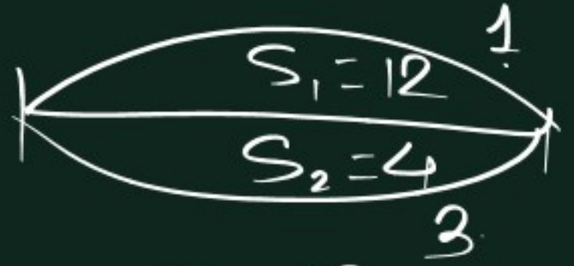
21)




$D = 12$

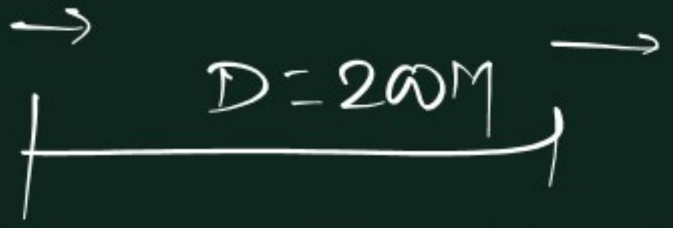
$$\Rightarrow \frac{12+12}{1+3} = \frac{24}{4} = 6 \text{ kmph}$$

22)


$$\frac{x}{3} + \frac{x}{2} = 5$$

$$\boxed{x = 6}$$

24)




$P = 8 \text{ kmph}$ $\quad T = ? \text{ kmph}$

$$T = \frac{D}{S}$$

$$T = \frac{200M}{(8-?) \times \frac{5}{18}} = \frac{\cancel{200}^{40} \times 18}{1 \times \cancel{5}} = \boxed{?2050}$$

$$T = \frac{?20}{60} = \boxed{12 \text{ min}}$$

26) $D = 60$, $T = 6$ Hrs, $S_1 = 10$ kmph

$D = 60$ km, $T = 5$, $S_2 = 12$ kmph

$S_1 = 10 = 6 + 4$

$S_2 = 12 = 4 + 8$

$A(S) = 3x = 6$

$B(S) = y = 4$

$3x + y = 10$

$2x + 2y = 12$

$3x + y = 10$

$x + y = 6$

$2x = 4$

$x = 2$

6


$(2D \times 2) = 8 \times 8$

$2 = 5$

Bus

$S = 20$ kmph

$T = 2$ min

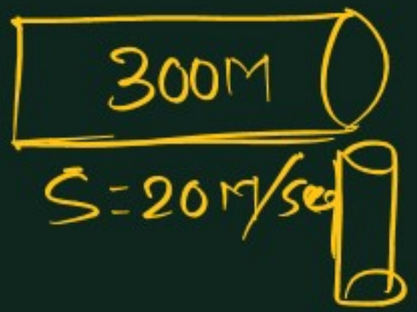
$D = \frac{20 \times 2}{60}$

Man

$D = \frac{20 \times 2}{60}$ $\quad T = \frac{8 \text{ min}}{60}$

$S = \left(\frac{20 \times 2}{60}\right) \times \frac{60}{8} = 5$ kmph

D = length of Train



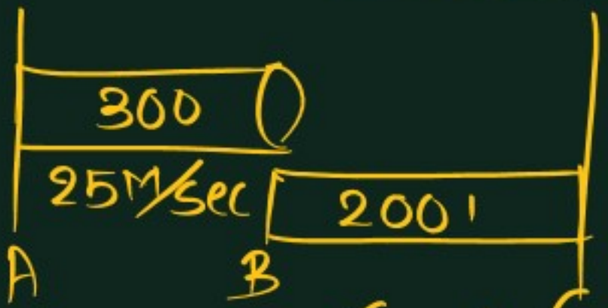

Pole / Man / Tree / Post

$$T = \frac{D}{S}$$

$$T = \frac{300}{20} = 15 \text{ sec}$$

TRAIN

D = Length of (TRAIN + OBJECT)



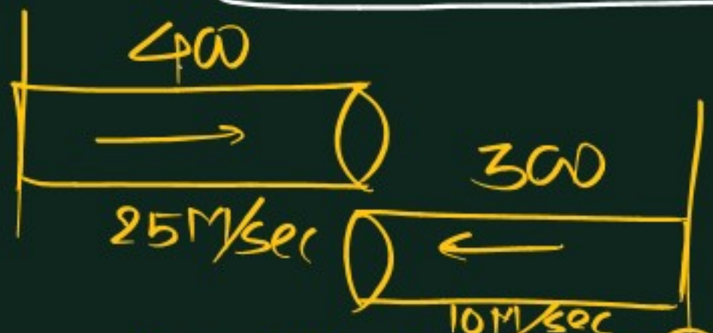

Platform / Bridge / Tunnel / Stationary Train

D = 300 + 200 = 500 M

S = 25 m/sec

$$T = \frac{500}{25} = 20 \text{ sec}$$

Opposite $= S_1 + S_2$




D = Length of Both Train

T = ?

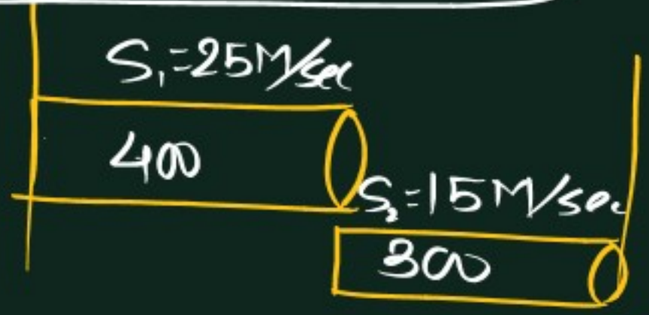
$S_1 = 25$ M/sec $S_2 = 10$ M/sec

Effective (SP) $= 25 + 10 = \underline{35}$ M/sec

$D = 400 + 300 = 700$

$$T = \frac{D}{S} = \frac{700}{35} = \boxed{20 \text{ sec}}$$

Same $= S_1 - S_2$




D = Length of Both Train

$D = 400 + 300 = 700$ M

Eff (SP) $= 25 - 15 = 10$ M/sec

$$T = \frac{D}{S} = \frac{700}{10} = 70 \text{ sec}$$

| Object | Direction | Distance | Effective speed |
| --- | --- | --- | --- |
| Pole/Tree/man/Post | — | Length of Train | Speed of Train |
| Platform/Tunnel/Bride/Stairway Train | — | Length of [Train + Object] | Speed of Train |
| Moving Train | Opposite | Length of [Both Train] | $S_1 + S_2$ |
| Moving Train | Same | Length of [Both Train] | $S_1 - S_2$ |