

1. Radius of the orbit of Neptune  
 $r = 4.5 \times 10^9 \text{ km}$ .

Time taken by Neptune to complete  
 a trip around sun = 165 years.

$$\text{Distance covered} = 2\pi r$$

$$= 2 \times 3.14 \times 4.5 \times 10^9 \text{ km}$$

$$\text{Time} = 165 \text{ years} = 365 \text{ days} = 365 \times 24$$

$$= 8760 \text{ hours}$$

$$\text{Speed} = \frac{\text{Distance}}{\text{time}} = \frac{2826 \times 10^7}{8760}$$

$$= \frac{2826 \times 10^6}{876} = 3.2260 \times 10^6 \text{ km/hr}$$

2. Circumference of a circular cycle track  
 $= 314 \text{ m}$

$$2\pi r = 314 \text{ m}$$

$$2 \times \frac{22}{7} \times r = \frac{44}{7} \times r = 314 \text{ m}$$

$$r = \frac{314 \times 7}{44} = 49.954$$

AB = diameter.

A cyclist travels from A to B with constant velocity of 15.7 m/s.

(a) distance moved by cyclist = Distance = Speed  $\times$  Time.

$$314 \text{ m} = \text{circumference} = 157 \text{ m} = \frac{1}{2} \text{ circumference}$$

Distance

$$157 = 15.7 \times t$$

$$t = 10 \text{ sec}$$

(b) Displacement if AB represents N-S direction, =  $2r = 49.954 + 49.954$   
Approx 100m

(c) Avg Velocity =  $\frac{\text{Displacement}}{\text{time}} = \frac{100}{10} = 10 \text{ m/s}$

3. Circular motion is the movement of an object along the circumference of a circle. Can be either uniform or non-uniform.

(b) Radius = 42,250 km

Time = 24 hrs to revolve around earth

$$C = 2 \times \frac{22}{7} \times 42250 = 265571 \text{ approx}$$

$$\text{Speed} = \frac{265571}{24} = 11065 \text{ Km/hr.}$$