

2) A circular cycle track has a circumference of 314 m with A & B as one of its diameters. A cyclist travels from A to B along the circular path with velocity of constant magnitude 15.7 m/s.

Find Find:

- a) the displacement distance moved by the cyclist.
- b) the displacement of the cyclist if A & B represent north-south direction.
- c) the average velocity of the cyclist.

~~ans a)~~ distance =  $(314 \div 2) \text{ m}$   
= 157 m

b) displacement =

circumference =  $2\pi r$   
= 314 m

~~circumference~~  $r = 314 \times (7 \div 22) \times \frac{1}{2}$   
= 49.95 m

Diameter = displacement  
= 49.95 m  $\times 2$   
= 99.9 m

c) Average velocity =  $15.7 + (15.7 \div 2) \text{ m/s}$   
=  $31.4 \div 2 \text{ m/s}$   
= 15.7 m/s



3) a) Define circular motion.

ans) Circular motion of an object along the circumference of a circle or rotating along a circular path.

b) An artificial satellite is moving in a circular orbit of radius 42,250 km. Calculate speed, if it takes 24 hours to revolve around the earth.

ans) Distance covered by the satellite in

$$\begin{aligned}
 24 \text{ hours} &= s = 2\pi r \\
 &= 2 \times 3.14 \times 42250 \\
 &= 265464.58 \text{ km}
 \end{aligned}$$

Therefore speed of satellite,

$$\begin{aligned}
 v &= \frac{\text{distance travelled}}{\text{time taken}} \\
 &= \frac{265464.58}{24 \times 60 \times 60} \\
 &= 3.07 \text{ km s}^{-1}
 \end{aligned}$$