Home Assignment

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Given,

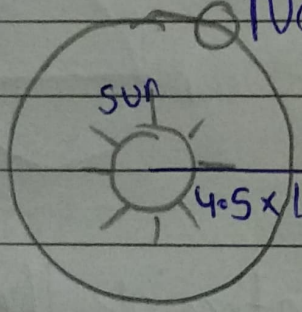
1) Radius of Orbit of Neptune = 4.5×10^9 km

Time taken for one complete revolution by Neptune = 165 years

Need to find out, speed of the planet in km/hr

We know that speed = $\frac{\text{Total distance travelled}}{\text{Total Time taken}}$

$= \frac{\text{Circumference of the orbit}}{\text{Time taken for one revolution}}$



$= \frac{2\pi \times 4.5 \times 10^9}{165 \text{ years}}$

$= \frac{2\pi \times 4.5 \times 10^9}{165 \times 365 \times 24 \times 12}$ (Converting hours into years)

$= \frac{\pi \times 45 \times 10^8}{165 \times 365 \times 12 \times 4}$

$= \frac{10^8 \times \pi}{11 \times 365 \times 4}$

$= \frac{100 \times 10^6 \times \pi}{11 \times 365 \times 4}$

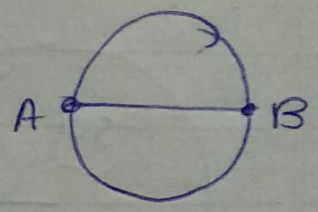
$= \frac{22 \times 10^6 \times \pi}{7 \times 73 \times 11}$

$= \frac{10^7}{7 \times 73} = \frac{10^7}{551}$

Lec

② Given that,
Circumference of a circular cycle track = 314m
AB is the diametre
A cyclist travels from A to B along a circular path.
Constant Magnitude = 15.7 m/s

(a) To be find out distance = ?
$2\pi r$ = Circumference of the circular track
πr = From A to B along a circular path
= $\frac{\text{Circumference}}{2}$



= $\frac{314}{2}$ m
= 157m

(b) Displacement = Diametre of the circular track
Diametre = 2 × Radius (2r)
$2\pi r = 314$
$2 \times 3.14 \times r = 314$
$2r = \frac{314}{3.14}$
= 100m (Displacement)

Q2

(c) Average Velocity = $\frac{\text{Displacement}}{\text{Time}}$

$= \frac{100}{t}$

Time = $\frac{\text{Distance}}{\text{Speed}}$

$= \frac{157}{15.7}$ $\frac{157}{15.7}$

= 10 second

Average Velocity = $\frac{100}{10}$ m/s = 10m/s

(3) a) The motion of a body moving around a fixed point in a circular path is known as circular motion

b)

(b) Given that,
Radious of Orbit of an artificial satellite = 42250 km
It takes 24 hours to revolve once around the earth.
Need to be find out,
Speed,
We know that Speed = $\frac{\text{Distance}}{\text{Time}}$
Distance = Circumference of the orbit
$= 2\pi r$

$$\text{Speed} = \frac{2\pi \times 42250}{\cancel{24}\ 12}$$

$$= \frac{\pi \times \cancel{42250}^{2112 5}}{\cancel{12}\ 6}$$

$$= 3520.83 \times 3.14$$

$$= 11059.4062 \text{ m/s}$$