TTask

(1)

To cover $S_1 = 120m \rightarrow t_1 = 2sec.$

$S_2 = 240m \rightarrow t_2 = ?$

Given train is moving with uniform speed

$\therefore$ Speed = constant

$\Rightarrow \frac{S_1}{t_1} = \frac{S_2}{t_2}$

$\Rightarrow \frac{120}{2} = \frac{240}{t_2} \Rightarrow \frac{1}{2} = \frac{2}{t_2} \Rightarrow t_2 = 4 sec$

(2)

time = 3 hrs ; speed = 65 kmph.

$\therefore$ speed = $\frac{distance}{time}$ $\Rightarrow$ distance = speed x time

= 65 x 3

= 195 kms

(3)

distance = 28 km

time = 7 sec.

speed = $\frac{distance}{time}$

speed = $\frac{28}{7}$

= 4 km/sec

(4)

speed = 20 m/s

time = 10 sec

speed = $\frac{distance}{time}$

$\Rightarrow$ distance = speed x time

= 20 x 10

= 200 m.

(5)

distance = 8 km

t = 5 min

= 5×60 sec

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{8 \times 1000}{5 \times 60} = \frac{20}{3} = 6.66 \text{ m/s}$$

(6)

speed = 72 kmph ; $t = 20 \text{ min} = \frac{1}{3}$ hrs.

$$\text{speed} = \frac{\text{distance}}{\text{time}} \Rightarrow \text{distance} = \text{speed} \times \text{time}$$

$$= 72 \times \frac{1}{3}$$

$$= 24 \text{ km}$$

(7)

$V_1 = 30$ kmph $\rightarrow t_1 = 30 \text{ min} = \frac{1}{2}$ hrs

$V_2 = 40$ kmph $\rightarrow t_2 = 40 \text{ min} = \frac{2}{3}$ hrs.

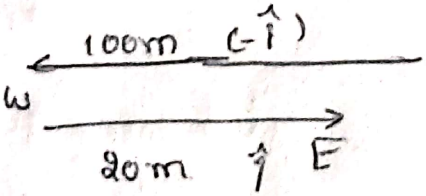
Total distance travelled $= V_1 t_1 + V_2 t_2$

$$= 30 \times \frac{1}{2} + 40 \times \frac{2}{3}$$

$$\Rightarrow 15 + 13.33 \times 2$$

$$\Rightarrow 15 + 26.66 = 41.67 \text{ km}$$

(8)



Total distance = 100m + 20m

= 120 m

Displacement = $100(-\hat{i}) + 20(\hat{i})$

$\Rightarrow -80\hat{i}$

$|\text{Displacement}| = |-80\hat{i}| = 80 \text{ m}$

(9)

Distance covered = path length = 1600 m

After one rotation the runner come back to it's original position ∴ Displacement = 0.

(10)

$V_1 = 30$ kmph $\rightarrow$ $t_1 = 30$ min $= \frac{1}{2}$ hr

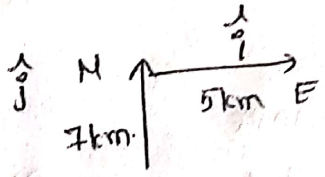
$V_2 = 60$ kmph $\rightarrow$ $t_2 = 30$ min $= \frac{1}{2}$ hr.

Total distance travelled $= V_1 t_1 + V_2 t_2$

$= 30 \times \frac{1}{2} + 60 \times \frac{1}{2}$

$= 15 + 30 = 45$ km

(13)



Total distance = 7 km + 5 km = 12 km

Displacement $= 7\hat{j} + 5\hat{i}$

$= \sqrt{7^2 + 5^2} = \sqrt{49 + 25}$

$= \sqrt{74} = 8.6$ km $\rightarrow$ NE

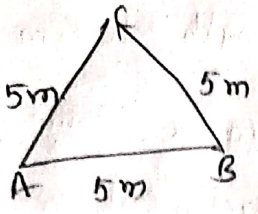
(14)

(a) 76 kmph $= 76 \times \frac{5}{18} = 4.1 \times 5 = 20.5$ m/sec

(b) 5 m/sec $= 5 \times \frac{18}{5}$ kmph $= 18$ kmph

(c) 1 km/min $= \frac{1000}{60}$ m/sec $= 16.66$ m/sec

(15)



For one rotation:

Distance = AB + BC + CA

= 5m + 5m + 5m = 15m

Displacement → After one rotation, the body come back to it's original position

Displacement = 0

(16)

$t = 0.2$ sec : speed = 30 kmph $= 30 \times \frac{5}{18}$ m/sec

$= \frac{25}{3}$ m/sec

distance = speed × time

$= \frac{25}{3} \times 0.2 = \frac{5}{3} = 1.66$ m

(17)

Distance = 100m ; time = 10 sec

$$\text{speed} = \text{velocity} = \frac{\text{Distance (or) Displacement}}{\text{time.}}$$

$= \frac{100}{10} = 10$ m/s

(18)

(a) 1 m/sec = 100 cm/sec

(b) 20 cm/sec = 0.2 m/sec

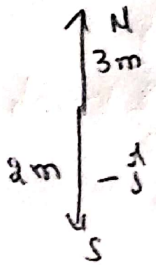
(c) 3 m/sec = $3 \times \frac{18}{5}$ kmph = 10.8 kmph

(d) 18 kmph = $18 \times \frac{5}{18} = 5$ m/s.

1- Task

CUQ's

(10)



Distance = 2m + 3m = 5m

Displacement = $2(-\hat{j}) + 3(\hat{j}) = -2\hat{j} + 3\hat{j}$

$= 1\,\hat{j}$

|Displacement| = $|1\,\hat{j}| = 1$ m

SAQ's

(1)

distance = 60 km ; t = 3 hrs

velocity = $\frac{\text{distance}}{\text{time}} = \frac{60}{3} = 20$ kmph

(2)

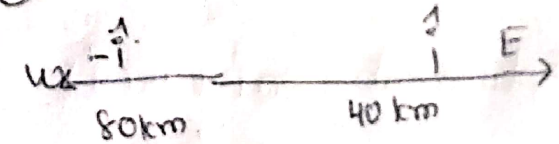
speed = 12 m/s ; t = 25 min = $\frac{25}{60}$ hrs

$= 12 \times \frac{18}{5}$ kmph = $\frac{5}{12}$ hr

$\therefore$ distance = speed × time

$= 12 \times \frac{18}{5} \times \frac{5}{12} =$ ~~18 km~~ 18 km

(3)



$\therefore$ Displacement = $40\hat{i} + 80(-\hat{i})$

$= 40\hat{i} - 80\hat{i}$

t = 2 hrs

|Displacement| = $|-40| = 40$ km

velocity = $\frac{\text{Displacement}}{\text{time}} = \frac{40}{2} = 20$ kmph

(4)

time = 50 min

$= 50 \times \frac{1}{60}$ hrs

$= \frac{5}{6}$ hrs

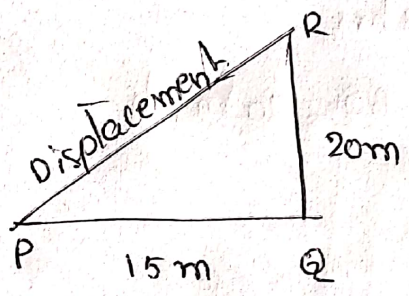
Speed = 24 m/s

$= 24 \times \frac{18}{5}$ kmph

$\therefore$ distance = speed × time

$= 24 \times \frac{\cancel{18}^{3}}{\cancel{5}} \times \frac{\cancel{5}}{\cancel{6}} = 72$ km

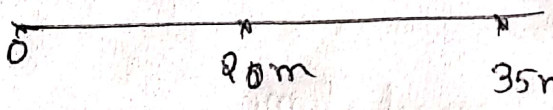
(5)



$PR = \sqrt{PQ^2 + QR^2} = \sqrt{15^2 + 20^2}$

$= \sqrt{225 + 400} = \sqrt{625} = 25$ m

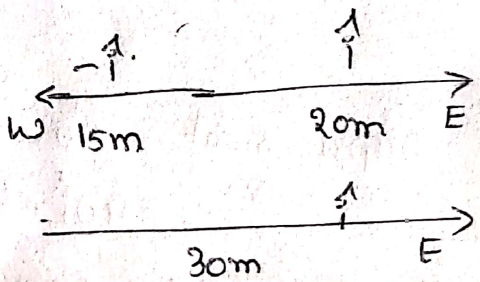
(6)



Displacement = 35 − 20

= 15m

(7)



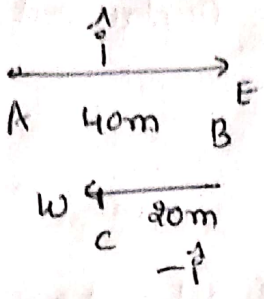
Distance = 20 + 15 + 30 = 65 m

Displacement = $20\hat{i} + 15(-\hat{i}) + 30\hat{i}$

$= 50\hat{i} - 15\hat{i}$

$= 35\hat{i}$

(8)



Total distance = AB + BC

= 40 + 20

= 60 m

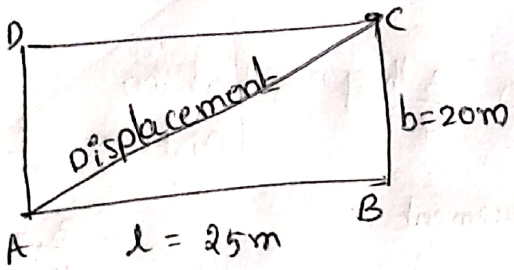
Displacement = $40\hat{i} + 20(-\hat{i})$

$= 40\hat{i} - 20\hat{i}$

$= 20\hat{i}$

$|\text{Displacement}| = |20\hat{i}| = 20m$

(9), (10)



Displacement $= \sqrt{l^2 + b^2}$

$= \sqrt{(25)^2 + (20)^2}$

$= 5\sqrt{25+16}$

$= 5\sqrt{41} \simeq 5 \times 7 = 35m$

For one round distance = Perimeter

$= 2(l+b)$

$= 2(25+20) = 2 \times 45 = 90m$

(13)

velocity = 45 kmph (or) $45 \times \frac{5}{18}$ m/s (or) $45 \times \frac{1000}{60}$ m/min

(a) distance = velocity × time

$= 45 \times 1$ hr

$= 45$ km

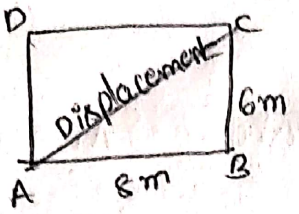
(b) distance $= 45 \times \frac{1000}{60}$

$= 750m$

(c) $d = 45 \times \frac{5}{18}$

$= 12.5m$

(15)



$A \to B \to C$

Displacement $= \sqrt{l^2+b^2}$

$= \sqrt{8^2+6^2} = \sqrt{64+36}$

$= \sqrt{100} = 10\ m$

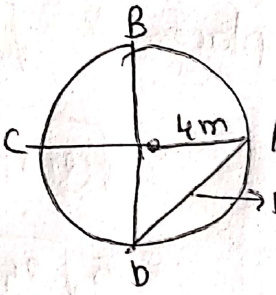
$A \to D$

Displacement of ant = AD = 6 m

time = 2 sec

Velocity = $\frac{\text{Displacement}}{\text{time}} = \frac{6}{2} = 3\ m/s$

(16)



For $\frac{3}{4}^{th}$ of rotation

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

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

$= \frac{3 \times 2\pi \times 4}{4} = 6\pi$

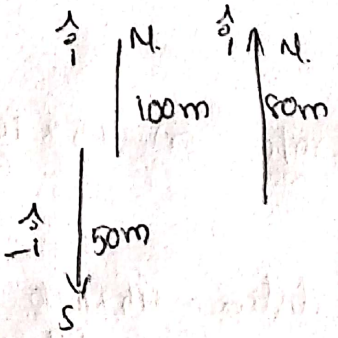
Displacement = AD = $\sqrt{2}\,R$

$= \sqrt{2} \times 4 = 4\sqrt{2}\ m$

$\therefore$ Distance : Displacement

$\Rightarrow 6\pi : 4\sqrt{2} \Rightarrow 3\pi : 2\sqrt{2}$

(17)



Total distance = 100 + 80 + 50 = 230 m

Displacement = $100\hat{i} + 80\hat{i} - 50\hat{i} = 130\hat{i}$

|Displacement| = $|130\hat{i}| = 130$m