HW

Home Assignment

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① What is uniform circular motion? How is uniform circular motion regarded as an accelerated motion? Explain
When an object revolves in a circular orbit its motion is said to be uniform circular motion.
Uniform Circulated motion is accelerated because the velocity changes due to continuous change in the direction of motion.
The change in velocity gives rise to an acceleration in the moving object.

② An object is moving with uniform speed in a circular circle of radius.
Calculate the distance & displacement:

a) When it completes half the circle

Distance = πr

~~$2 \times 3.14 \times r = \text{distance}$~~

Displacement = $2r$

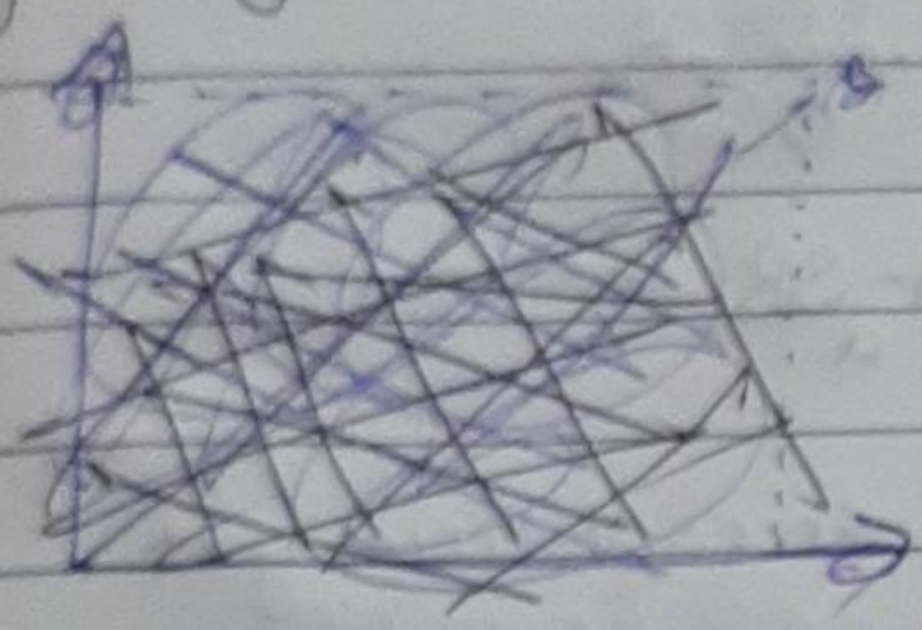
b) When it completes full circle

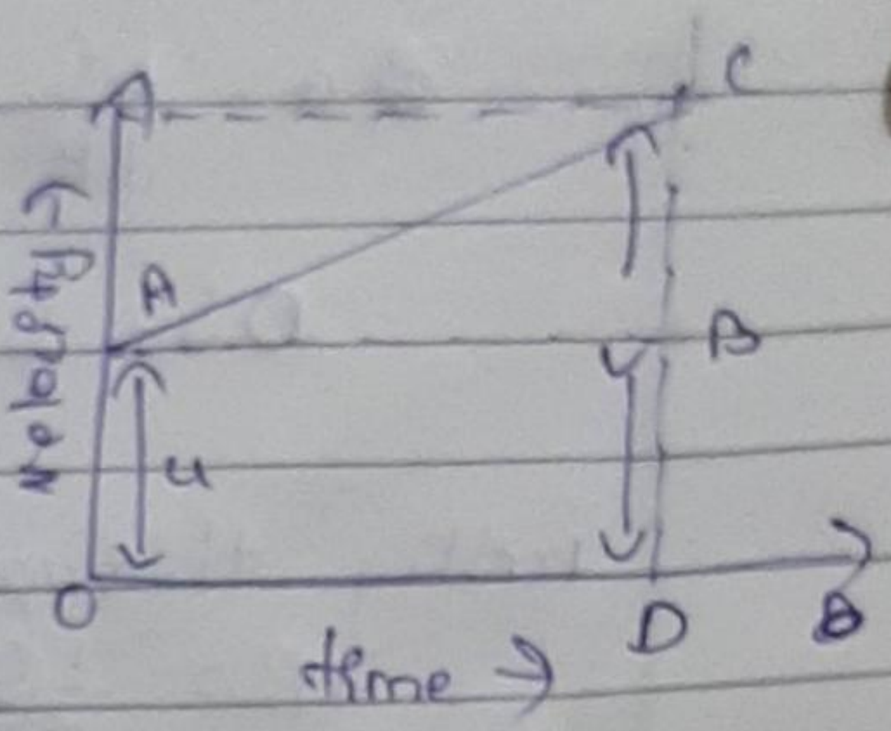
Distance = $2\pi r$

Displacement = 0

③ What type of motion does the object possess?
The object possess circular motion.

⑧ Draw velocity - time graph for an uniformly accelerated object.
Using velocity - time graph, derive $v = u + at$.





⑨ Write the 3 equations for the ~~time~~ uniformly accelerated motion. Also derive the second and third equations by graphical method.

Ans:- Eq 1: $v = u + at$

Eq 2: $s = ut + \frac{1}{2}at^2$

Eq 3: $v^2 = u^2 + 2as$

2nd Equation:-

s = area of trapezium OSQP

= area of rectangle OSAP + Area of Δ PAQ

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

3rd Equation:-

s = A of trapezium OSQP

$= \frac{1}{2}(OP + SQ) \times OS$

$\therefore OP = u$

$= \frac{1}{2}(u + SQ) \times OS$

a = Slop of $v-t$ graph PQ

$a = \frac{PQ}{PR} = \frac{SQ-SR}{OS}$

$$OS = \frac{SQ - SR}{a} \text{ ---------- (iv)}$$

Putting this value in eq (iii) we get

$$s = \frac{1}{2}(SR + SQ)\left(\frac{SQ-SR}{a}\right)$$

or $s = \frac{1}{2a}(AQ^2 - SR^2)$

$s = \frac{1}{2a}(v^2 - u^2)$

$v^2 - u^2 = 2as$

$\underline{v^2 = u^2 + 2as}$