frac{1}{2} \times (2\times5-1) \times 10$

$S = 45 - 45 = 0$

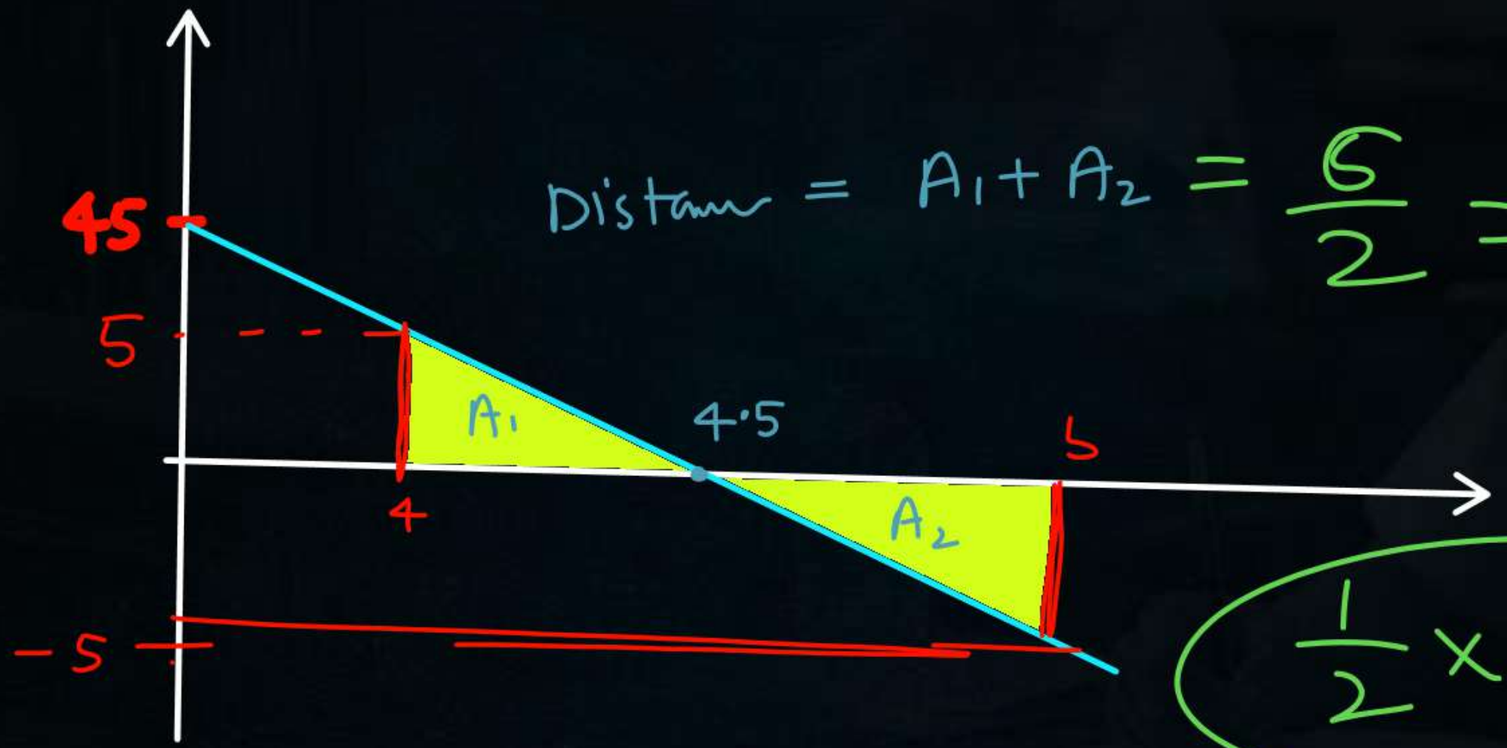
Q $u = 45$

$a = -10$

find distance travelled in 5^{th} second.

$t=4 \longrightarrow t=5$

खतरा



Distance $= A_1 + A_2 = \frac{6}{2} = 2.5$

$\frac{1}{2} \times \frac{1}{2} \times 5$

QUESTION - 01

H/W

A vehicle travels half the distance with speed v and the remaining distance with speed $2v$. Its average speed is:

[2023]

(1) $\frac{4v}{3}$

(2) $\frac{3v}{4}$

(3) $\frac{v}{3}$

(4) $\frac{2v}{3}$

Ans : (1)

QUESTION - 02

H/W

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:

[Mains 2011]

(1) $\frac{v_1+v_2}{2}$

(2) $\frac{v_1v_2}{v_1+v_2}$

(3) $\frac{2v_1v_2}{v_1+v_2}$

(4) $\frac{v_1^2v_2^2}{v_1^2+v_2^2}$

Ans : (3)

QUESTION - 03

H/w

A car moves from X to Y with a uniform speed v_u and returns to X with a uniform speed v_d. The average speed for this round trip is:

[2007]

(1) $\sqrt{v_u v_d}$

(2) $\frac{v_d v_u}{v_d + v_u}$

(3) $\frac{v_u + v_d}{2}$

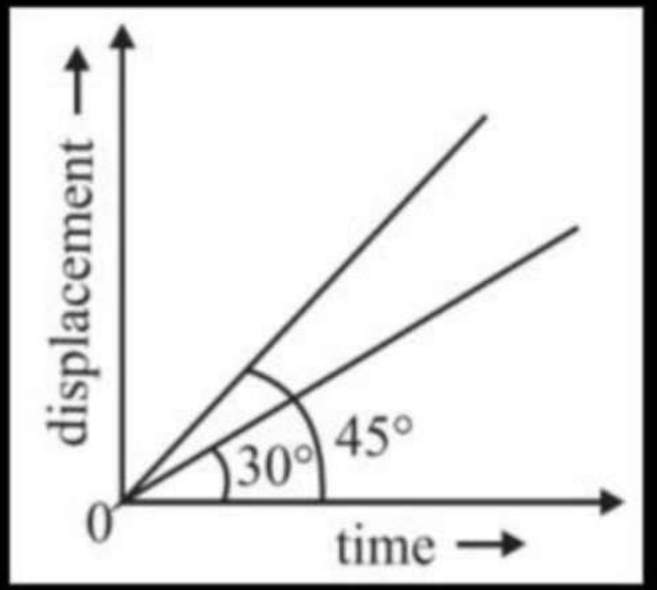
(4) $\frac{2v_d v_u}{v_d + v_u}$

Ans : (4)

QUESTION - 05

The displacement time graphs of two moving particle make angles of 30° and 45° with the x-axis as shown in the figure. The ratio of their respective velocity is:

[2022]



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

(2) $1:1$

(3) $1:2$

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

Ans : (4)

QUESTION - 06

Two cars P and Q start from a point at the same time in a straight line and their positions 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?

[NEET-II 2016]

(1) $\frac{a-f}{1+b}$

(2) $\frac{a+f}{2(b-1)}$

(3) $\frac{a+f}{2(1+b)}$

(4) $\frac{f-a}{2(1+b)}$

$a + 2bt = f - 2t$

$2bt + 2t = f - a$

$t(2b+2) = f-a$

$t = \frac{f-a}{2b+2}$

Ans : (4)

QUESTION - 08

KPP

The displacement 'x' (in meter) of a particle of mass 'm' (in kg) moving in one dimension under the action of a force, is related to time 't' (in sec) by $t = \sqrt{x} + 3$. The displacement of the particle when its velocity is zero, will be:

[Karnataka NEET 2013]

(1) 4 m
(2) 0 m (zero)
(3) 6 m
(4) 2 m

$t - 3 = \sqrt{x}$

$x = (t-3)^2$

$v = 2(t-3) = 0$

$t = 3$

Ans : (2)

QUESTION - 10

The position x of a particle with respect to time t along x-axis is given by $x = 9t^2 - t^3$ where x is in metres and t in seconds. What will be the position of this particle when it achieves maximum speed along the $+x$ direction?

[2007]

(1) 54 m
(2) 81 m
(3) 24 m
(4) 32 m

$x = 81 - 27 =$

$x = 9t^2 - t^3$

$v = 18t - 3t^2$

max

$18 - 6t = 0$

$t = 3$

Ans : (1)

QUESTION - 11

(F) HW

A particle moves along a straight line OX. At a time t (in seconds) the distance x (in metres) of the particle from O is given by $x = 40 + 12t - t^3$. How long would the particle travel before coming to rest?

[2006]

(1) 16 m
(2) 24 m
(3) 40 m
(4) 56 m

Ans : (1)

QUESTION - 12

The displacement x of a particle varies with time t as $x = ae^{-\alpha t} + be^{\beta t}$, where a, b, α and β are positive constants. The velocity of the particle will

[2005]

(1) be independent of β

(2) drop to zero when $\alpha = \beta$

(3) go on decreasing with time

(4) go on increasing with time

$$x = a e^{-\alpha t} + b e^{\beta t}$$

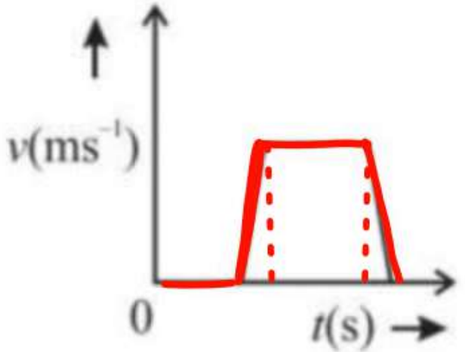
$$v = -\alpha a e^{-\alpha t} + b\beta e^{\beta t}$$

$$v = b\beta e^{\beta t} - \frac{\alpha a}{e^{\alpha t}}$$

Ans : (4)

QUESTION - 13

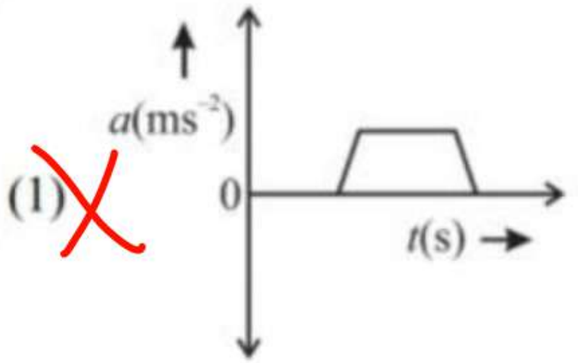
The velocity (v) – time (t) plot of the motion of a body is shown below.



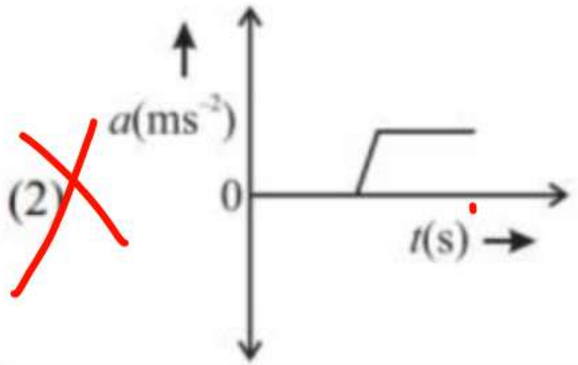
The acceleration (a) – time (t) graph that best suits this motion is:

[2024]

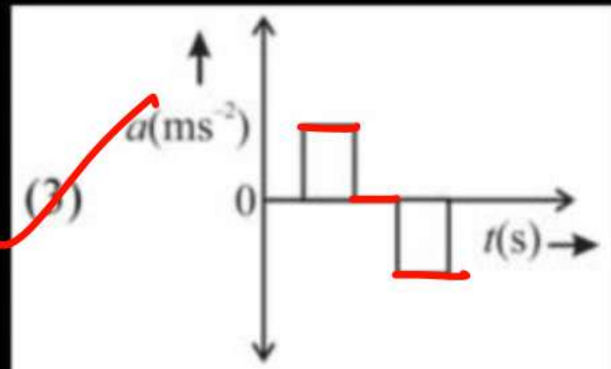
(1)



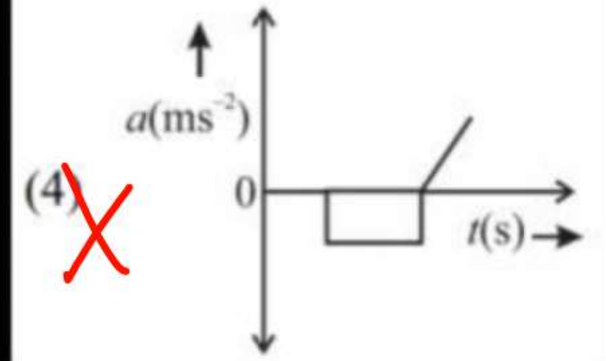
(2)



(3)



(4)



Ans : (3)

QUESTION - 15

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:

[2012]

(1) $24\ m\ s^{-2}$ (2) zero

(3) $6\ m\ s^{-2}$ (4) $12\ m\ s^{-2}$

$v = 0$ ✓

$a =$ ✓

Ans : (4)

QUESTION - 18

Motion of a particle is given by equation $s = (3t^3 + 7t^2 + 14t + 8)$ m. The value of acceleration of the particle at t = 1 sec is:

[2000]

(1) $10\ m/s^2$

(2) $32\ m/s^2$

(3) $23\ m/s^2$

(4) $16\ m/s^2$

Ans : (2)

QUESTION - 20

The ratio of the distance traveled by a freely falling body in the 1^{st}, 2^{nd}, 3^{rd} and 4^{th} second:

[2022]

(1) 1 : 2 : 3 : 4
(2) 1 : 4 : 9 : 16
(3) 1 : 3 : 5 : 7
(4) 1 : 1 : 1 : 1

Ans : (3)

QUESTION - 22

A stone falls freely under gravity. It covers 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:

[NEET 2013]

(1) $h_2 = 3h_1$ and $h_3 = 3h_2$

(2) $h_1 = h_2 = h_3$

(3) $h_1 = 2h_2 = 3h_3$

(4) $h_1 = \frac{h_2}{3} = \frac{h_3}{5}$

$\frac{h_1}{h_3} = \frac{1}{5}$

$h_1 : h_2 : h_3 \equiv 1 : 3 : 5$

$\frac{h_1}{h_2} = \frac{1}{3}$ $\quad h_2 = 3h_1$

$\frac{h_2}{h_3} = \frac{3}{5}$ $\quad h_3 = 5h_1$

$h_1 = \frac{h_2}{3}$

$h_1 = \frac{h_3}{5}$

Ans : (4)

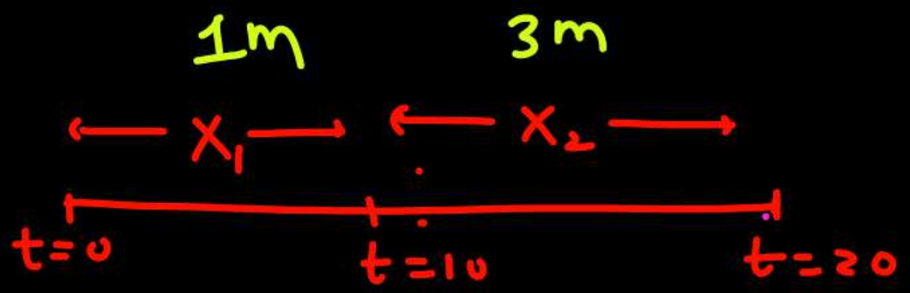
QUESTION - 25

A particle starts its motion from rest under the action of a constant force. If the distance covered in first 10 seconds is S_1 and that covered in the first 20 seconds is S_2, then

[2009]

(1) $S_2 = 3S_1$ (2) $S_2 = 4S_1$

(3) $S_2 = S_1$ (4) $S_2 = 2S_1$



$x_1 = s_1$

$x_1 + x_2 = s_2$

$s_1 = 1$

$s_2 = 1 + 3 = 4$

$\frac{s_1}{s_2} = \frac{1}{4}$

Ans : (2)

QUESTION - 26

A particle moves in a straight line with a constant acceleration. It changes its velocity from 10 m s^{-1} to 20 m s^{-1} while passing through a distance 135 m in t second. The value of t is:

[2008]

(1) 12 (2) 9

(3) 10 (4) 1.8

$u_i = 10$

$v_f = 20$

$s = 135$

$t =$

$a = ?$

$v = u + at$

Ans : (2)

QUESTION - 27

The distance travelled by a particle starting from rest and moving with an acceleration $\frac{4}{3}ms^{-2}$, in the third second is:

[2008]

(1) $\frac{10}{3}m$ (2) $\frac{19}{3}m$

(3) 6m (4) 4m

$$S = u + \frac{1}{2}(2n-1)a$$

$$= 0 + \frac{1}{2}(2\times3-1)\times\frac{4}{3}$$

$$= \frac{5}{2}\times\frac{4}{3}$$

Ans : (1)

QUESTION

H/w

A particle goes from A to B with a speed of 40 km/h and B to C with a speed of 60 km/h. If AB = 6BC the average speed in km/h between A and C is.

Ans. (42 km/hr)

QUESTION HW

A particle starts from rest, accelerates at 2 m/s^2 for 10 s and then goes at constant speed for 30 s and then decelerates at 4 m/s^2 till it stops. What is the distance travelled by it:

1. 750 m
2. 800 m
3. 700 m
4. 850 m

Ans. (1)

QUESTION

HW

The driver of a car which is moving on a straight horizontal road with a speed of 72 kmh^{-1} applies brakes. If the retardation produced is 20 ms^{-2}, the distance moved by the car before coming to rest will be

1. 10 m
2. 8 m
3. 6 m
4. 2 m

Ans. (1)

QUESTION H/W

A car is moving with a velocity of 30 m/s. The driver applied brake for 5 seconds to bring it down to zero. What is the average acceleration?

1. $-5\ m/s^2$
2. $6\ m/s^2$
3. $-6\ m/s^2$
4. Zero

Ans. (3)

QUESTION H/W

A particle starts from rest at $t = 0$ and $x = 0$ to move with a constant acceleration $= +2\ m/s^2$, for 20 seconds. After that, it moves with $-4\ m/s^2$ for the next 20 seconds. Finally, it moves with positive acceleration for 10 seconds until its velocity becomes zero.

(a) What is the value of the acceleration in the last phase of motion?

(b) What is the final x-coordinate of the particle?

(c) Find the total distance covered by the particle during the whole motion.

Ans: (a) $4\ m/s^2$, (b) 200 m, (c) 1000 m

QUESTION

H|w

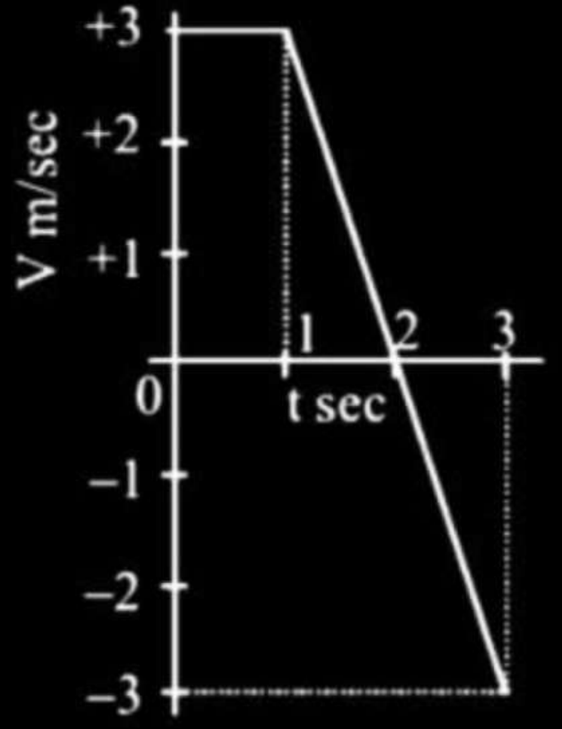
A particle moves along a straight line, x. At time t = 0, its position is at x = 0. The velocity, V, of the object changes as a function of time t, as indicated in the figure; t is in seconds, V in m/sec and x in meters.

(a) What is x at t = 3sec ?

(b) What is the instantaneous acceleration (in m/sec^2) at t = 2sec?

(c) What is the average velocity (in m/sec) between t = 0 and t = 3sec?

(d) What is the average speed (in m/sec) between t = 1 and t = 3sec?



Ans. (a) 3m, (b) $-3\ m/s^2$, (c) 1 m/s, (d) 3/2 m/s

QUESTION H/W

A driver travelling at speed 36 kmh^{1} sees the light turn red at the intersection. If his reaction time is 0.6 s, and then the car can deaccelerate at 4 ms^{-2}. Find the stopping distance of the car.

Ans. (18.5 m)

QUESTION (*) HW

Consider a particle initially moving with a velocity of 5 ms^{-1} starts decelerating at a constant rate of 2 ms^{-2}.

(a) Determine the time at which the particle becomes stationary.

(b) Find the distance travelled in the second second.

(c) Find the distance travelled in the third second.

hint
Graph

Ans. (a) 2.5 s, (b) 2 m, (c) 0.5 m

QUESTION

If a body starting from the fest travels with a uniform acceleration of 10 ms^{-2} for first 10 second and with uniform acceleration 5 ms^{-2} for next 20 seconds, then average acceleration of the body for 30 s is:

1. 15 ms^{-2}
2. 10 ms^{-2}
3. 20 ms^{-2}
4. 20/3 ms^{-2}

Ans. (4)

2. A moving train is stopped by applying brakes. It stops after traveling 80 m. If the speed of the train is doubled and retardation remains the same. It will cover a distance:

HW

(1) Same as earlier

(2) Double the distance traveled earlier

(3) Four time the distance traveled earlier

(4) Half the distance traveled earlier

(Yakeen NEET Physics M-1)

13. The bus moving with a speed of 30 km/h is brought to a stop by applying brakes after 6 m . If the same bus is moving at a speed of 90 km/h, then the minimum stopping distance is:

(1) 36 m (2) 45 m (3) 60 m (4) 54 m

(Yakeen NEET Physics M-1)

Chupchap daigram बनाओ
Ghutna lagao . . .

distance = speed x time

$$time = \frac{distance}{time}.$$

* jiski jarurat ho use man lo.

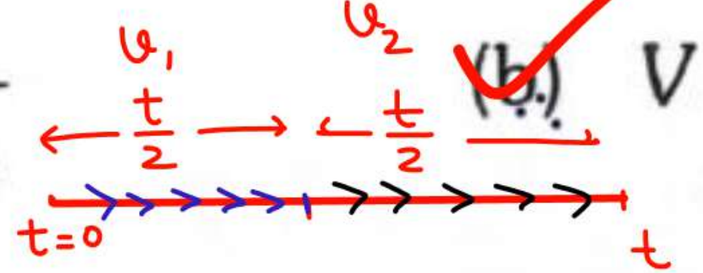
Q A particle travel with const velocity 20 m/s for 2 sec and for next 5 sec it travel with 10 m/s and in last part of journey it travel with 30 m/s for 10 sec. find Avg velocity.

Sol^n

$$\text{Avg velocity} = \frac{20\times3+10\times5+30\times10}{2+5+10} = \frac{V_1t_1+V_2t_2+V_3t_3}{t_1+t_2+t_3}$$

9. A person travels along a straight road for the first half time with a velocity v_1 and the next half time with a velocity v_2. The mean velocity V of the man is **[RPET 1999; Similar RPET 1996; BHU 2002; MP PET 2009]**

(a) $\frac{2}{V} = \frac{1}{v_1} + \frac{1}{v_2}$



(b) $V = \frac{v_1 + v_2}{2}$

(c) $V = \sqrt{v_1 v_2}$

(d) $V = \sqrt{\frac{v_1}{v_2}}$

$$\langle V \rangle = \frac{v_1 \frac{t}{2} + v_2 \frac{t}{2}}{t} = \frac{V_1 + V_2}{2}$$

A particle moves for 20 *seconds* with velocity 3 *m/s* and then velocity 4 *m/s* for another 20 *seconds* and finally moves with velocity 5 *m/s* for next 20 *seconds*. What is the average velocity of the particle **[MH CET 2004]**

(a) 3 *m/s* (b) 4 *m/s*

(c) 5 *m/s* (d) Zero

A train has a speed of 60 *km/h* for the first one hour and 40 *km/h* for the next half hour. Its average speed in *km/h* is **[JIPMER 1999]**

(a) 50 (b) 53.33

(c) 48 (d) 70

A cat moves from X to Y with a uniform speed v_u and returns to X with a uniform speed v_d. The average speed for this round trip is **[Similar MP PMT 2001; CBSE PMT 2007]**

(a) $\frac{2v_dv_u}{v_d+v_u}$ (b) $\sqrt{v_uv_d}$

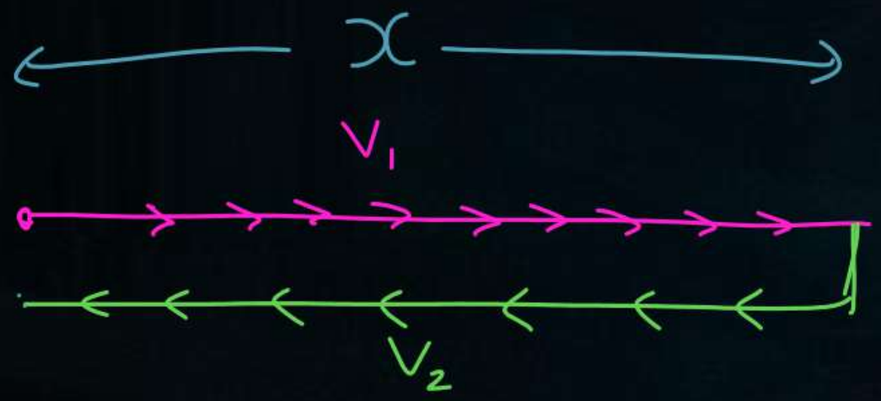
(c) $\frac{v_dv_u}{v_d+v_u}$ (d) $\frac{v_u+v_d}{2}$

One car moving on a straight road covers one third of the distance with 20 *km/hr* and the rest with 60 *km/hr*. The average speed is **[MP PMT 1999; CPMT 2002; Kerala PET 2010]**

(a) 40 *km/hr* (b) 80 *km/hr*

(c) $46\frac{2}{3}$ *km/hr* (d) 36 *km/hr*

Q



$\langle \vec{v} \rangle = 0$

$$\langle \text{speed} \rangle = \frac{\text{Distance}}{\text{time}} = \frac{x + x}{t_{\text{जाने}} + t_{\text{आने}}}$$

$$= \frac{2x}{\frac{x}{V_1} + \frac{x}{V_2}} = \frac{2V_1V_2}{V_1 + V_2}$$

A body starts to fall freely under gravity. The distances covered by it in first, second and third *second* are in ratio

[MP PET 1997; RPET 2001; Kerala PET 2009, 12]

(a) 1 : 3 : 5

(b) 1 : 2 : 3

(c) 1 : 4 : 9

(d) 1 : 5 : 6

Q5 A car travels a distance d on a straight road in two hours and then returns to the starting point in next three hours. Its average speed is:

(A) $\frac{d}{5}$

(B) $\frac{2d}{5}$

(C) $\frac{d}{2} + \frac{d}{3}$

(D) none of these

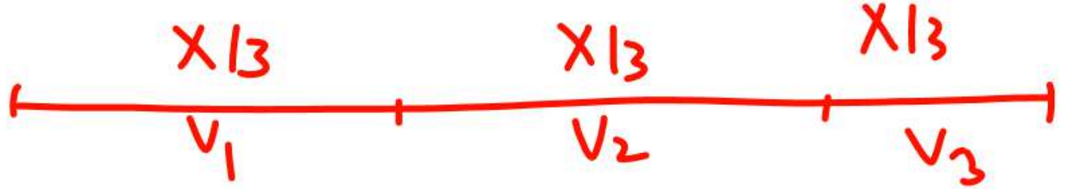
$\frac{d+d}{2+3}$

Q4 A body covers one-third of the distance with a velocity v_1, the second one-third of the distance with a velocity v_2, and the last one-third of the distance with a velocity v_3. The average velocity is:

(A) $\frac{v_1+v_2+v_3}{3}$

(B) $\frac{3v_1v_2v_3}{v_1v_2+v_2v_3+v_3v_1}$

(C) $\frac{v_1v_2+v_2v_3+v_3v_1}{3}$



$$\langle \vec{v} \rangle = \frac{x}{\frac{x}{3 \cdot v_1} + \frac{x}{3 v_2} + \frac{x}{3 v_3}}$$

Q2 A bicyclist encounters a series of hills. Uphill speed is always v_1 and downhill speed is always v_2. The total distance travelled is ℓ, with uphill and downhill portions of equal length. The cyclists average speed is

(A) $\frac{v_1}{v_2}$

(B) $\frac{v_2}{v_1}$

(C) $\frac{v_1 v_2}{v_1+v_2}$

(D) $\frac{2v_1 v_2}{v_1+v_2}$

$\frac{\ell}{\frac{\ell}{2v_1}+\frac{\ell}{2v_2}}$

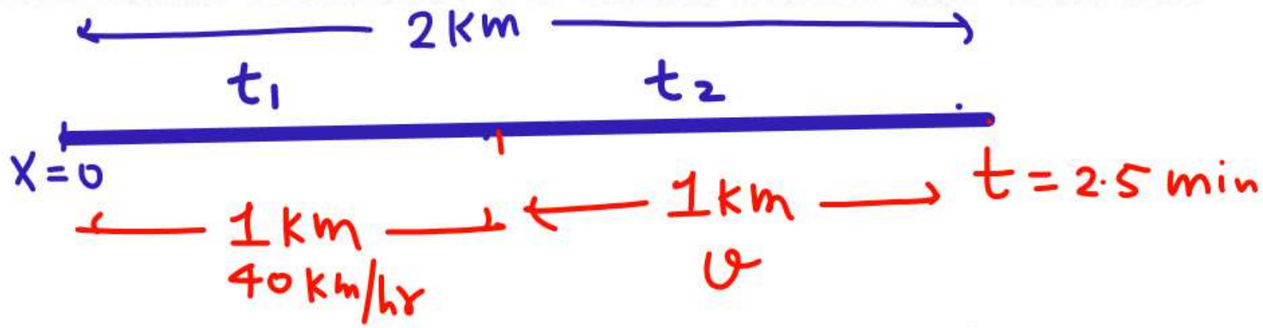
Q1 A car covers a distance of 2 km in 2.5 minute, if it covers half of the distance with speed 40 km/hr. the rest distance it will cover with speed

(A) 56 km/hr

(B) 60 km/hr

(C) 50 km/hr

(D) 48 km/hr



$t_1 + t_2 = 2.5$ min.

$\frac{1}{40} + \frac{1}{v} = \frac{2.5}{60}$

$\frac{25}{600} - \frac{1}{40} = \frac{1}{v}$

Home Work.

- KPP will be uploaded (Today evening)
- DPP
- Ques are attached in this ppt.

THANK YOU