YAKEEN NEET 2.0

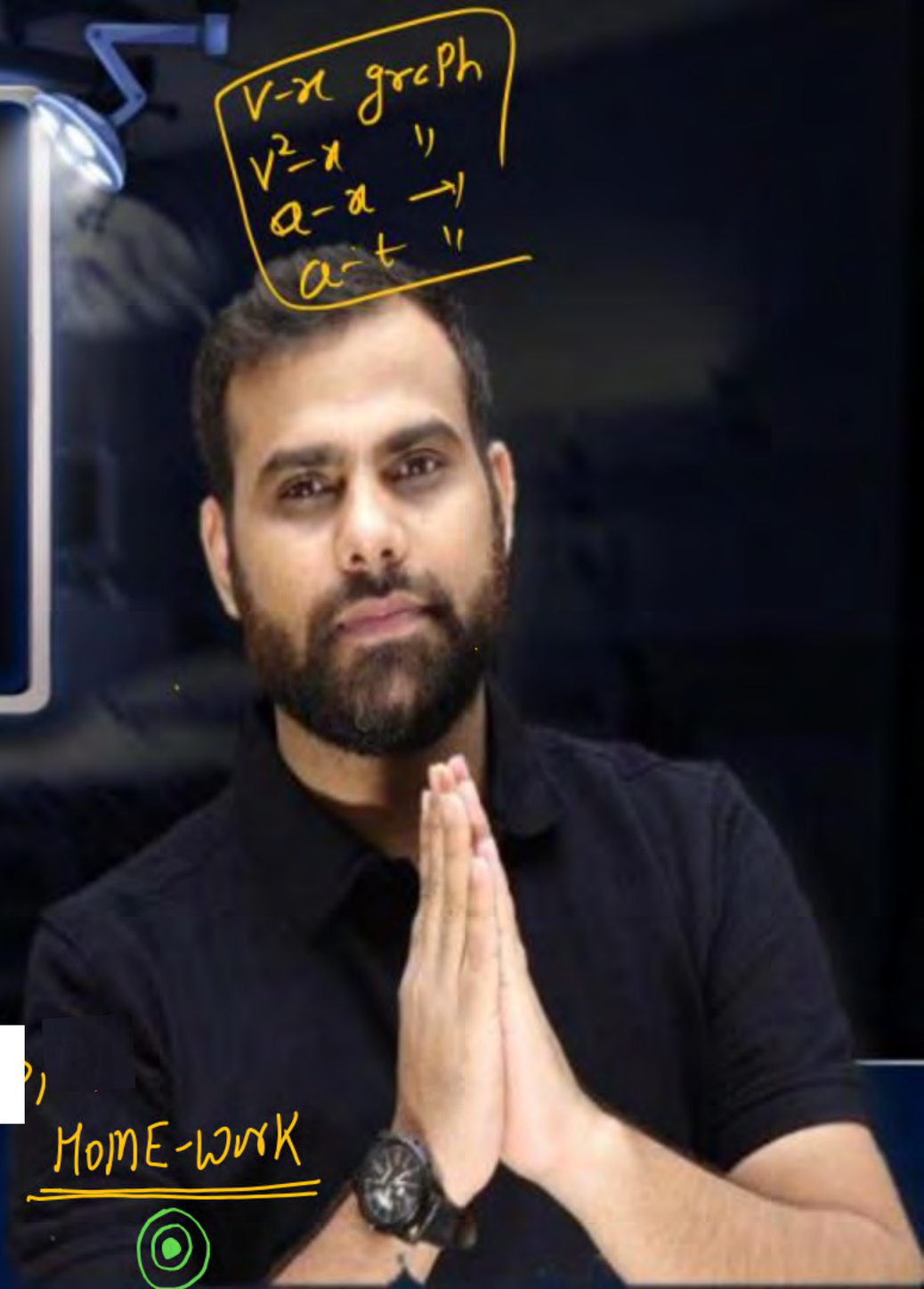
2026

Motion in a Straight Line

Physics

Homework Solution 02 (of lec 12, 13, 14)

By- Manish Raj (MR Sir)



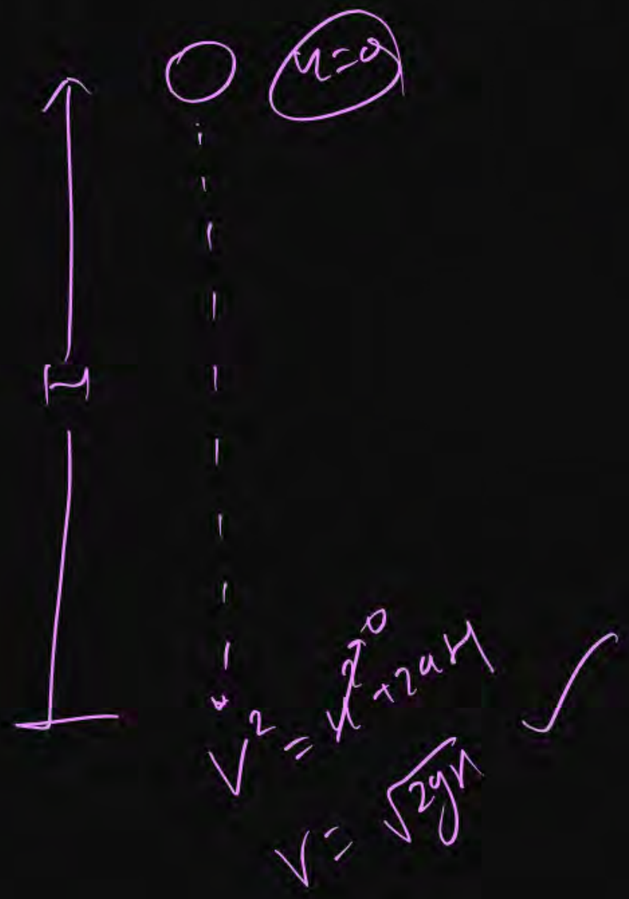
Question

Motion under gravity is an example of

1. Non-uniform acceleration, uniform motion
2. Non-uniform motion, Non-uniform acceleration
3. Non-uniform motion, uniform acceleration
4. Uniform motion, uniform acceleration

Question

Object is dropped from height '*H*' from ground ten find time taken to reach ground and velocity at ground.



$V = gt$

Question

Ball is drop and move 85 m in n^{th} sec then find that time interval.

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

$$85 = 5(2n-1)$$

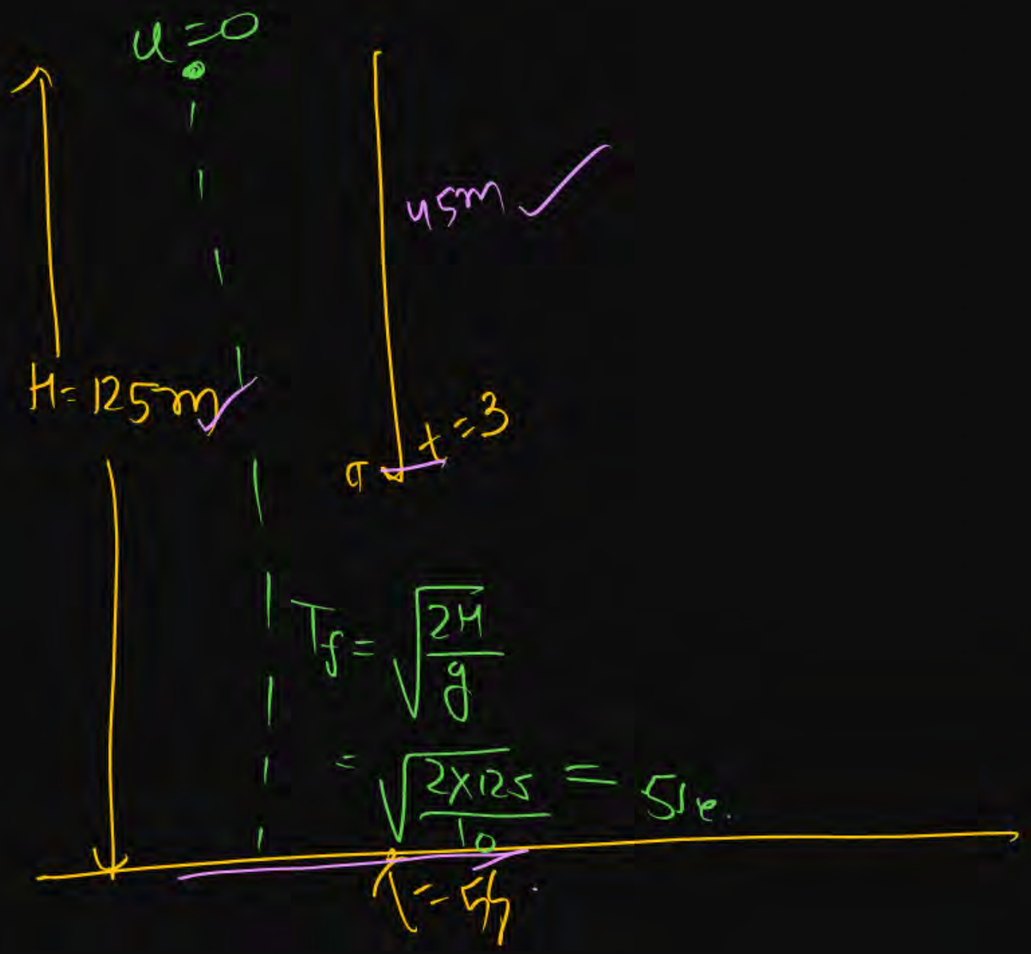
$$18 = 2n$$

$$n = 9$$

$$t = 9\,sec$$

Question

Ball is dropped from 125 m then distance moved in last 2 sec of Journey.



80m = 125 − 45

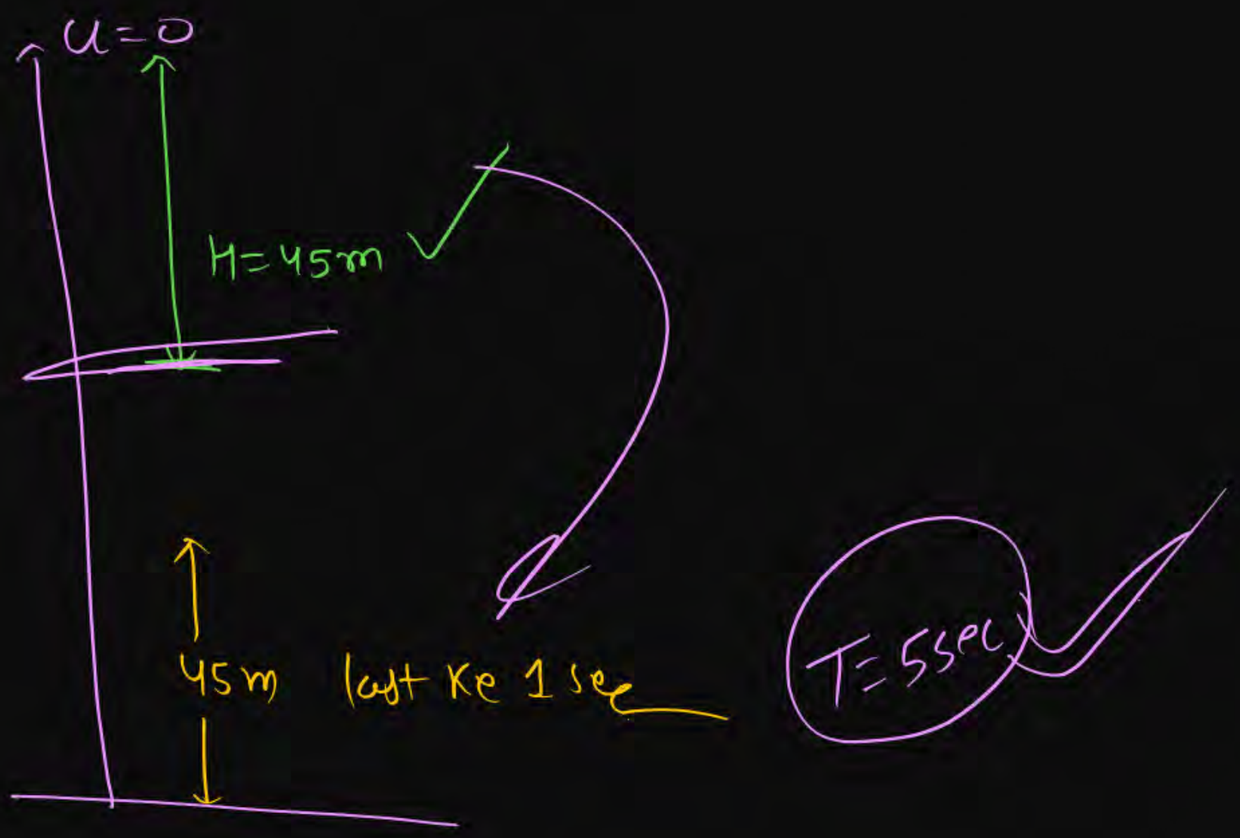
Question

Ball is dropped then find ratio of distance in 3^{rd} sec and 7^{th} sec?

5 : 13

Question

Object is dropped and distance in last 1 sec is equal to 1st 3 sec then find height from ground from where ball is dropped.

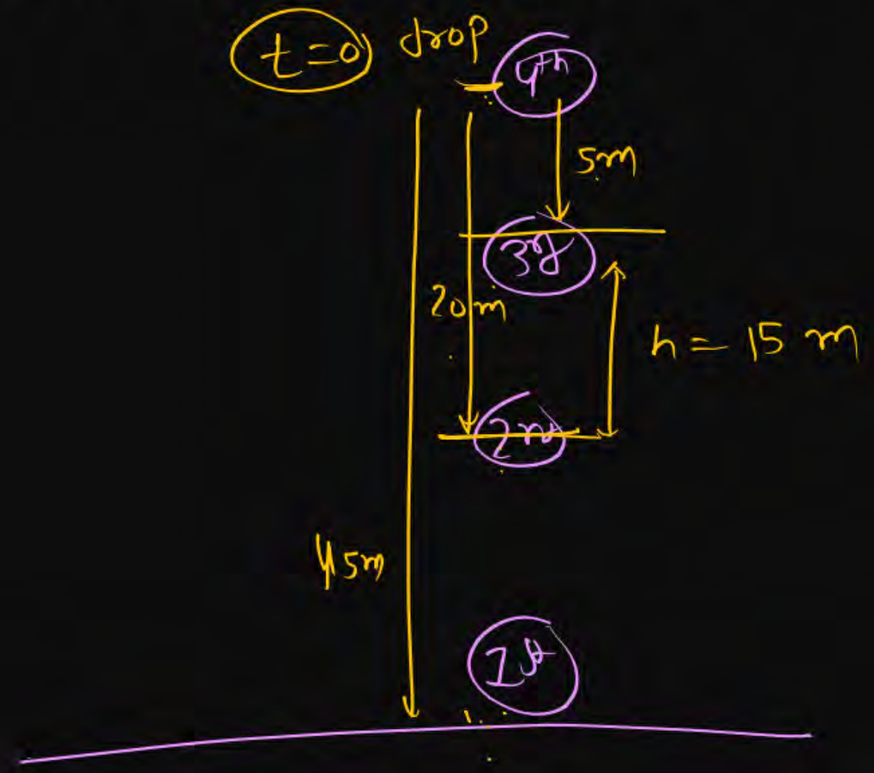


H=125m

T=5sec

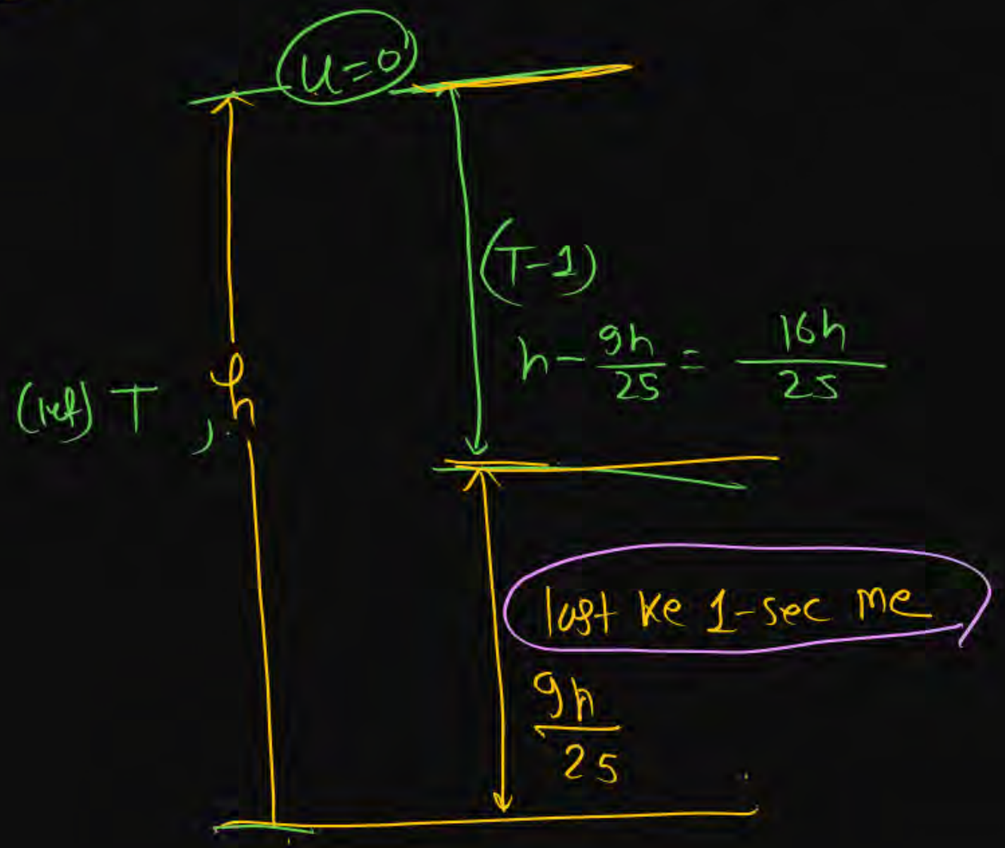
Question

A ball is dropped at $t = 0$ sec after 1 sec 2^{nd} ball is dropped after 2 sec 3^{rd} ball is dropped, after 3 sec, 4^{th} ball is dropped. Then, find distance between 2^{nd} and 3^{rd} ball when 4^{th} ball is about to fall.



Question

A particle is dropped under gravity from rest from a height h and it travels a distance $\frac{9h}{25}$ in the last second, the height h is :



$$h = \frac{1}{2} g T^2$$

$$\frac{16h}{25} = \frac{1}{2} g (T-1)^2$$

$$\frac{25}{16} = \left(\frac{T}{T-1}\right)^2$$

$$\frac{5}{4} = \frac{T}{T-1}$$

$$5T - 5 = 4T$$

$T = 5$ sec

$h = 125$ m

Ans

$S = x : 3x : 5x : 7x : 9x$ ...

Optimum

MR$^{\text{l}}$ $h = S$

$$\frac{9h}{25} = \frac{9 \times 5}{25} = \frac{9}{5}x$$

$$\frac{9h}{25} = \frac{9 \times 20}{7}x$$

$$\frac{9 \times 125}{25} = 45$$

Question

Motion under gravity is an example of

1. Non-uniform acceleration, uniform motion
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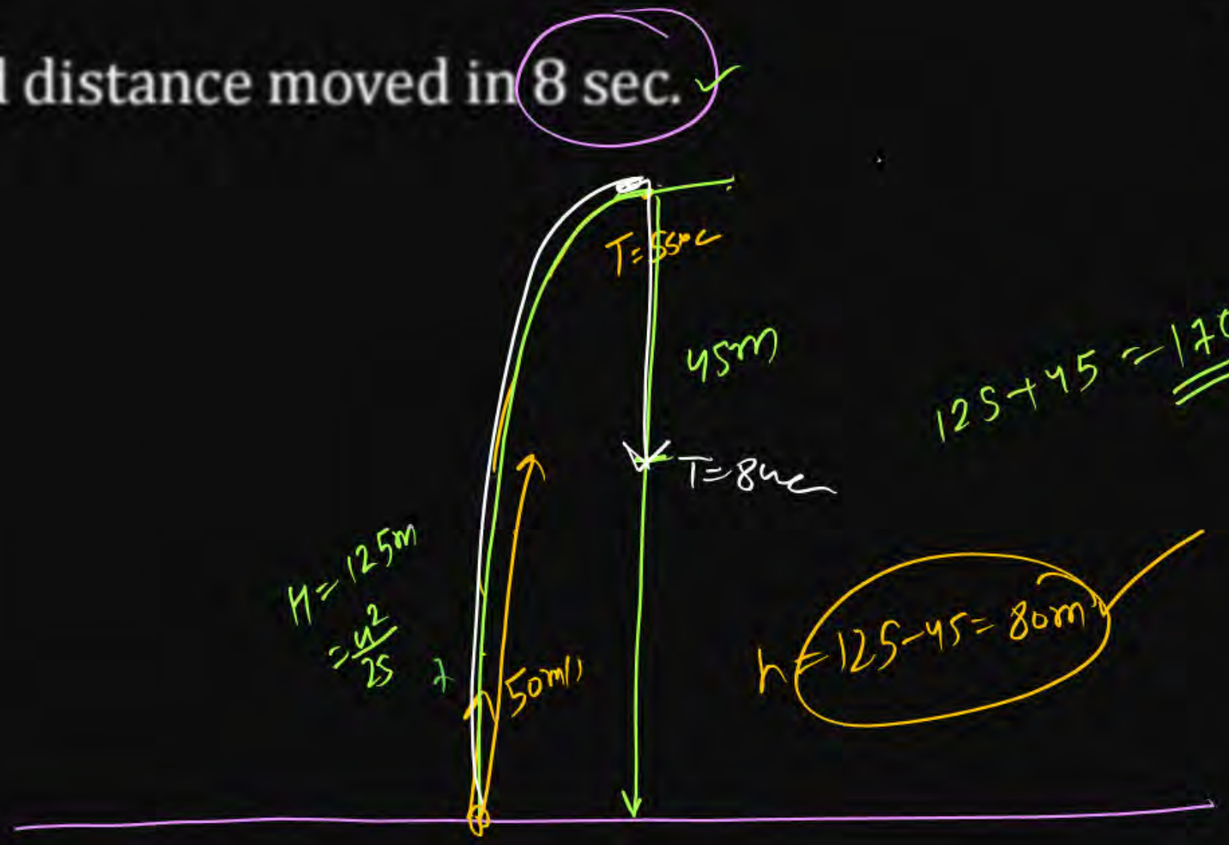
Question

Ball is projected up with 50 m/s then find distance moved in 8 sec.



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

$$= 50 \times 8 - \frac{1}{2} \times 10 (8)^2$$

$$= 400 - 320$$

$$= \underline{80m}$$

64
5
320

Question

Ball is projected up with 70 m/s then find displacement in 10^{th} sec and 10 sec.

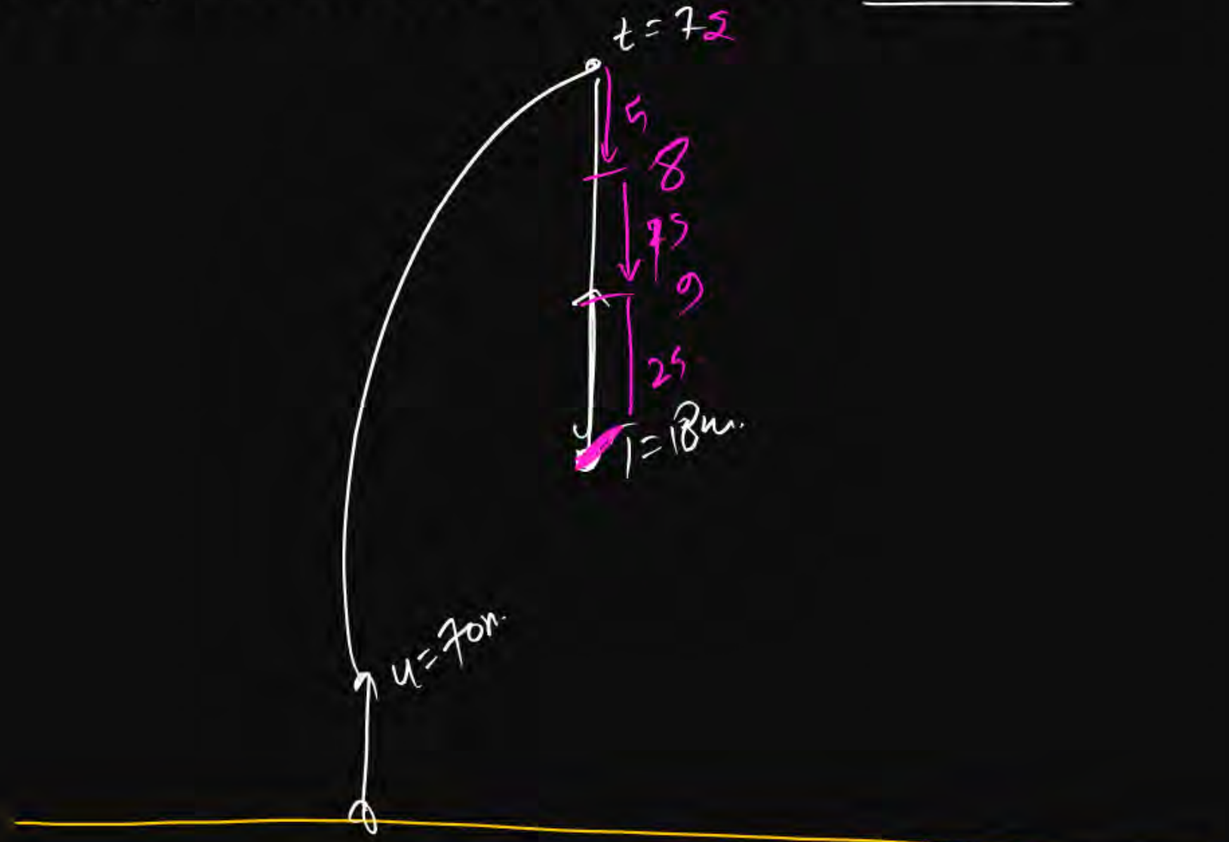
$$S_{nth} = u + \frac{g}{2}(2n-1)$$

$$= 70 - \frac{10}{2}(20-1)$$

$$= 70 - 10 \times 5$$

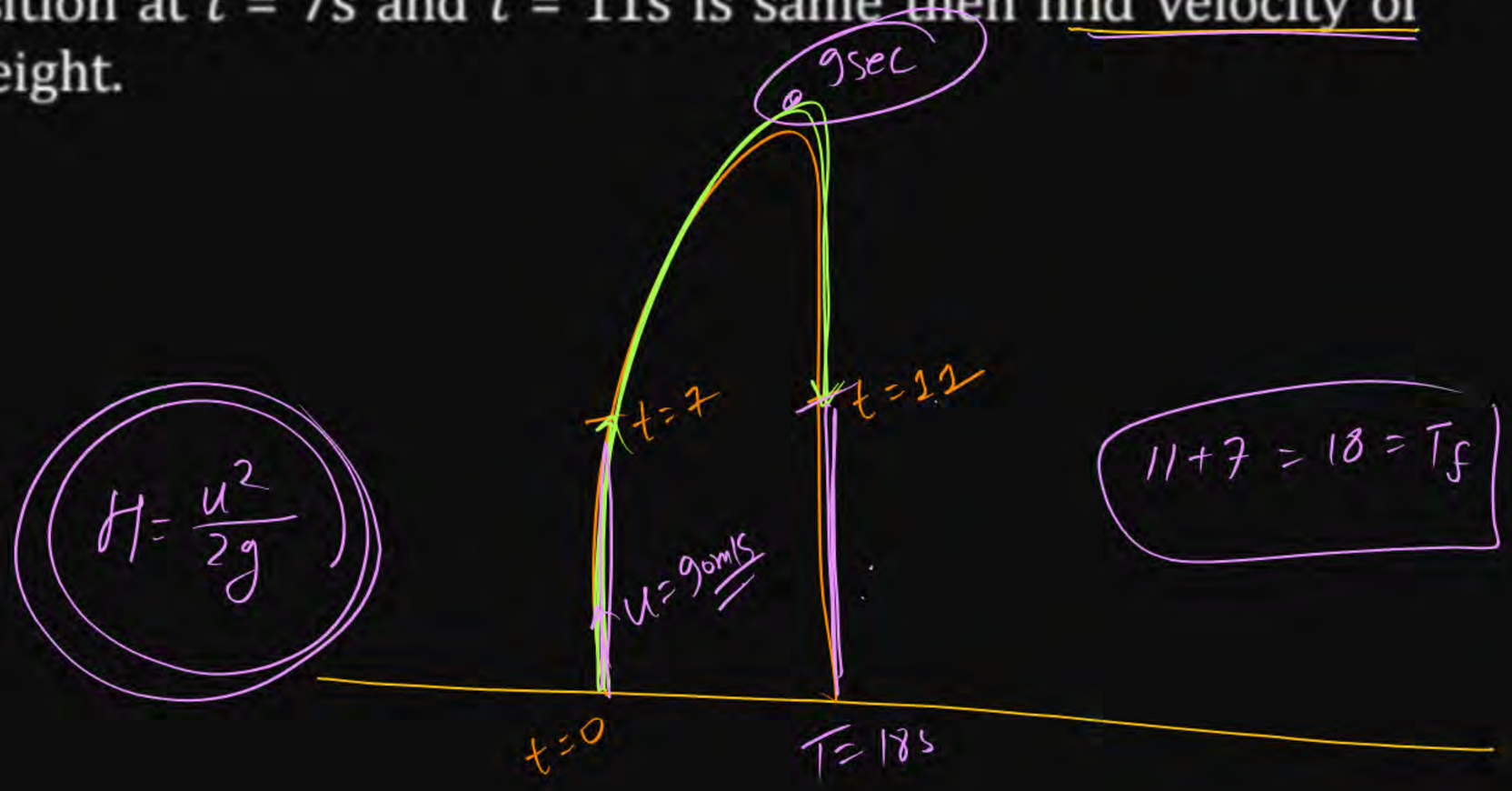
$$= 70 - 95$$

disp^m in 10^{th} sec $= 25m$



Question

Ball is projected up its position at $t = 7s$ and $t = 11s$ is same then find velocity of projection and maximum height.



Question

Object is projected up with u its height at 3 sec and 13 sec is same find u and that height.

$T_f = 3 + B = 16$ sec

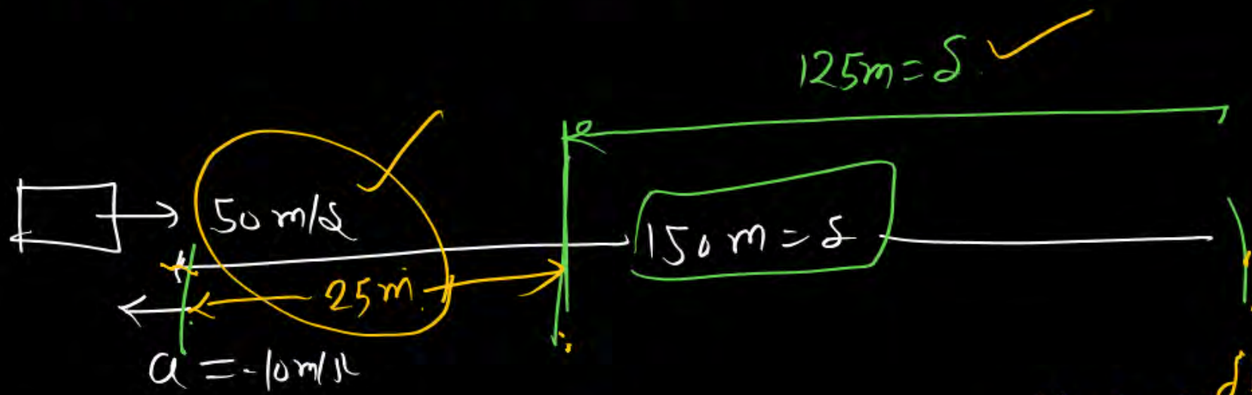
$T_{up} = 8$ sec $= \frac{u}{g}$

$u = 80$ m/s

$h = \frac{u^2}{2g} = 320$ m

Reaction time :→ The time gap between taking desigion and respond.

② CAR is moving with Velocity 50m/s and he decided to apply Break which produce retardation (10m/s²) before coming to rest he Traval 150m then find reaction time.



hint 1st Calculate Stopping distance

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

$= 125m$

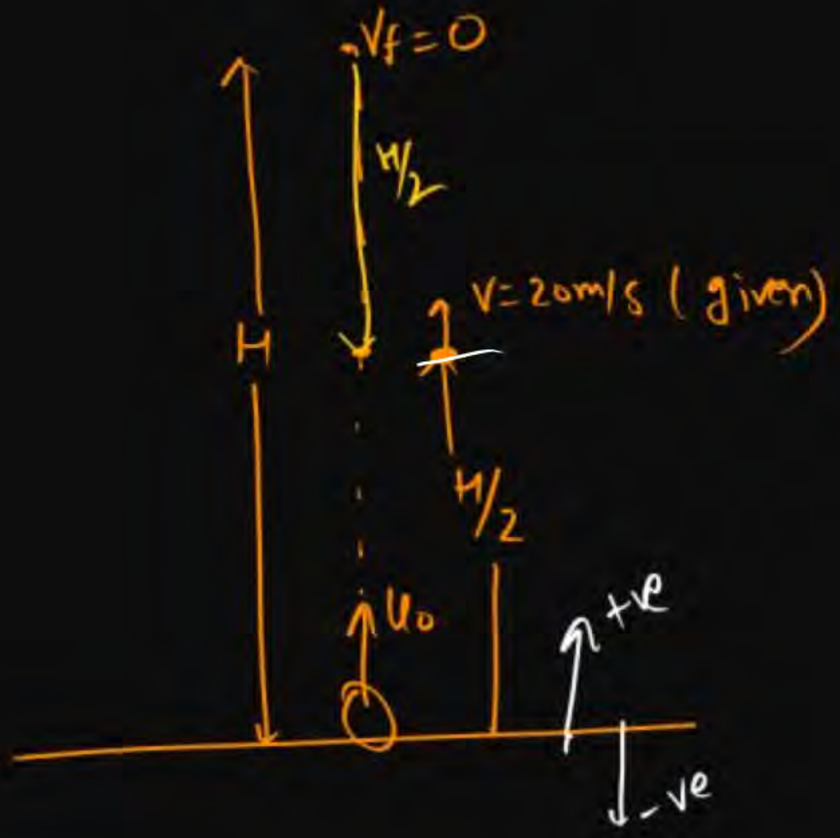
$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$= \frac{25m}{50} = \frac{1}{2}\text{sec}$$

4/40

Question

A ball is thrown upward with u_0 if its velocity at half of maximum height is 20 m/s then find it velocity u_0.

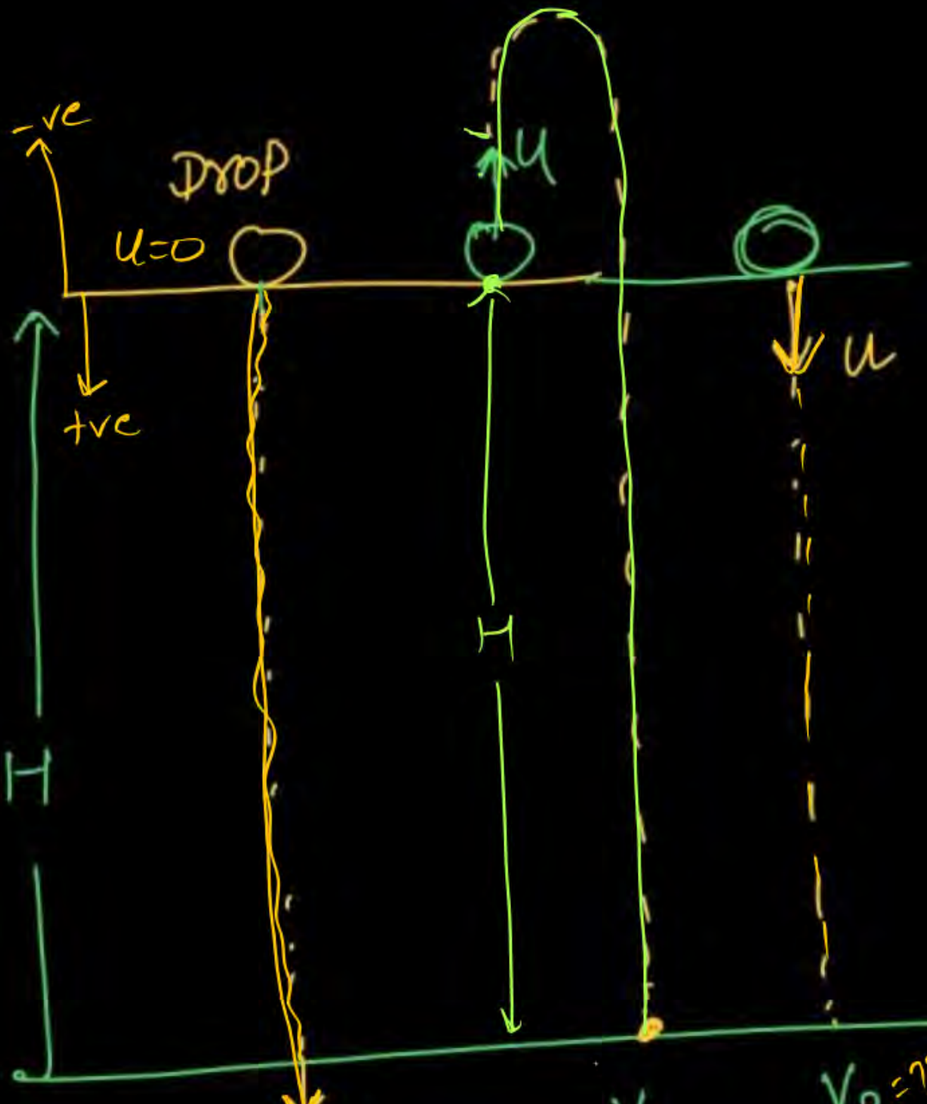


$$u_{mid} = \sqrt{\frac{u_0^2 + 0}{2}}$$

$$20 = \sqrt{\frac{u_0^2}{2}}$$

$$20 = \frac{u_0}{\sqrt{2}}$$

$$u_0 = 20\sqrt{2}$$



$V_2^2 - (u)^2 = 2gH$

$V_2 = \sqrt{u^2+2gH}$ · R ✓

$V_3^2 = u^2 + 2gH$

$V_3 = \sqrt{u^2+2gH}$ ✓

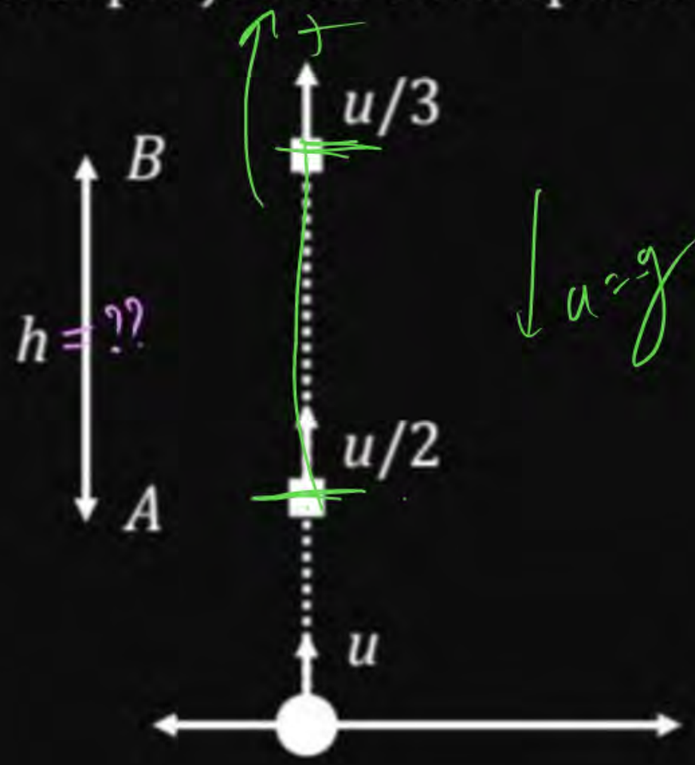
$V_3 = V_2$ ✓

Rel^n B/w V_1 & V_2 & V_3

H/W

Question

Ball is projected with speed u as shown in figure then find distance between A and B



$a = g$

$$\left(\frac{u}{3}\right)^2 - \left(\frac{u}{2}\right)^2 = 2(-g)h$$

hint:
use 3rd eqn of motion ??

PYQ

No need to write in note2

Question

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

[MR* (2022)]

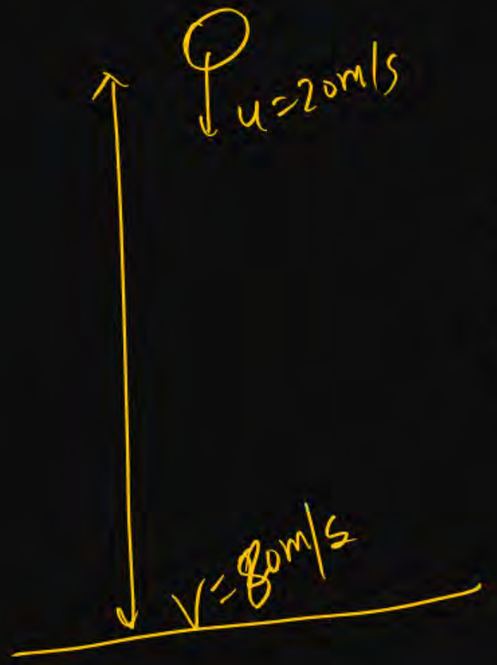
1. 1 : 1 : 1 : 1
2. 1 : 2 : 3 : 4
3. 1 : 4 : 9 : 16
4. 1 : 3 : 9 : 16

⇒ 1 : 3 : 5 : 9 :

Question

A ball is thrown vertically downward with a velocity of 20 m/s from the top of a tower. It hits the ground after some time with a velocity of 80 m/s. The height of the tower is: ($g = 10\ m/s^2$) [2020]

1. 340 m
2. 320 m
3. 300 m
4. 360 m



$v_f^2 - u_i^2 = 2as$

$(80)^2 - (20)^2 = 2gh$

Question

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: **(2013)**

1. $h_1 = h_2 = h_3$ ✗
2. $h_1 = 2\,h_2 = 3\,h_3$ ✗
3. $h_1 = \frac{h_2}{3} = \frac{h_3}{5}$ ✓
4. $h_2 = 3\,h_1$ and $h_3 = 3\,h_2$ ✗

$h_1 : h_2 : h_3 = x : 3x : 5x$

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

$3h_1 = h_2$

Question

A boy standing at the top of a tower of 20 m height drops a stone. Assuming $g = 10\ m/s^2$, the velocity with which it hits the ground is: **(2011 Pre)**

1. 10.0 m/s
2. 20.0 m/s ✓
3. 40.0 m/s
4. 5.0 m/s

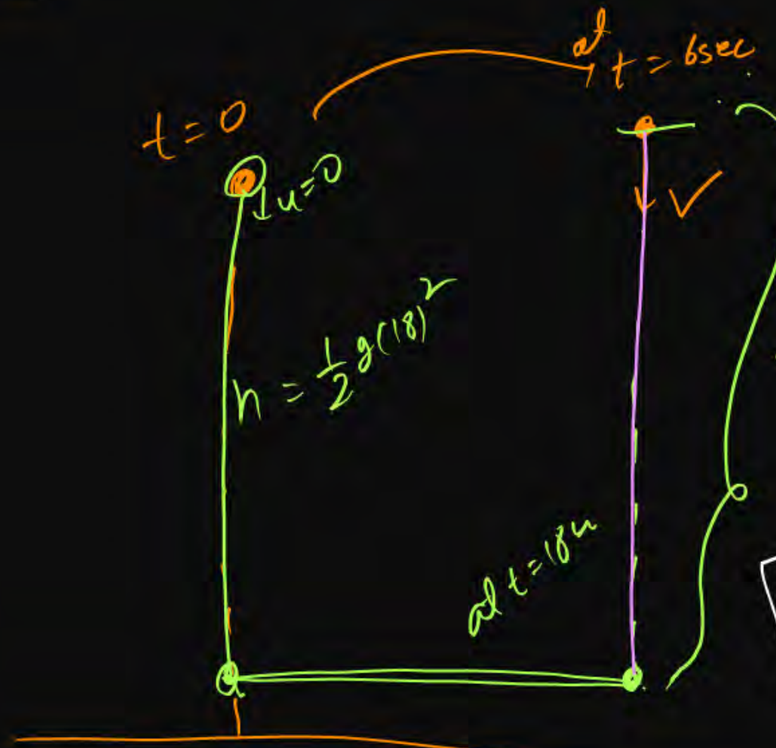
$V = \sqrt{2gH} = \sqrt{2 \times 10 \times 20}$

$= \sqrt{400}$

Question

A ball is dropped from a high rise platform at $t = 0$ starting from rest. After 6 seconds another ball is thrown downwards from the same platform with a speed v. The two balls meet at $t = 18$ s. What is the value of v? **(2010 Pre)**

1. 75 m/s
2. 55 m/s
3. 40 m/s
4. 60 m/s



Question

Two bodies, A (of mass 1 kg) and B (of mass 3 kg) are dropped from heights of 16 m and 25 m, respectively. The ratio of the time taken by them to reach the ground is:

(2006)

1. 5/4
2. 8/5
3. 5/8
4. 4/5 ✓

$$\frac{T_1 = \sqrt{\frac{2\times 16}{g}}}{T_2 = \sqrt{\frac{2\times 25}{g}}} = \sqrt{\frac{16}{25}} = \frac{4}{5}$$

Question

If a ball is thrown vertically upwards with speed u, the distance covered during the last t seconds of its ascent is [2003]

1. ut
2. $\frac{1}{2}gt^2$
3. $ut - \frac{1}{2}gt^2$
4. $(u + gt)t$

Question

A man throws ball with the same speed vertically upwards one after the other at an interval of 2 seconds. What should be the speed of the throw so that more than two balls are in the sky at any time? (Given $g = 9.8\ m/s^2$) **[MR* (2003)]**

1. More than 19.6 m/s
2. At least 9.8 m/s
3. Any speed less than 19.6 m/s
4. Only with speed 19.6 m/s

$\frac{2u}{g} = nt$

$\frac{2 \times u}{g} = 3 \times 2$

$u = 30\ m/s$

Question

A particle is thrown vertically upward. Its velocity at half of the height is 10 m/s, then the maximum height attained by it: ($g = 10\ m/s^2$) **(2001)**

1. 8 m
2. 20 m
3. 10 m
4. 16 m

$\uparrow 10\ m/s$

$\uparrow u = 10\sqrt{2}$

$H = \frac{(10\sqrt{2})^2}{2g}$

$= \frac{100 \times 2}{2 \times 10}$

Question

A body starts falling from height 'h' and travels distance $h/2$ during last second of motion then time of flight is (in second): (1999)

1. $\sqrt{2}-1$
2. $2+\sqrt{2}$
3. $\sqrt{2}+\sqrt{2}$
4. $\sqrt{3}+2$

$$t_2 = T - \frac{T}{\sqrt{2}}$$

$$1 = T\left(1-\frac{1}{\sqrt{2}}\right)$$

$$1 = T\left(\frac{\sqrt{2}-1}{\sqrt{2}}\right)\times\left(\frac{\sqrt{2}+1}{\sqrt{2}-1}\right)$$

Question

A body dropped from a height h with initial velocity zero, strikes the ground with a velocity 3 m/s. Another body of same mass dropped from the same height h with an initial velocity of 4 m/s. The final velocity of second mass, with which it strikes the ground is:

[MR* (1996)]

1. 5 m/s
2. 12 m/s
3. 3 m/s
4. 4 m/s

$V^2 = 2gh$ — (I)

$v_f^2 - u^2 = 2gh$ — (II)

$g = 2gh$

$v_f^2 - 16 = 2gh$

$g = v_f^2 - 16$

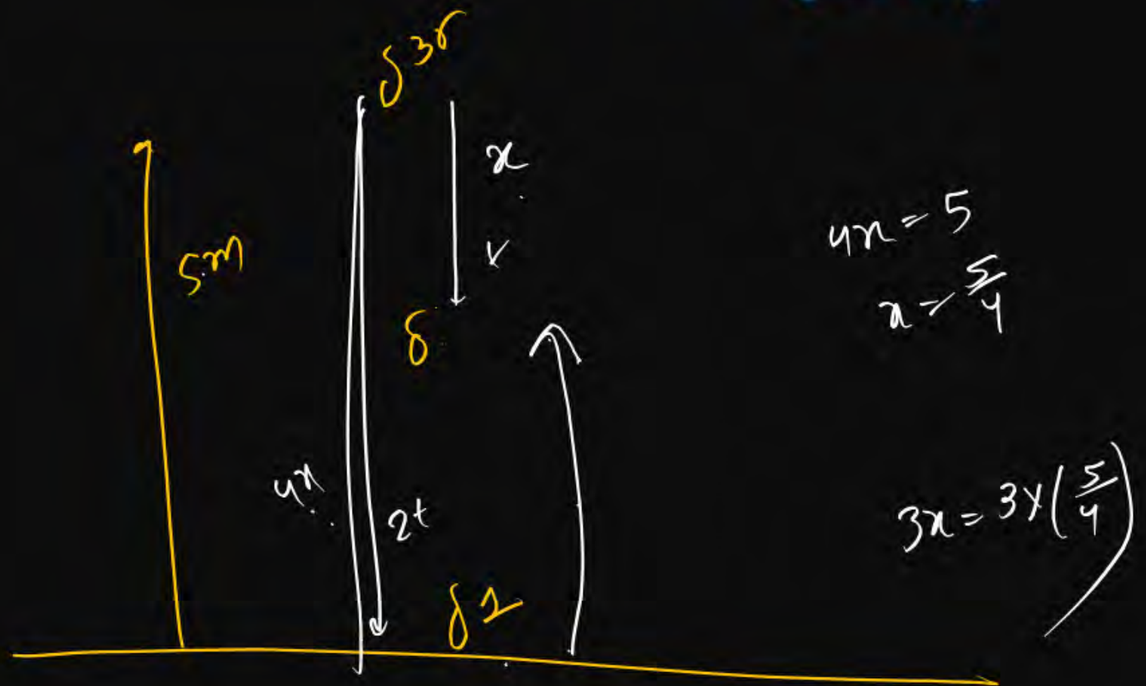
$25 = v_f^2$

v_f

Question

The water drop falls at regular intervals from a tap 5 m above the ground. The third drop is leaving the tap at instant the first drop touches the ground. How far above the ground is the second drop at that instant? **(1995)**

1. 3.75 m
2. 4.00 m
3. 1.25 m
4. 2.50 m



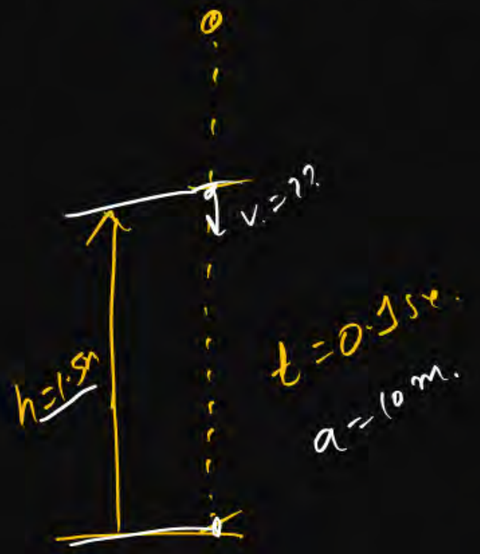
Question

A person sitting in the ground floor of a building notices through the window, of height 1.5 m, a ball dropped from the roof of the building crosses the window in 0.1 s. What is the velocity of the ball when it is at the topmost point of the window?

($g = 10\ m/s^2$)

(2020-Covid)

1. 14.5 m/s
2. 4.5 m/s
3. 20 m/s
4. 15.5 m/s



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

$1.5 = u \times \frac{1}{10} + \frac{1}{2} 10 \left(\frac{1}{10}\right)^2$

$\frac{15}{10} = \frac{u}{10} + \frac{1}{2 \times 10}$

$15 - \frac{1}{2} = u$

$u = \frac{29}{2}$

@MRPHYSICSS

Join for Class question P.d.f.

THANK YOU