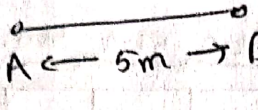
6th formulation

WS-6 Kinematics

(1)



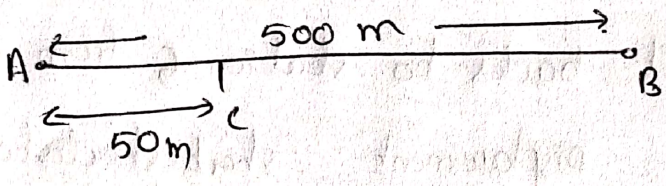
Here distance = path length covered

= 5m

(2)

SI unit of meter distance in meter

(3)



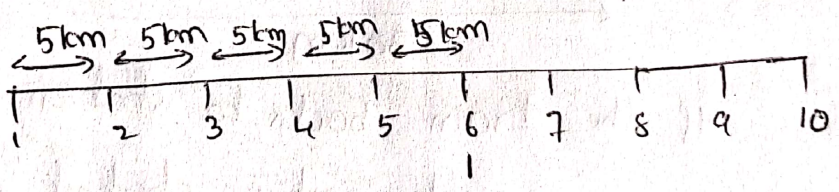
Here C is the point where car stopped finally.

∴ displacement = Final position - initial position

= C − A

= 50m

(4), (5), (6)



(4) After reaching to 6-station

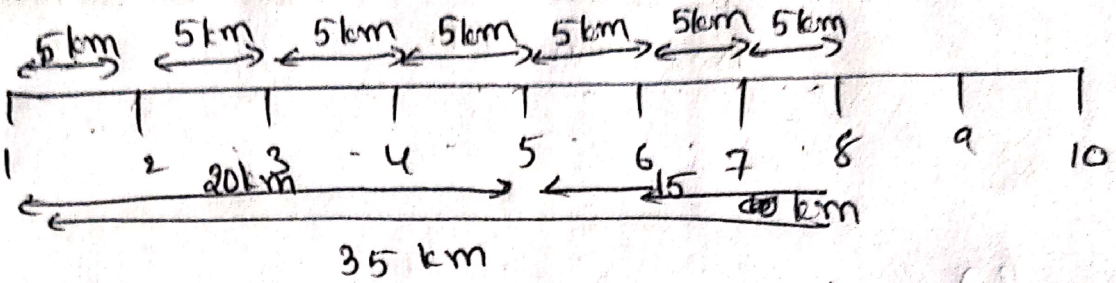
Displacement = shortest distance between station 1 & 6

= 5+5+5+5+5

= 25km

(5), (6)

After reaching station-8, the train is returned back to station-1



∴ Distance = Path length covered

= 1 → 8 + 8 → 1

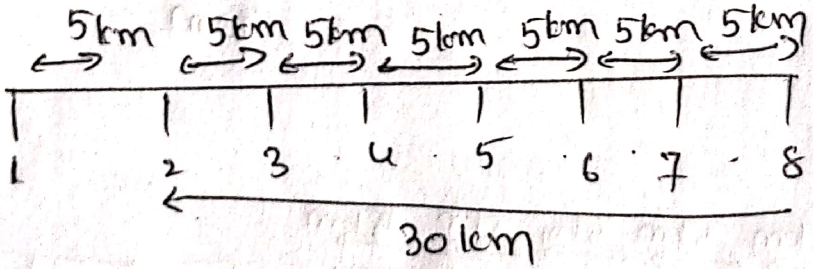
⇒ 35 km + 35 km = 70 km

If it backs to station-5 from 8.

Displacement = shortest distance between station 5 and 1

= 20 km

(7)

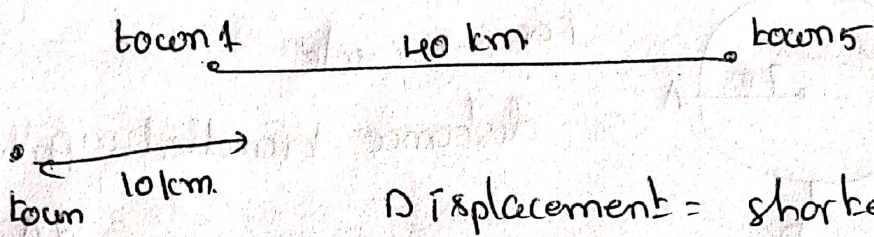


If the train backs to station-2

Displacement = shortest distance b/w 2 and 1

= 5 km

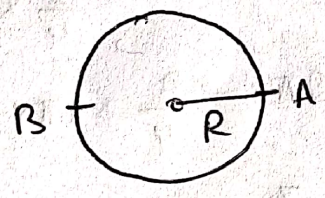
(8)



Displacement = shortest distance covered by the body

= 10 km in reverse direction

(9)



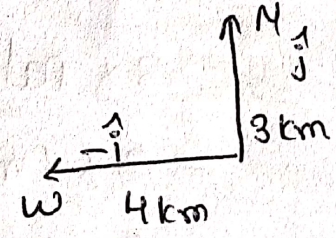
Distance travelled = Path length covered

$= \frac{1}{2} \times$ Circumference

$= \frac{1}{2} \times 2\pi R$

$= \pi R$.

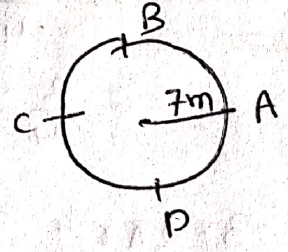
(10)



Distance travelled = 4 km + 3 km

= 7 km

(13), (14)

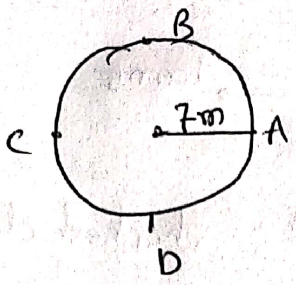


Displacement = shortest distance b/w A & C

= 2 R

= 2 × 7 = 14m

(14)



For 1 cycle

distance travelled = Path length covered

$= 2\pi r$

For 2nd cycle the body reaches to D

$\therefore$ Distance travelled $= \frac{3}{4} \times$ Circumference

$= \frac{3}{4} \times 2\pi r.$

$\therefore$ Total distance $= 2\pi r + \frac{3}{4} \times 2\pi r$

$\Rightarrow \frac{7}{4} \times 2\pi r \Rightarrow \frac{7}{\cancel{4}_{2}} \times \cancel{2} \times \frac{\overset{11}{\cancel{22}}}{\cancel{7}} \times \cancel{7}$

$= 77m$

(15)

For 3 cycles Distance travelled

$= 3 \times$ Path length covered

$= 3 \times$ Circumference

$= 3 \times 2\pi r.$

In 4th cycle if the body reaches to D

Distance travelled $= \frac{3}{4} \times$ Circumference

$= \frac{3}{4} \times 2\pi r.$

$\therefore$ Total distance $= 3 \times 2\pi r + \frac{3}{4} \times 2\pi r$

$\Rightarrow \frac{15}{\cancel{4}_{2}} \times 2\pi r$

$\Rightarrow \frac{15}{2} \times 7 \times \pi$

$\Rightarrow 52.5\pi$

(16)

Distance travelled = path length covered = 15 m.

(17)

$r = 0.5m$

For one rotation distance covered = path length travelled

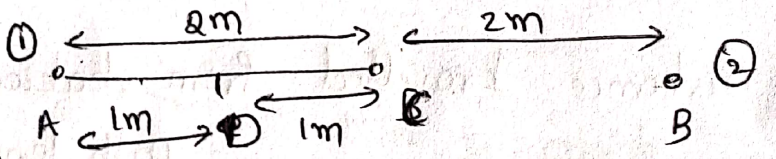
$= 2\pi r.$

For 14 rotations $= 14 \times 2\pi r$

$= 14 \times 2\pi \times 0.5$

$= \underline{14\pi m}$

(18)



'C' in colliding point. Clearly they had given that they displaced half of their distance of hitting.

(i.e) 1m from C

If we consider 1st ball it reaches to D finally

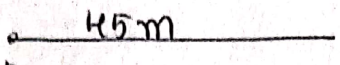
So it's displacement = shortest distance b/w A & D

$= \underline{1m}$.

L Task

Jee main level

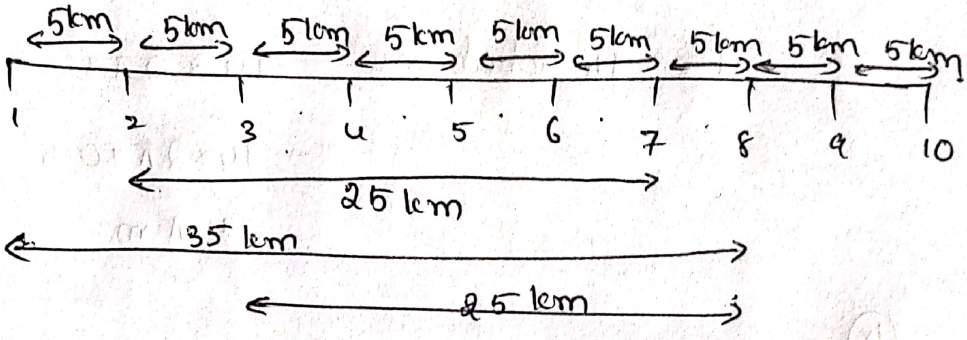
(1)



Displacement = shortest distance b/w P and Q

= 45m

(2), (4), (5), (6)



(3) Distance travelled from station-2 to 7

= Path length covered

= 25 km

(4)

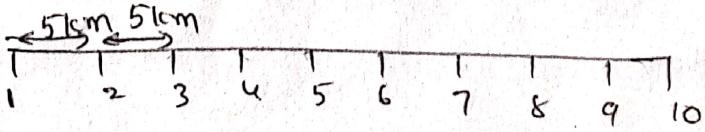
From station-1 to 8

Distance = 35 km

From 8 → 3 distance = 25 km

∴ Total distance = 60 km

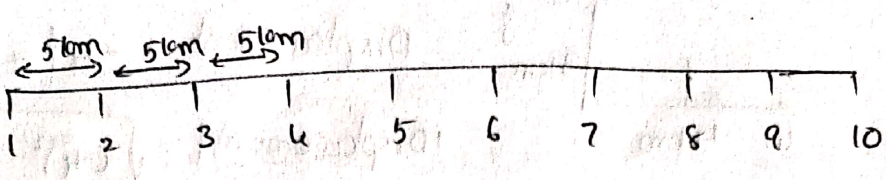
(5)



After reaching from station-5 to 3.

Displacement = shortest distance b/w 1 & 3 = 10 km

(6)



If the train return back to station-2

∴ Displacement = shortest distance b/w 2 & 1

= 5 km = +ve.

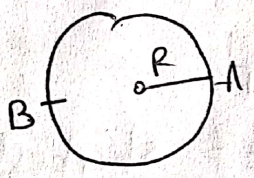
(7)

Distance between town-1 and town-5 acts as

displacement = 40 km = 40000 m

1 km = 1000 m

(8)

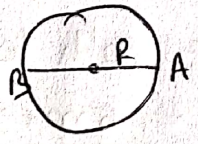


If the rat reaches to exactly opposite point B.

Displacement = Diameter

= 2R.

(9)



For one rotation

Distance = Circumference of Circular Path

= $2\pi R$.

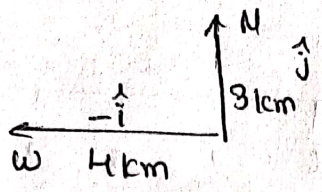
For next half rotation

Distance = $\frac{1}{2}$ × Circumference of Circular Path

= $\frac{1}{2} \times 2\pi R = \pi R$

∴ Total distance = $2\pi R + \pi R = 3\pi R$.

(10)



Displacement $= -4\hat{i} + 3\hat{j}$

$|\text{Displacement}| = \sqrt{(-4)^2 + 3^2} = \sqrt{16+9}$

$= \sqrt{25} = 5$ km

(13), (14), (15)

From fig

From C → G ⇒ distance = path length covered

= 60 + 30m

From B → D

Displacement = shortest distance b/w B and D

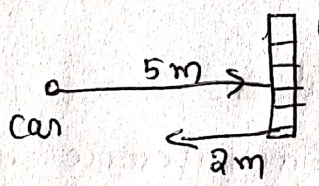
= 10 m

From D → G → F.

Displacement = shortest distance b/w D & F

= 5m

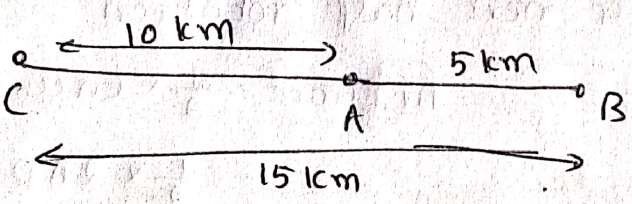
(16)



Distance = path length covered

= 5m + 2m = 7m

(17)



∴ Displacement = shortest distance b/w A & C = 10 km