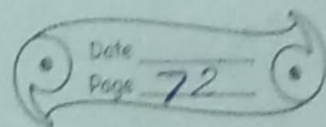


(u)

Home Assignment



1 Given, diameter of the track (d) = 200 m
 Therefore, circumference of the track (πd) =
 = 200 π metres

Distance covered in 40 seconds = 200 π metres

Distance covered in 1 seconds = $\frac{200\pi}{40}$ metres

Distance covered in 2 minutes and 20 seconds
 (140 seconds) = $140 \times \frac{200\pi}{40}$ metres

$$= \frac{140 \times 200 \times 22}{40 \times 7} = 2200 \text{ metres} \quad [\text{Distance}]$$

No. of laps completed by the athlete in 140 seconds

$$= \frac{140}{40} = 3.5$$

Therefore, the final position of the athlete is at the opposite end of the circular track. So, the net displacement is 200 m.

2. Given, Distance from A to B = 300 m

From A to C = 300 + 100 m = 400 m

Time taken from A to B = 2 min 30 secs (150 secs)

From A to C = 2 min 30 secs + 1 min = (210 secs)

Displacement from A to B = 300 m

From A to C = 300 m - 100 m = 200 m

W

$$\text{Avg speed} = \frac{\text{Total Distance}}{\text{Total time}} = \frac{300 \text{ m/s}}{150} = 2 \text{ m/s} \quad (\text{A to B})$$

$$\text{Avg velocity} = \frac{\text{Total Displacement}}{\text{Total time}} = \frac{200}{210} = 0.95 \text{ m/s} \quad (\text{A to C})$$

$$\text{Avg. velocity} = \frac{\text{Displacement}}{\text{Time}} = \frac{300}{150} = 2 \text{ m/s} \quad (\text{A to B})$$

$$\text{Avg. velocity} = \frac{\text{Displacement}}{\text{Time}} = \frac{200}{210} = 0.95 \text{ m/s}$$

3. Distance = d

Time to reach school = t_1

Time to reach home = t_2

$$\text{Avg. speed} = \frac{\text{Total Distance}}{\text{Time}}$$

$$t_1 = \frac{d}{20} \quad t_2 = \frac{d}{30}$$

$$\frac{2d}{t_1 + t_2} = \frac{2d}{\frac{d}{20} + \frac{d}{30}} = \frac{120}{5} \text{ km/h} = 24 \text{ km/h}$$

Therefore, Abdul's avg speed for the entire trip is 24 km per hour

W

4. $u = 0 \text{ m/s}$

$a = 3 \text{ m/s}^2$

$t = 8 \text{ s}$

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

$$= 0 + \frac{1}{2} \times 3 \times 8^2 = 96 \text{ metres}$$

Distance of motorcycle is 96 metres

5. Displacement of first car = $\Delta AOB = \frac{1}{2} \times OB \times OA$

$$OB = 5 \text{ sec} \quad \& \quad OA = 52 \text{ km/h} = 14.44 \text{ m/s}$$

$$\text{Area} = 5 \times 14.44 \text{ m} = 36 \text{ metres}$$

Displacement of second car = $\frac{1}{2} \times OD \times OC$

$$OC = 10 \text{ sec} \quad \& \quad OD = 3 \text{ km/h} = 0.83 \text{ m/s}$$

$$\text{So, Area} = \frac{1}{2} \times 10 \times 0.83 = 4.15 \text{ m}$$

So the first car travelled further post the application of brakes

6. a) Line B

b) No

$$\rightarrow 16 \text{ km} \quad 5.71 \text{ km}$$

$$a) \quad 7 \quad 5.14 \text{ km}$$

CW

75

7. Given,
 $u = 0$
 $s = 20\text{m}$
 $a = 10\text{m/s}^2$
 $v^2 - u^2 = 2as$
 $v^2 = 2as + u^2$
 $= 2 \times 10 \times 20 + 0$

$\Rightarrow v = 400\text{m/s}$

$t = \frac{(v-u)}{a}$
 $= \frac{20-0}{10}$
 $= 2\text{secs}$

So, it reaches the ground in 2 secs

8. (a) The shaded area is the displacement of the car over a time period of 4 secs.

So, $\frac{1}{2} \times 4 \times 6 = 12\text{metres (Ans)}$

(b) Since the speed of the car doesn't change from the points $(x=6)$ & $(x=10)$, the car is said to be in uniform motion from the 6th to the 10th second