(a)

Home Assignment

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1 Given, diametre of the track (d) = 200m
Therefore, circumference of the track (πd) =
$= 200\pi$ metres
Distance covered in 40 seconds = 200π 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

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

No. of laps completed by the athelete in 140 seconds
$= \frac{140}{40} = 3.5$
Therefore, the final position of the athelete is at the opposite end of the circular track. So, the net displacement is 200m.

2. Given, Distance from A to B = 300m
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 = 2min 30ses + 1min = (210 secs)
Displacement from A to B = 300m
From A to C = 300m - 100m = 200m

(iv)

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

Avg velocity = $\frac{\text{Total Displacement}}{\text{Total time}} = \frac{240}{210}$ = 1.9 m/s (A to C)

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

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

③ Distance = d

Time to reach school = t_1

Time to reach home = t_2

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

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

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

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

(v)

④ $u = 0$ m/s

$a = 3$ m/s

$t = 8$ s

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

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

Distance of motorboat is 96 metres

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

OB = 5 secs & OA = 52 km/h = 14.44 m/s

Area = 5×14.44 m = 36 metres

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

OC = 10 secs & OC 3 km/h = 0.83 m/s

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

So the first car travelled farther post the application of brakes

⑥ a) Line B

b) No

c) ~~16 km~~ 5.71 km

d) $\frac{7}{7}$ 5.14 km

CW

7. Given,

$u = 0$

$s = 20m$

$a = 10 m/s^2$

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

$v^2 = 2as + u^2$

$= 2 \times 10 \times 20 + 0$

$\Rightarrow v = 400 m/s$

$t = \frac{(v-u)}{a}$

$= \frac{20-0}{10}$

$= 2 secs$

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, $\frac{1}{2} \times 4 \times 6 = 12$ 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