2 => Questions

GENERAL APTITUDE

SPEED TIME DISTANCE-I

Speed:

Speed of an object is the distance covered by it in a unit time interval.

1 hour | 1 sec

500 m ⟶ 25 sec

$\frac{500}{25}$ Speed = ?

20 m ⟶ 1 sec

20 m/sec

100 km ⟶ 2 hours

50 km ⟶ 1 hour

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

distance: km

time: hours

m/sec

km/hr OR m/sec

1
Pole
Point size body
100m

Train crossing an electric pole:

$$S = \frac{d}{t}$$

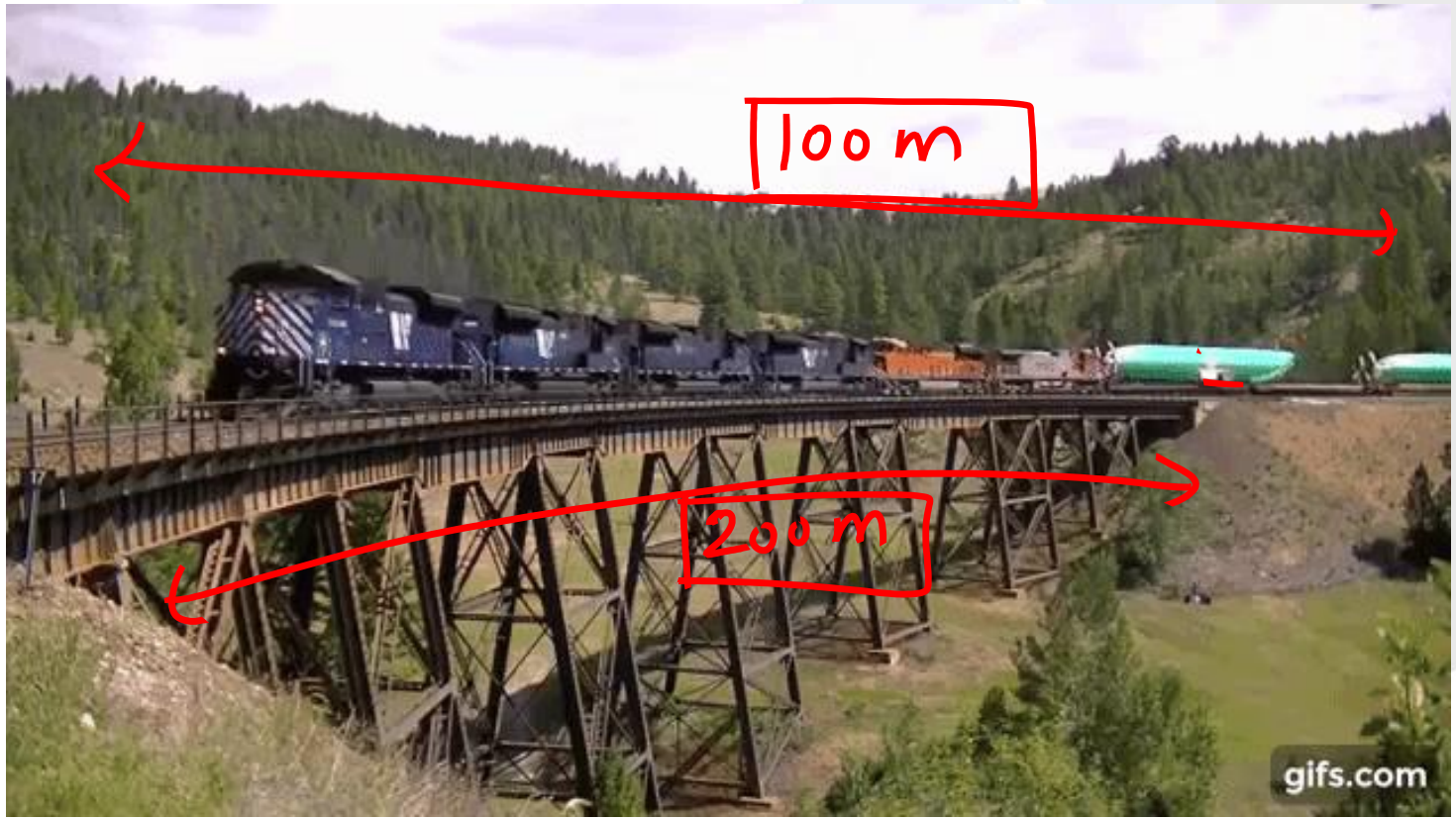
$$t = \frac{\text{distance}}{\text{speed}} = \frac{\text{length of train}}{\text{speed of train}}$$

length = 200 m

S = 20 m/sec

$$t = \frac{200}{20} = 10 \text{ sec}$$

Train crossing a bridge:



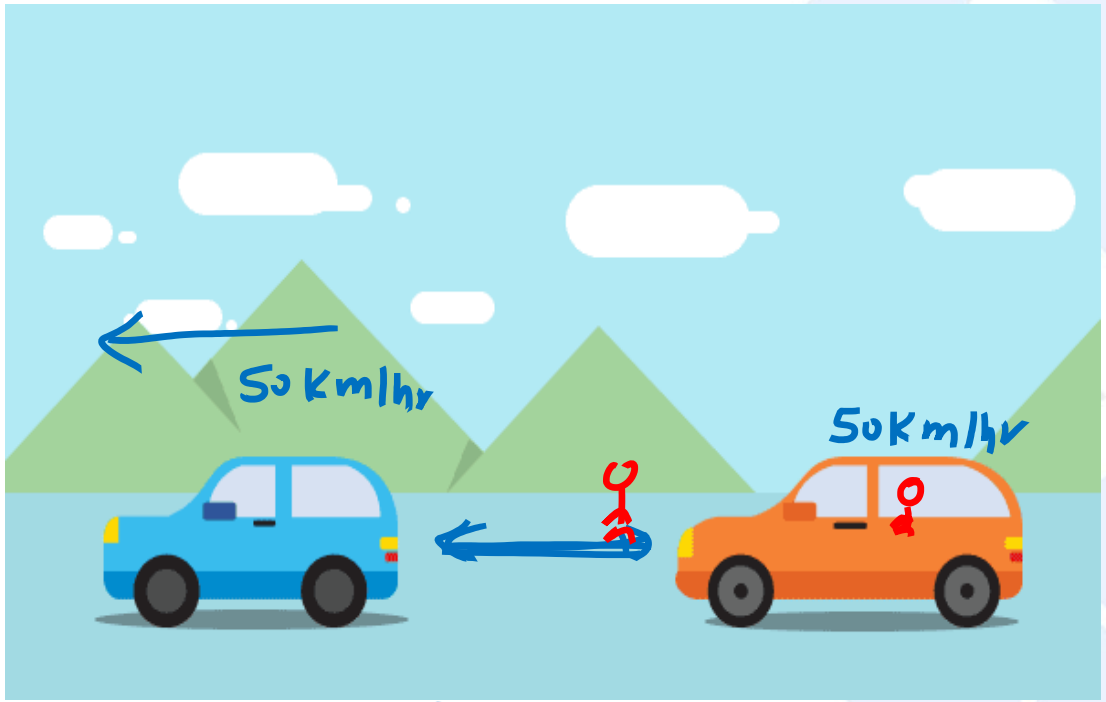
distance = 100 + 200 = 300 m

t = 15 sec (Assume)

Speed = $\frac{300}{15}$ = 20 m/sec

Relative speed: Imp

The speed of an object with respect to w.r.t the another object.



Relative speed = 50 - 50 = 0 (Same Direction)

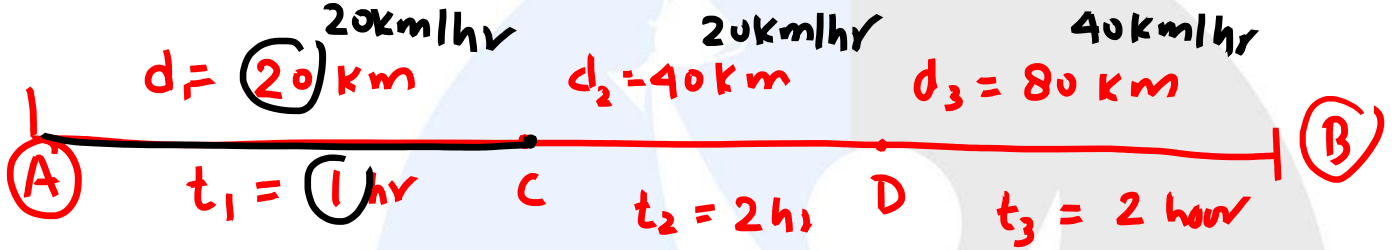
① When objects are in same direction

R. speed = $(S_1 - S_2)$ $[S_1 > S_2]$

② When object are in opposite direction

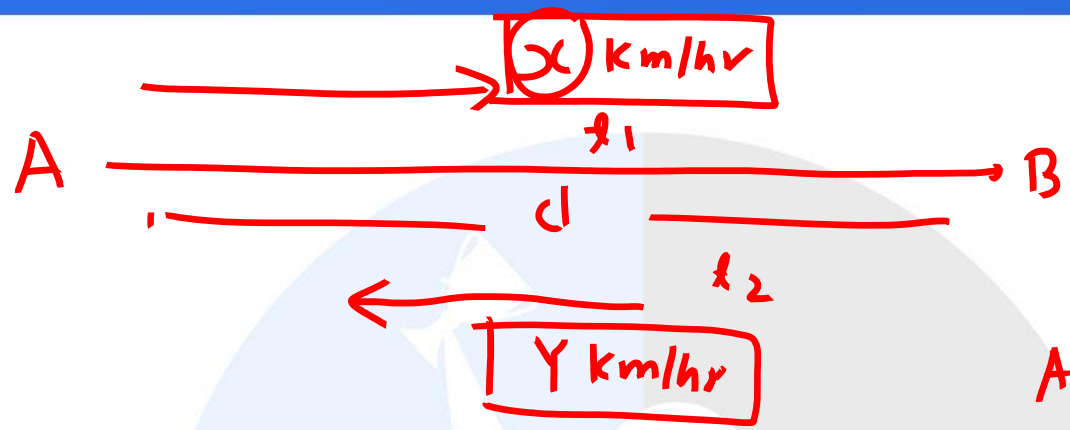
R. speed = $(S_1 + S_2)$

Average speed: The average speed of an object is the distance travelled by the object divided by the duration of the interval.



$$\text{Average Speed} = \frac{\text{Total distance travelled}}{\text{total time taken}} = \frac{d_1 + d_2 + d_3}{t_1 + t_2 + t_3}$$

$$= \frac{140}{5} = \boxed{28 \text{ km/hr}}$$



Average speed = $\frac{2xy}{x+y}$

Av. speed = $\frac{d+d}{\frac{d}{x}+\frac{d}{y}}$

$\frac{2d}{d\left[\frac{y+x}{xy}\right]} = \frac{2xy}{x+y}$

Conversions:

i. To convert speed from km/hr to m/s

A km /hr = (A x 5/18) m/s.

$\times \frac{5}{18}$

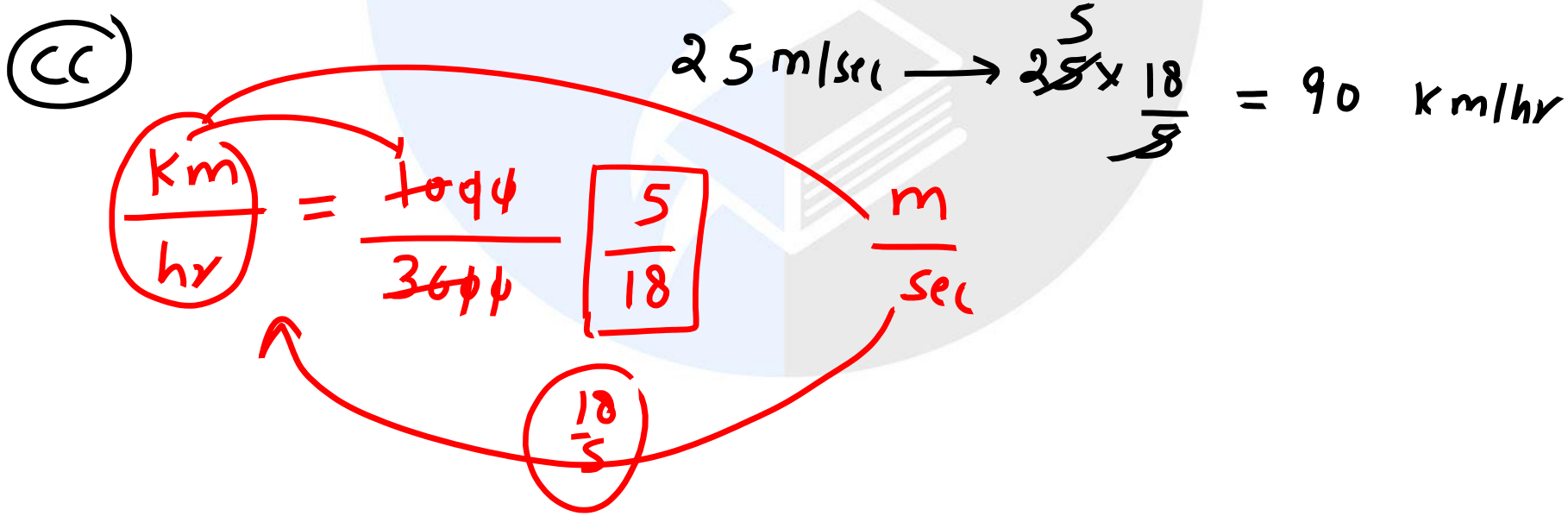
$72\ km/hr \longrightarrow 72 \times \frac{5}{18} = 20\ m/sec$

ii. To convert speed from m/s to km/hr

B m/s = (B x 18/5) km/hr.

$\times \frac{18}{5}$

$25\ m/sec \longrightarrow 25 \times \frac{18}{5} = 90\ km/hr$



A 75m long train is running at 54 km/hr. In how much time will it cross an electric pole?

(1) 25 sec (2) 20 sec (3) 15 sec (4) 5 sec

$$S = 54\ \text{km/hr} \times \frac{5}{18} = 15\ \text{m/sec}$$

$$d = 75\ \text{m}$$

$$t = \frac{d}{s} = \frac{75}{15} = 5\ \text{sec}$$

A 415 m long train is running at 63 km/hr. In how much time will it cross a tunnel 285 m long?

(1) 40 sec (2) 50 sec (3) 60 sec (4) 70 sec

$d = 415 + 285 = 700\ m$

$s = \cancel{63}^{7} \times \frac{5}{\cancel{18}_{2}} = \frac{35}{2}\ m/sec$

$t = \frac{\cancel{700}^{20}}{\cancel{35}} \times 2 = 40\ sec$

A train crosses a bridge and a platform of length 450 m and 700 m in 20 sec and 30 sec respectively. Find the speed of the train.

(a) 25 m/s (b) 26 m/s (c) 25.5 m/s (d) 27 m/s

Ans

$S = \frac{(l + 450)}{20}$ (Bridge)

$S = \frac{(l + 700)}{30}$ Platform

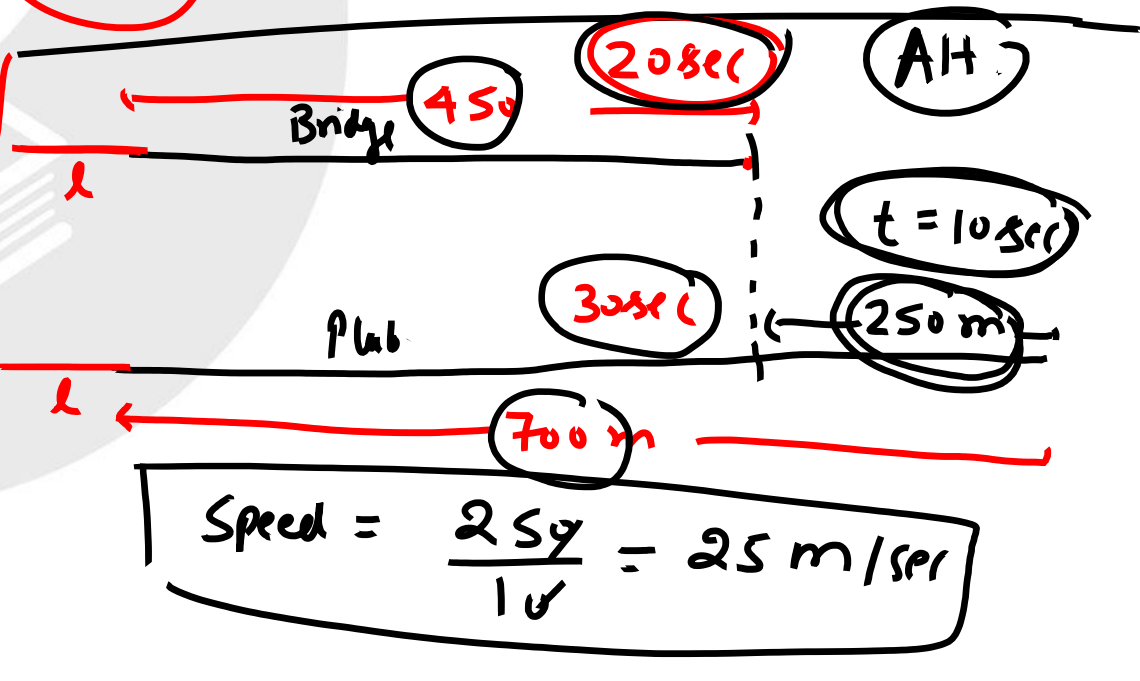
$S = \frac{500}{20} = 25$

$S = 25$ m/sec

$\frac{l + 450}{20} = \frac{l + 700}{30}$

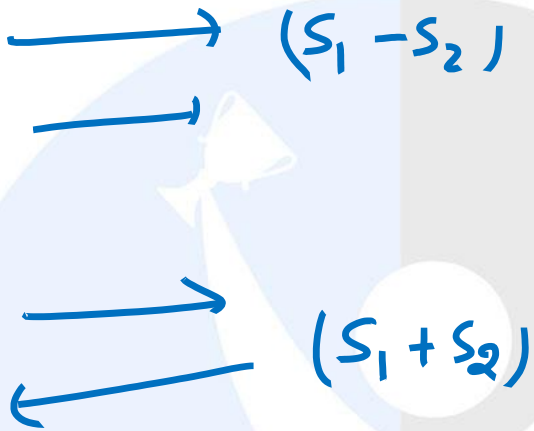
$3l + 1350 = 2l + 1400$

$l = 50$ m



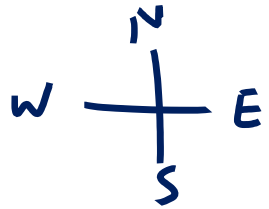
Speed $= \frac{250}{10} = 25$ m/sec

RELATIVE SPEED:



Two train started at 7 AM from the same point. The first train travelled north at a speed of 80 km/h and the second train travelled south at a speed of 100 km/h. The time at which they were 540 km apart is _____AM.

(A) 9 (B) 10 (C) 11 (D) 11.30



R speed = 80 + 100 = 180 km/hr

d = 540

$t = \frac{540}{180} = 3$ hours

10:00 AM

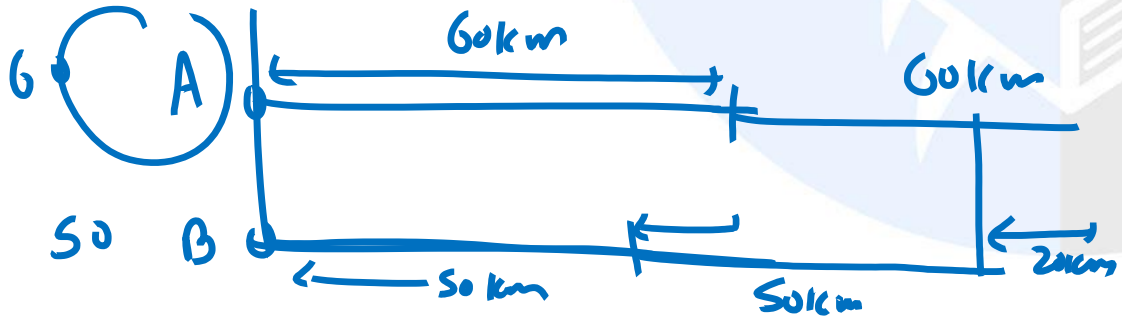
Two cars start at the same time from the same location and go in the same direction. The speed of the first car is 50 km/h and the speed of the second car is 60 km/h. the number of hours it takes for the distance between the two cars to be 20 km is_____.

(A) 1 (B) 2 (C) 3 (D) 6

R.speed = 60 − 50 = 10 km/hr

d = 20 km

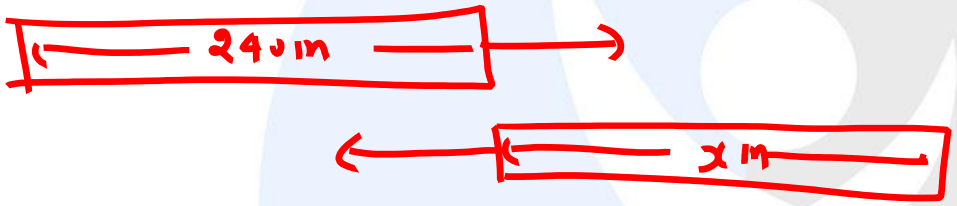
$t = \frac{20}{10} = 2$ hours



Train A with length 240 m is running in opposite direction towards Train B and cross each other completely in 10 seconds. If the sum of speed of both trains is 198 kmph, then Find the length of Train B (in m).

(a)240 (b)310 (c)540 (d)360

Ans



R speed = $198 \text{ kmph} \times \frac{5}{18} = 55 \text{ m/sec}$

$d = (240 + x)\text{ m}$

$t = 10 \text{ sec}$

$d = S \times t$

$(240 + x) = 55 \times 10$

$x = 550 - 240$

$x = 310 \text{ m}$

- A train 100m long takes 9 seconds to cross a man walking at 5 km/hr in the direction opposite to that of the train. Find the speed of the train.

(1) 55 km/hr (2) 45 km/hr (3) 25 km/hr (4) 35 km/hr

R.Speed = $\frac{2u}{100} \times \frac{2}{18} = 4u$ km/hr

$(S + 5) = 4u$

$S = 35$ km/hr

A train crosses a man, who is running in the same direction of train at the speed of 2m/sec. in 10 seconds. The same train crosses a tunnel in 54 seconds. If speed of train is 72 km/h then what is the length of tunnel?

(a) 850 m (b) 800 m (c) 900 m (d) 750 m

R speed = 20 − 2 = 18 mps

t = 10 sec

d = 18 × 10

l = d = 180 m

$72 \times \frac{5}{18} = 20$ mps

$\frac{20}{1} = \frac{(180 + x)}{54}$

$1080 = 180 + x$

$x = 900$ m

THANK YOU

HAPPY LEARNING