

GATE 2021

GENERAL APTITUDE

धमाकेदार ट्रिक के साथ 🔥🔥

**TIME, SPEED & DISTANCE, -5,
PROBLEMS BASED ON TRAIN**

33



AVINASH SIR



AVINASH SINGH SIR

GATE | EE (CE)



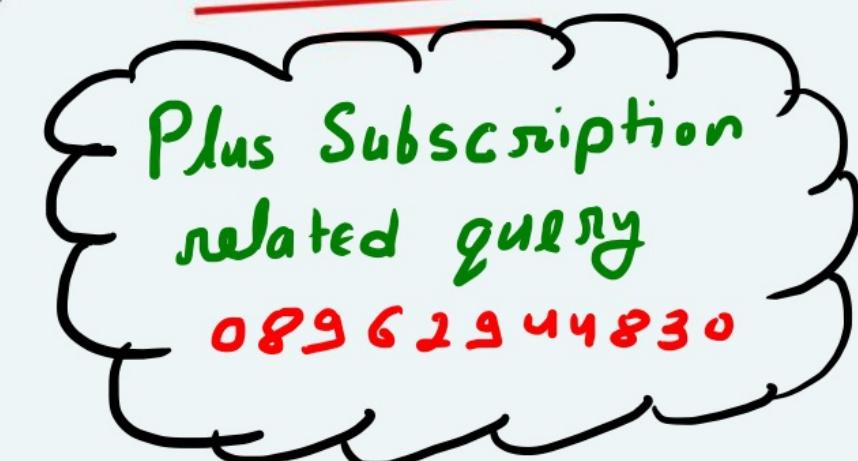
Secured Score 99.86% in
CAT (Quantitative Section)



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Mentored 25k+ Students for
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Subjects Taken:
General Aptitude
Engineering Mathematics
Digital Electronics



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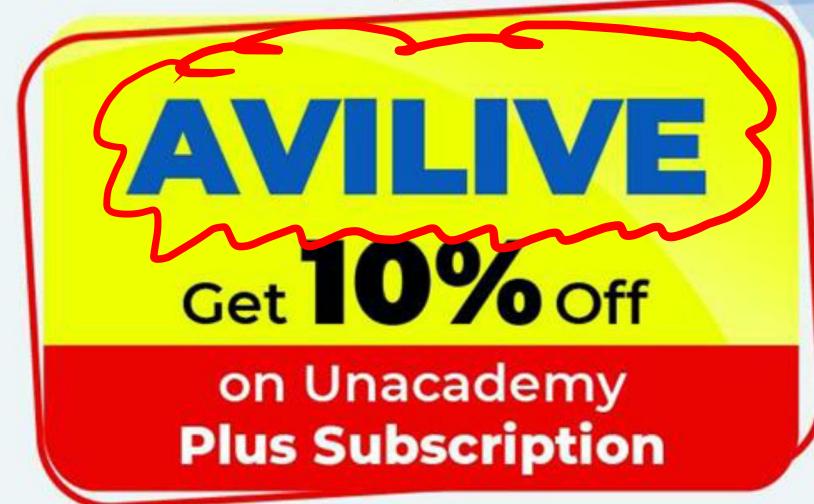
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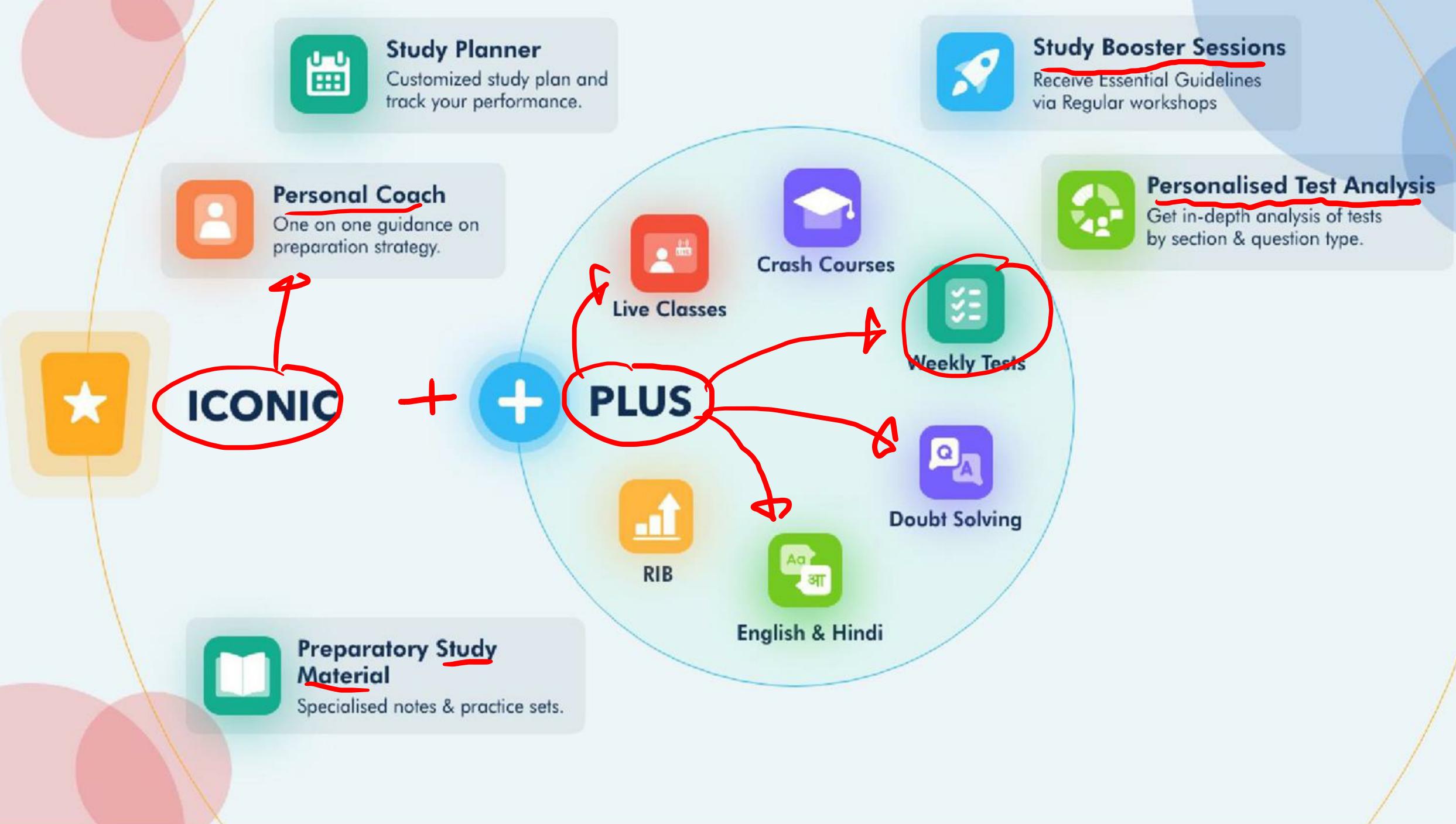
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BY AVINASH SIR

25 Nov, 2020

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2022

Analytical Aptitude

- Venn Diagram
- Syllogism
- Series
- Coding & Decoding
- Clock & Calendar
- Distance & Direction
- Blood Relation
- Seating Arrangements
- Puzzle

Free

5:00 PM

Quantitative Aptitude

- Time & Work
- Pipes & Cisterns
- Ratio & Proportion
- Number System
- Sequence & Series
- Average
- Time, Speed & Distance
- Percentage
- Profit, Loss & Discount
- Allegation & Mixture
- Powers, exponents and logarithms
- Algebra
- Permutation & Combination
- Probability
- Data Interpretation
- Mensuration and geometry

2022

Spatial Aptitude

- Shape Matching - Two Dimensional
- Visual Comparison - Two Dimensional
- Group Rotation - Two Dimensional
- Combining Two Dimensional Shapes
- Cube Views in Three Dimensions
- Cubes in Two and Three Dimensions
- Other Solids in Two and Three Dimensions
- Block Counting in Three Dimensions
- Two-Dimensional Mirror Reflections
- Paper folding and Cutting

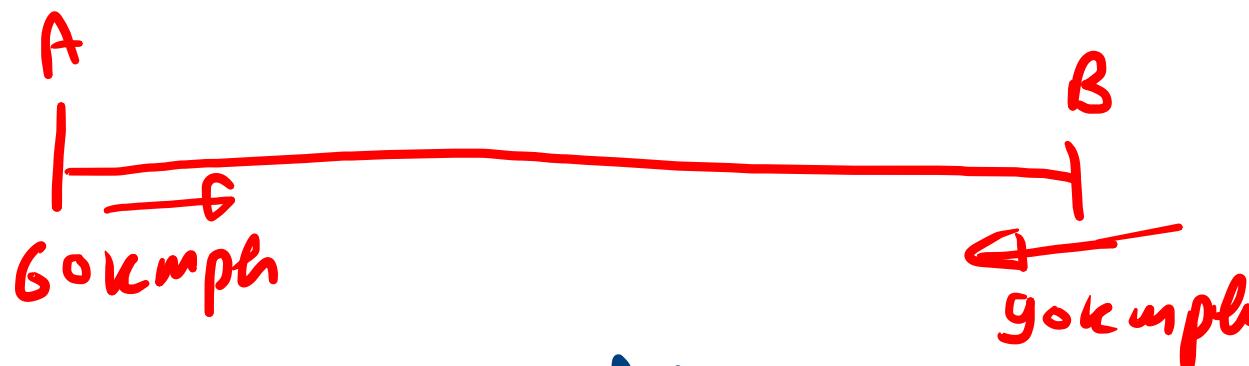
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✓ Home Work Question

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 onward 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)]



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

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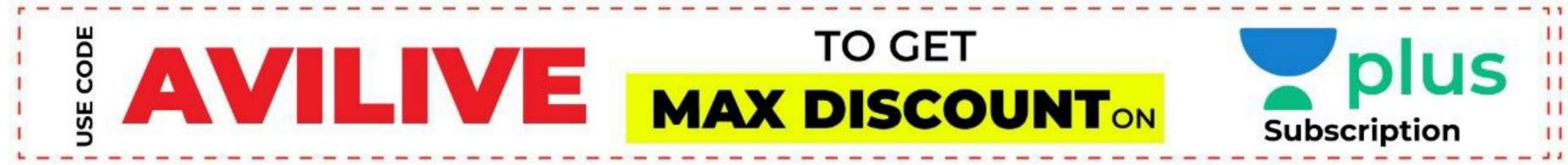
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Today's Class Agenda

- Remaining Questions based on Average Speed
- Questions based on Train





- 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

$$\text{Avg of } (60, 40) = \frac{2 \times 60 \times 40}{60 + 40} = \underline{\underline{48 \text{ kmph}}}$$

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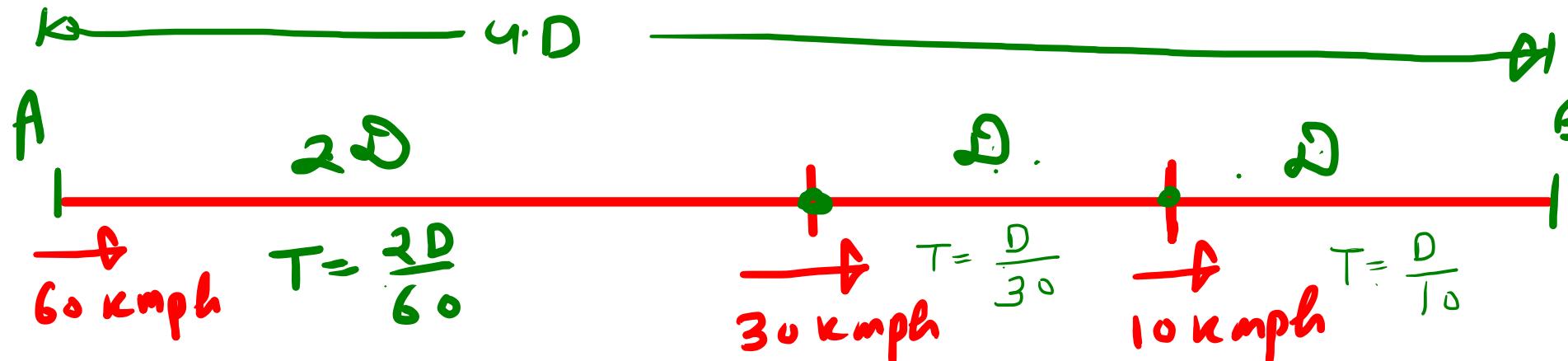
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- 2) A tourist covers half of this journey by train at 60 kmph, half of the remainder by bus at 30 kmph and the rest by cycle at 10 kmph. The average speed of the tourist in kmph during his entire journey is
- A) 36 B) 30 C) 24 D) 18
- [GATE 2013, 2 MARKS]



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

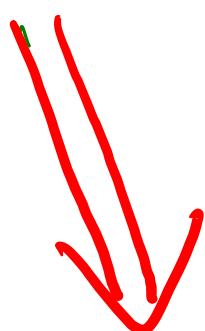
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60 kmph

30 kmph 10 kmph



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

60 kmph

15 kmph

$$\frac{2 \times 15 \times 60}{15 + 60} = \frac{30 \times 60}{75} = 24 \text{ kmph}$$



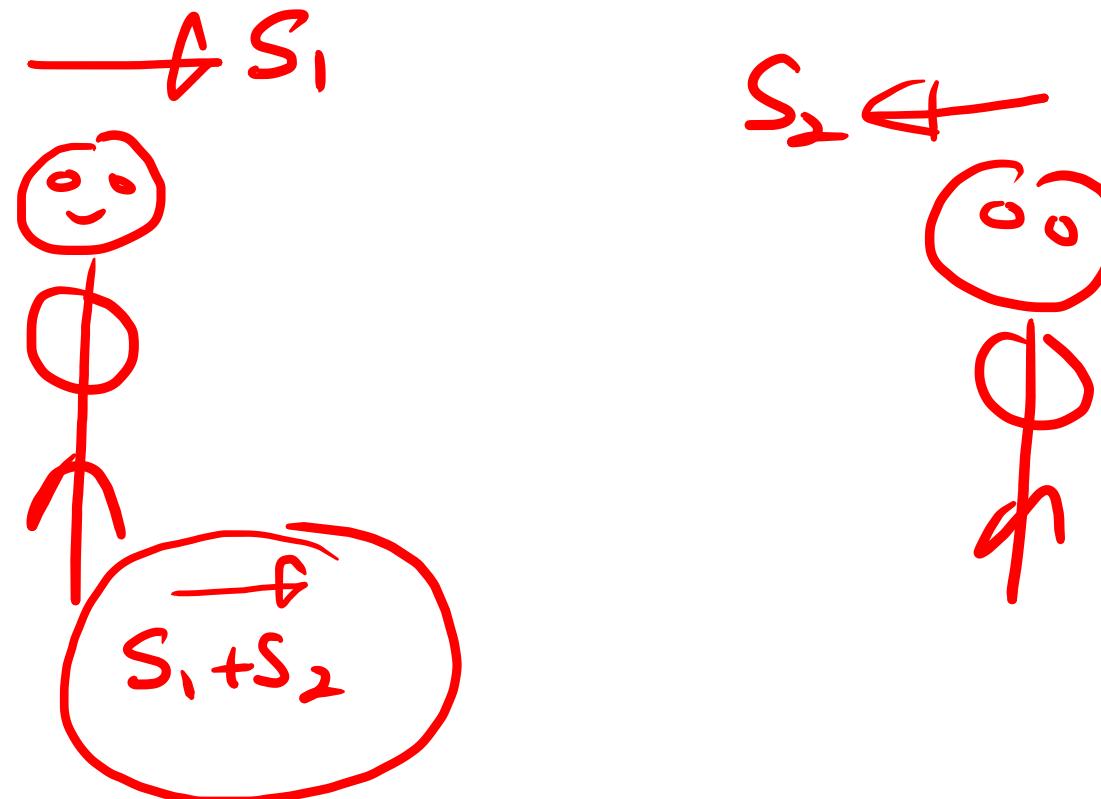
- 3) A tourist covers half of his journey by train at 60 km/h, half of the remainder by bus at 30 km/h and the rest by cycle at 10 km/h. Average speed of the tourist during the journey is
- A) 36 km/h B) 33 km/h C) 24 km/h D) 18 km/h

[ESE-2019, GS Paper]

CSAT + 2011 or 2012
GATE + 2013
ESE + 2019

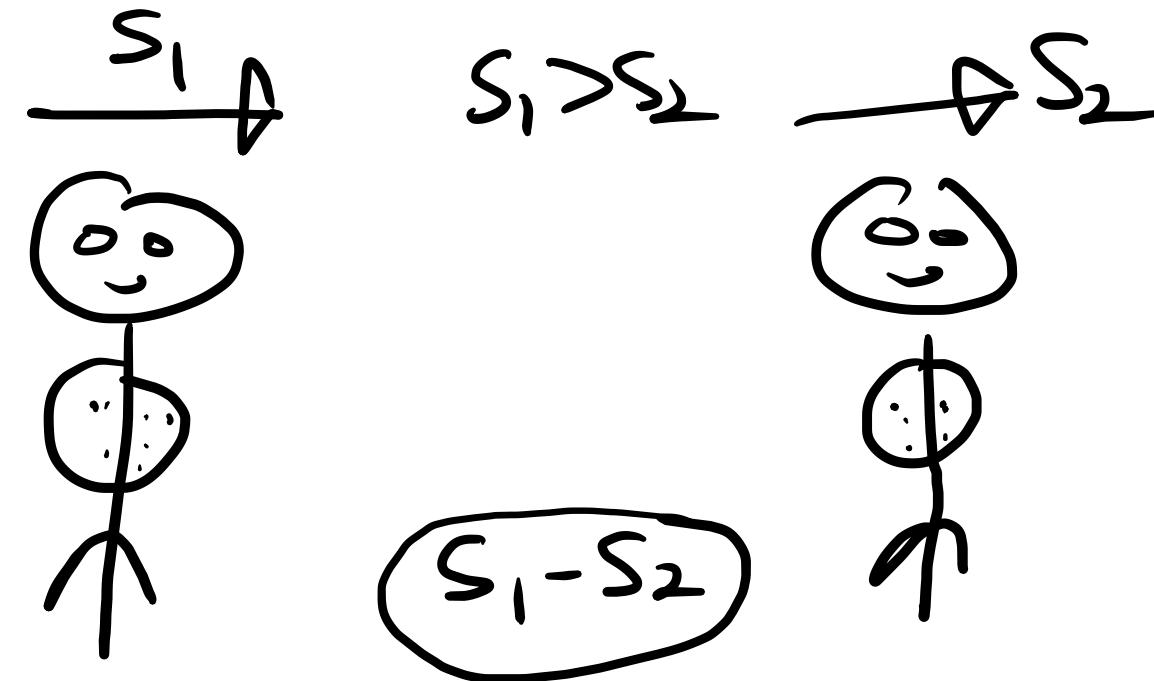
Time, Speed & Distance

Relative Speed:



Time, Speed & Distance

Relative Speed:



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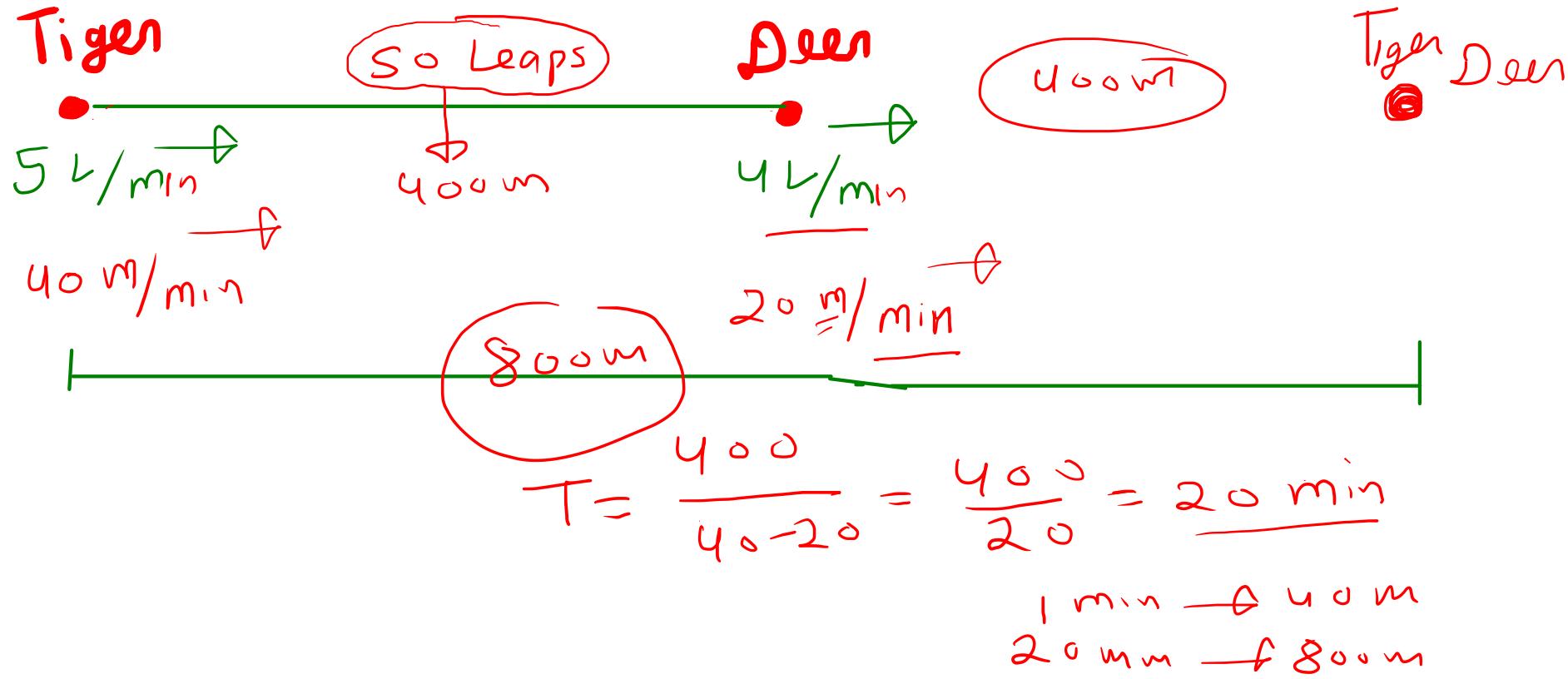
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4) A tiger is 50 leaps of its own behind a deer. The tiger takes 5 leaps per minute to the deer's 4. If the tiger and the deer cover 8 m and 5 m per leap, respectively. What distance in meter will the tiger have to run before it catches the deer? [GATE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

Ans: 800 m



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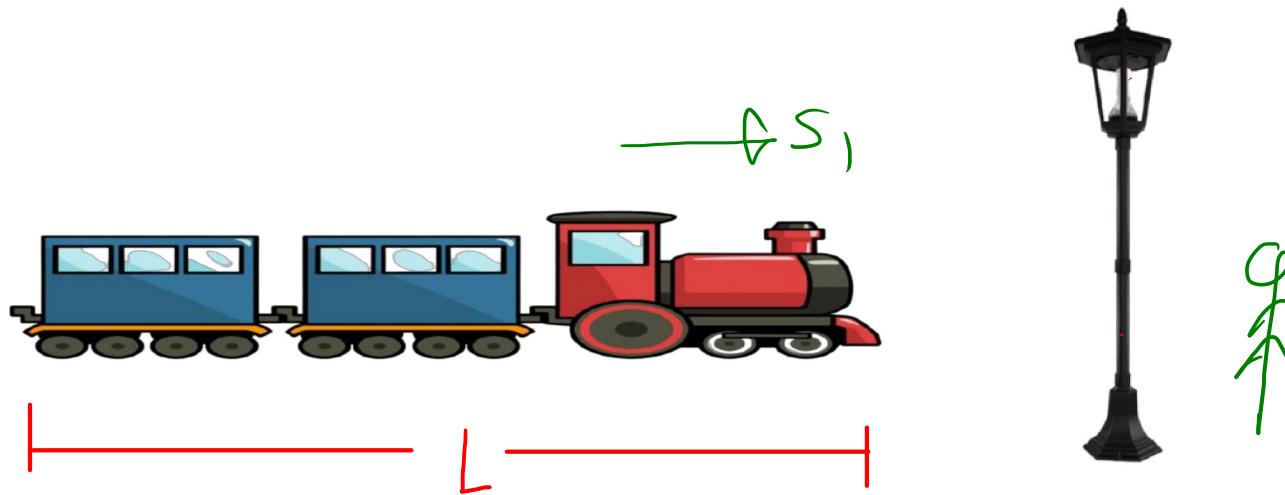
Question Based on train

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

Cy

Question Based on train

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



Time taken by train to pass the pole

$$= \frac{L}{s_1}$$

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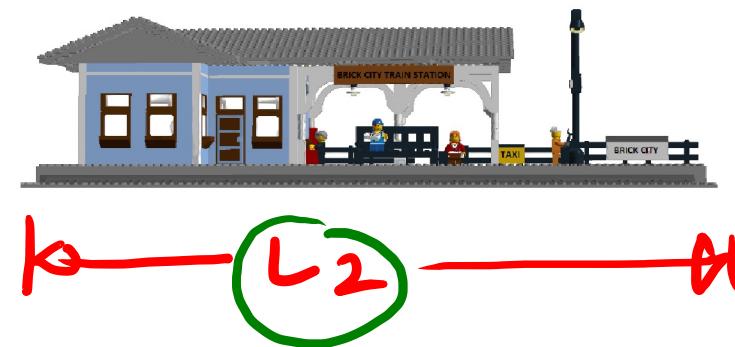
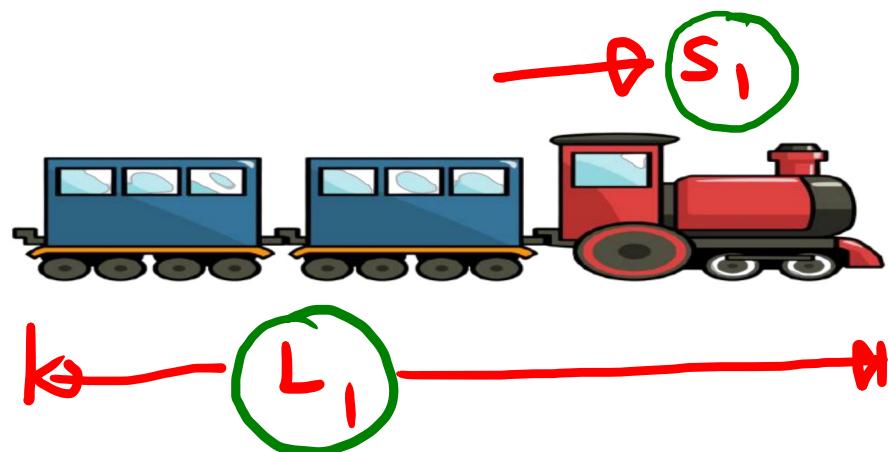
Question Based on train

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



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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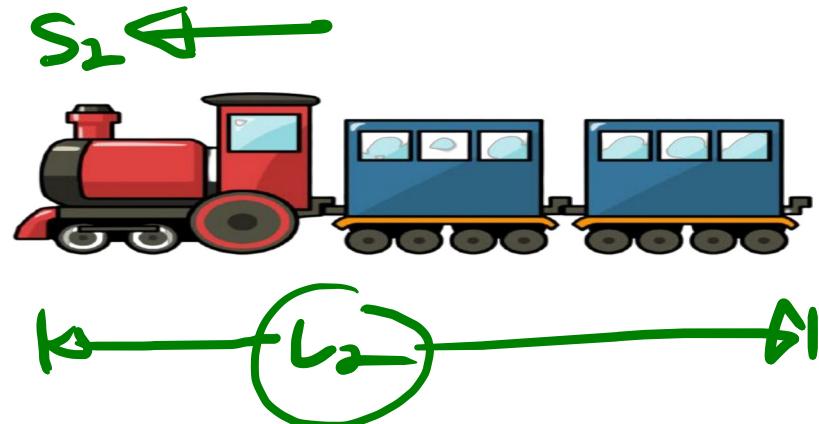
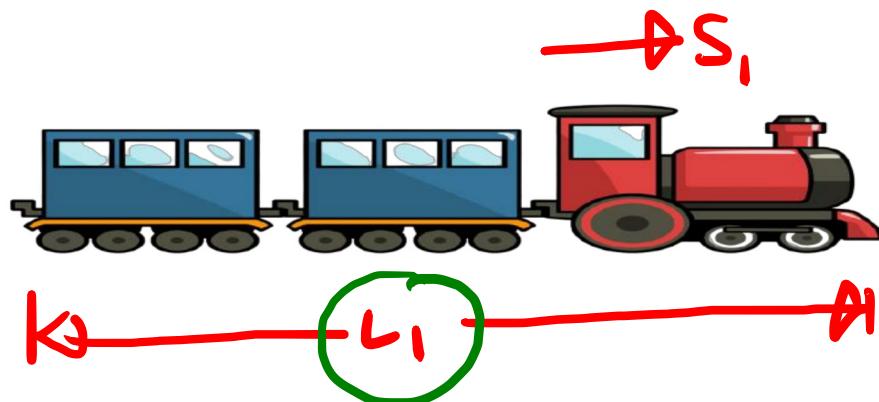
Question Based on train

CASE-3 : Two moving body in opposite direction



Question Based on train

CASE-3 : Two moving body in opposite direction



Time taken to pass each other

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

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Question Based on train

CASE-4 : Two moving body in same direction

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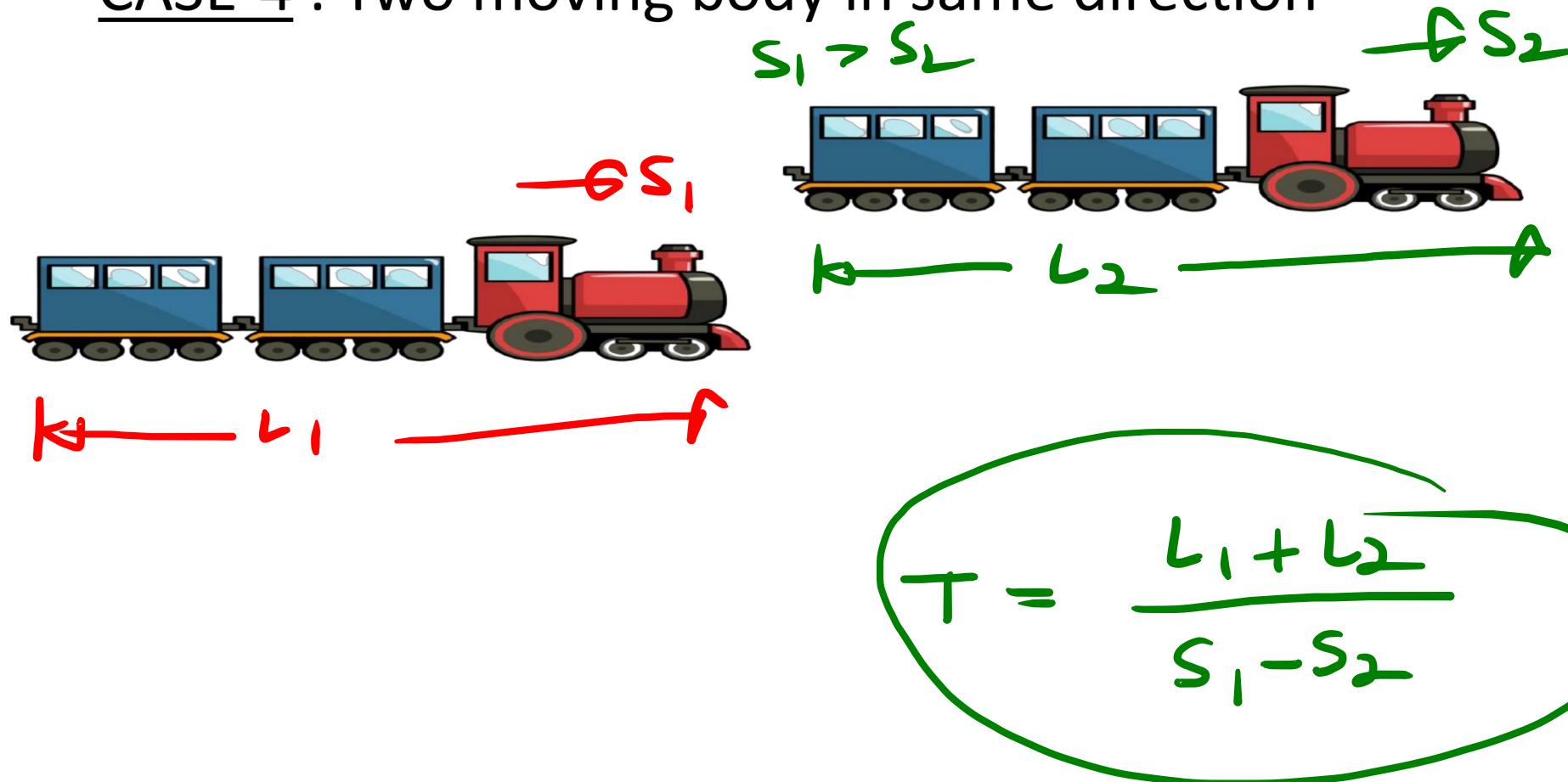
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Question Based on train

CASE-4 : Two moving body in same direction



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

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

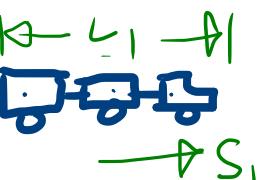
5) Find the length of the train?

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

6) Find its speed in m/s?

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

M-Y



$$L_1 = 120$$

$$S_1 = 15$$

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

$$\frac{L_1}{S_1} = 8$$

M-Y

~~M-Y~~

$$L_1 + 180 \rightarrow 20 \text{ sec}$$

$$L_1 \rightarrow 8 \text{ sec}$$

$$180 \text{ m} \rightarrow 12 \text{ sec}$$

$$15 \text{ m} \rightarrow 1 \text{ sec}$$

$$S_T \approx 15 \text{ m/sec}$$



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:

S₆₀

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

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

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

$$280 \times 2$$

560

$$S_T = \frac{280}{20} \text{ m/sec}$$

$$= \underline{\underline{14 \text{ m/sec}}}$$

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8) 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

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9) From the time the front of a train enters a platform, it takes 25 seconds for the back of the train to leave the platform, while travelling at a constant speed of 54 km/h. At the same speed, it takes 14 seconds to pass a man running at 9 km/h in the same direction as the train. What is the length of the train and that of the platform in meters, respectively?

[GATE 2018, 2 MARKS (ME)]

- (A) 210 and 140 (B) 162.5 and 187.5 (C) 245 and 130 (D) 175 and 200

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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

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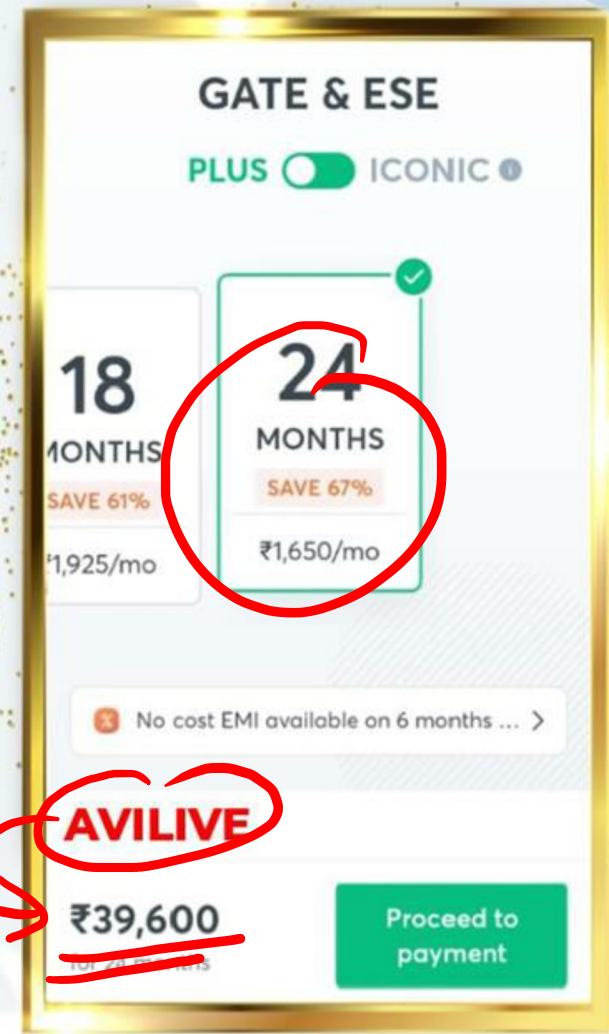
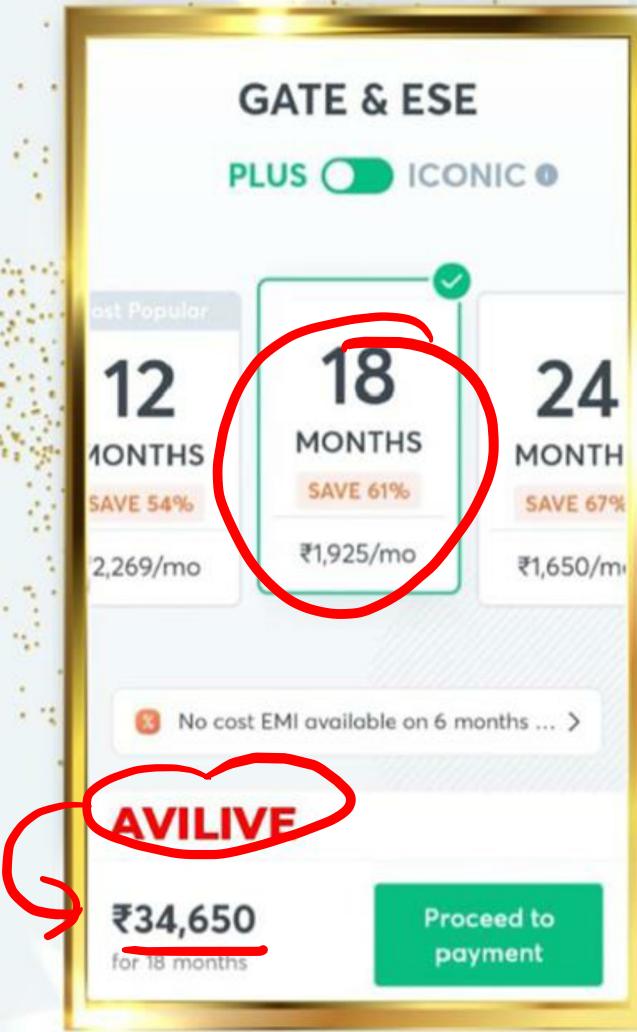
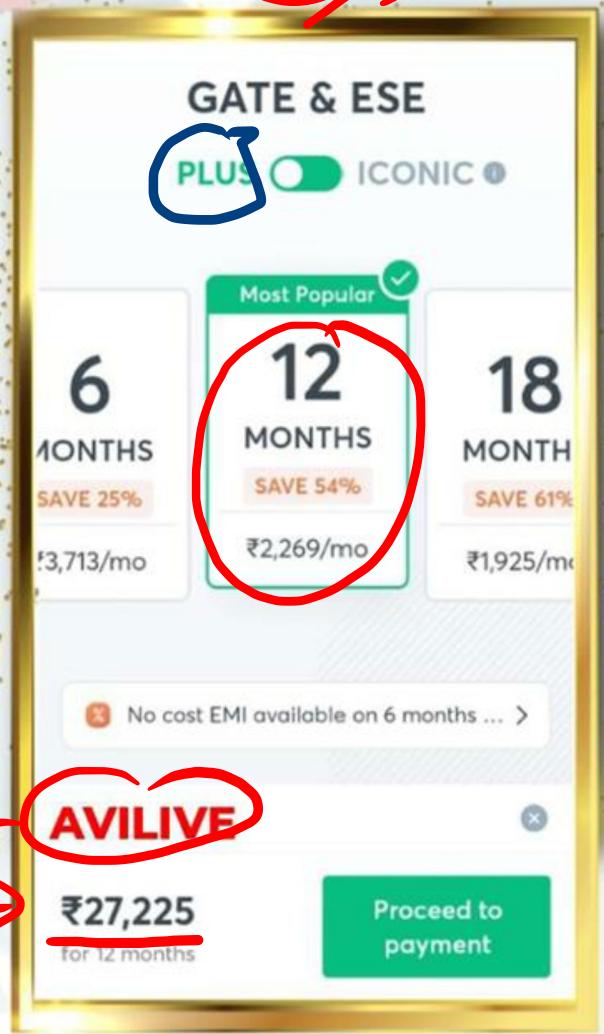
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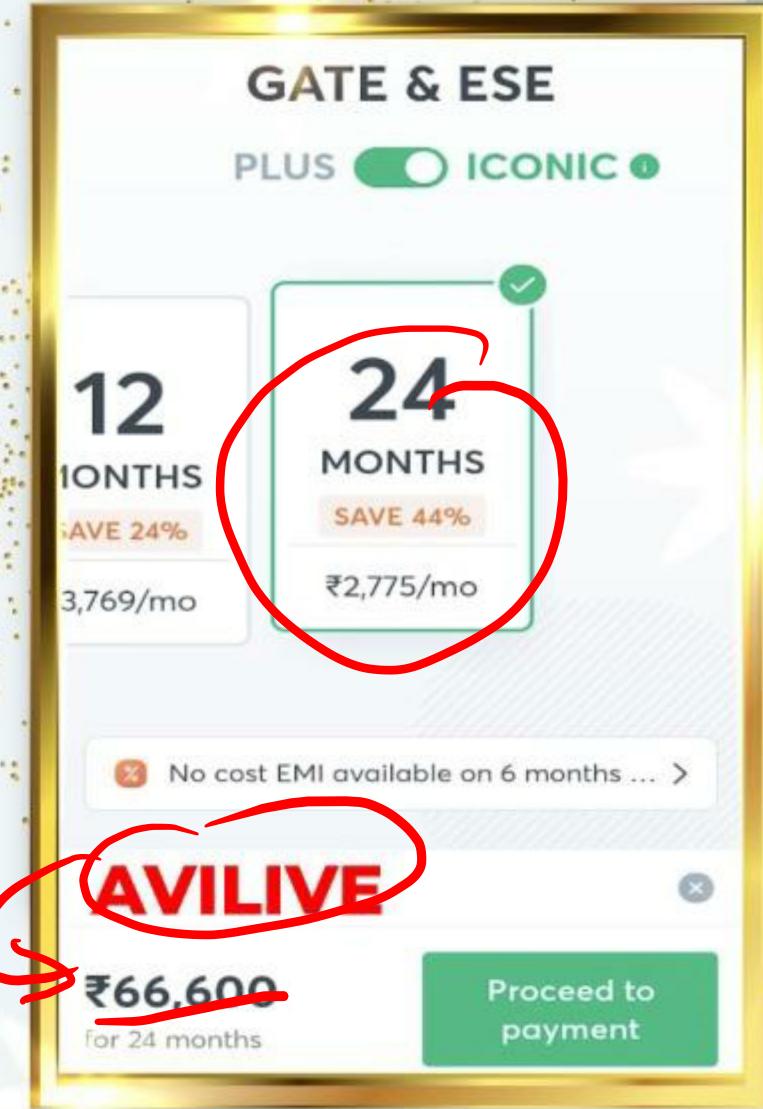
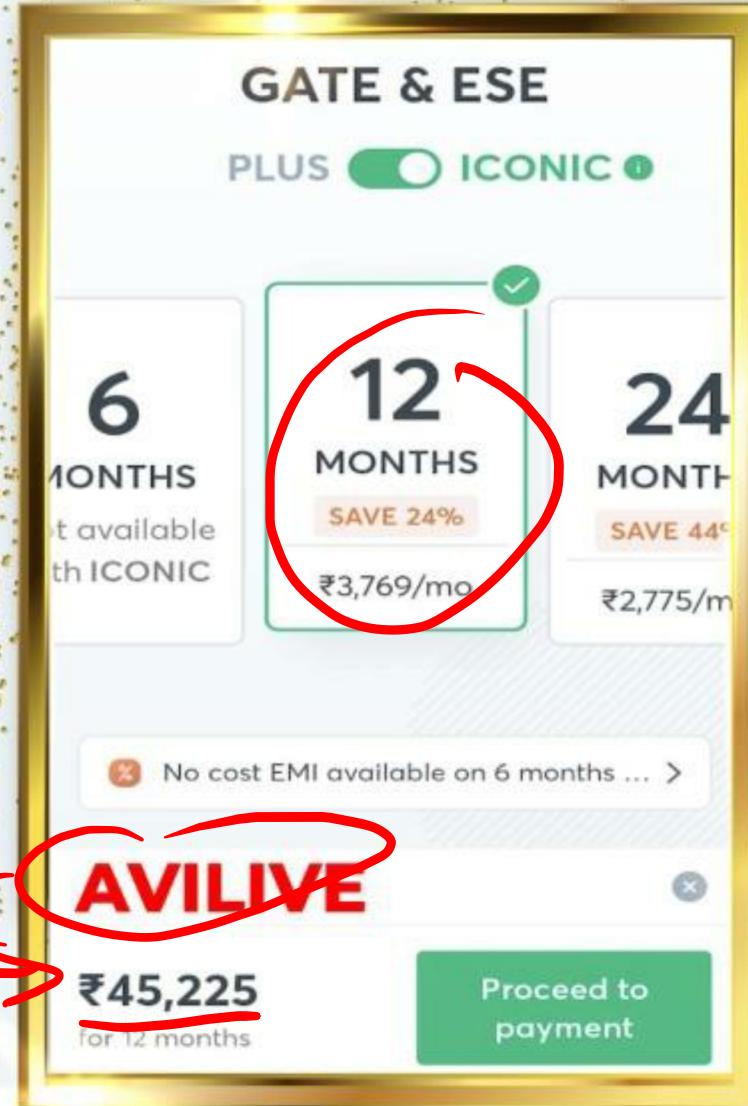
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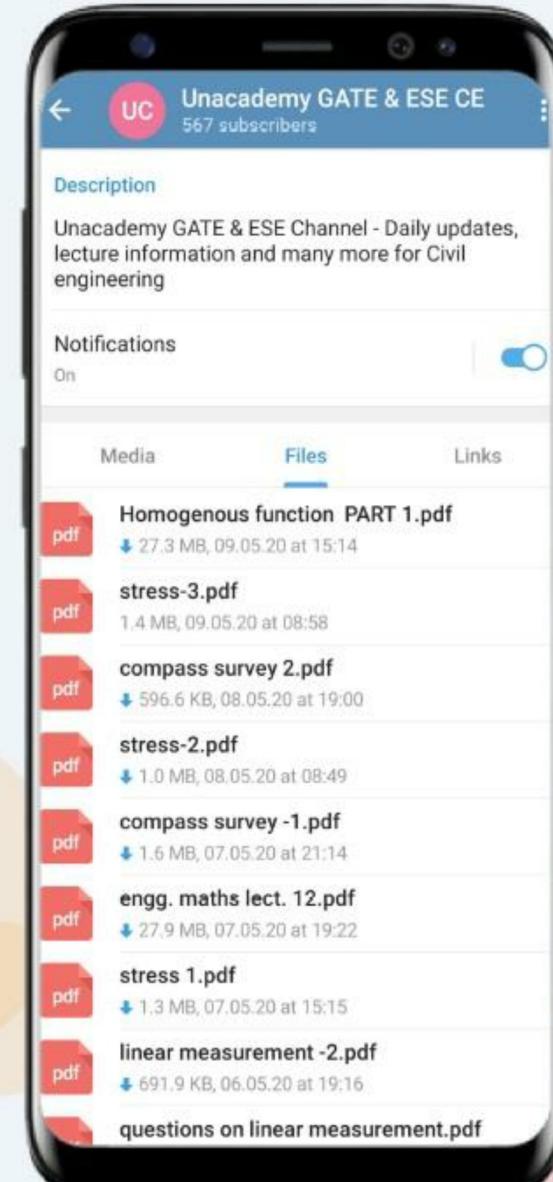








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