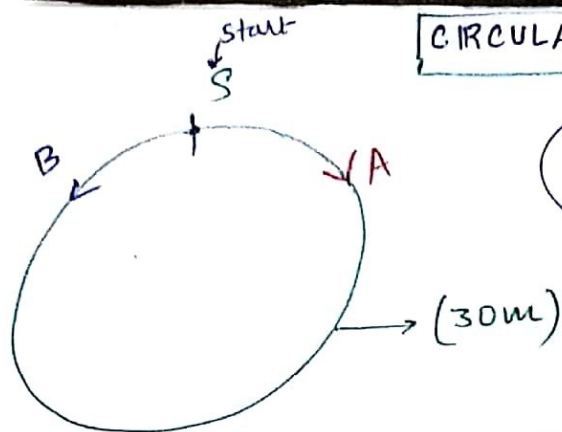


CIRCULAR RACES



$$A = 15 \text{ m/s}$$

$$B = 10 \text{ m/s}$$

1. Time taken for meeting @ Start Point for the first time

$$\text{LCM}(t_A, t_B)$$

$$\text{LCM}\left(\frac{\text{circumference}}{s_{pA}}, \frac{\text{circumference}}{s_{pB}}\right)$$

$$\text{LCM}\left(\frac{30}{15} + \frac{30}{10}\right) = 6 \text{ sec}$$

@ 6 sec

$$D_A = 15 \times 6 = 90 \text{ m} = 3 \text{ h}$$

$$D_B = 10 \times 6 = 60 \text{ m} = 2 \text{ h}$$

@ 12 sec

$$D_A = 15 \times 12 = 6 \text{ h}$$

$$D_B = 4 \text{ h}$$

} @ SP

2. Time taken for meeting for the 1st time

circumf.

Rel. ($s_{pA} \pm s_{pB}$)

$$= \frac{30}{(15+10)} = 1.2 \text{ sec}$$

@ 1.2 sec

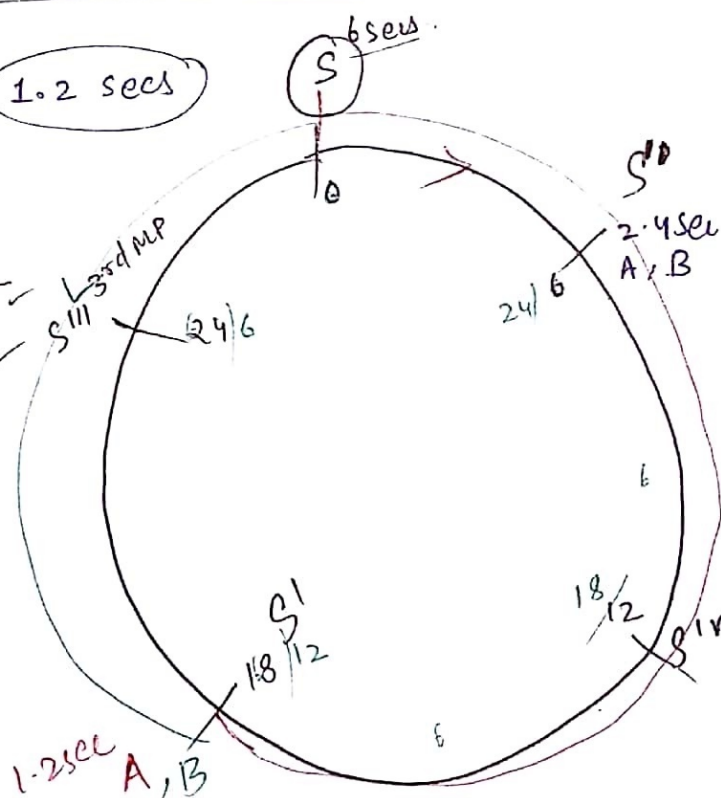
$$D_A = 15 \times 1.2 = 18 \text{ m}$$

$$D_B = 10 \times 1.2 = 12 \text{ m}$$

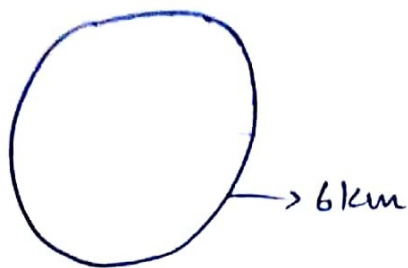
@ 2.4 sec

$$D_A = 36 \text{ m}$$

$$D_B = 24 \text{ m}$$



Pg 53
(7) x



A $\rightarrow$ 6 km/h
B $\rightarrow$ 12 km/h

$$\frac{6 \text{ km}}{(6+12) \frac{\text{km}}{\text{h}}} = \frac{1}{3} \text{ h} \approx 20 \text{ min} \checkmark$$

$\frac{30}{18} \times 6$

⑧ @SP $\text{LCM}\left(\frac{600}{15}, \frac{600}{20}\right) \frac{\text{m}}{\text{sec}} = \frac{600}{5} = 120 \text{ sec} \approx 2 \text{ mins} \checkmark$

3rd formulae

No. of distant int meeting points on the track

$$= \frac{P}{Q}$$

value after ①
value after ② formulae

1.2

4th formulae

Time taken for meeting at the start point is independent of the dirn. of the runners.

5th formulae

if 3 Runners. $\text{LCM} \rightarrow (t_A, t_B, t_C)$

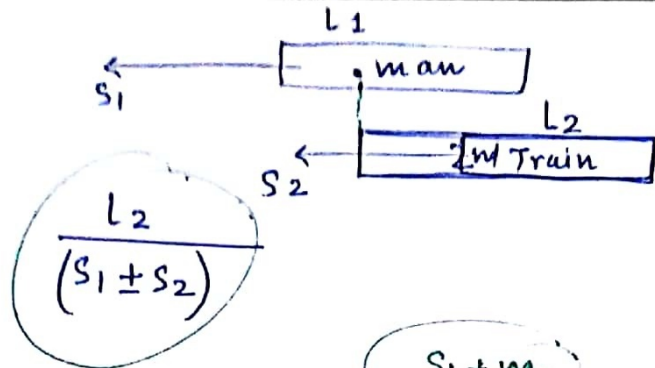
$$\text{LCM} \left[\frac{\text{circ}}{(A \pm B)}, \frac{\text{circ}}{(B \pm C)} \right]$$

Q Time taken $\rightarrow$ train passes poll $\rightarrow \frac{L_T}{SP_T}$ Train

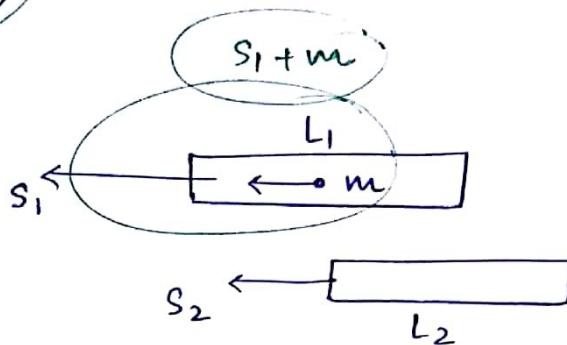
$\rightarrow$ Platform $\rightarrow \frac{L_T + L_P}{SP_T}$ platform

$\rightarrow$ to cross each other $\rightarrow \frac{L_1 + L_2}{SP_1 \pm SP_2}$

Q

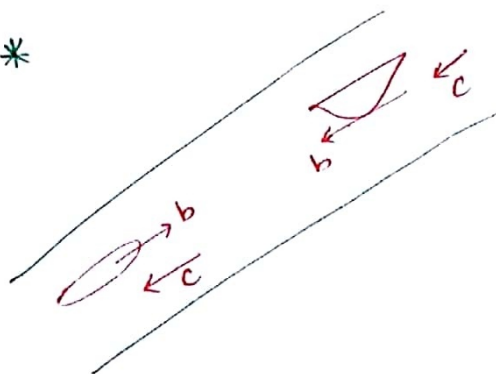


Q



$$\frac{L_2}{S_2 - (S_1 + m)}$$

*



$$\downarrow sp = (b+c) \rightarrow \text{time less}$$

$$\uparrow sp = (b-c) \rightarrow \text{time more}$$

Pg 53
Q2



$$\frac{D}{\downarrow (20+c)} = \frac{1}{3}$$

$$\frac{D}{\uparrow (20-c)} = \frac{1}{2}$$

$$\frac{20-c}{20+c} = \frac{2}{3}$$

$$c = 4$$

Q74
Pg 77

$$x = 8 \text{ km/h}$$

$$x - y = \frac{D}{3t} \quad \left| \quad x + y = \frac{D}{t} \right.$$

$$\frac{\frac{D}{3t}}{\frac{D}{t}}$$

$$\frac{x - y}{3(x - y)} = \frac{(x + y)}{(x + y)}$$

$$3(x - y) = (x + y)$$

$$3x - 3y = x + y$$

$$2x - 3y = 8 + y$$

$$16 = 4y$$

$$y = 4$$

SIR

$$\frac{D}{\downarrow(8+c)} = t$$

$$\frac{D}{\downarrow(8-c)} = 3t$$

$$\frac{8-c}{8+c} = 3$$

Pg 84

Q9

use options

put $v = 60$

through options

$$\frac{840}{v} - \frac{840}{v+10} = 2$$

$$\frac{840}{60} - \frac{84}{7} = 2$$

$$14 - 12 = 2 \quad \checkmark$$