YAKEEN NEET 2.0

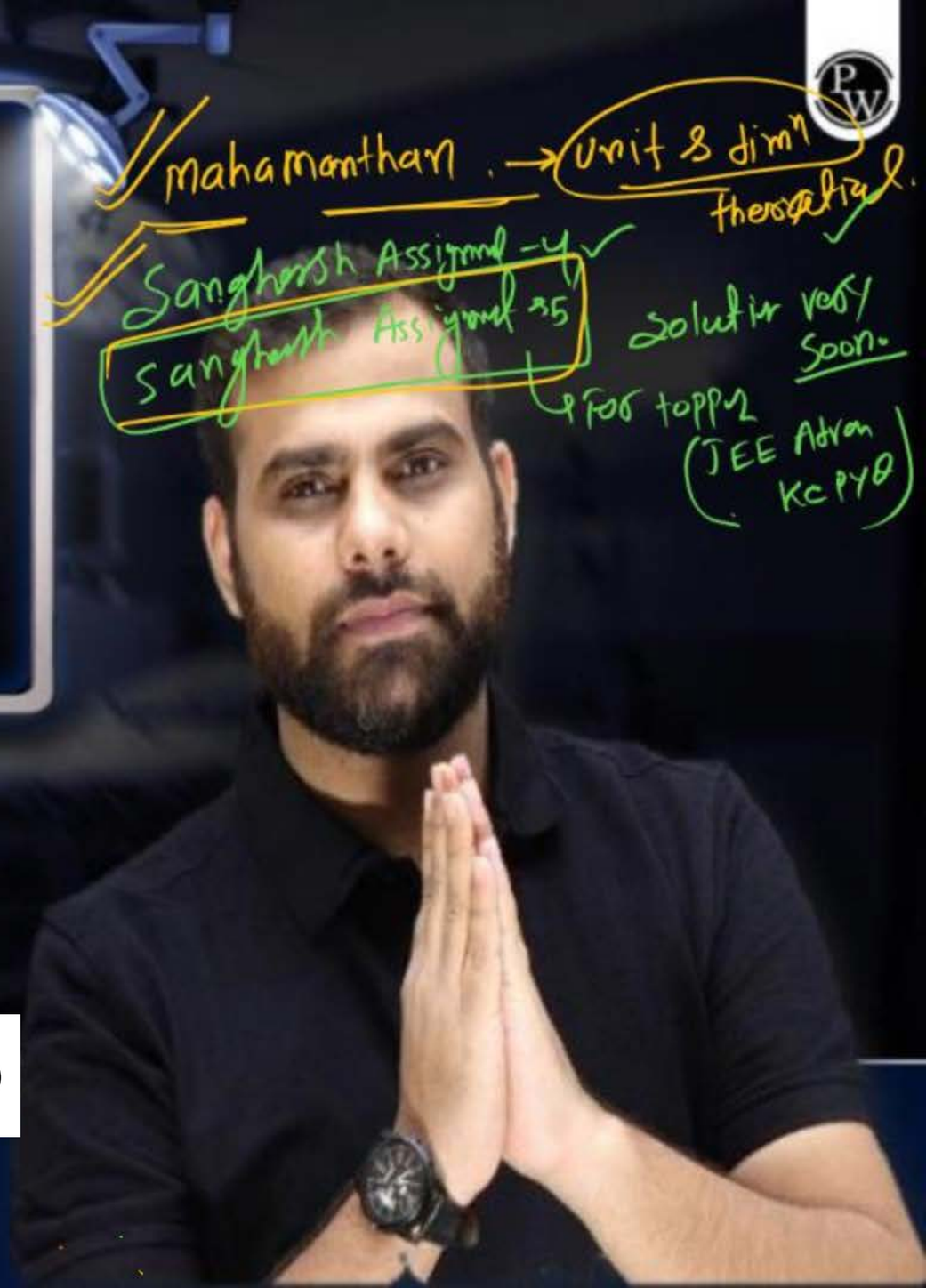
2026

Motion in a Straight Line

Physics

Homework Solution 01 (of Lec-02)

By- Manish Raj (MR Sir)



Question

Statement-1: Distance and displacement is different physical quantity.

Statement-2: Distance and displacement have same unit and dimension.

H/W

1. Both are wrong
2. Both are correct
3. 1st wrong, 2nd correct
4. 1st correct, 2nd wrong

Note (H/W)

Question

Fill in the blanks : (may/must/must not/may not)

(disp^m must be zero)

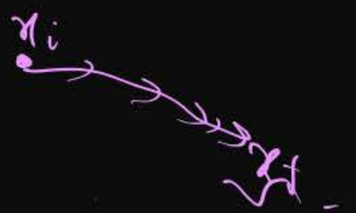
A. Distance travelled by object is zero the displacement must not be non-zero.

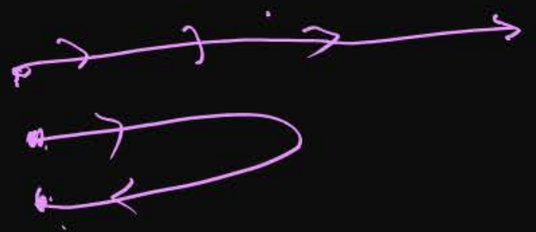
B. Distance travelled by object is not zero then displacement may / may not be zero.

C. Displacement moved is zero then distance may or may not be zero

(Starting Point पर आ)

D. If displacement is not equal to zero then distance must not equal to zero.





Question

Note (H/W)
Part of mahamant bhi hoga

True / False

dist not mention

A. Particle is moving on straight line, distance is equal to displacement — false

B. Displacement independ of choice of frame of reference — false

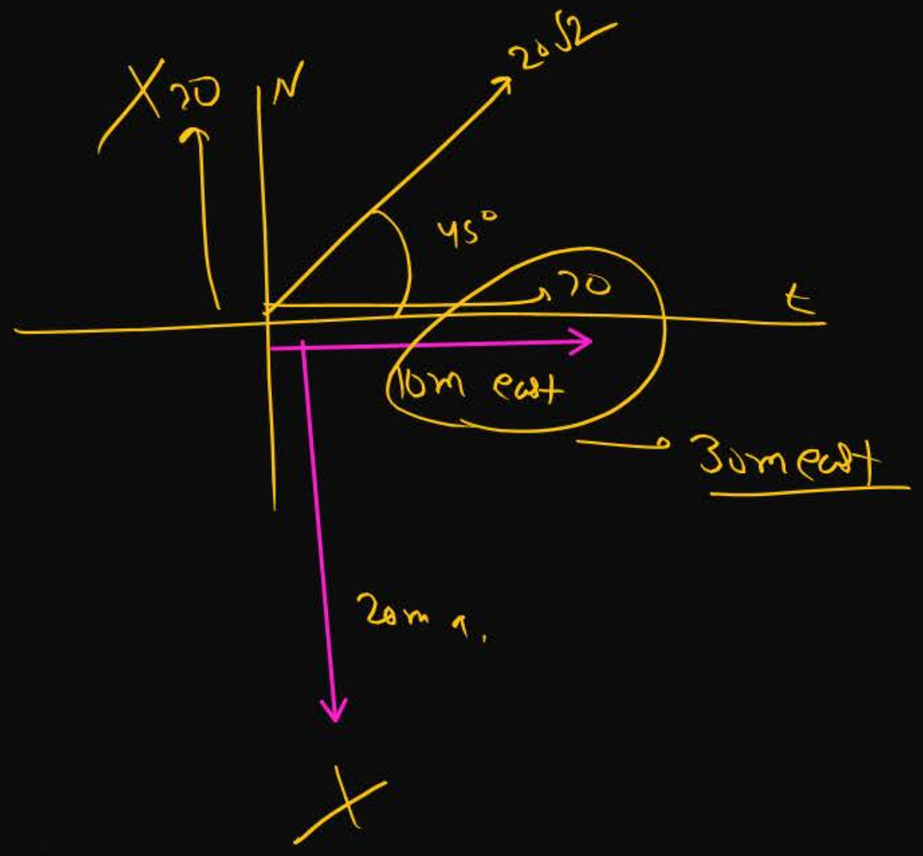
C. For a particle moving on parabolic path distance always grater than displacment — True

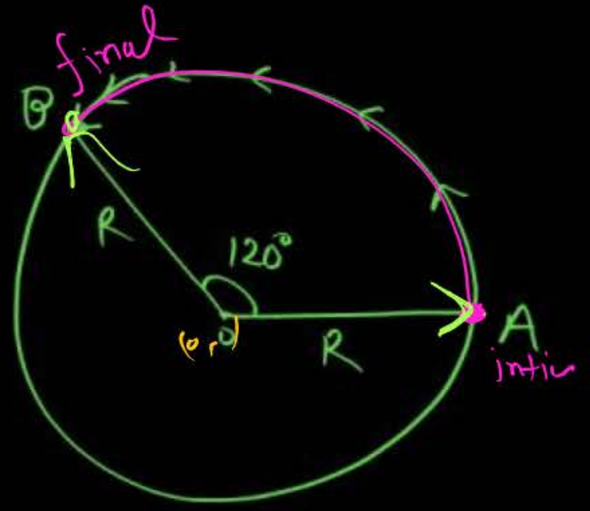
D. Displacement is not zero; then distance must not be zero — True

E. Distance is not equal to zero; then displacement may equal to zero. — True

Question

A student moves 10m towards east then 20m south and then $20\sqrt{2}$ north east then find displacement?





$$\text{disp}^{m} = \vec{r_f} - \vec{r_i}$$

$$= 2R \sin(\theta/2)$$

$$= 2R \sin\left(\frac{120^{\circ}}{2}\right)$$

$$= 2R \frac{\sqrt{3}}{2}$$

$$= \sqrt{3}R$$

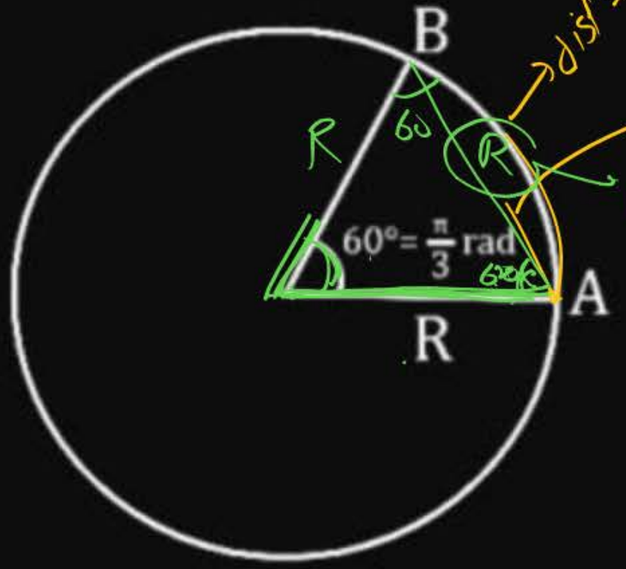
$$\text{dist}^{n} =$$

$$\text{disp} =$$

H/W

Question

Object moves on a circular path by angle 60° then find ratio of distance to displacement.



dist = Rθ

dist = 2R sin(θ/2)

= 2R sin(60°/2)

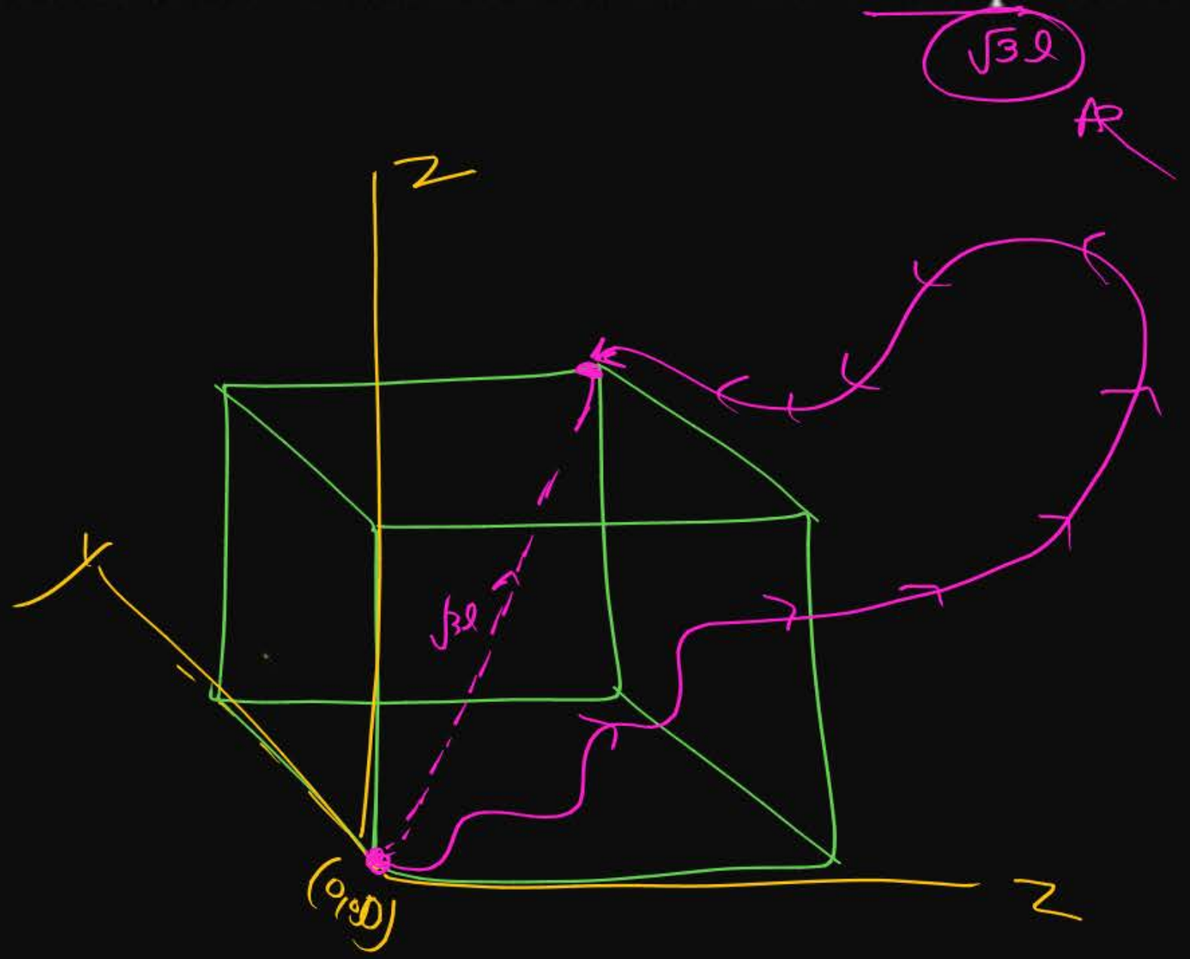
= 2R × 1/2

= R

H/W

Question HW

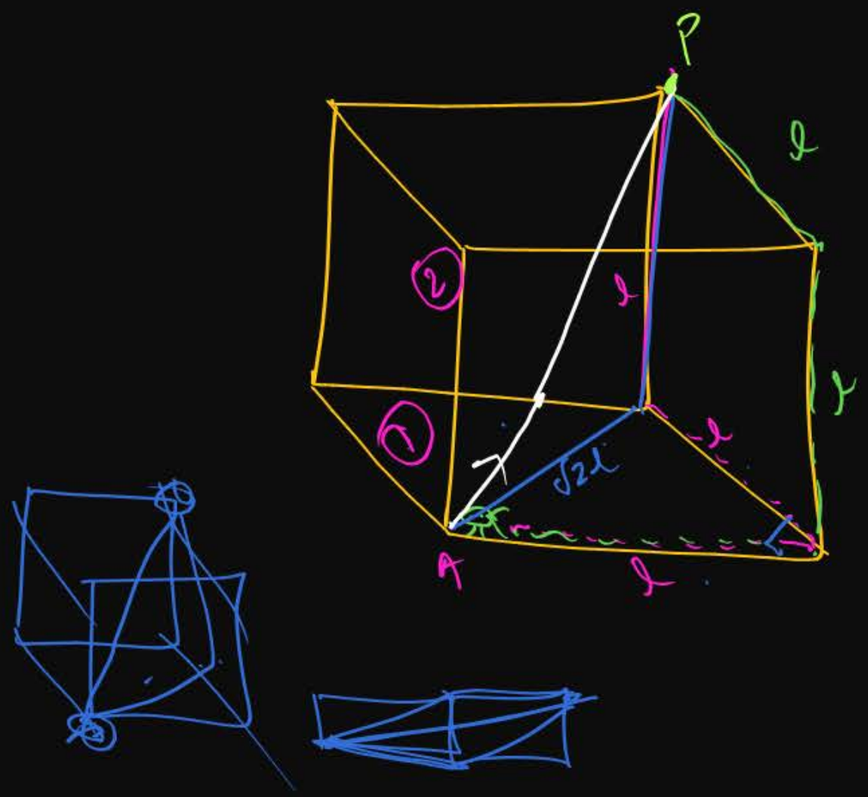
A butterfly start flying from a corner of the cubical room of side l and reaches to the opposite corner of the room. Find its displacement.

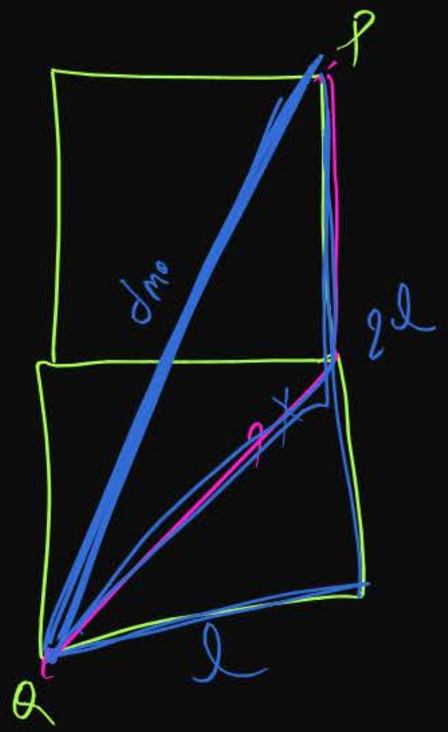


Question HW

An ant start moving from a corner of the solid cubical room and want to reach opposite of body diagonal find minimum distance moved by ant.

↳ 3ℓ / $\sqrt{2}\ell + \ell$





$d_{min} = \sqrt{\ell^2 + (2\ell)^2}$

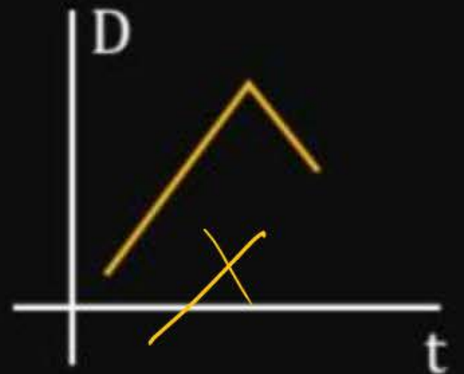
$= \sqrt{5\ell^2}$

$\therefore \sqrt{5}\,\ell$ Ans

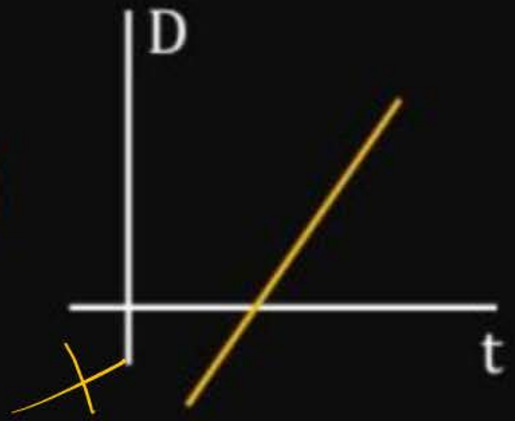
Question

Which of the following graph is correct for distance-time.

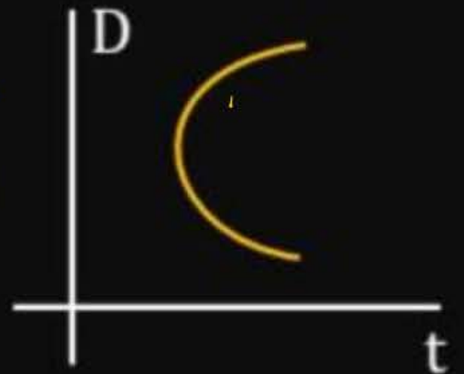
1



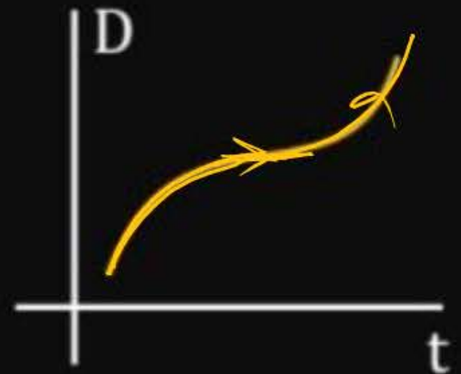
2

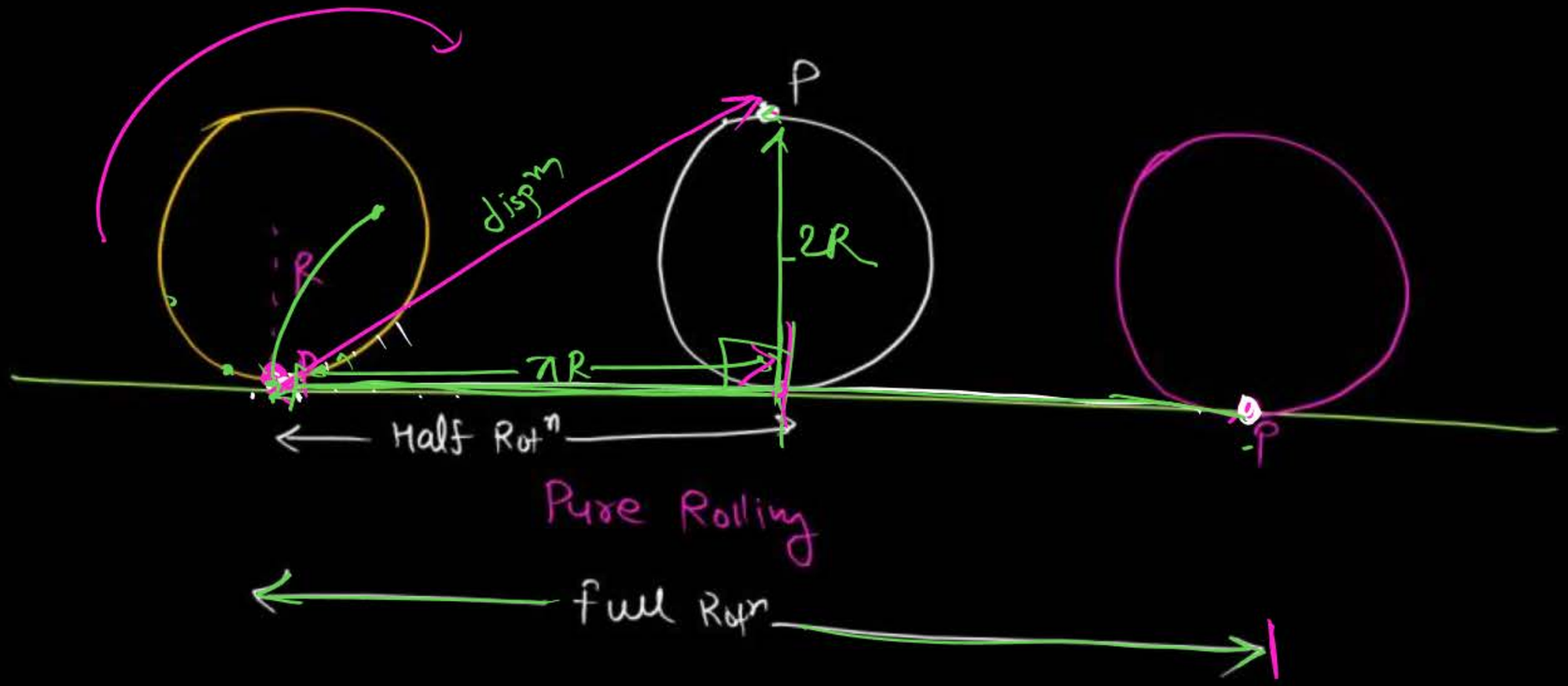


3



4





(#) $|\text{disp}^m|_P$ in full Rot^n = ?? $2\pi R$

$|\text{disp}^m|_P$ in Half Rot^n = ??

Just Try

$\text{disp}^n = \sqrt{(\pi R)^2 + (2R)^2} = R\sqrt{\pi^2 + 4}$

Ans

Think about $\frac{1}{4}^{th}$ $8R$

Question

HTW

A drunkard is walking along a straight road. He takes 5 steps forward and 3 steps backward and so on. Each step is 1 m long and takes 1s. There is a pit on the road 11 m away from the starting point. The drunkard will fall into the pit after:

1. 21 s
2. 29 s ✓
3. 31 s
4. 37 s

2m + 2m + 1 + 2 = 6m + 5 = 11m

8 sec 8 sec 8 sec + 5.

Question 11/20

A mosquito net over a 7 ft × 4 ft bed is 3 ft high. The net has a hole at one corner of the bed through which a mosquito enters the net. If flies and sits at the diagonally opposite upper corner of the net.

(a) Find the magnitude of the displacement of the mosquito.

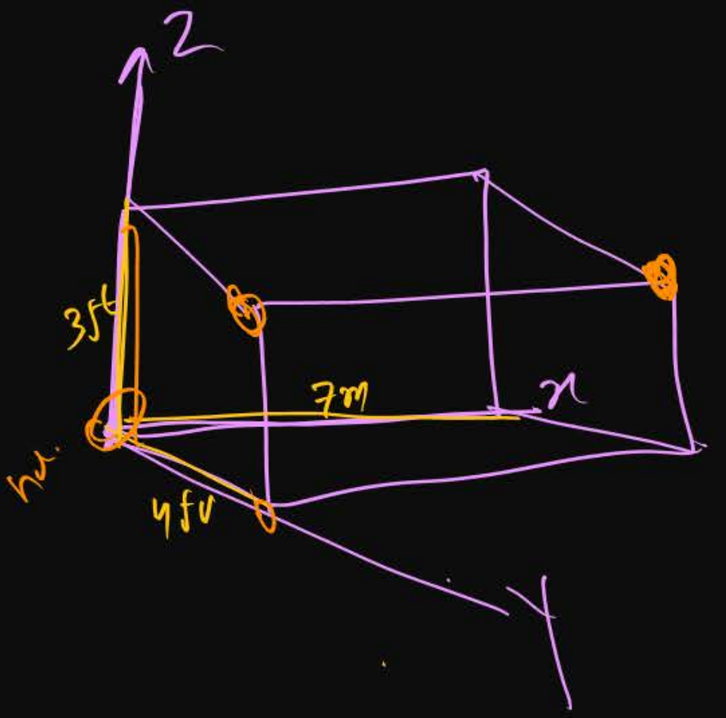
(b) Taking the holes as the origin, the length of the bed as the X-axis, its width as the Y-axis, and vertically up as the Z-axis, write the components of the displacement vector.

$$d_m = \sqrt{7^2+3^2+4^2}$$

$$= \sqrt{49+9+16}$$

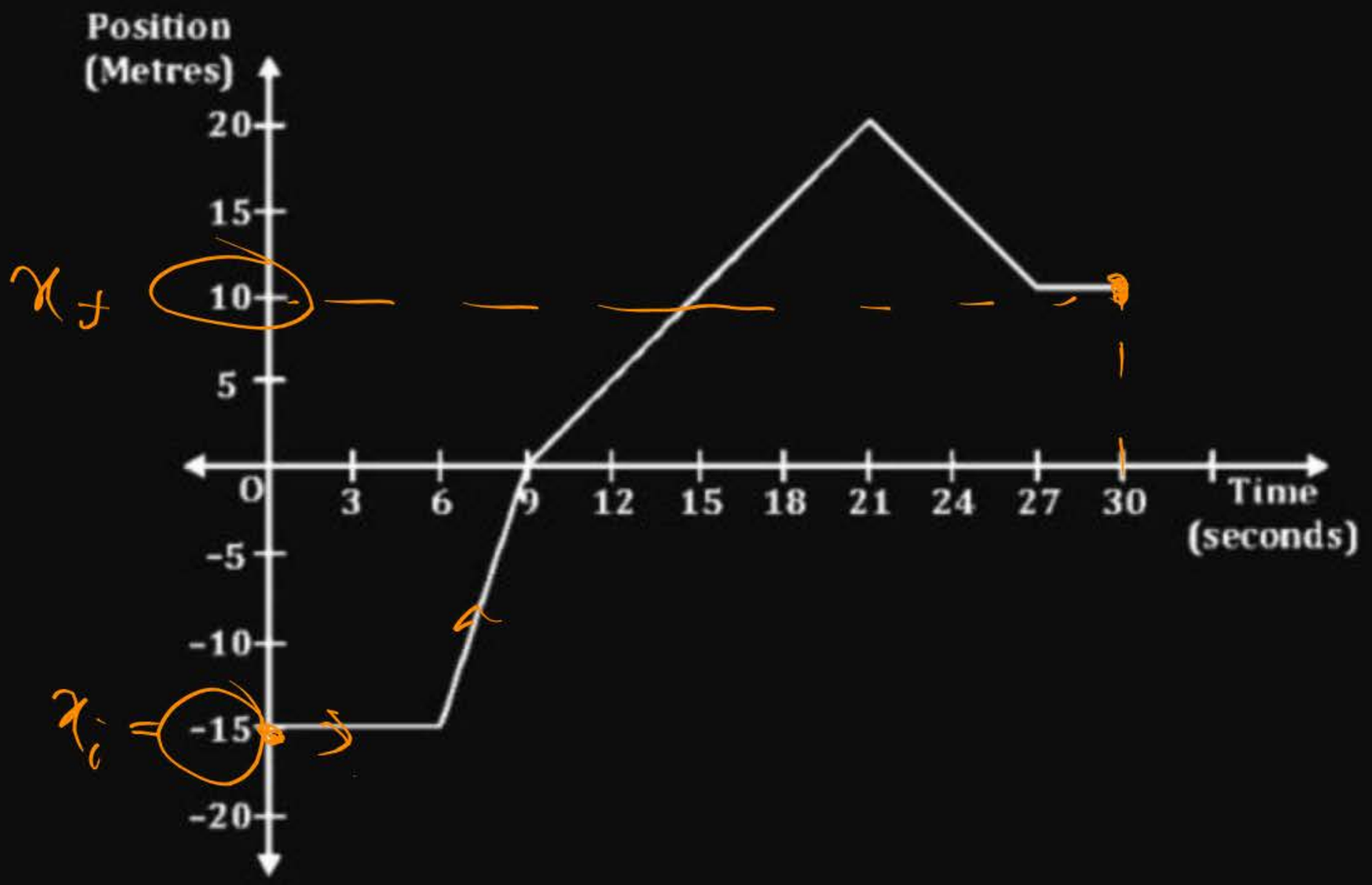
$$= \sqrt{49+25} = \sqrt{74}$$

$\vec{s} = 7\hat{i} + 4\hat{j} + 3\hat{k}$



Question

The position-time graph for an elevator travels up and down is given below. Find the distance and displacement of the elevator between 6 seconds and 21 seconds.



THANK YOU