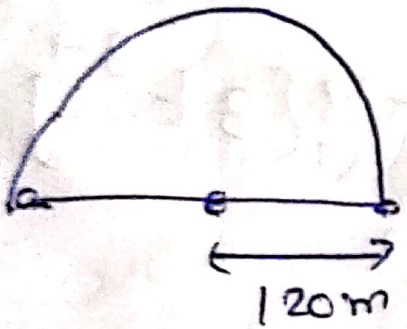
8th class WS-3 { Distance, Displacement
Ttasle Average speed and Average velocity }

1) Given The ~~etc~~ cyclist is revolving in a circular path of radius $r = 120$

Time taken For half rotation = 1 min = 60 sec.



∴ Total displacement = $2r \Rightarrow 2 \times 120$

$\Rightarrow 240$ m

∴ Average velocity = $\frac{\text{Total displacement}}{\text{Total time}}$

$= \frac{240\ m}{60\ sec} = 4\ m\ sec^{-1}$

(2)

Given that a motorist drives for north with

a speed = 85 kmph.

in Time = 35 min = $\frac{35}{60}$ hrs

∴ His displacement s_1 = speed × time

$= 85 \times \frac{35}{60}$

$= 49.56$ km.

He then continued his journey towards north

covered a distance (d) = 130 km.

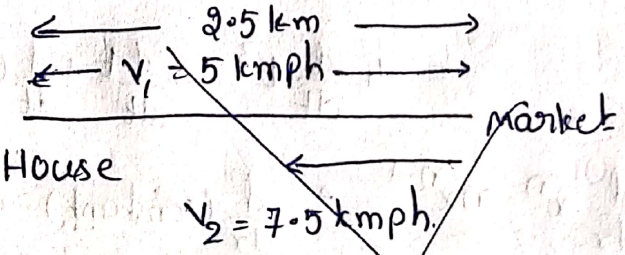
∴ Total displacement = $s_1 + d$

$= 49.56 + 130$

$= 179.56$ km

$\simeq 179.6$ km.

(3)



Total time taken

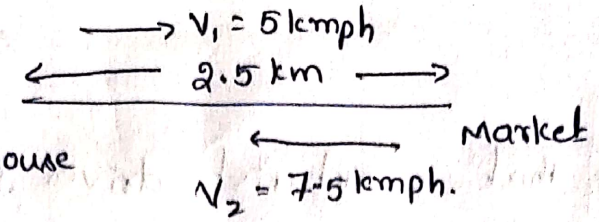
= 50 min

= $\frac{50}{60}$ hrs.

clearly the first half of distance [House - Market] covered with a speed V_1 and next half of distance [Market] with a speed V_2. ∴ $\langle \text{speed} \rangle = \frac{2V_1V_2}{V_1+V_2} = \frac{2 \times 5 \times 7.5}{5+7.5}$

$= 6$ kmph

(3)



clearly The Person is covering first half of the distance [House - Market] with a speed V_1 and remaining half of the distance [Market - house] with a speed V_2

$$\therefore \langle \text{speed} \rangle = \frac{2V_1V_2}{V_1+V_2}$$

$$= \frac{2\times5\times7.5}{5+7.5}$$

$$= 6 \text{ kmph} = 6\times\frac{5}{18} \text{ m/s} = \frac{5}{3} \text{ m/s}$$

(4)

Given displacement of the particle

$$x = 4t^3 - 3t + 2.$$

$$\therefore \langle \text{velocity} \rangle = \frac{dx}{dt} = \frac{d}{dt}[4t^3 - 3t + 2]$$

$$= 4\frac{d}{dt}t^3 - 3\frac{dt}{dt} + \frac{d}{dt}(2)$$

$$\left[\because \frac{d}{dx}x^n = nx^{n-1} \text{ & } \frac{d}{dx}(\text{constant}) = 0\right]$$

$$\therefore \langle \text{velocity} \rangle = 4[3t^{3-1}] - 3 + 0$$

$$= 12t^2 - 3$$

At $t = 3$ sec $\Rightarrow \langle \text{velocity} \rangle = 12(3)^2 - 3$

$$= 108 - 3 = 105 \text{ m/s}$$

(6)

Given in $t_1 = 4$ sec → Distance travelled $d_1 = 16$ m

$t_2 = 2$ sec → Distance travelled $d_2 = 16$ m

$$\therefore \quad \langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total distime}}$$

$$= \frac{d_1 + d_2}{t_1 + t_2}$$

$$= \frac{16 + 16}{4 + 2} = \frac{32}{6} = 6.33 \text{ m/s}.$$

(8)

Total distance she swimmed = 180 m

Total time taken = 1 min = 60 sec

$$\therefore \quad \langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{180}{60} = 3 \text{ m/s}$$

(10)

After a turns around a rectangular track

The runner back to his starting point.

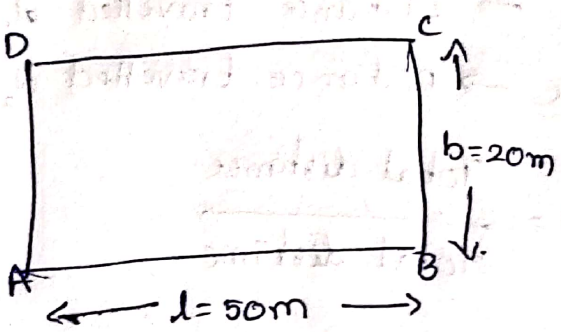
$$\therefore \quad \text{Initial position} = \text{Final position}$$

$$\Rightarrow \quad \text{Displacement} = \text{Final Position} - \text{Initial Position}$$

$$= 0$$

$$\therefore \langle \text{velocity} \rangle = \frac{\text{Total displacement}}{\text{Total time}} = \frac{0}{100} = 0.$$

(9)



For one rotation

Total distance = circumference

$= 2[l+b]$

$= 2[50+20] = 2 \times 70$

$= 140$ m.

For Two rotations

Total distance $= 2 \times 140$

$= 280$ m.

Total time $= 100$ sec

$\therefore \quad \langle speed \rangle = \dfrac{\text{Total distance}}{\text{Total time.}}$

$= \dfrac{280}{100} = 2.8$ m/s

(19)

We know that $\text{Time} = \dfrac{\text{distance}}{\text{speed.}}$

Time for 120 km $= t_1 = \dfrac{120}{60} = 2$ hrs

Time for 180 km $= t_2 = \dfrac{180}{90} = 2$ hrs

$\therefore$ Total distance travelled $= 120+180 = 300$ km

$\langle speed \rangle = \dfrac{\text{Total distance}}{\text{Total time}}$

$= \dfrac{300}{t_1+t_2} = \dfrac{300}{2+2}$

$= \dfrac{300}{4} = 75$ kmph

(7) Given length of the pool = 90m

For covering 180m, usha takes 1 min = 60sec

she is coming back to her initial position after 1min [According to data given in question]

so her Total displacement = 0

$\therefore$ velocity = $\frac{\text{Total displacement}}{\text{Total time}} = \frac{0}{60} = 0$

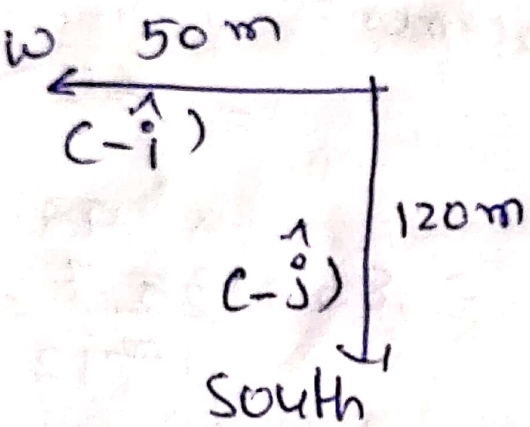
(8) distance she travel swimmed = 180m

(5) Given Prema travels 50m west and 120m south

(A) ∴ Distance travelled = Total Path length covered

= 50 + 120 = 170m.

(i.e)



whenever directions are given we have to take vector form for measuring displacement

⇒ Displacement = −50(−î) + 120(−ĵ)

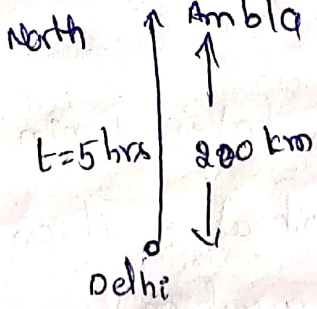
⇒ −50î − 120ĵ

∴ |Displacement| = $\sqrt{(-50)^2+(-120)^2}$

= $\sqrt{2500+14400}$ = $\sqrt{16900}$

= $\sqrt{(130)^2}$ = 130 km

(11)



(D) As the car returns to delhi

Then The Displacement = 0

Because initial and final positions are same [Delhi]

so $\langle velocity \rangle = \frac{Total\ displacement}{Total\ time} = \frac{0}{10} = 0$

Here Total distance covered by the car = 200 + 200

For complete journey = 400 km

Total time taken = 5 hr + 5 hr = 10 hrs

$\langle speed \rangle = \frac{Total\ distance}{Total\ time} = \frac{400}{10} = 40$ kmph

(12) A According to given data

Nithin covering 300 m in 15 sec where as

Jathin covering 600 m in 1 min → 60 sec.

so in Nithin speed = $\frac{300}{15} = 20$ m/s

Jathin speed = $\frac{600}{60} = 10$ m/s

clearly Nithin will win the race because his speed is more than Jathin.

(13)

(a) Given Athelet speed = 10 m/s

bicycle speed = 20 m/min = $\frac{20\ m}{60\ sec} = \frac{1}{3}$ m/s = 0.33 m/s

scooter speed = 30 kmph = $30 \times \frac{5}{18} = \frac{25}{3} = 8.33$ m/s

$a > c > b$

(16) A Given For one revolution time taken = 4 sec.

(i) Along AB (~~half of rot~~) Distance covered = $\frac{1}{4}$ Circumference of a circle

$= \frac{1}{4} \times 2\pi r = \frac{\pi r}{2}$

For $\frac{1}{4}^{th}$ rotation time = 1 sec

$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{\frac{\pi r}{2}}{1} = \frac{\pi r}{2}$

(ii) Along AC (half of rotation)

Distance covered = $\frac{1}{2}$ Circumference of a circle

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

Time taken = 2 sec

$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{\pi r}{2}$.

(iii) For one complete revolution

Distance covered = circumference of a circle

$= 2\pi r$

Time taken = 4 sec

$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{2\pi r}{4} = \frac{\pi r}{2}$

(18) Given the body is covering x% of distance with a speed v_1 & $(100-x)$% with a speed v_2.

Time s

$= 5 \text{ hrs}$

(18)

Given $x = 20$; let the total distance $= S$

	Distance	speed	time
$x\% \Rightarrow 20\% = \frac{20}{100} S = \frac{1}{5} S$	$\longrightarrow$	V_1	$\longrightarrow t_1 = \frac{S}{5V_1}$
$80\% = \frac{80}{100} S = \frac{4}{5} S$	$\longrightarrow$	V_2	$\longrightarrow t_2 = \frac{4S}{5V_1}$

$$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time.}} = \frac{S}{t_1 + t_2}$$

$$= \frac{S}{\frac{S}{5V_1} + \frac{4S}{5V_2}}$$

$$= \frac{\cancel{S}}{\frac{S}{5}\left[\frac{1}{V_1} + \frac{4}{V_2}\right]}$$

$$= \frac{5}{\frac{V_2 + 4V_1}{V_1 V_2}} = \frac{5V_1V_2}{4V_1 + V_2}.$$

(b) Total distance S ; $x = 30$

$x\%$ $\quad$ 10

$s_1 = 30\% = \frac{30}{100} \cdot S = \frac{3}{10} S \rightarrow v_1 \rightarrow t_1 = \frac{s_1}{v_1} = \frac{3S}{10v_1}$

$s_2 = (100-x)\% \Rightarrow 70\% = \frac{70}{100} S = \frac{7}{10} S \rightarrow v_2 ; \; t_2 = \frac{s_2}{v_2} = \frac{7S}{10v_2}$

$$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{S}{t_1 + t_2}$$

$$= \frac{S}{\frac{3S}{10v_1} + \frac{7S}{10v_2}} = \frac{S}{\frac{S}{10}\left[\frac{3}{v_1} + \frac{7}{v_2}\right]} = \frac{10}{\frac{3v_2 + 7v_1}{v_1 v_2}}$$

$$= \frac{10 v_1 v_2}{7v_1 + 3v_2}$$

(c) Total distance s $\quad x = 40$

$s_1 = x\% = \frac{40}{100} S = \frac{2}{5} S \rightarrow v_1 ; \; t_1 = \frac{s_1}{v_1} = \frac{2S}{5v_1}$

$s_2 = (100-x)\% = \frac{60}{100} S = \frac{3}{5} S \rightarrow v_2 ; \; t_2 = \frac{s_2}{v_2} = \frac{3S}{5v_2}$

$$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{S}{t_1 + t_2}$$

$$= \frac{S}{\frac{2S}{5v_1} + \frac{3S}{5v_2}} = \frac{S}{\frac{S}{5}\left[\frac{2}{v_1} + \frac{3}{v_2}\right]} = \frac{5}{\frac{2v_2 + 3v_1}{v_1 v_2}}$$

$$= \frac{5 v_1 v_2}{2v_2 + 3v_1}$$

(d) Total distance $= S$; $x = 50$

$s_1 = x\% = \frac{50}{100} S = \frac{1}{2} S \rightarrow v_1 ; \; t_1 = \frac{s_1}{v_1} = \frac{S}{2v_1}$

$s_2 = (100-x)\% = \frac{50}{100} S = \frac{1}{2} S \rightarrow v_2 ; \; t_2 = \frac{s_2}{v_2} = \frac{S}{2v_2}$

$$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{S}{t_1 + t_2} = \frac{S}{\frac{S}{2v_1} + \frac{S}{2v_2}}$$

$$= \frac{S}{\frac{S}{2}\left[\frac{1}{v_1} + \frac{1}{v_2}\right]} = \frac{2}{\frac{v_2 + v_1}{v_1 v_2}}$$

$$= \frac{2 v_1 v_2}{v_1 + v_2}$$

100

(19)

we know that Time = $\frac{\text{distance}}{\text{speed}}$

Time for 120 km = $t_1 = \frac{120}{60} = 2$ hrs

Time for 180 km = $t_2 = \frac{180}{90} = 2$ hrs

$\therefore$ Total distance travelled = 120+180 = 300 km

$$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{300}{t_1 + t_2} = \frac{300}{2+2}$$

$$= \frac{300}{4} = 75 \text{ kmph}$$

(20)

Given Average speed = 60 kmph

Distance = 300 km

$$\therefore \text{Time} = \frac{\text{Total distance}}{\text{Average speed}}$$

$$= \frac{300}{60}$$

$$= 5 \text{ hrs}$$

(18)

9th integrated

WS-1 → Task

Integer type

(8)

Given distance covered by the cab $d = 45$ m

Time $t = 9$ sec

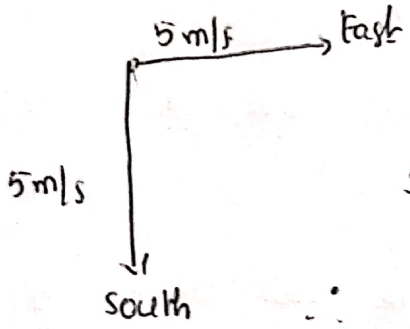
$\therefore$ speed $= \frac{\text{distance}}{\text{Time}}$

$= \frac{45}{9}$

$= 5$ m/s.

(9)

The Direction of velocity of wind blowing is



East indicated by a unit vector $\hat{i}$

South indicated by a unit vector $-\hat{j}$

$\therefore$ The resultant velocity of wind $= 5(\hat{i}) + 5(-\hat{j})$

$= 5\hat{i} - 5\hat{j}$

$\therefore$ The magnitude of velocity $= |V| = \sqrt{5^2 + (5)^2}$

$= \sqrt{25+25}$

$= \sqrt{(25)(2)}$

$= 5\sqrt{2} = 5 \times 1.414$

$= 7.07$ m/s

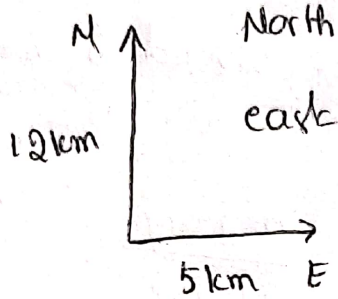
L Task advanced level

(9)

The direction of motion of a body is shown as

North is indicated by a unit vector $\hat{j}$

east is indicated by a unit vector $\hat{i}$



∴ The resultant displacement of the body is $= 5\hat{i} + 12\hat{j}$

$$|\text{displacement}| = \sqrt{5^2 + 12^2}$$

$$= \sqrt{25 + 144} = \sqrt{169} = 13 \text{ km}$$

(10)

Total distance covered = 10 km + 20 km

= 30 km

Total time taken = 5 + 10

= 15 sec.

$$\therefore \langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{30 \text{ km}}{15 \text{ sec}} = 2 \text{ km/sec.}$$

(20) Given Average speed = 60 kmph

Distance = 300 km.

$$\text{Time} = \frac{\text{Total distance}}{\text{Average speed}} = \frac{300 \text{ km}}{60} = 5 \text{ hrs}$$

L Task

CUQ's

(6) The total distance covered by ant is = 2 cm + 1.5 cm + 2.5 cm + 3 cm

= 9 cm

The total time taken = 1 + 1 + 1 + 1 = 4 sec.

$$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{9}{4} = 2.25 \text{ cm/sec}$$

$$= 2.25 \times 10^{-2} \text{ m/s}$$

(9) Given radius of circular path = 200 m

Time taken for half revolution = 5 min = 5 × 60 = 300 sec

$$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{\pi r}{300}$$

$$= \frac{22}{7} \times \frac{200}{300} = \frac{44}{7 \times 3} = \frac{44}{21} \text{ m/s}$$

The distance covered for half rotation = $\frac{1}{2}$ (Circumference)

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

SAQs

① Given in a time $t_1 = 2$ sec, An object moves a distance of $s_1 = 10$ m

$$\langle \text{velocity} \rangle = \frac{s_1}{t_1} = \frac{10}{2} = 5 \text{ m/s}$$

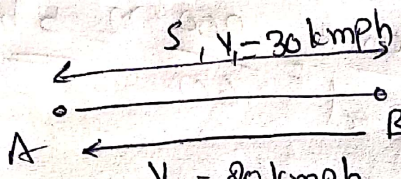
In a time $t_2 = 8$ sec, Distance covered $s_2 = 20$ m.

$$\langle \text{velocity} \rangle = \frac{s_2}{t_2} = \frac{20}{8} = 2.5 \text{ m/s}$$

Total distance covered $= s_1 + s_2 = 10 + 20 = 30$ m

Total time taken $= t_1 + t_2 = 2 + 8 = 10$ sec

$$\langle \text{velocity} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{30 \text{ m}}{10 \text{ sec}} = 3 \text{ m/s}$$

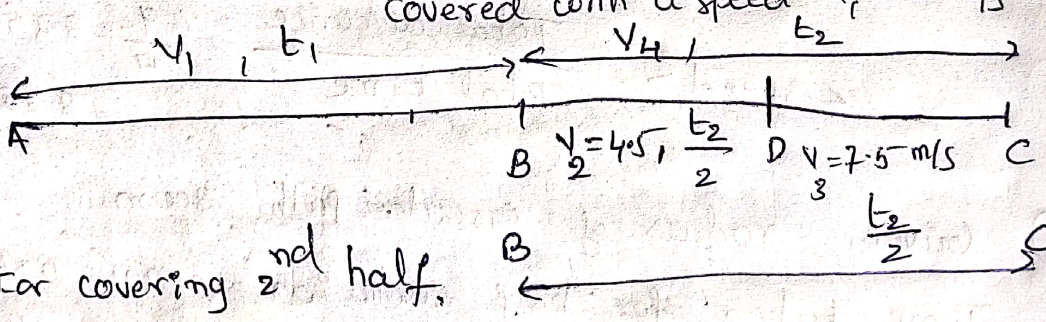
② 

For the entire Journey of Motor cyclist, Ist half [A→B] is covered with a speed v_1, 2nd half [B→A] is covered with a speed v_2.

$$\langle \text{speed} \rangle = \frac{2 v_1 v_2}{v_1 + v_2} = \frac{2 \times 30 \times 20}{30 + 20}$$

$$= \frac{2 \times \overset{6}{\cancel{30}} \times 20}{\cancel{50}} = 24 \text{ kmph}$$

③ Given that the first half of the distance is covered with a speed $v_1 = 3$ m/s



For covering 2nd half of the distance, the effective velocity becomes

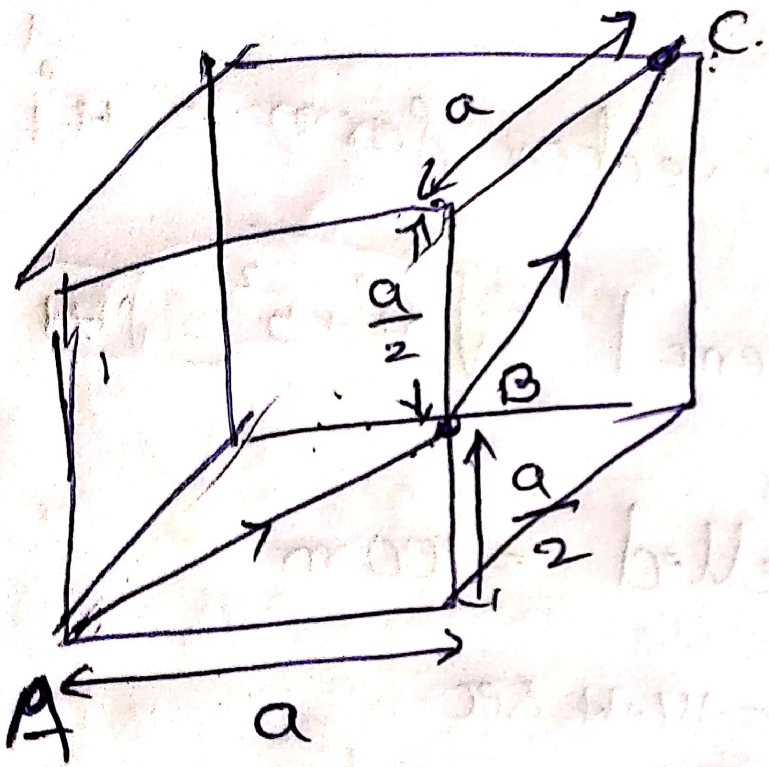
$$v_4 = \frac{v_2 + v_3}{2} = \frac{4.5 + 7.5}{2}$$

$$v_4 = \frac{12}{2} = 6 \text{ m/s}$$

For Total Journey

$$\therefore \langle \text{velocity} \rangle = \frac{2 v_1 v_4}{v_1 + v_4} = \frac{2 \times 3 \times 6}{3 + 6} = \frac{4 \cancel{12} \times \cancel{3}}{\cancel{9}\ \cancel{3}} = 4 \text{ m/s}$$

(4)



The shortest distance or minimum distance covered by the ant to reach diagonally opposite corner is AC

From Fig $AC = AB + BC$

$$= \sqrt{a^2 + \left(\frac{a}{2}\right)^2} + \sqrt{a^2 + \left(\frac{a}{2}\right)^2}$$

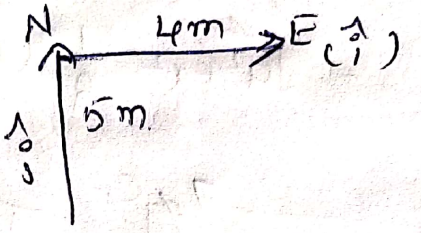
$$\Rightarrow 2\sqrt{a^2 + \left(\frac{a}{2}\right)^2} = 2\sqrt{a^2 + \frac{a^2}{4}}$$

$$\Rightarrow 2\sqrt{\frac{5a^2}{4}} = 2\frac{\sqrt{5}a}{2} = \sqrt{5}a$$

(6) $\langle \text{speed} \rangle = \dfrac{\text{Total distance}}{\text{Total time}}$

$= \dfrac{50}{300} = \dfrac{1}{6}$ m/s

(7) The directions of motion of a body are represented as shown below



$\therefore$ The Displacement = vector form = $4\hat{i} + 5\hat{j}$ m

$\therefore$ |Displacement| $= \sqrt{4^2+5^2} = \sqrt{41} = 6.4$ m

(8)

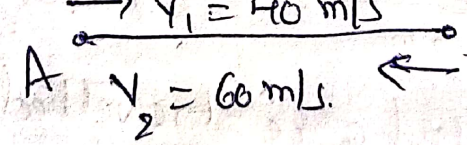
Total distance travelled = 100 m

Time taken = 14.4 sec.

$\langle \text{velocity} \rangle = \dfrac{\text{Total distance}}{\text{Time taken}} = \dfrac{100}{14.4} = 6.94$ m/s

(9) Here the Body travels total distance = 2(AB)

The Ist half of the distance [A→B] is covered with a speed 40 m/s and 2nd half of the distance [B→A] covered with a speed of 60 m/s



$\langle \text{speed} \rangle = \dfrac{\text{Total distance}}{\text{Total time}}$

$\langle \text{speed} \rangle = \dfrac{2V_1V_2}{V_1+V_2} = \dfrac{2\times40\times60}{40+60} = \dfrac{80\times60}{100} = 48$ m/s

(10) In this problem in a total time of 10 hrs the Bus returns to Delhi.. i.e) initial and final positions of the body are same

$\therefore$ Displacement = Final position − initial position

$\therefore$ $\langle velocity \rangle = \frac{\text{Total displacement}}{\text{Total time}} = \frac{0}{} = 0$

(11) Total distance covered = 3 km = 3×10^3 m

Time taken = 5 min = 5×60 = 300 sec

(or) $= \frac{5}{60} = \frac{1}{12}$ hrs.

(a) speed = $\frac{\text{distance}}{\text{time}} = \frac{3 \times 10^5 \text{ cm}}{300} = 1000$ cm/sec

(b) speed = $\frac{3000}{300} = 10$ m/s

(c) speed = $\cancel{10}^{2} \times \frac{18}{\cancel{5}} = 36$ kmph

1 m/s = $\frac{18}{5}$ kmph

(12) Velocity of a car = 45 kmph.

(a) In a time = 1 hr → Distance = velocity × time

= 45 × 1 hr = 45 km

(b) If time = 1 min → Distance = $\frac{45 \times 10^3}{60} = 750$ m/min

(c) 45 kmph = $\cancel{45}^{5} \times \frac{5}{\cancel{18}_{2}}$ m/s = $\frac{25}{2} = 12.5$ m/s

(15) Radius of Circular Path = 7 m ; Time taken = 2 sec

Distance = circumference of a circle = $\cancel{2}\pi r/\cancel{2}$

$= \cancel{2} \times \frac{22}{7} \times 7$

$= \cancel{44}$ m.

Displacement = 0 For one rotation

speed = $\frac{\text{distance}}{\text{time}} = \frac{\cancel{44}}{2} = \cancel{22}$ m/s

Displacement = $2r = 2 \times 7 = 14$ m [half rotation]

Velocity = $\frac{\text{Displacement}}{\text{Time}} = \frac{14}{2} = 7$ m/s

(16) Given car takes T sec to complete $\frac{1}{4}^{th}$ of rotation

For Full rotation = 4T sec.

For Half rotation = 2T sec.

For one Rotation = Displacement = 0

$$\langle velocity \rangle = \frac{\text{Total displacement}}{\text{Total time}} = 0$$

Total distance = Circumference of a circle

$= 2\pi R$

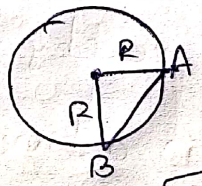
$$\langle speed \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{2\pi R}{4T} = \frac{\pi R}{2T}$$

For Half rotation Displacement = 2R

$$\langle velocity \rangle = \frac{\text{Total displacement}}{\text{Total time}}$$

$$= \frac{2R}{2T} = \frac{R}{T}$$

For $\frac{1}{4}^{th}$ of Rotation =



Displacement = $AB = \sqrt{R^2+R^2} = \sqrt{2}\,R$

$$\langle velocity \rangle = \frac{\text{Total displacement}}{\text{Total time}}$$

$$= \frac{\sqrt{2}\,R}{2T}$$

(17) (i) Here train is moving with ~~uniform speed~~

$$\text{speed} = \frac{\text{Distance}}{\text{Time}} = \frac{240}{4}$$ (or) $\frac{120}{3}$ (or) $\frac{3}{\frac{1}{2}}$

$= 60$ kmph

(ii) speed of car $= \frac{\text{Distance}}{\text{time}} = \frac{120}{3} = 40$ kmph

(iii) speed of Bus $= \frac{3\text{ km}}{\frac{1}{2}\text{ hr}} = 6$ kmph

(iv) Total distance travelled by Been

$= 240$ km $+ 120$ km $+ 3$ km

$= 363$ km

(v) Total time Mr Been travelled = $4\text{ hrs} + 3\text{ hrs} + \frac{1}{2}\text{ hr}$

$= 7.5\text{ hr}$

(vi) $\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{363\text{ km}}{7.5\text{ hr}}$

$= 48.4\text{ kmph}$

(18) let the distance between A and B is d km

Time taken to travel from A to B = $\frac{d}{4}$ hrs

Time taken to travel from B to A = $\frac{d}{6}$ hrs

Total distance travelled = $d + d = 2d$

Total time taken = $\frac{d}{4} + \frac{d}{6} = \frac{3d+2d}{12} = \frac{5d}{12}$ hrs

$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{2d}{\frac{5d}{12}} = \frac{24}{5} = 4.8\text{ kmph}$

Here time taken from $A \to B = \frac{\text{distance}}{V_1} = \frac{d}{4}$ hrs

$B \to A = \frac{d}{V_2} = \frac{d}{6}$ hrs

(19) Distance travelled for 3 hrs = $d_1 = V_1 t_1 = 15 \times 3$

$= 45\text{ km}$

Distance travelled for 2 hrs = $d_2 = V_2 t_2$

$= 20 \times 2 = 40\text{ km}$

Total distance = $d_1 + d_2 = 45\text{ km} + 40\text{ km}$

$= 85\text{ km}$

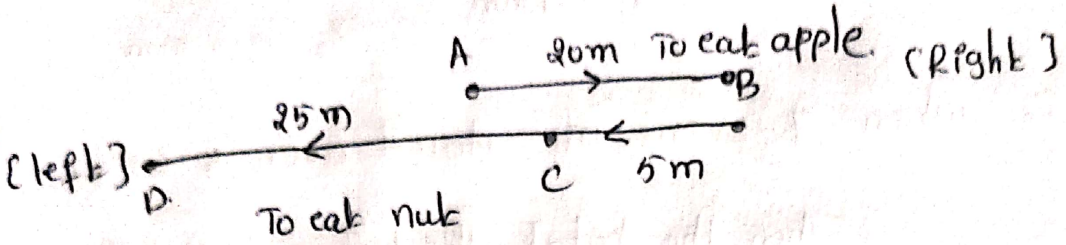
Total time = $3\text{ hr} + 2\text{ hr} = 5\text{ hrs}$.

$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{85\text{ km}}{5\text{ hrs}} = 17\text{ kmph}$

WS-2 6th, WS-3, 8th

(5)

Direction of motion of Pig



Total distance travelled = 20 + 5 + 25

= 50 m

Total time taken = 300 sec

Total Displacement = shortest distance between final and initial positions

= D − A

~~⇒ 25 − 5 ⇒~~

= 30 − 20

= 10 m

$$\langle \text{velocity} \rangle = \frac{\text{Total displacement}}{\text{Total time}} = \frac{10}{300} = 0.033 \text{ m/s}$$

$$\langle \text{speed} \rangle = \frac{\text{Total distance}}{\text{Total time}} = \frac{50}{300} = \frac{1}{6} \text{ m/s}$$