

## Time, Speed & Distance



## Time, Speed & Distance

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$=\left(\frac{5}{18}\right) \frac{18}{5}$$

Unit  $\rightarrow$  Km/hr or m/sec

$$1 \text{ Km/hr} = \frac{\frac{1000}{3600}}{60} \text{ m/sec} = \frac{5}{18} \text{ m/sec}$$

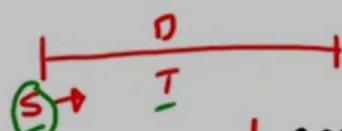
$$1 \text{ Km/hr} = \frac{5}{18} \text{ m/sec}$$

$$(36 \text{ Km/hr}) \rightarrow 36 \times \frac{5}{18} = 10 \text{ m/sec}$$



# Time, Speed & Distance

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



CASE I

D = Constant

$$S \propto \frac{1}{T} \Rightarrow S_1 T_1 = S_2 T_2$$

$$\frac{S_1}{S_2} = \frac{T_2}{T_1}$$

CASE II

Speed = Constant

$$D \propto T$$

$$\frac{D_1}{D_2} = \frac{T_1}{T_2}$$

CASE III

Time = Constant

$$S \propto D$$

$$\uparrow \quad \uparrow$$

$$\frac{S_1}{S_2} = \frac{D_1}{D_2}$$

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GENERAL  
APTITUDE

MASTERY:

### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance



1) A worker travels from his home to Factory at 4 km/h and reaches Factory 20 min late. If the speed had been 6 km/h he would have reached 10 min early. Find the distance from his home to Factory?

A) 4km

B) 6km

C) 8km

D) 9km

Diagram: Home to Factory

Given:  $D = \text{Constant}$

Home  $\rightarrow$  Factory

Time taken at 4 kmph:  $T_1$  (Given)

Time taken at 6 kmph:  $T_2$  (Given)

Distance:  $D = S \times T$

Equation:  $S_1 \times T_1 = S_2 \times T_2$

Substituting values:

$$4 \times (T + \frac{20}{60}) = 6 \times (T - \frac{10}{60})$$

$$4T + \frac{40}{60} = 6T - \frac{60}{60}$$

$$4T + \frac{2}{3} = 6T - 1$$

$$2 = 2T + \frac{1}{3}$$

$$T = \frac{5}{6} \text{ hr} = 50 \text{ min}$$

Calculation:

$$D = 4 \times \frac{50}{60} = \frac{200}{60} = \frac{100}{30} = \frac{50}{15} = \frac{10}{3} = 6.67 \text{ km}$$

$$D = 6 \times \frac{50}{60} = \frac{300}{60} = \frac{150}{30} = \frac{50}{10} = 5 \text{ km}$$

Final Answer: 6 km



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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

- 1) A worker travels from his home to Factory at 4 km/h and reaches Factory 20 min late. If the speed had been 6 km/h he would have reached 10 min early. Find the distance from his home to Factory?
- A) 4km      B) 6km      C) 8km      D) 9km

(P-I)

Home  
4 kmph →  
6 kmph ←

6 KM  
 $D = \text{constant}$

$$\frac{s_1}{s_2} = \frac{T_2}{T_1} \Rightarrow \frac{T_1}{T_2} = \frac{s_2}{s_1}$$
$$\frac{T_1}{T_2} = \frac{6}{4} = \frac{3}{2}$$

+ 60 min  
1 unit = 30 min

Factory  
20 min late  
10 min Early

10 AM → 10:20  
g:50  
30 min  
=

$$D = 6 \times \frac{60}{60} = 6 KM$$

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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance



1) A worker travels from his home to Factory at 4 km/h and reaches Factory 20 min late. If the speed had been 6 km/h he would have reached 10 min early. Find the distance from his home to Factory?

A) 4km

B) 6km

C) 8km

D) 9km



4 kmph →  
6 kmph →

D

4 KM → 1 hr = 60 min  
6 KM → 30 min

(A)  $D = 4 \text{ KM}$

$T_1 = 1 \text{ hr} = 60 \text{ min}$

$T_2 = 40 \text{ min} \quad 20 \text{ min}$

2 KM → 20 min  
4 KM → 40 min

6 kmph

(B)  $D = 6 \text{ KM}$

$T_1 = 60 \text{ min}$

$T_2 = 1 \text{ hr} = 60 \text{ min}$

20 min late  
10 min Early

10 AM → 10:20

9:50 → 30 min ↑

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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

2) While traveling from office to home, Ram's car got some problem so he took 25% more than the usual time to reach home. His speed in this case is what part of the usual speed?

A)  $\left(\frac{1}{4}\right)^{\text{th}}$

B)  $\left(\frac{5}{4}\right)^{\text{th}}$

C)  $\left(\frac{4}{5}\right)^{\text{th}}$

D) NOTA

office

$D = \text{Constant}$

Home

$S_1$

$S_2$

$$\frac{S_1}{S_2} = \frac{T_2}{T_1} = \frac{100+25}{100} = \frac{125}{100} = \frac{5}{4}$$

$T_1$

$$T_2 = T_1 + 25\% \text{ of } T_1$$

$$\frac{S_1}{S_2} = \frac{5}{4} \Rightarrow \frac{S_2}{S_1} = \frac{4}{5}$$

$$S_2 = \frac{4}{5} S_1$$

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Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

Time, Speed and Distance - 1 | Basic Concept | General Aptitude | Lec 29 | GATE CE | ...

Q) The ratio of the speeds of A and B is 3:7. If B takes 20 min less than A to cover a certain distance, then what is the time taken (in min) by A to cover the same distance?

A) 15 min

B) 20 min

C) 35 min ✓

D) 50 min

$$\frac{S_A}{S_B} = \frac{3}{7} = \frac{T_B}{T_A}$$

$D = \text{Constant}$

$$\frac{T_B}{T_A} = \frac{3}{7} \Rightarrow$$

$$\frac{T_A}{T_B} = \left(\frac{7}{3}\right)$$

$\begin{array}{l} 35 \text{ min} \\ 15 \text{ min} \end{array}$

$4 \text{ unit} = 20 \text{ min}$   
 $1 \text{ unit} \Rightarrow 5 \text{ min}$

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\*4) Travelling at  $\frac{4}{5}$ th of the original speed a train is 10 min late. Find the usual time taken by the train to complete the journey?

- A) 40 minutes      B) 50 minutes      C) 30 minutes      D) NOTA

$$D = \text{constant}$$

$$S_1 \rightarrow$$
  
$$S_2 = \frac{4}{5} S_1 \rightarrow$$

$$\frac{S_1}{S_2} = \frac{5}{4} = \frac{T_2}{T_1}$$

$$\frac{T_1}{T_2} = \frac{4}{5} \quad \text{1 unit} = 10 \text{ min}$$

40 min  
50 min



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## Home Work Question

Two persons cover the same distance at speed of 25 km/h and 30 km/h respectively. Find the distance travelled if one person takes 25 minute more than the other.

A) 61.5 km

B) 60.5 km

C) 63.5 km

D) 62.5 km

$$\frac{T_1}{T_2} = \frac{S_2}{S_1} = \frac{30}{25} = \left( \frac{6}{5} \right) \text{ 1 unit - } \cancel{25}$$

$\uparrow 150 \text{ min}$   
 $\cancel{125 \text{ min}}$

$$D = S_1 \cdot T_1$$
$$D = \frac{S_1}{S_2} \cdot T_2$$

$$D = 25 \times \frac{150}{60}$$

$$D = 30 \times \frac{125}{60}$$

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## Home Work Question

The ratio between the speed of Hemant and Nitish is 6: 7. If Hemant takes 30 minutes more than Nitish to cover a distance. Find the actual time taken by Hemant and Nitish?

- (A) 120 min & 180 min      (B) 180 min & 120 min  
(C) 210 min & 180 min      (D) 180 min & 210 min

$$\frac{T_2}{T_1} = \frac{S_1}{S_2} = \frac{c}{f}$$

$$\frac{T_1}{T_2} \rightarrow \frac{S_2}{S_1}$$

$$\frac{T_1}{T_2} = \left(\frac{7}{6}\right) \text{ | Unit } = \underline{30 \text{ min}}$$

$$D = \text{constant}$$



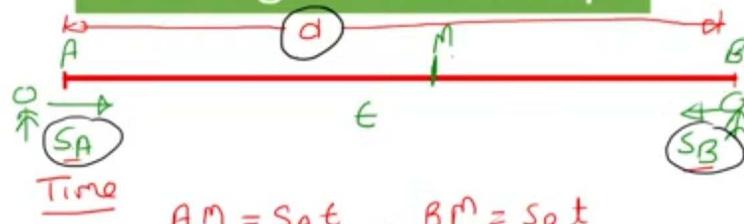
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CASE 1

### Meeting Point Concept



$$A \text{ m} = s_A t, \quad B \text{ m} = s_B t$$

$$A \text{ B} = A \text{ m} + B \text{ m} \Rightarrow d = s_A t + s_B t$$

$$t(s_A + s_B) = d$$

$$t = \frac{d}{s_A + s_B}$$

Relative Speed

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

$T = \text{Constant}$

$S \propto D$

$$\frac{s_1}{s_2} = \frac{D_1}{D_2}$$

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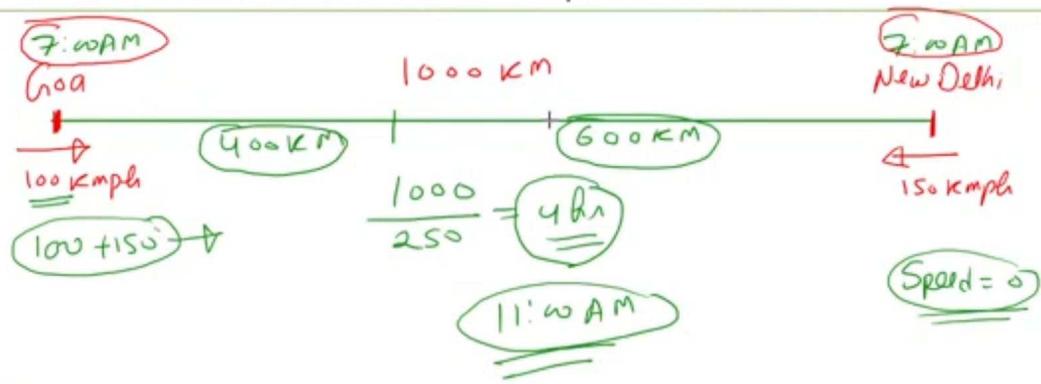
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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

1) Two trains start at the same time(7:00 AM) from Goa and New Delhi, proceed toward each other at the rate of 100 km/h and 150 km/h respectively and distance between Goa and New Delhi is 1000 km. find the time when they will meet?



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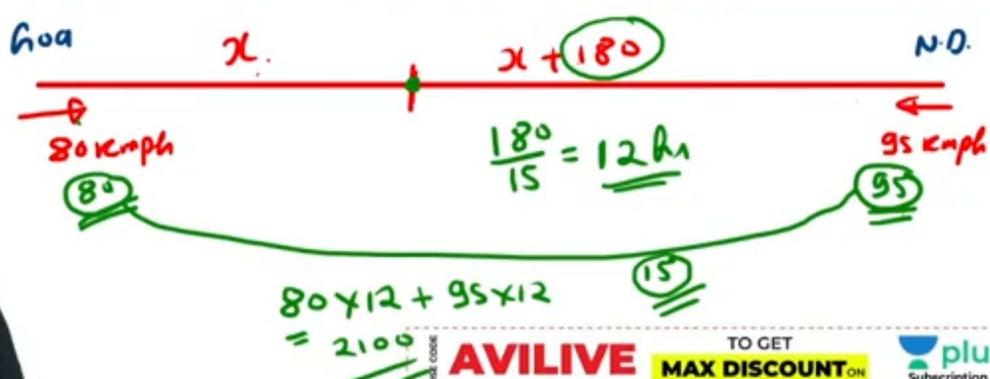




Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

2) Two trains start at the same time from Goa and New Delhi, proceed toward each other at the rate of 80 km/h and 95 km/h respectively. When they meet, it is found that one train has travelled 180 km more than other. Find the distance between Goa and New Delhi.

- A) 1800 km      B) 2000 km      C) 2100 km      D) 960 km



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Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

3) 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 take for the distance between the two cars to be 20 km is \_\_\_\_.

A) 1

✓ B) 2

[GATE 2019]

C) 3

D) 6

50 kmph

60 kmph

1 hr → 10 km

2 hr → 20 km



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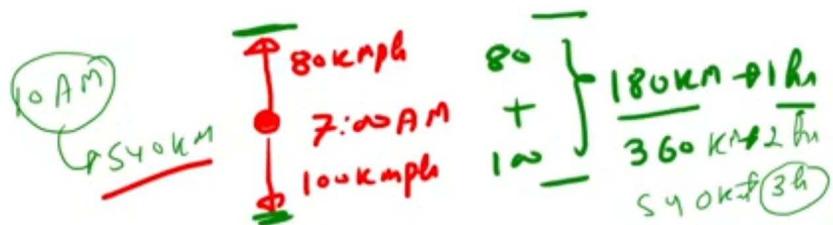


## Home Work Question

Two trains Started at 7 AM from the same point. The first train travelled north at a speed of 80km/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

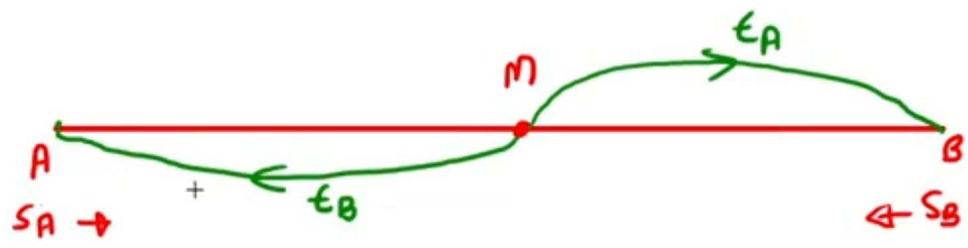
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## Meeting Point Concept



Time taken by A to reach M to B =  $t_A$   
B " " M to A =  $t_B$

① Time    ② Distance



USE CODE

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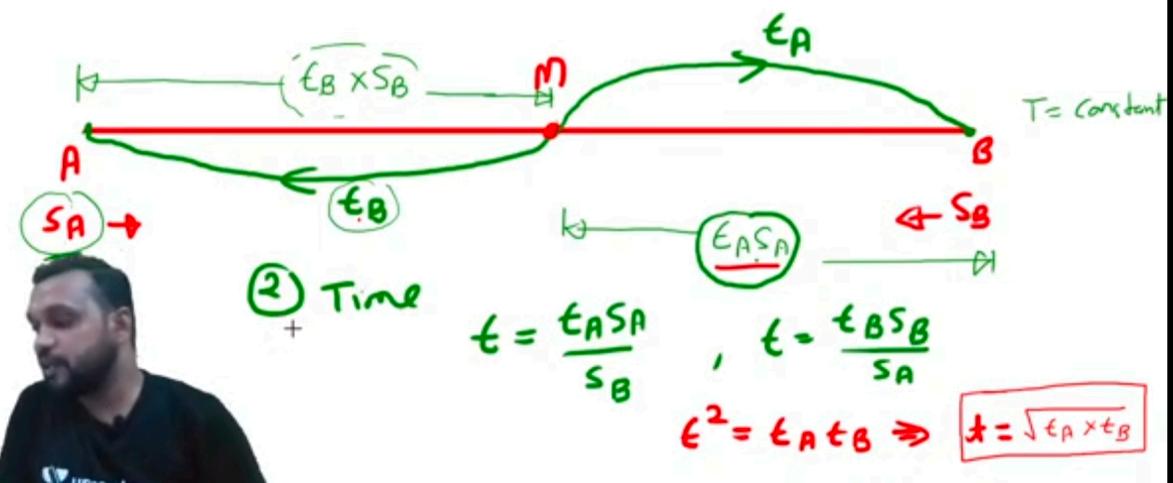
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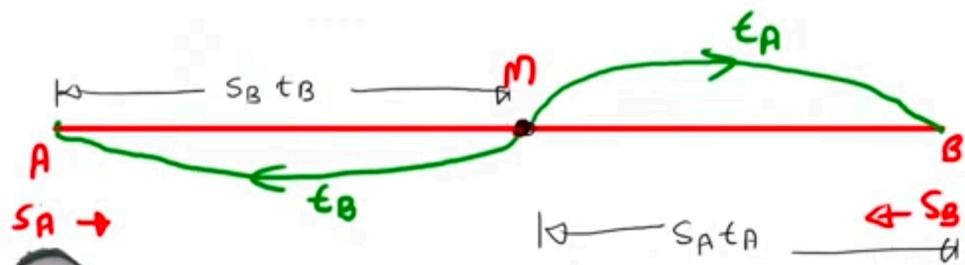
$T = \text{Constant}$  ( $s \propto d$ )

① Distance =  $A \rightarrow B = AM + MB = \boxed{\epsilon_B s_B + \epsilon_A s_A}$



③  $T = \text{constant}$  ( $S \propto D$ )

$$\frac{S_A}{S_B} = \frac{S_B t_B}{S_A t_A} \Rightarrow \frac{S_A^2}{S_B^2} = \frac{t_B}{t_A} \Rightarrow \boxed{\frac{S_A}{S_B} = \sqrt{\frac{t_B}{t_A}}}$$

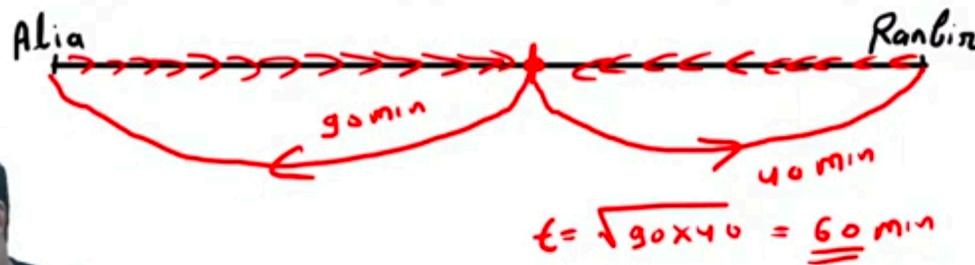




### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

1) Alia and Ranbir started simultaneously in opposite directions from home P and Q respectively. Each of them run towards starting point of other. After crossing each other, Alia and Ranbir took 40 minutes and 90 minutes respectively to reach their destinations. Find the time taken by them to meet each other.

- A) 65 min      B) 90 min      C) 135 min      D) NOTA



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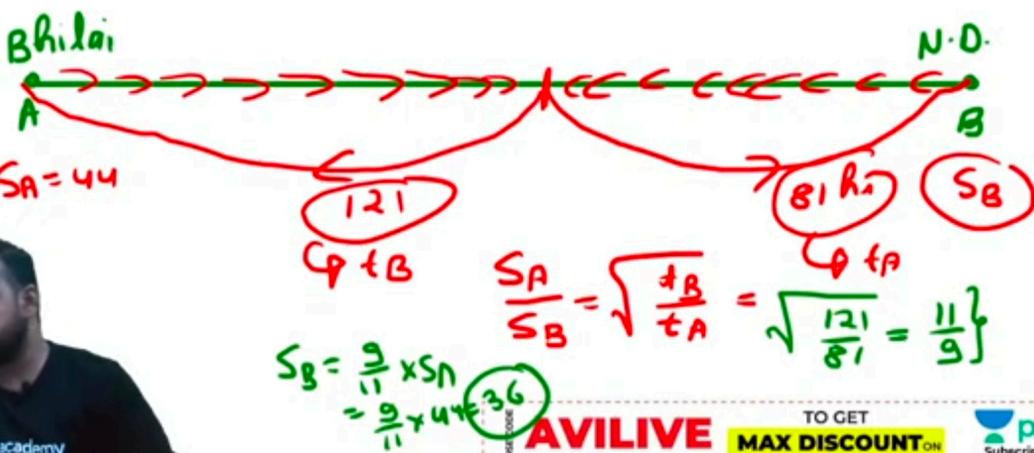




Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

2) Train A starts its journey from Bhilai to New Delhi while train B starts from New Delhi to Bhilai. After crossing each other they finish their journey in 81 hours and 121 hours respectively. Then what will be speed of train B if train A speed is 44 km/h?

- A) 44 km/h      B) 55 km/h      C) 36 km/h      D) 46 km/h



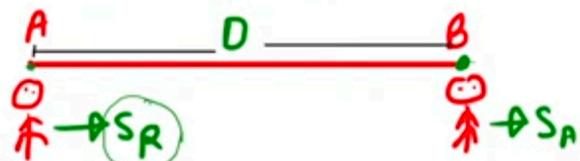
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CASE II

$$S_R > S_A$$



Ranbir

$$S_R - S_A \rightarrow$$

$$\frac{D}{S_R - S_A} = t$$

Speed = 0

(SOL)  $T = \text{Constant}$



$$AB = AM - BM$$

$$D = S_R t - S_A t$$

$$D = t(S_R - S_A)$$

$$t = \frac{D}{S_R - S_A}$$



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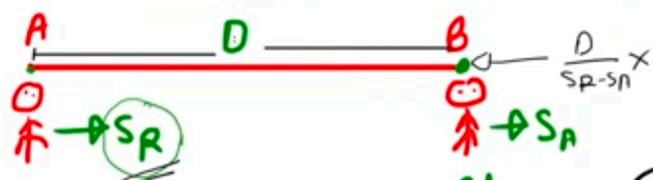
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CASE II

$$S_R > S_A$$

(SAID)  $T = \text{Constant}$



Alia

M&F

Ranbir

$$S_R - S_A \rightarrow$$

$$\frac{D}{S_R - S_A} = t$$

Speed = 0

$$AB = AM - BM$$

$$D = S_R t - S_A t$$

$$D = t(S_R - S_A)$$

$$t = \frac{D}{S_R - S_A}$$

$$AM = 0 + \left( \frac{D}{S_R - S_A} \right) S_A$$

$$AM = S_R \left( \frac{D}{S_R - S_A} \right)$$



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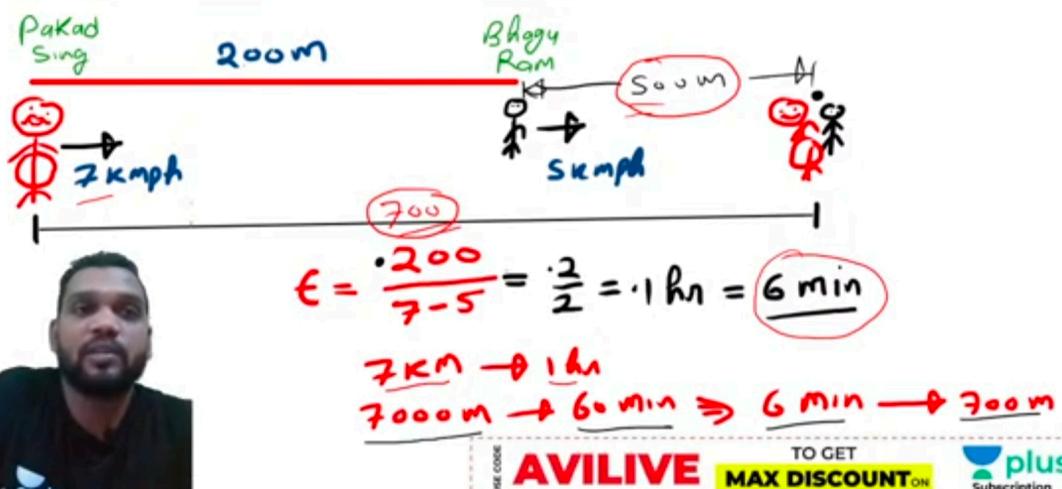
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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

Q) The thief Bhagu Ram is spotted by the police man Pakad Singh from a distance of 200 m. Once they see each other start running. What is the distance Bhagu Ram whose running at 5 kmph would have covered before being caught by Pakad Singh running at 7 kmph?  
A) 600 m      B) 500 m      C) 700 m      D) NOTA



$$t = \frac{200}{7-5} = \frac{200}{2} = 100 \text{ min}$$

$$5 \times 100 = 500 \text{ m}$$

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## Average Speed

Average Speed =

Total distance covered throughout the Journey  
Total time taken for the Journey

$$AS = \frac{d}{T}$$



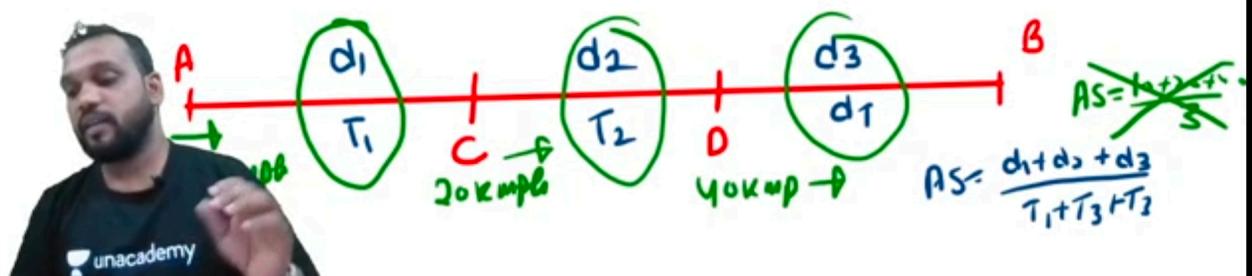
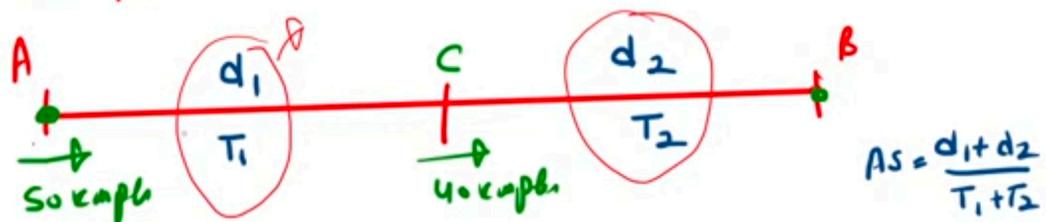
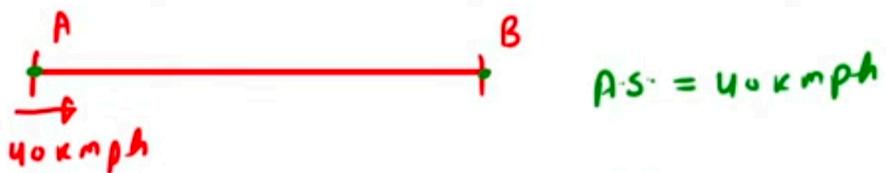
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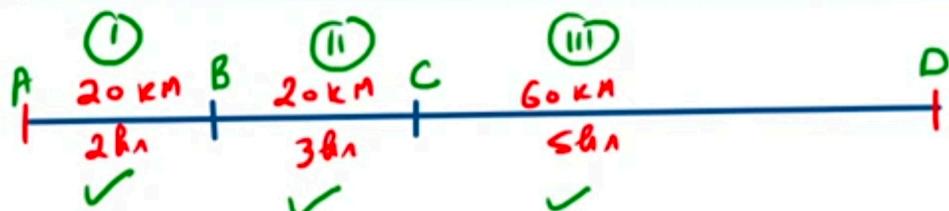


Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance



1) A train travels a distance of 20 km in the first 2 hours, 20 km in the next 3 hours and 60 km in last 5 hours. What is the average speed of the train for the entire journey?

- A) 10 kmph      B) 12 kmph      C) 14 kmph      D) NOTA



$$AS = \frac{20 + 20 + 60}{2+3+5} = \frac{100}{10} = 10 \text{ kmph}$$



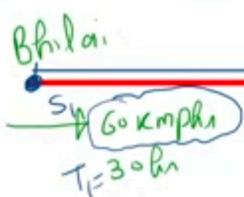
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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

Q) A truck goes from Bhilai to Goa with an average speed of 60 km/hr. The journey takes 30 hours. It returns from Goa to Bhilai on the same road with an average speed of 40 km/hr. What was the average speed of the truck during the roundtrip?



$$\text{A.S.} = \frac{60 \times 30 + 60 \times 30}{30 + 45}$$
$$= \frac{1800 \times 2}{75} = \frac{72 \times 2}{3} = 24 \times 2 = 48$$

$$S_1 = 60 \times 30$$
$$T_1 = 45$$
$$S_2 = 40 \times 45$$
$$T_2 = 45$$
$$\text{A.S.} = \frac{60 + 40}{2} = 50$$

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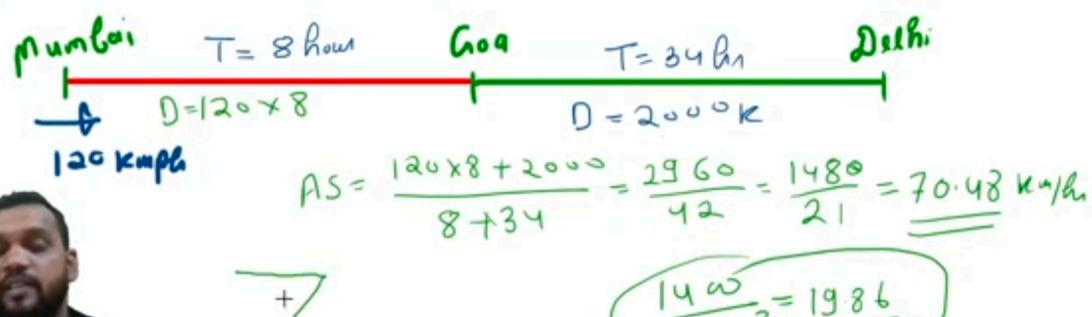
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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

3) A person travels from Mumbai to Goa in exactly 8 hours with a speed of 120 km/hr. From Goa, the person travels to Delhi in 34 hours. If the distance from Goa to Delhi was 2000 km, how long will it take to get from Delhi to Bombay if the person maintains the speed equal to the average speed? The distance from Delhi to Bombay is 1400 km.



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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

- 4) A person travels from A to B with a speed of 60 kmph and returns from B to A at 40 km/hr. What is the average speed for the whole journey?  
A) 64 kmph      B) 48 kmph      C) 50 kmph      D) 60 kmph



$$\text{AVG} = \frac{\frac{D}{60} + \frac{D}{40}}{\frac{D}{60} + \frac{D}{40}} = \frac{2 \times 60 \times 40}{40 + 60} = \underline{\underline{48 \text{ kmph}}}$$

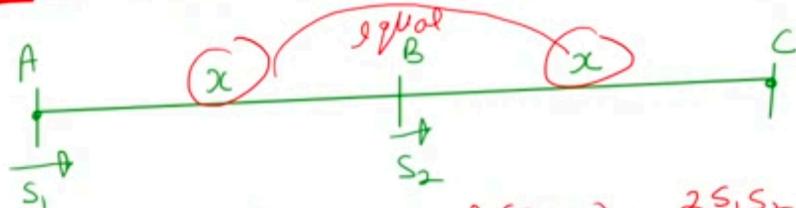


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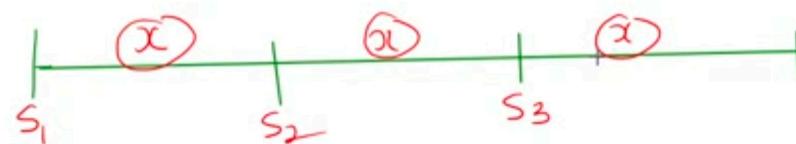


Special Case:-

**CASE I** when Distance is equal in each journey



$$A.S. = H.M. \text{ of } (s_1, s_2) = \frac{2s_1 s_2}{s_1 + s_2}$$



$$A.S. = H.M \text{ of } (s_1, s_2, s_3) = \frac{3}{\frac{1}{s_1} + \frac{1}{s_2} + \frac{1}{s_3}}$$



USE CODE

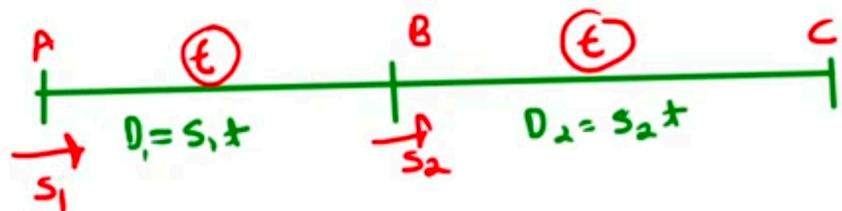
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Special Case:-

CASE II when time is equal in each journey



$$AS = \frac{s_1 t + s_2 t}{t+t} = \frac{s_1 + s_2}{2}$$





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5) A man travels from A to B at a speed of 30 Km/hr in 40 min and he travels from B to C with a speed of 60 km/hr in 40 min. Find the average speed of whole journey?

- A) 40 kmph      ✓ B) 45 kmph      C) 50 kmph      D) 60 kmph

$$\frac{30+60}{2} = 45 \text{ kmph}$$



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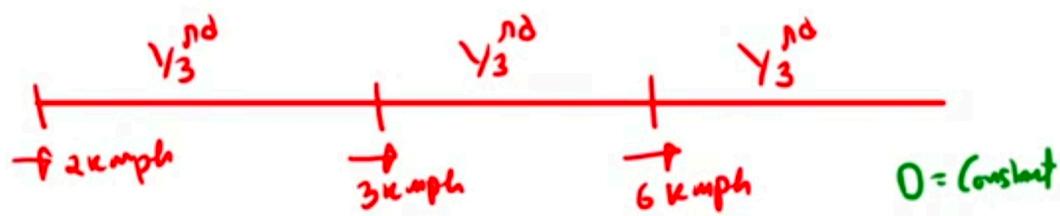




Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

Q) Divya covers first  $\frac{1}{3}$ rd of the distance walking at 2 kmph, second  $\frac{1}{3}$ rd of the distance running at 3 kmph and the rest cycling at 6 kmph. Find the average speed for the whole journey?

- A) 3 kmph      B) 3.66 kmph      C) 9.81 kmph      D) 5 kmph



$$\text{AS} = \text{Harmonic Mean} (2, 3, 6) = \frac{3}{\frac{1}{2} + \frac{1}{3} + \frac{1}{6}}$$

3 kmph =  $\frac{18}{3+2+1}$

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Today - Jul 25, 2021

## Home Work Question

An automobile travels from city A to city B and returns to city A by the same route. The speed of the vehicle during the on word and return journeys were constant at 60 km/h and 90 km/h, respectively. What is the average speed in km/h for the entire journey?

A) 72

B) 73

C) 74

D) 75

[GATE 2018, 2 MARKS (IN)]



$$\text{Avg of } (60, 90) = \frac{60 \times 90 \times 2}{60 + 90} = \frac{90 \times 60 \times 2}{150} = 72$$

USE CODE **AVILIVE** TO GET **MAX DISCOUNT ON** 





Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

1) A person travels from A to B with a speed of 60 kmph and returns from B to A at 40 km/hr. What is the average speed for the whole journey?

- A) 64 kmph      B) 48 kmph      C) 50 kmph      D) 60 kmph

$$\text{Avg speed} = \frac{2 \times 40 \times 60}{40 + 60} = \underline{\underline{48 \text{ kmph}}}$$



USE CODE **AVILIVE** TO GET **MAX DISCOUNT** ON 





Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

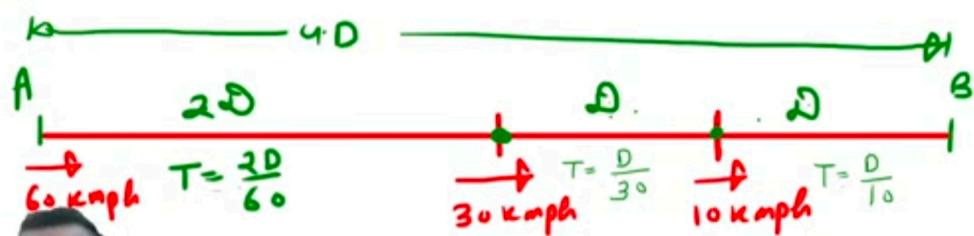
2) A tourist covers half of this journey by train at 60 kmph, half of the remainder by bus at 30 kmph and the rest by cycle at 10 kmph. The average speed of the tourist in kmph during his entire journey is  
[GATE 2013, 2 MARKS]

A) 36

B) 30

C) 24

D) 18



$$\text{A.S.} = \frac{4D}{\frac{2D}{60} + \frac{D}{30} + \frac{D}{10}} = \frac{4}{\frac{1}{30} + \frac{1}{9} + \frac{1}{10}} = \frac{4 \times 60}{2+2+6} = \frac{4 \times 60}{10} = 24$$

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$$\frac{2 \times 30 \times 10}{10 + 30} = \frac{2 \times 30 \times 10}{40} = 15 \text{ kmph}$$



$$\frac{2 \times 15 \times 60}{15 + 60} = \frac{2 \times 15 \times 60}{75} = 24 \text{ kmph}$$





Time, Speed & Distance-5 | Problems Based on Train | General Aptitude | Lec 33 | G…



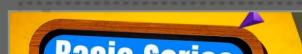
Relative Speed:



27:47 / 1:10:20



TRICK TO SOLVE

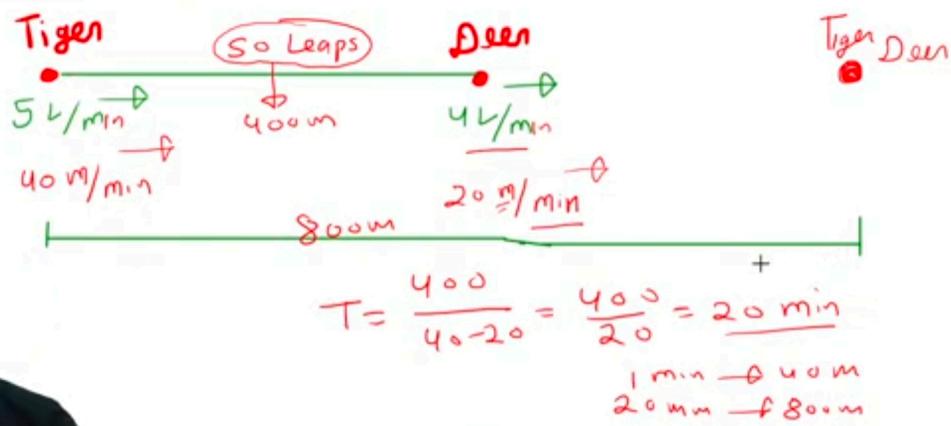




### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

1) A tiger is 50 leaps of its own behind a deer. The tiger takes 5 leaps per minute to the deer's 4. If the tiger and the deer cover 8 m and 5 m per leap, respectively. What distance in meter will the tiger have to run before it catches the deer? [GATE 2015]

Ans:



$$T = \frac{400}{40-20} = \frac{400}{20} = 20 \text{ min}$$

1 min → 40 m  
20 min → 800 m



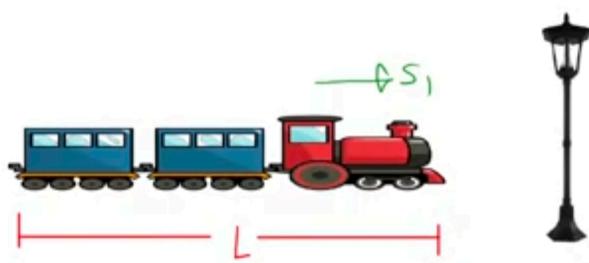
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## Question Based on train

CASE-1 : Moving body & a stationary body of negligible length



Time taken by train to pass the pole

$$= \frac{L}{S_1}$$

USE CODE

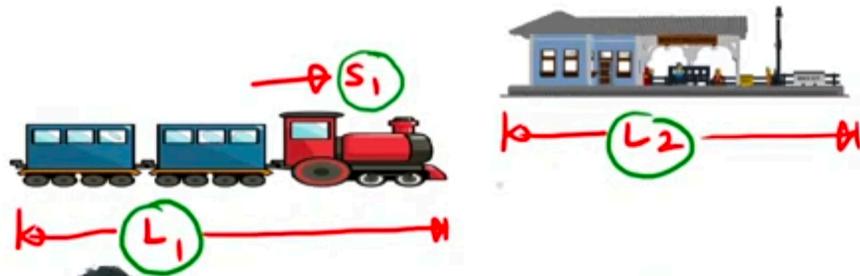
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## Question Based on train

CASE-2 : Moving body & a stationary body of length L



Time taken by train to pass the platform =  $\frac{L_1 + L_2}{S_1}$

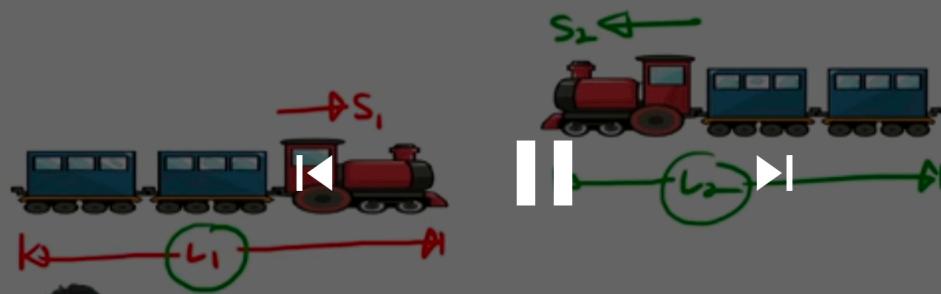


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### CASE-3 : Two moving body in opposite direction



Time taken to pass each other

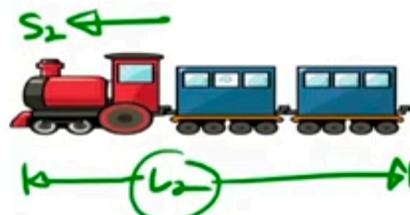
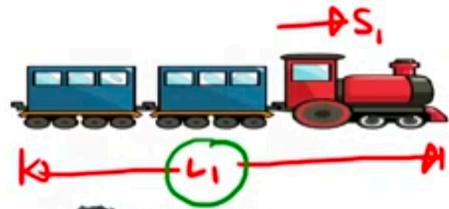
$$= \frac{L_1 + L_2}{s_1 + s_2}$$

48:14 / 1:10:20



## Question Based on train

CASE-3 : Two moving body in opposite direction



Time taken to pass each other

$$= \frac{L_1 + L_2}{S_1 + S_2}$$

USE CODE

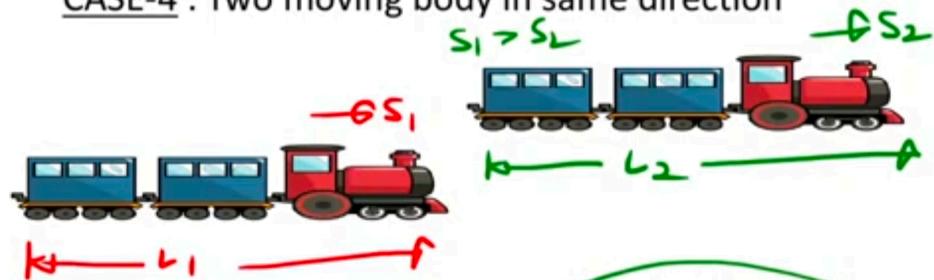
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## Question Based on train

CASE-4 : Two moving body in same direction



$$T = \frac{L_1 + L_2}{s_1 - s_2}$$



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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

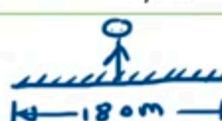
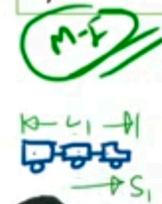
A man is standing on Railway Bridge which is 180 m long. He finds that a train crosses the bridge in 20 seconds but himself in 8 seconds.

Q) Find the length of the train?

- A) 500      B) 120      C) 150      D) 210

Q) Find its speed in m/s?

- A) 50      B) 12      C) 15      D) 21



$$\frac{180 + L_1}{S_1} = 20$$
$$\frac{L_1}{S_1} = 8$$

XXX  
M-E

$$L_1 + 180 \rightarrow 20 \text{ sec}$$
$$L_1 \rightarrow 8 \text{ sec}$$
$$180 \text{ m} \rightarrow 12 \text{ sec}$$
$$15 \text{ m} \rightarrow 1 \text{ sec}$$
$$S_1 = 15 \text{ m/sec}$$



USE CODE

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Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

7) A train that is 280 meters long, traveling at a uniform speed, crosses a platform in 60 seconds and passes a man standing on the platform in 20 seconds. What is the length of the platform in meters?

[GATE 2014, 2 MARKS (ME, EC)]

Ans:

560

$$280 + L_p \rightarrow 60 \text{ sec}$$

$$\underline{280 \text{ m}} \rightarrow \underline{20 \text{ sec}}$$

$$L_p \rightarrow 40 \text{ sec}$$

$$280 \times 2 = 560$$

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## Home Work Question

It takes 10 s and 15 s respectively, for two trains traveling at different constant speeds to completely pass a telegraph post. The length of the first train is 120 m and that of the second train is 150 m. The magnitude of the difference in the speeds of the two trains (in m/s) is

[GATE 2016]

(A) 2.0

(B) 10.0

(C) 12.0

(D) 22.0

$$\begin{aligned} 120 \text{ m} &\rightarrow 10 \text{ sec} \Rightarrow S = 12 \text{ m/sec} \\ 150 \text{ m} &\rightarrow 15 \text{ sec} \Rightarrow S = 10 \text{ m/sec} \end{aligned}$$

②

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Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

1) Two trains are running in opposite directions in the same speed. The length of each train is 120 meter. If they cross each other in 12 seconds, the speed of each train (in km/hr) is

A) 42

B) 36

C) 28

D) 20

$$\begin{aligned} \frac{120 + 120}{240 \text{ m}} &\rightarrow \frac{12 \text{ sec}}{12 \text{ sec}} \Rightarrow S = \frac{240}{12} = \underline{\underline{20 \text{ m/sec}}} \\ S = 10 \text{ m/sec} &= 10 \times \frac{18}{5} \text{ km/hr} \\ &= \underline{\underline{36 \text{ km/hr}}} \end{aligned}$$



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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

Q) A man sitting in a train which is traveling at 50 kmph observes that a goods train, traveling in opposite direction, takes 9 seconds to pass him. If the goods train is 280 m long, find its speed.?

A) 60

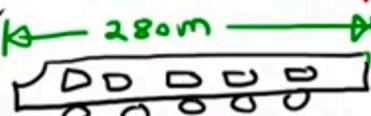
B) 62

C) 64

D) 65



$$112 - 50 = 62 \text{ kmph}$$



$$9 \rightarrow S \text{ kmph}$$

$$\frac{280 \text{ m}}{9 \text{ sec}} \rightarrow S \text{ kmph}$$

$$S = \frac{280 \text{ m}}{9 \text{ sec}} \times \frac{18}{5} \text{ km/h}$$

$$S = 112 \text{ kmph}$$

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Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

Time, Speed & Distance-6 | General Aptitude | Lec 34 | GATE CE



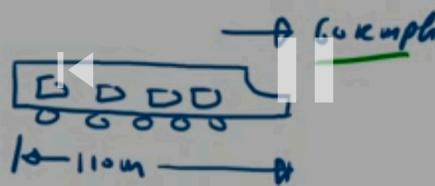
3) A train of length 110 meter is running at a speed of 60 kmph. In what time, it will pass a man who is running at 6 kmph in the direction opposite to that in which the train is going?

A) 10

B) 8

C) 6

D) 4



$$\begin{aligned} \text{Relative speed} &= 60 + 6 = 66 \text{ kmph} \\ &= 66 \times \frac{5}{18} \text{ m/sec} \\ &= \underline{\underline{20 \text{ m/sec}}} \end{aligned}$$

39:45 / 1:03:10

GATE 2021

34

5M

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gate

Aptitude for GATE/ESE/PSUs/AE/IE/College Placement, Topic- Time, Speed & Distance



Time, Speed & Distance-6 | General Aptitude | Lec 34 | GATE CE



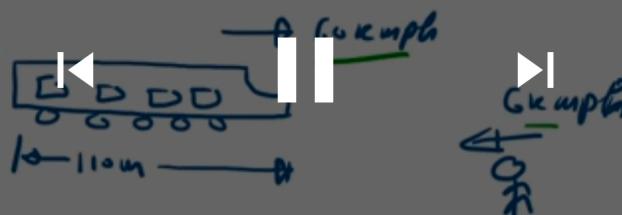
Q3) A train of length 110 meter is running at a speed of 60 kmph. In what time, it will pass a man who is running at 6 kmph in the direction opposite to that in which the train is going?

A) 10

B) 8

C) 6

D) 4



110 m →

$$60 + 6 = 66 \text{ kmph}$$

$$= 72 \times \frac{5}{18} \text{ m/sec}$$

$$= \underline{\underline{20 \text{ m/sec}}}$$

40:08 / 1:03:10

GATE 2021



5M



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GATE TUTORIALS



Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance



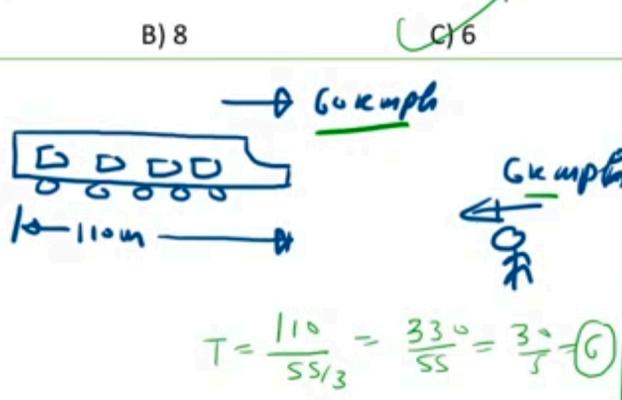
3) A train of length 110 meter is running at a speed of 60 kmph. In what time, it will pass a man who is running at 6 kmph in the direction opposite to that in which the train is going?

A) 10

B) 8

C) 6

D) 4



$$\begin{aligned} \text{Relative Speed} &= (60 + 6) \text{ kmph} \\ &= 66 \text{ kmph} \\ \text{Time} &= \frac{\text{Distance}}{\text{Speed}} = \frac{110}{66} = \frac{5}{3} \text{ hours} \end{aligned}$$

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Aptitude for GATE/ESE/PSUs/AE/IE/College Placement, Topic- Time, Speed & Distance

Time, Speed & Distance-6 | General Aptitude | Lec 34 | GATE CE

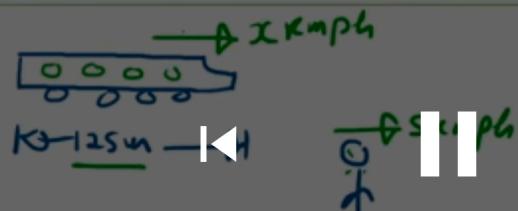
4) A train 125 m long passes a man, running at 5 km/hr in the same direction in which the train is going, in 10 seconds. The speed of the train is ?

A) 45 kmph

B) 25 kmph

C) 30 kmph

D) 50 kmph



$$\frac{125 \text{ m}}{10 \text{ sec}} = 12.5 \text{ m/sec}$$

$$(x-5) = 12.5 \times \frac{5}{18}$$
$$x = 50 \text{ kmph}$$

48:20 / 1:03:10

GATE 2021



TRICK TO SOLVE

ELITE BATCH

GATE TUTORIALS



### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

Q) A train 125 m long passes a man, running at 5 km/hr in the same direction in which the train is going, in 10 seconds. The speed of the train is ?

- A) 45 kmph      B) 25 kmph      C) 30 kmph      D) 50 kmph

$$1 \text{ kmph} = \frac{5}{18} \text{ m/sec}$$
$$(x-5) = 12.5 \times \frac{18}{5}$$
$$x = 50 \text{ kmph}$$



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### Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Time, Speed & Distance

5) A 320 m long train moving with an average speed of 120 km/hr crosses a platform in 24 sec. A man crosses the same platform in 4 minutes. What is the speed of man in m/s?

[GATE]

A) 2.4

B) 1.5

C) 1.6

D) 2

$$\frac{320 + L_p}{800 \text{ m}} \rightarrow 24 \text{ sec}$$

$$L_p = 480 \text{ m}$$

$$\frac{480}{x} = 4 \times 60$$

$$x = \frac{480}{4 \times 60} = 2 \text{ m/sec}$$

$$Sp = 120 \text{ kmph} = \frac{\frac{2}{3}}{\frac{1}{3}} = \frac{100}{3} \text{ m/sec}$$

$$3 \text{ sec} \rightarrow 100 \text{ m}$$
$$24 \text{ sec} \rightarrow 800 \text{ m}$$

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