YAKEEN NEET 2.0

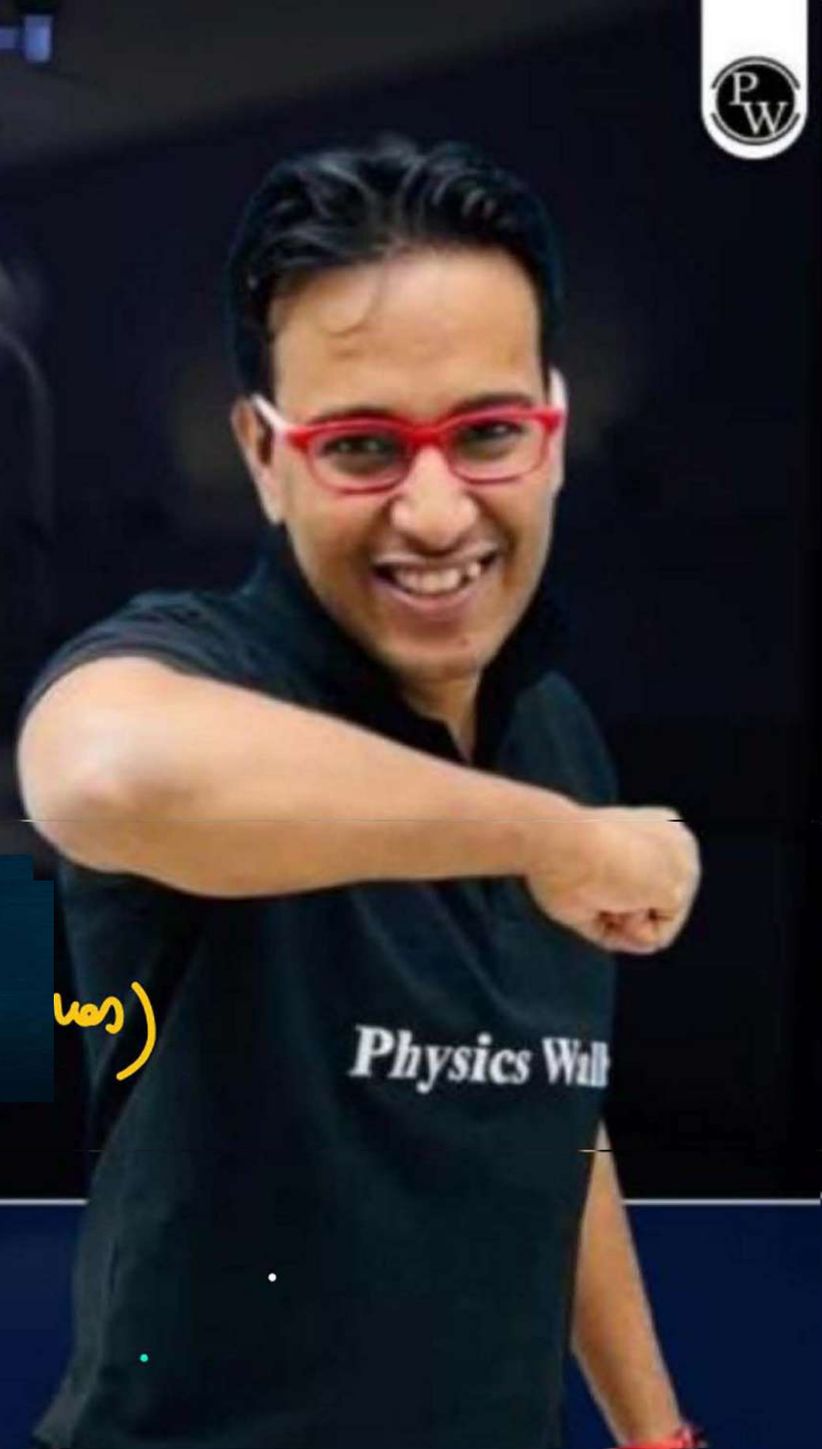
2026

Kinematics

PHYSICS

KPP- -18

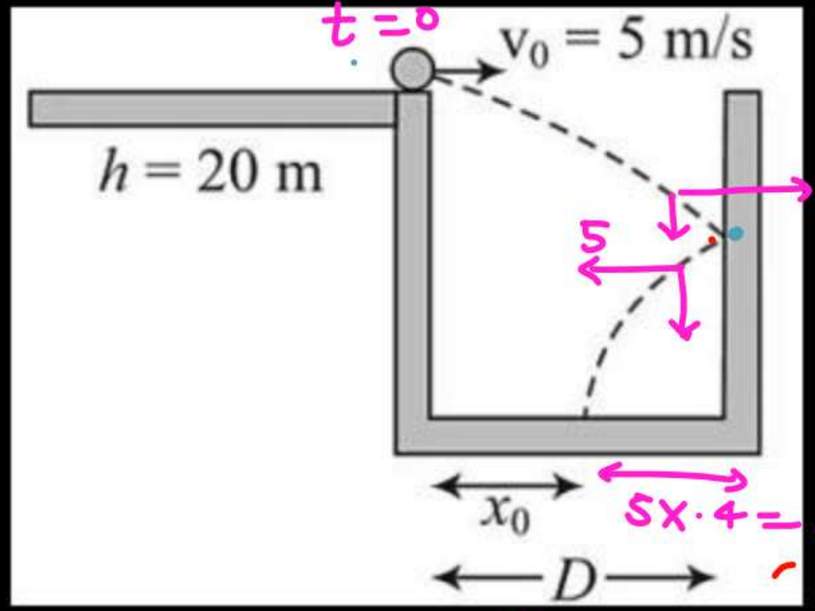
By - Saleem Ahmed Sir



Question - 01

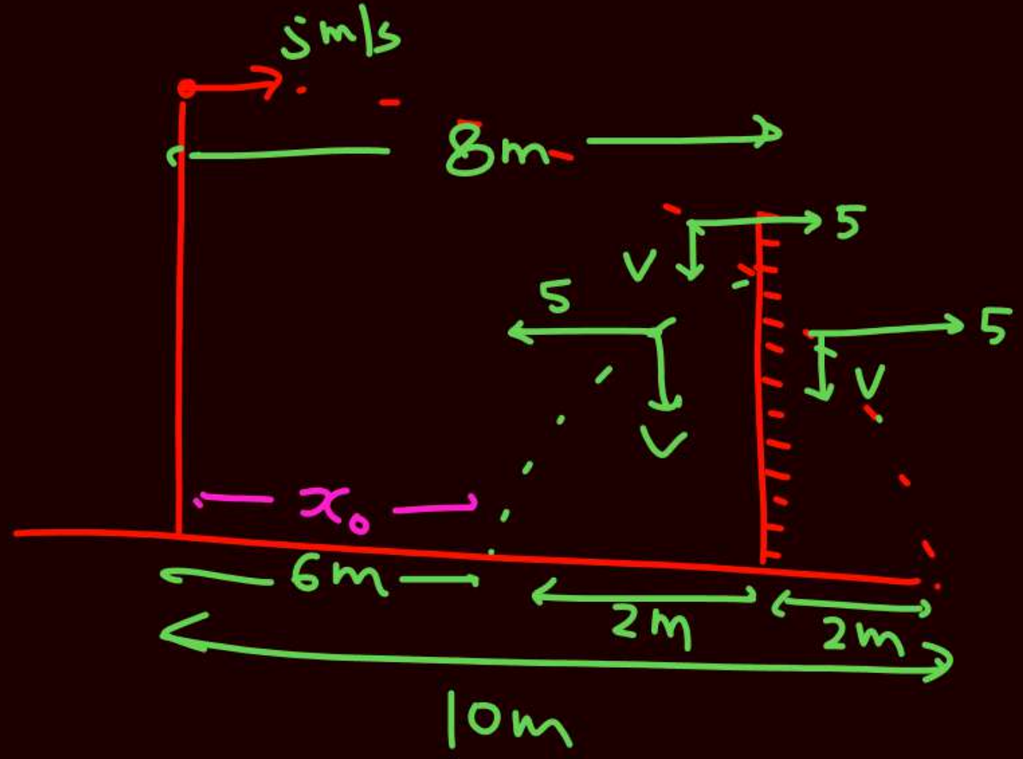
$t_1 = \frac{8}{5} = 1.6$

A ball leaves a horizontal table with velocity $v_0 = 5$ m/s. The ball bounces elastically from a vertical wall at a horizontal distance D(=8 m) from the table, as shown in figure. The ball then strikes the floor a distance x_0 from the table ($g = 10$ m/s^2). Find the value of x_0(in m).



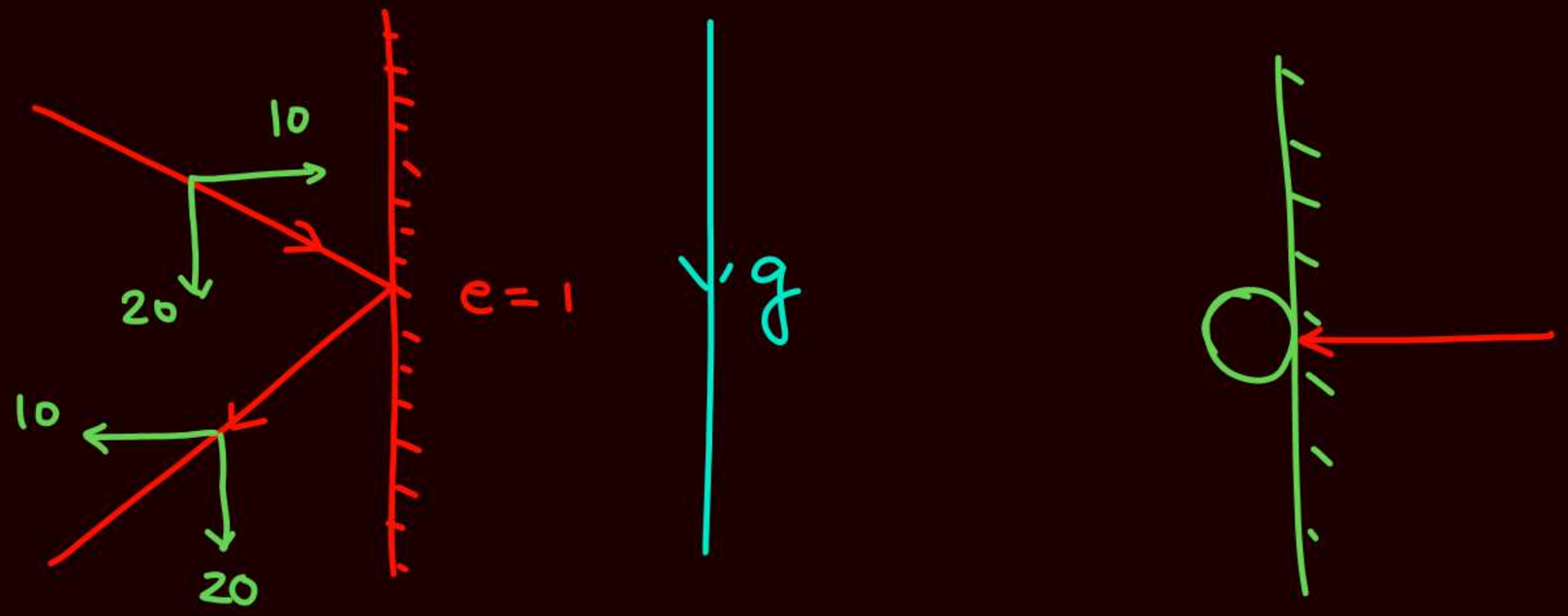
$t = \sqrt{\frac{2h}{g}} = \sqrt{\frac{2 \times 20}{10}} = 2$

Ans : (6)



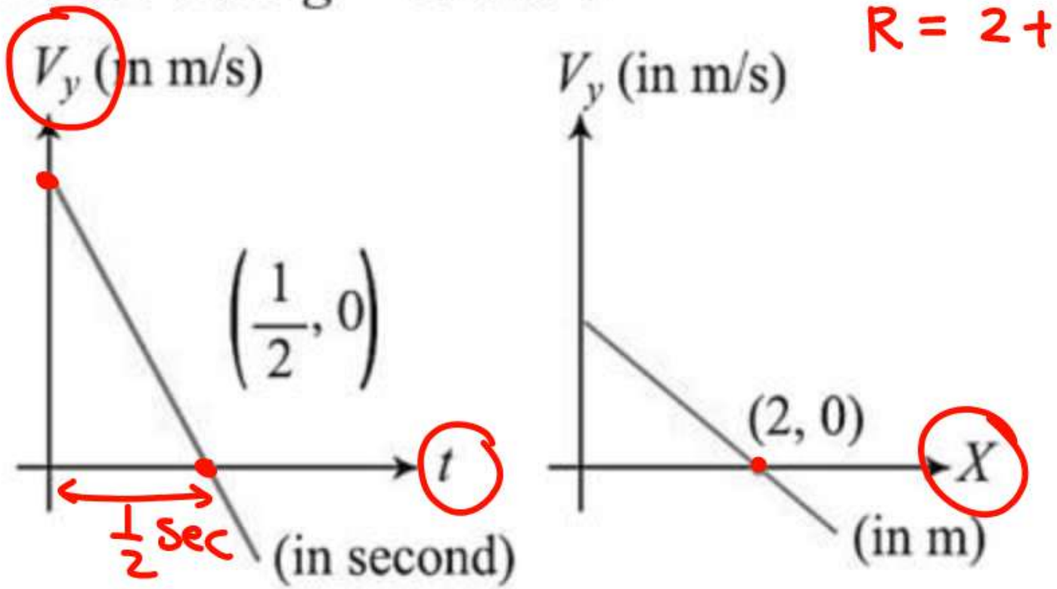
2 sec

D

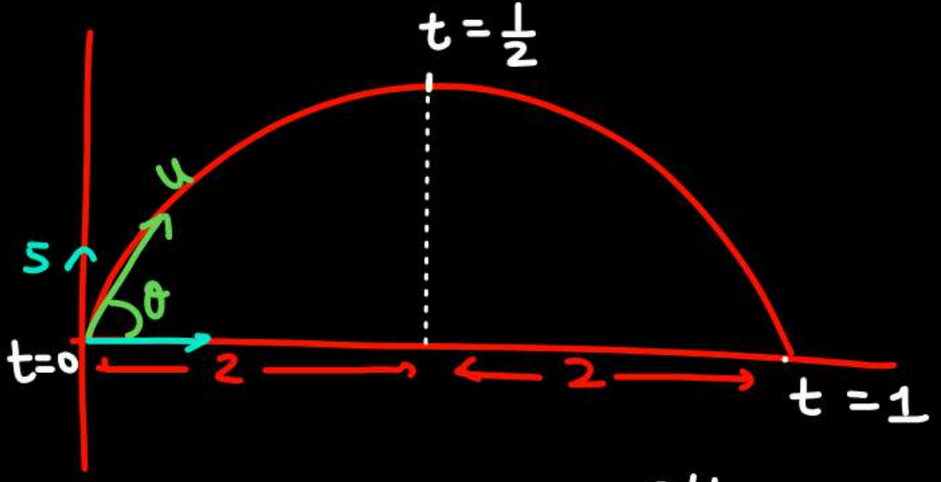

10
20
e = 1
10
20
g

Passage for questions no. 02 to 04

Two graphs of the same projectile motion (in the xy-plane) projected from origin are shown. x-axis is along horizontal direction and y-axis is vertically upwards. Take $g = 10\ ms^{-2}$.



$R = 2+2 = 4$



$T = 1 = \frac{2u_y}{10}$ $\quad u_y = 5$

$4 = u_x \times 1$

$R = \frac{2u_x u_y}{10}$

$u_x = 4$

$u_y = 5$

$v = \sqrt{5^2 + 4^2} = \sqrt{41}$

Question - 02

The projection speed is:

(1) $\sqrt{37}\,\text{ms}^{-1}$

(2) $\sqrt{41}\,\text{ms}^{-1}$

(3) $\sqrt{14}\,\text{ms}^{-1}$

(4) $\sqrt{40}\,\text{ms}^{-1}$

Ans : (2)

Question - 03

Projection angle with the horizontal is:

(1) $\tan^{-1}\left(\frac{4}{5}\right)$

(2) $\tan^{-1}\left(\frac{2}{3}\right)$

(3) $\tan^{-1}\left(\frac{5}{4}\right)$

(4) $\tan^{-1}\left(\frac{1}{2}\right)$

Ans : (3)

Question - 04

Maximum height attained from the point of projection is:

(1) 1.25 m

(2) 12.5 m

(3) 2.25 m

(4) None of these

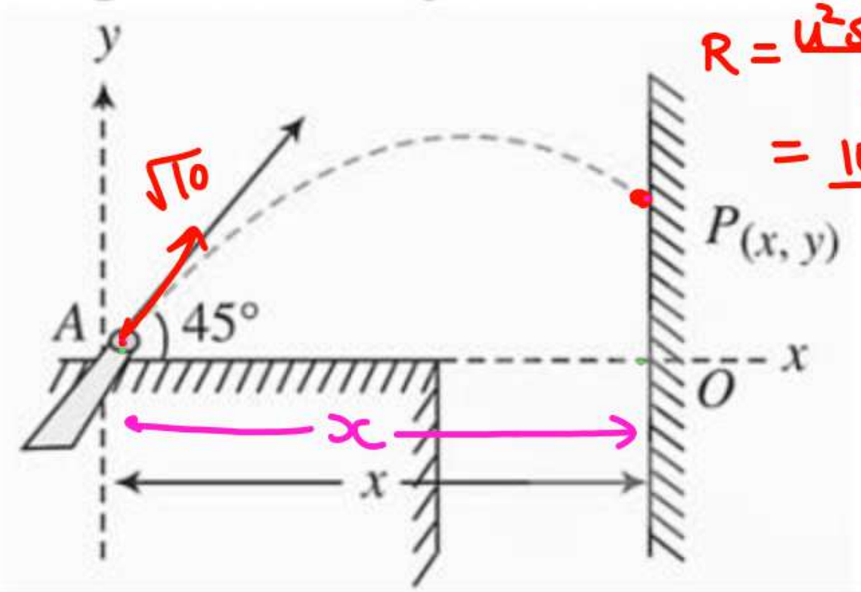
Ans : (1)

Question - 05

$y = x\tan\theta\left(1-\frac{x}{R}\right)$

$y = x\left(1-\frac{x}{R}\right) = x(1-x)$

A jet of water is projected at an angle $\theta = 45°$ with horizontal from point A which is situated at a distance $x = OA =$ (a) 1/2 m , (b) 2 m from a vertical wall. If the speed of projection is $v_0 = \sqrt{10}\,ms^{-1}$, find point P of striking of the water jet with the vertical wall.



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

$= \frac{10\times 1}{10} = 1$

(2 ques ☡)

(a) $x = \frac{1}{2}$

w/o formula

$\frac{1}{2} = \sqrt{10}\times\frac{1}{\sqrt{2}}\cdot t$

$t = \frac{1}{2\sqrt{5}}$

$y = (\sqrt{10}\sin 45)t - \frac{1}{2}\cdot g\cdot t^2$

$y = \sqrt{10}\cdot\frac{1}{\sqrt{2}}\cdot\frac{1}{2\sqrt{5}} - \frac{1}{2}\times 10\times\frac{1}{20}$

$y = \frac{1}{2} - \frac{1}{4} = \frac{1}{4}$

(b) $x = 2$

$x = 2 = \sqrt{10}\cos 45\, t$

$2 = \sqrt{10}\cdot\frac{1}{\sqrt{2}}\,t$

$t = \frac{2}{\sqrt{5}}$

$y = \sqrt{10}\,\frac{1}{\sqrt{2}}\cdot\frac{2}{\sqrt{5}} - \frac{1}{2}\times 10\times\frac{4}{5}$

$y = 2 - 4$

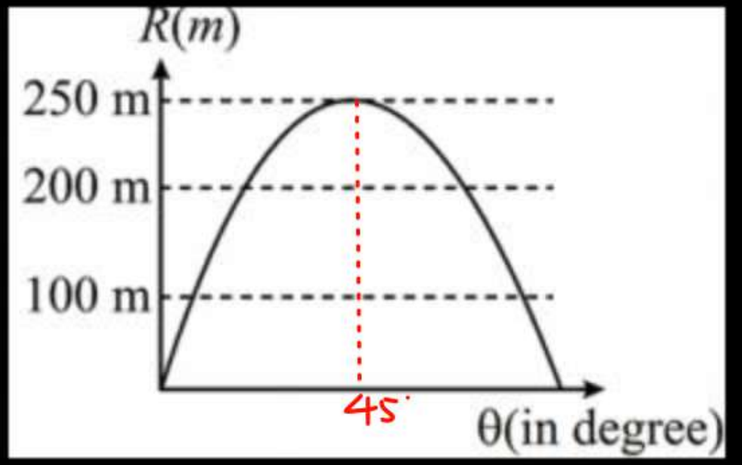
$y = -2$

Ans : (a) P = $\left(\frac{1}{2}\text{m}, \frac{1}{4}\text{m}\right)$, (b) (2m, −1m)

Question - 06

Langage Prob.

From the ground level a ball is to be shot with a certain speed. Graph shows the range R it will have versus the launch angle θ. The least speed the ball will have during its flight if θ is chosen such that the flight time is half of its maximum possible value, is equal to (Take $g = 10\ m/s^2$).



(1) 250 m/s

(2) $50\sqrt{3}$ m/s

(3) 50 m/s

(4) $25\sqrt{3}$ m/s

$R_{max} = 250 = \frac{u^2 \sin 90}{g}$

$u = 50$

Humne esa θ liya $T = \frac{T_{max}}{2}$

$u\cos\theta = 50 \times \cos 30°$

$= 25\sqrt{3}$

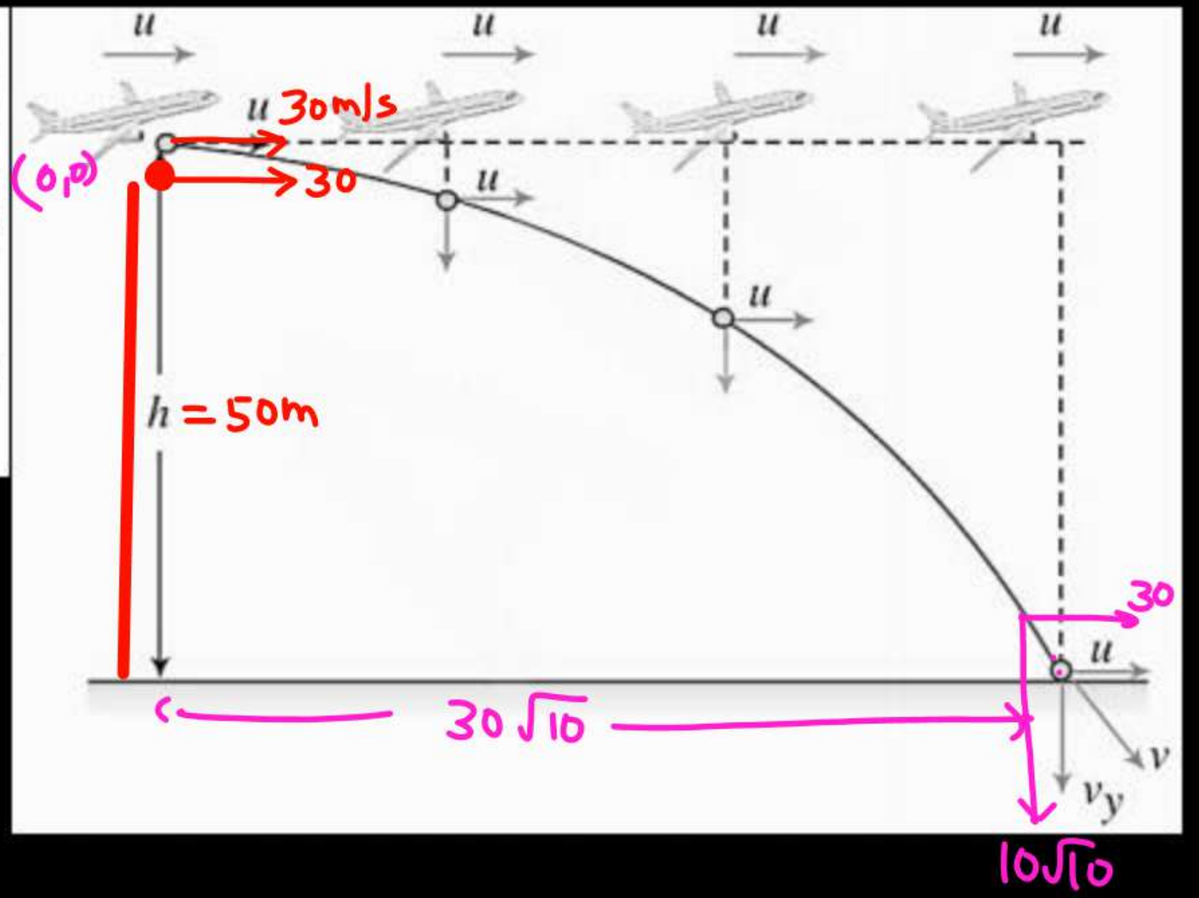
$\frac{2u\sin\theta}{g} = \frac{1}{2} \frac{2u\sin 90}{g}$

$\theta = 30°$

Ans : (4)

Question - 07

A relief food package is dropped from a airplane which is moving horizontal with a velocity of $30\ ms^{-1}$ at a height $h = 50$ m. Find the (a) time of flight of the package, (b) location of the point of striking of the food package, (c) velocity of the package at the time of striking the ground, and (d) displacement of the food package.



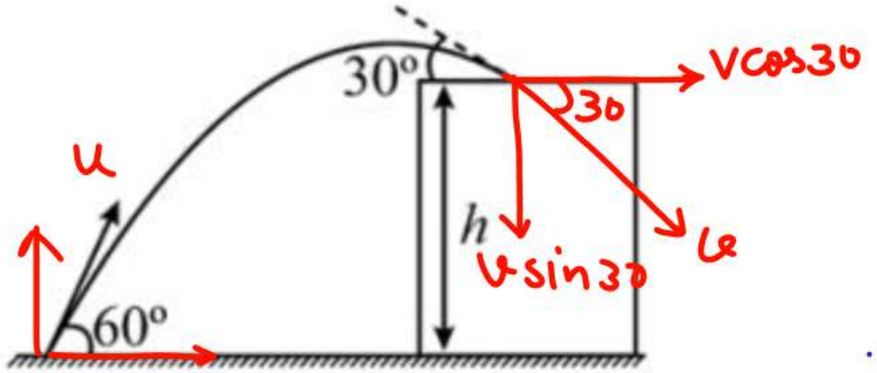
$$\sqrt{\frac{2h}{g}} = \sqrt{\frac{2\times 50}{10}} = \sqrt{10}$$

$$V_y = 0 + 10\times\sqrt{10}$$

Ans : (a) $t = \sqrt{10}s$, (b) $x = 30\sqrt{10}m$,
(c) $v = 10\sqrt{19}ms^{-1}$, (d) $10\sqrt{115}m$.

Question - 08

A stone projected at an angle of 60° from the ground level strikes at an angle of 30° on the roof of a building of height 'h'. Then the speed of projection of the stone is:



(1) $\sqrt{2gh}$ (2) $\sqrt{6gh}$

(3) $\sqrt{3gh}$ (4) $\sqrt{gh}$

$u \times \frac{1}{2} = v\frac{\sqrt{3}}{2}$

$u = v\sqrt{3} \Rightarrow u^2 = v^2 \cdot 3$

$(-v\sin 30)^2 = (u\cos 60)^2 - 2 \times 10 \times h$

$\frac{v^2}{4} = u^2\frac{3}{4} - 20h$

$\frac{u^2}{3\times 4} - \frac{3u^2}{4} = -20h$

$-u^2 + 9u^2 = +240h$

$u = \sqrt{30h}$

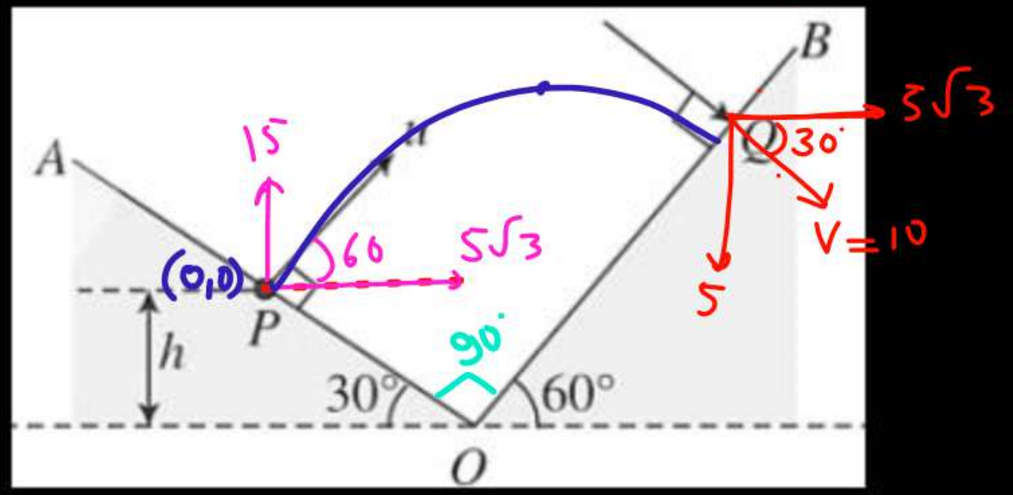
Ans : (3)

Question - 09

(e) $x = 5\sqrt{3} \times 2 = 10\sqrt{3}$

$y = 15 \times 2 - \frac{1}{2} \times 10 \times 2^2 = 10$ $\Rightarrow \sqrt{(10\sqrt{3})^2 + (10)^2} = 20$ = PQ

Two inclined planes OA and OB having inclination (with horizontal) 30° and 60°, respectively, intersect each other at O as shown in the figure. A particle is projected from point P with velocity $u = 10\sqrt{3}\ \text{ms}^{-1}$ along a direction perpendicular to plane OA. If the particle strikes plane OB perpendicularly at Q, calculate the



(a) velocity with which particle strikes the plane OB.

(b) time of flight.

(c) vertical height h of P from O.

(d) maximum height from O, attained by the particle.

(e) distance PQ.

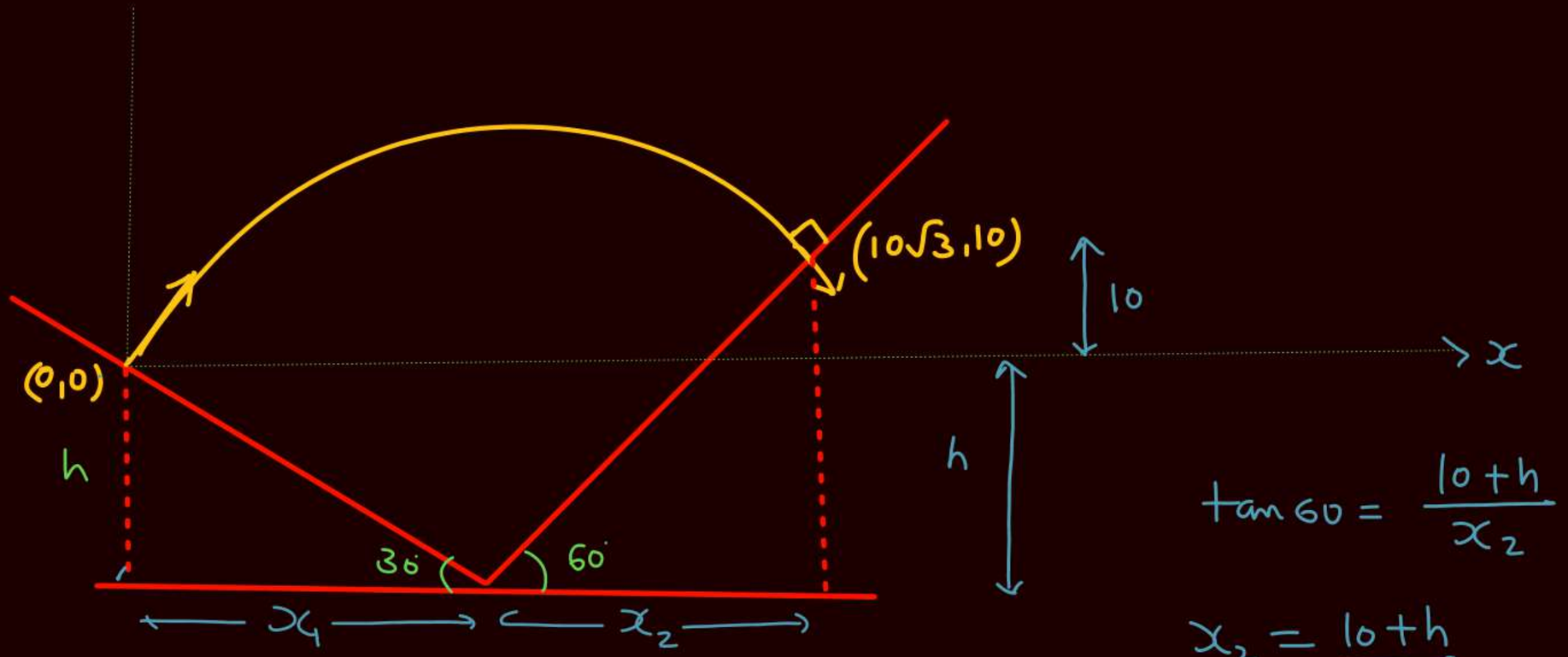
$5 + \frac{(15)^2}{2 \times 10} = 5 + \frac{225}{20} = \frac{325}{20}$

T = 2

$V\frac{\sqrt{3}}{2} = 5\sqrt{3}$

$V = 10$

Ans : (b) 2 s, (c) 5 m, (d) 16.25 m, (e) 20 m



$\tan 30° = \frac{h}{x_1} = \frac{1}{\sqrt{3}}$

$x_1 = h\sqrt{3}$

$\tan 60 = \frac{10+h}{x_2}$

$x_2 = \frac{10+h}{\sqrt{3}}$

$x_1 + x_2 = 10\sqrt{3}$

$h\sqrt{3} + \frac{10+h}{\sqrt{3}} = 10\sqrt{3}$

$3h + 10 + h = 30$

$h = 5$

Question - 10

A fighter plane moving with a speed of $50\sqrt{2}\,ms^{-1}$ upward at an angle of 45° with the vertical releases a bomb when it was at a height 1000 m from ground. Find

(a) The time of flight

(b) The maximum height of the bomb above ground

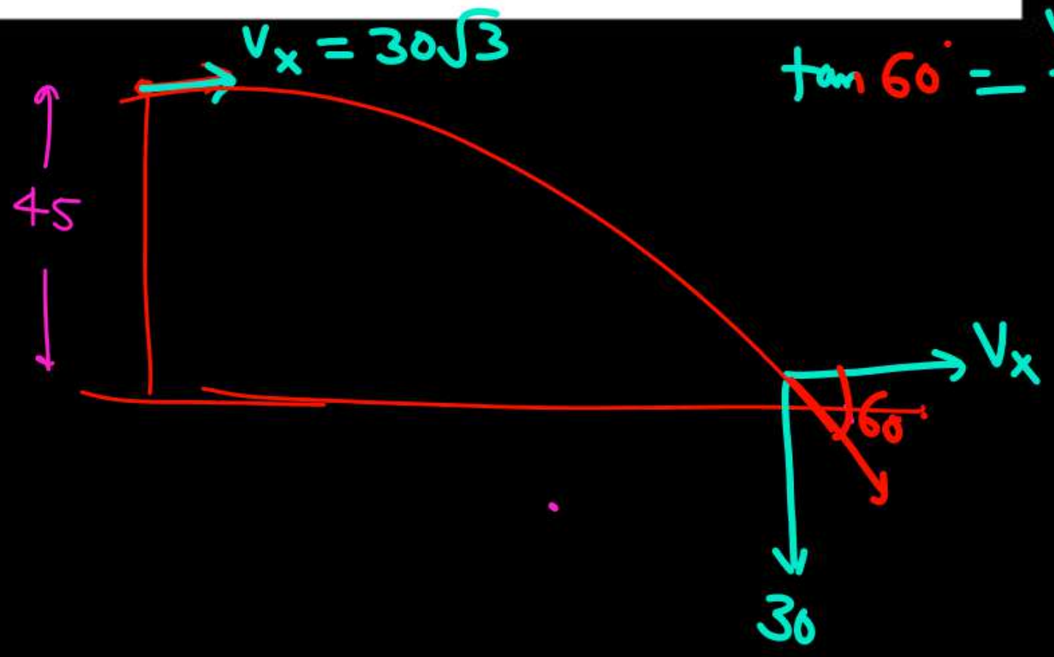
Ans : (a) 20 s, (b) 1125 m

Question - 11

A ball is thrown horizontally from the top of a tower and strikes the ground in 3 s at an angle of 30° with the vertical.

(a) Find the height of the tower.

(b) Find the speed with which the body was projected.



$$h = 0 + \frac{1}{2} \times 10 \times 3^2$$

$$h = 45$$

$$\tan 60^\circ = \frac{V_y}{V_x}$$

$$\sqrt{3} = \frac{30}{V_x}$$

$$V_x = \frac{30}{\sqrt{3}} = 10\sqrt{3}$$

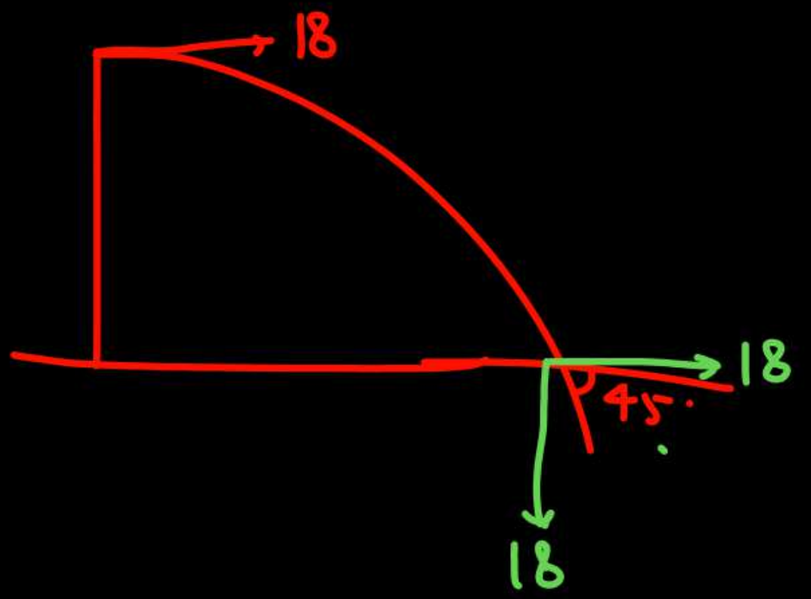
Ans : 45 m, $10\sqrt{3}$ ms^{-1}

Question - 12

A body is projected horizontally from the top of a tower with initial velocity 18 ms^{-1}. It hits the ground at angle 45°. What is the vertical component of velocity when strikes the ground?

(1) 9 ms^{-1} (2) $9\sqrt{2}$ ms^{-1}

(3) 18 ms^{-1} (4) $18\sqrt{2}$ ms^{-1}



Ans : (3)

Question - 13

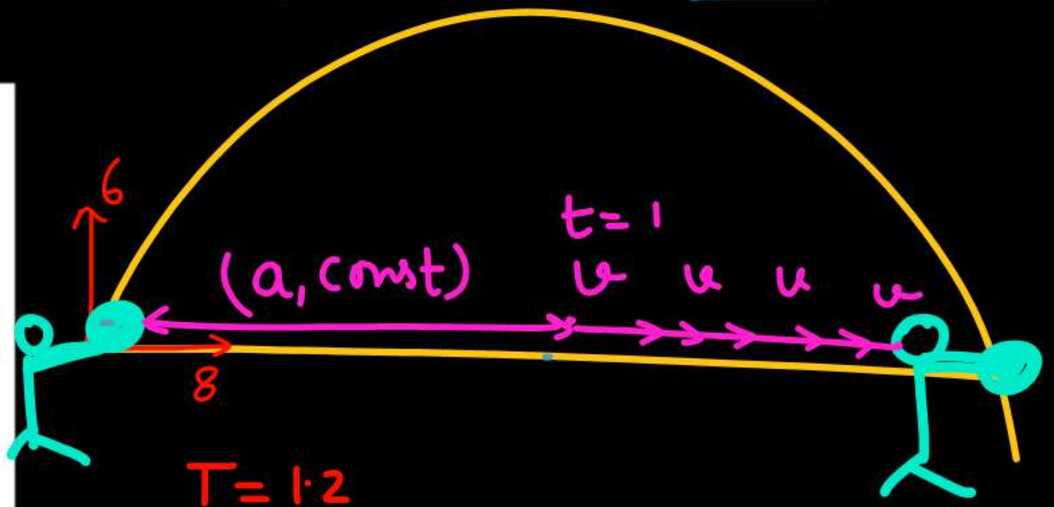
A person initially at rest throws a ball upward with speed 10 m/s at angle 37° with horizontal. He tries to catch the ball. For this, he accelerates just after he throws the ball, with constant acceleration for 1 sec and then continues to run at a constant speed and catches the ball exactly at the same height he throws the ball. Choose the correct option(s).
(Use $g = 10\ m/s^2$).

(1) Constant speed of person is approx. 13.7 m/s

(2) Acceleration of person is 15.2 m/s^2

(3) Acceleration of person is approx. 13.2 m/s^2

(4) Speed of person is 23 m/s



$v = 0 + 13.7 \times 1 = 13.7$

$T = 1.2$

$0 + \frac{1}{2} \times a \times 1^2 + .2 \times v = R$

$\frac{a}{2} + \frac{2}{10}(0 + a \times 1) = 1.2 \times 8$

$.5a + .2a = 9.6$

$a = \frac{96}{7} = 13.7$

$13.7\ m/s^2$

Or '1'

Ans : (1, 3)

Question - 14

A body is projected with a velocity of 60 ms^{-1} at 30° to horizontal.

Column-I		Column-II	
i.	Initial velocity vector	a.	$60\sqrt{3}\hat{i} + 40\hat{j}$
ii.	Velocity after 3 s	b.	$30\sqrt{3}\hat{i} + 10\hat{j}$
iii.	Displacement after 2 s	c.	$30\sqrt{3}\hat{i} + 30\hat{j}$
iv.	Velocity after 2 s	d.	$30\sqrt{3}\hat{i}$

Ans : i → c, ii → d, iii → a, iv → b

Question - 15

$\frac{1}{2} \times m \times 400 + m \times 10 \times 45 = \frac{1}{2} m v^2 + 0$

$v = 10\sqrt{13}$

A ball is thrown from the top of a building 45 m high with a speed 20 ms^{-1} above the horizontal at an angle of 30°. Find

(a) The time taken by the ball to reach the ground.

(b) The speed of ball just before it touches the ground.

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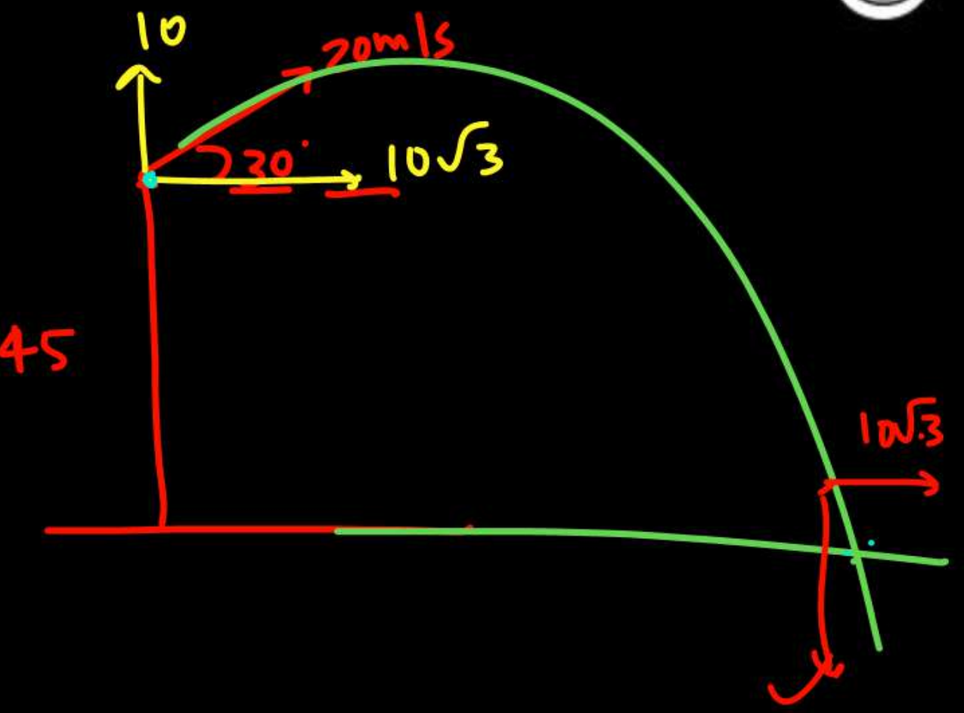

$-45 = 10t - \frac{1}{2} \times 10 \times t^2$

$-90 = 20t - 10t^2$

$t^2 - 2t - 9 = 0$

$$t = \frac{-(-2) + \sqrt{4^2 - 4 \times 1 \times (-9)}}{2a} = \frac{2 + \sqrt{40}}{2 \times 1} = 1 + \sqrt{10}$$

Ans : (a) $t = 1 + \sqrt{10}s$, (b) $10\sqrt{13} ms^{-1}$

@SALEEMSIR_PW

join it

THANK YOU