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**GATE/ESSE/PSUs**

# **NUMERICAL APTITUDE**

**FOR ALL EXAM**

**Time & Work - 3**

**LECTURE - 3**



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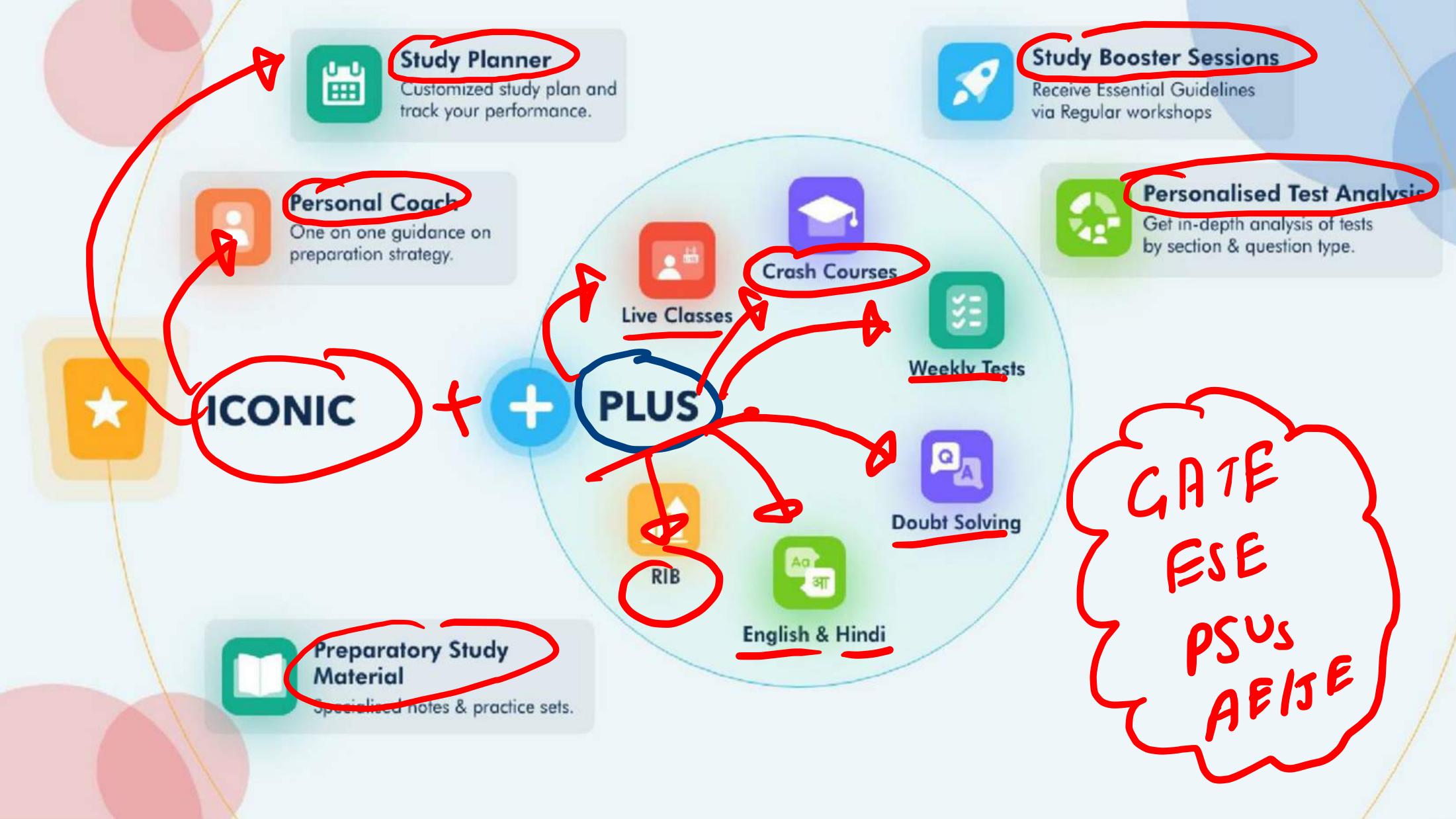
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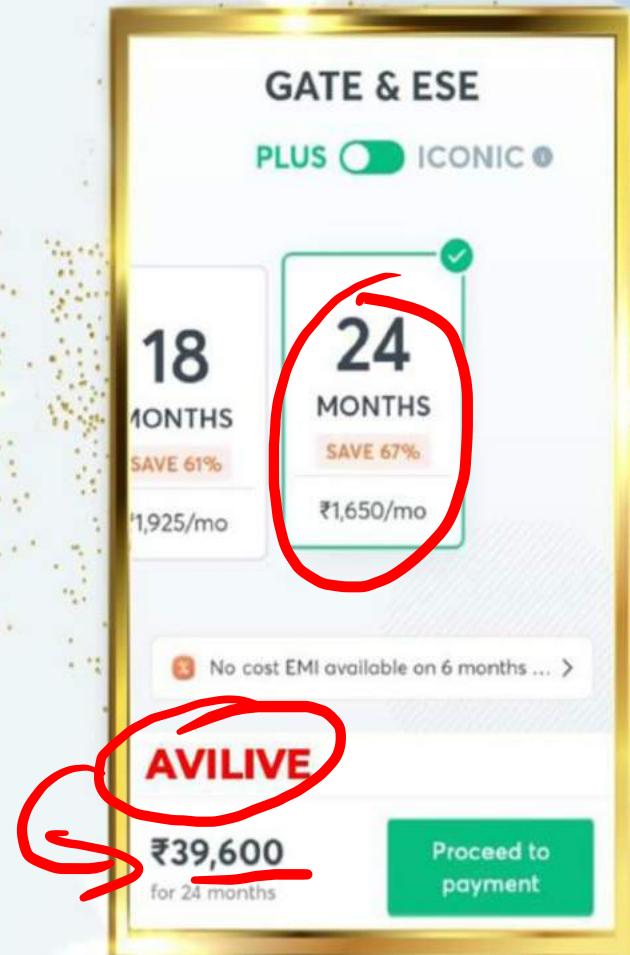
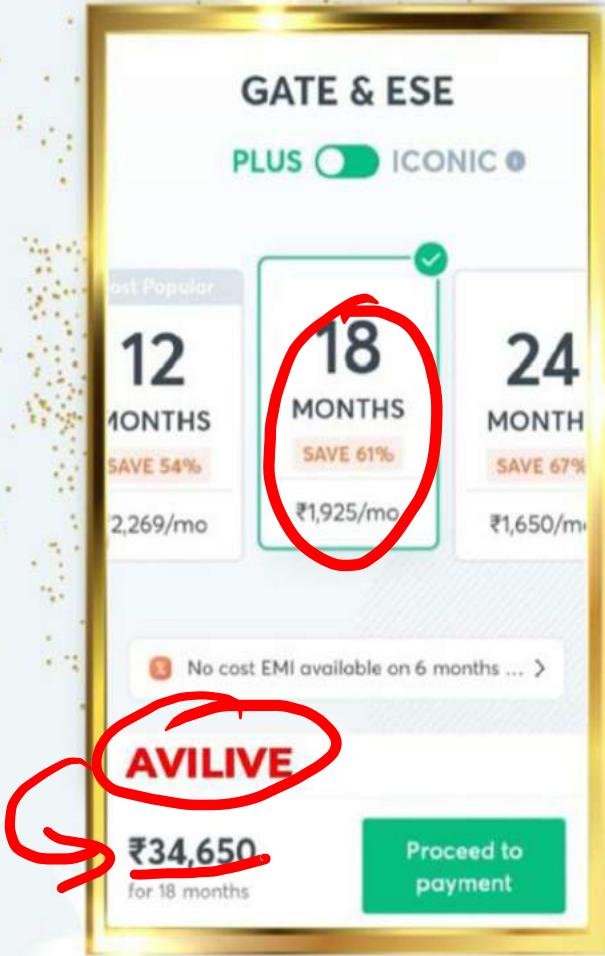
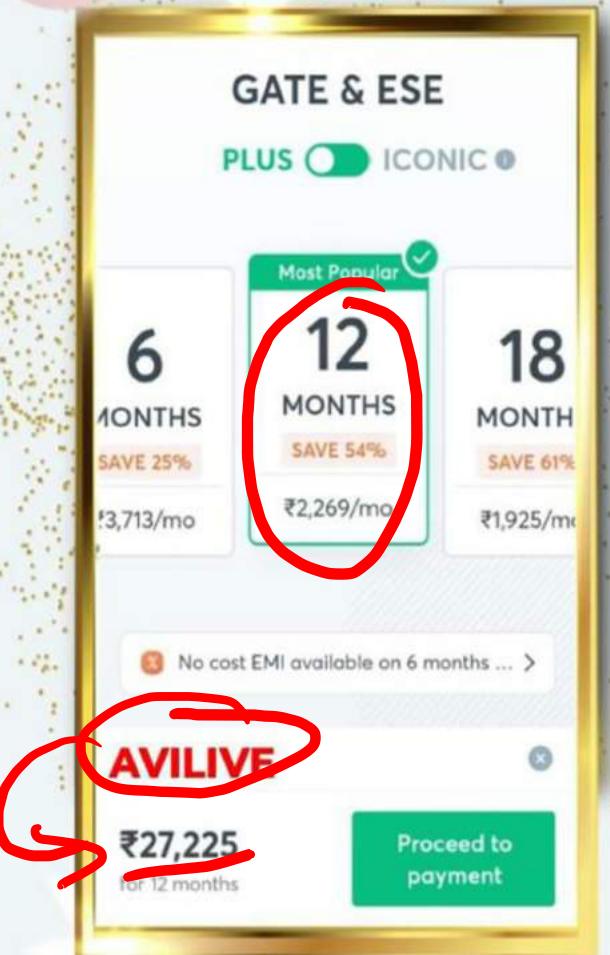


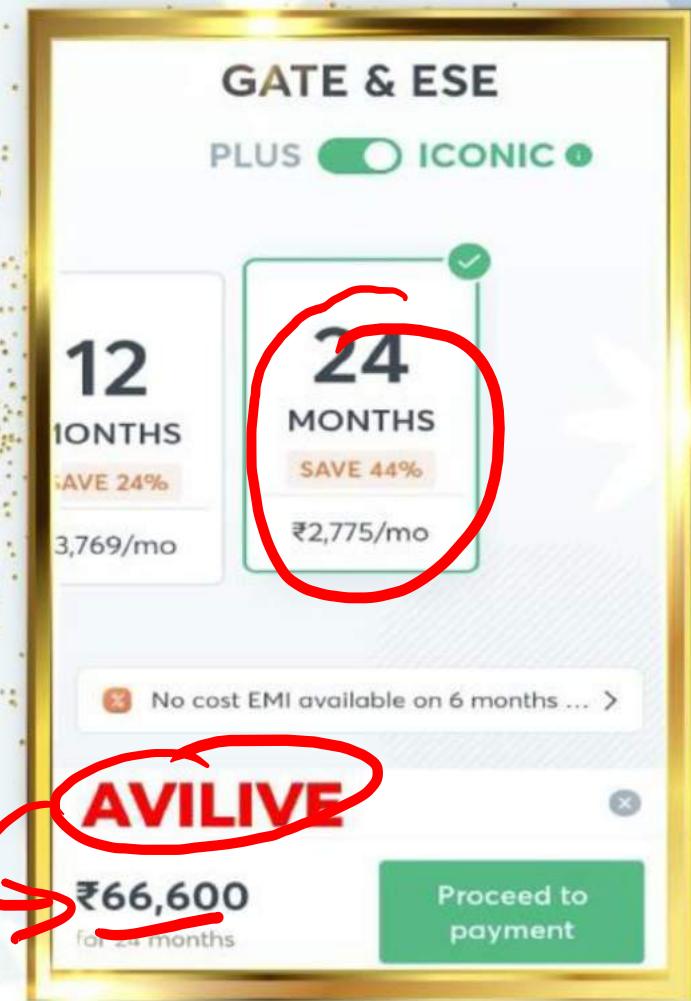
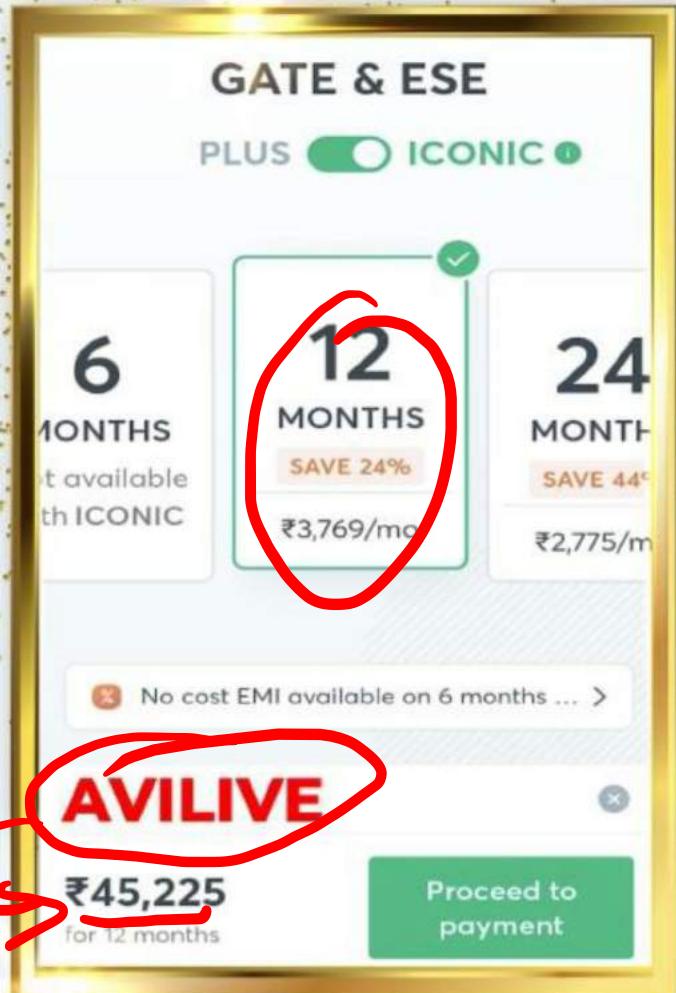
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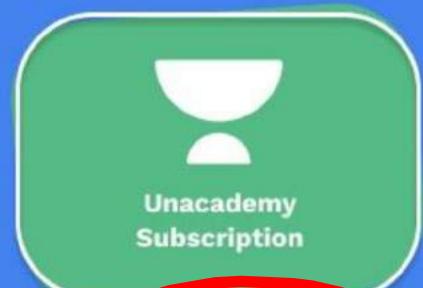
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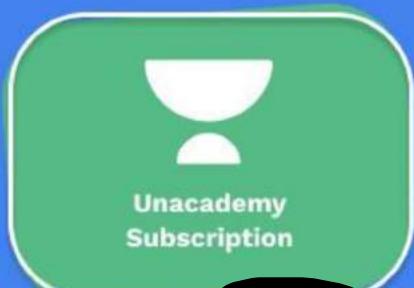
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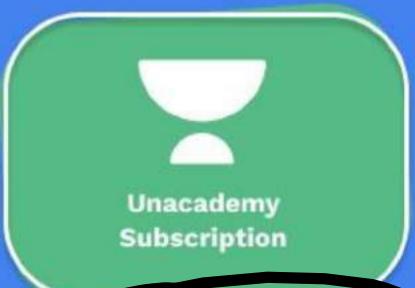
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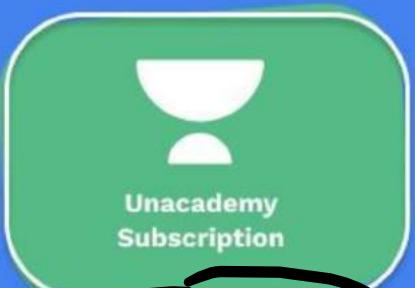
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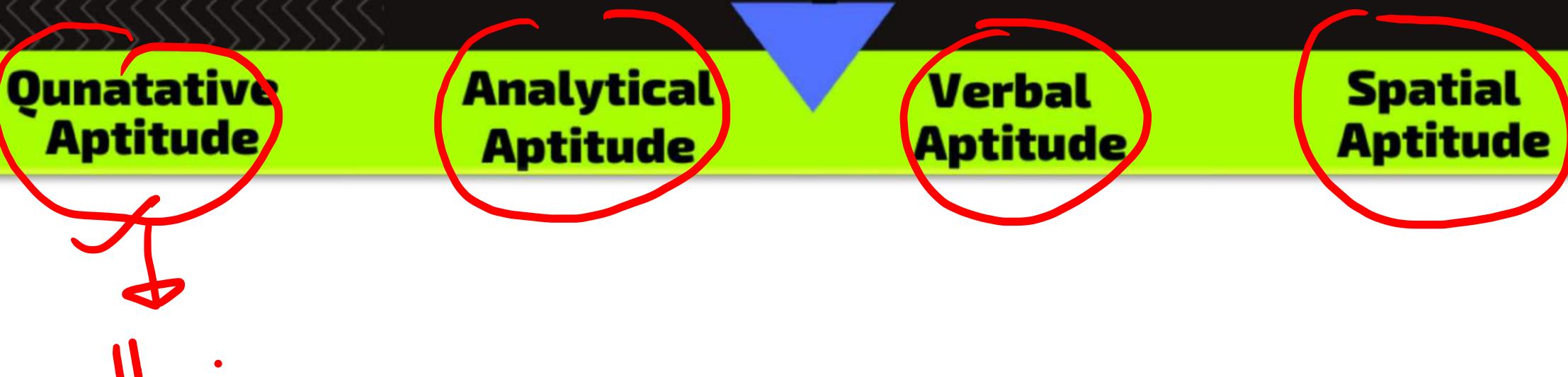
## General Aptitude

Quantitative  
Aptitude

Analytical  
Aptitude

Verbal  
Aptitude

Spatial  
Aptitude



## **Numerical Ability(Old)**

Numerical computation,  
numerical estimation,  
numerical reasoning and  
data interpretation.

## **Quantitative Aptitude(New)**

**Data interpretation:** data graphs (bar graphs, pie charts, and other graphs representing data), 2- and 3-dimensional plots, maps, and tables

**Numerical computation and estimation:** ratios, percentages, powers, exponents and logarithms, permutations and combinations, and series

**Mensuration and geometry,**  
**Elementary statistics and probability**

# **Topic wise Numerical Aptitude**

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

## Time & Work

- Basic concept
- Left the work-before/After(One left another join)
- Concept of ratio with efficiency
- **Work & Wages**
- **Men, Women, children based concept**
- Alternate days concepts
- MDH Concept
- Previous Year Asked Questions



## Today Class Agenda

Left the work-before/After(One left another join)  
Concept of ratio with efficiency

## Time & Work

$$n \times T = \text{Work}$$

95% questions  $\rightarrow$  Work = Constant

## Work & Wages

Wages  $\propto$  Work done

$$\eta \times T = \text{work done}$$

If  $T = \text{constant}$

$$\eta \propto \text{work done}$$

Wages  $\propto$   $\eta$

$\therefore T = \text{constant}$

~~eg~~  
 $A + B + C \rightarrow 4 \text{ Day}$

$T = \text{constant}$

₹ 400

~~& efficiency~~

## Work & Wages

Note:-

If people work for equal amount of time then we can divide wages in the ratio of their efficiency



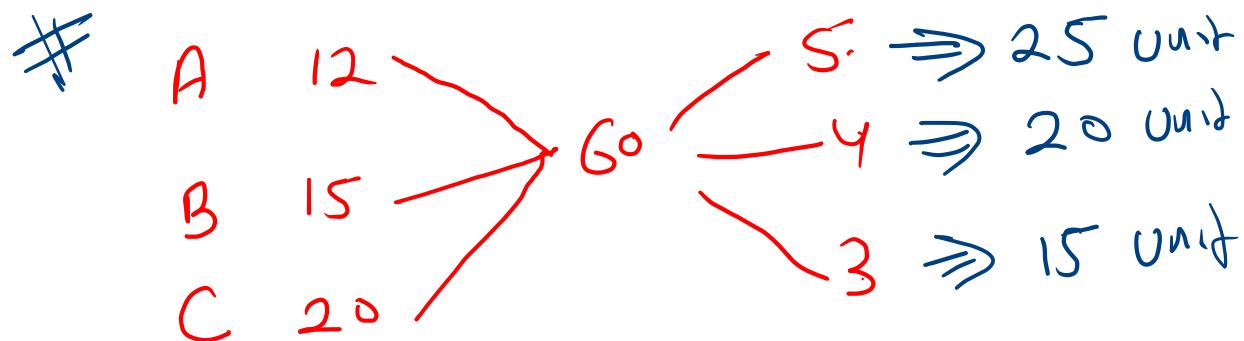
Q1) A, B, and C can do piece of work in 12, 15 and 20 days respectively. They completed the work together and got ₹ 240 for job. What is A's share?

A) ₹100

B) ₹110

C) ₹120

D) ₹200



$$T = \frac{60}{12} = 5 \text{ day}$$

A's share  
 $= \frac{25}{25+20+15} \times 240$   
 $= 100$

#  $T = \text{constant}$   
 I →  $12 : 15 : 20$   
 R →  $\frac{1}{12} : \frac{1}{15} : \frac{1}{20}$

A      B      C

$$\gamma \rightarrow \frac{1}{12}^{\circ} + \frac{1}{15}^{\circ} + \frac{1}{2}^{\circ}$$

$$(\cancel{5}^{\cancel{0}} + \cancel{4}^{\cancel{0}} + \cancel{3}^{\cancel{0}}) \checkmark$$

$$(5+4+3) \rightarrow 24^{\circ}$$

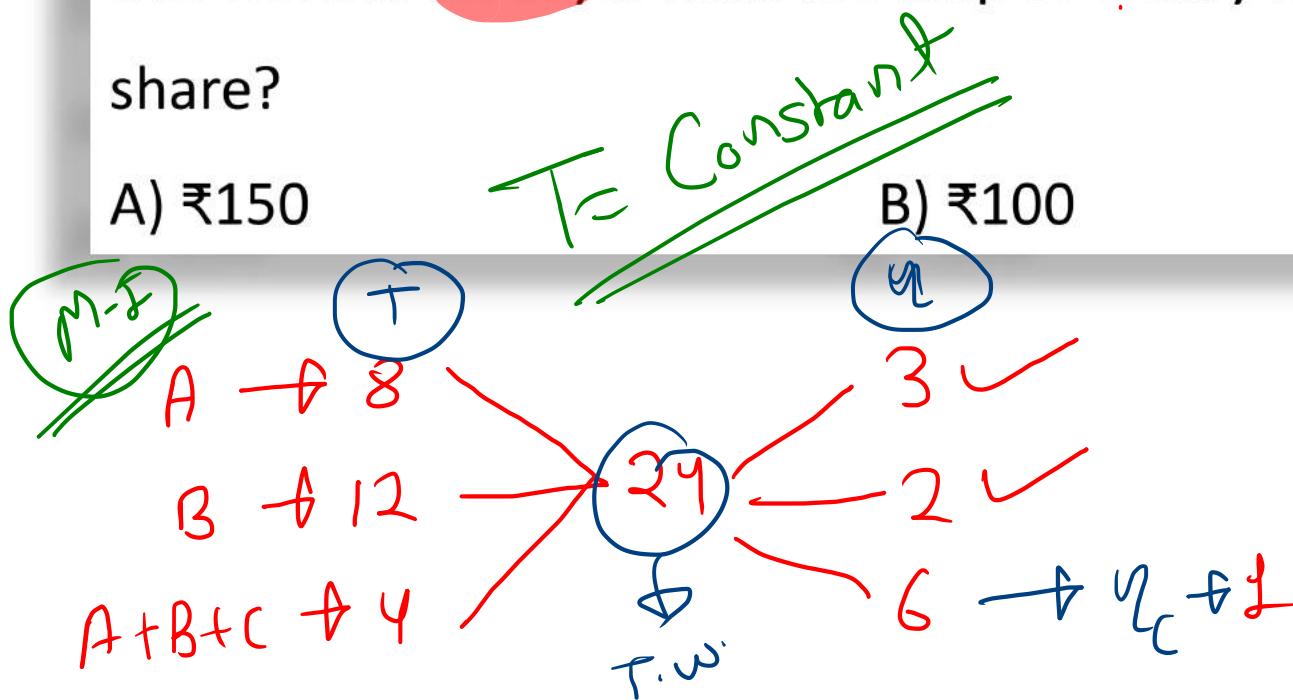
$$12 \rightarrow 24^{\circ}$$

$$1 \overset{+}{=} 2^{\circ}$$



Q2) A and B promised to complete a work for ₹300. A can do this work in 8 days and B can do this work in 12 days. With the help of C they completed the work in 4 days. Find out C's share?

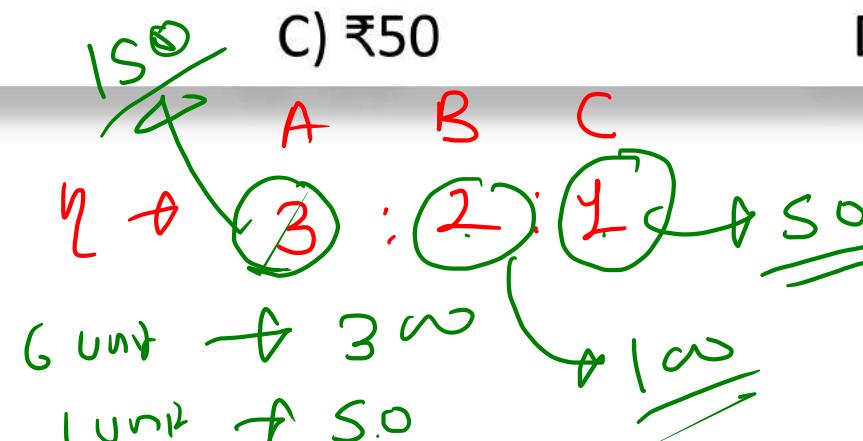
A) ₹150



B) ₹100

C) ₹50

D) NOTA



$$\begin{aligned} A+B+C+G \\ \frac{1}{8} + \frac{1}{12} + \frac{1}{6} + \frac{1}{G} = \frac{1}{4} \\ \frac{1}{G} = \frac{1}{4} - \frac{1}{8} - \frac{1}{12} - \frac{1}{6} \\ \frac{1}{G} = \frac{1}{4} - \frac{1}{8} - \frac{1}{12} - \frac{2}{12} \\ \frac{1}{G} = \frac{1}{4} - \frac{3}{12} - \frac{2}{12} \\ \frac{1}{G} = \frac{1}{4} - \frac{5}{12} \\ \frac{1}{G} = \frac{3}{12} - \frac{5}{12} \\ \frac{1}{G} = -\frac{2}{12} \\ \frac{1}{G} = -\frac{1}{6} \end{aligned}$$



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2) A and B promised to complete a work for ₹300. A can do this work in 8 days and B can do this work in 12 days. With the help of C they completed the work in 4 days. Find out C's share?

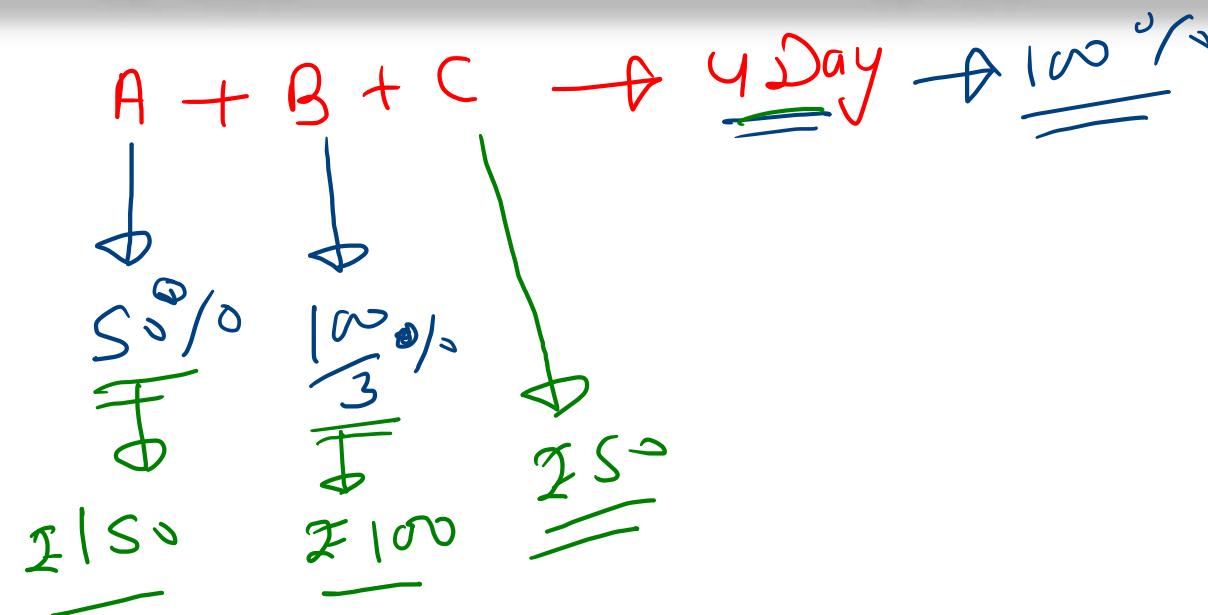
A) ₹150

B) ₹100

C) ₹50 ✓

D) NOTA

$$\begin{aligned} A &\rightarrow 8 \rightarrow 12.5\% \\ B &\rightarrow 12 \rightarrow 12.5\% \\ \text{Total} &\rightarrow 4 \rightarrow 12.5\% \end{aligned}$$



## Concept of Man Days

$$\text{1 person} \times \text{Time} = \text{Work}$$

Eg. 20 men → 20 Day  
↳ efficiency of each man is equal

$$M \times D = \text{Total work}$$

$$\text{Man} \times \text{Day} = \text{Total work}$$

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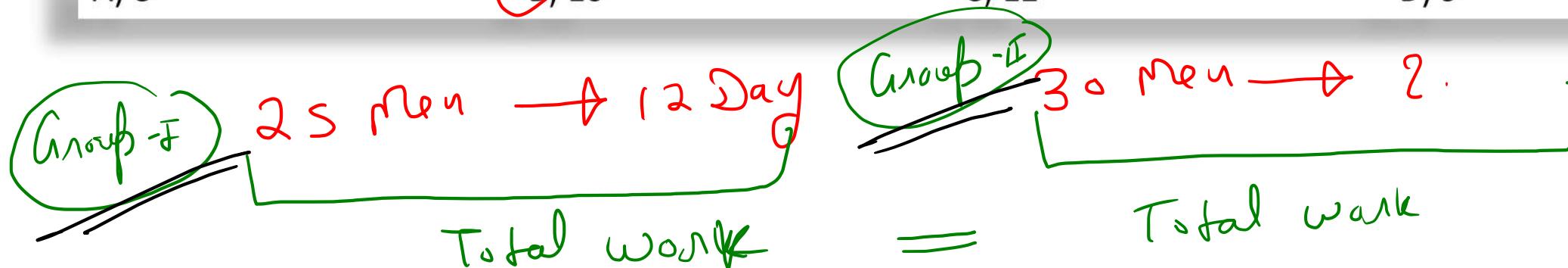
Q3) If 25 men can finish the work in 12 days, 30 men can finish the same work in how many days?

A) 8

B) 10

C) 12

D) 9



The formula  $M_1 D_1 = M_2 D_2$  is shown in a red-bordered box. To its right, the text "work = Constant" is written above a bracket connecting the two sides of the equation.

$$25 \times 12 = 30 \times x$$

A thought bubble contains the equation  $x = 10$ .

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4) In a camp there is ration for 250 men for 40 days. After 10 days, 50 more men join. Find in how many days, remaining ration would last?

A) 23

B) 24

C) 25

D) NOTA

$$\text{Total} = \text{Before 10 day} + \text{After 10 Day}$$

$\boxed{250 \times 40} = \boxed{250 \times 10} + \boxed{(250+50) \times x}$

$$25 \times 4 = 25 + 3x$$

$$25 = x$$



5) 4 men can repair a road in 7 hours. How many men are required to repair the road in 2 hours?

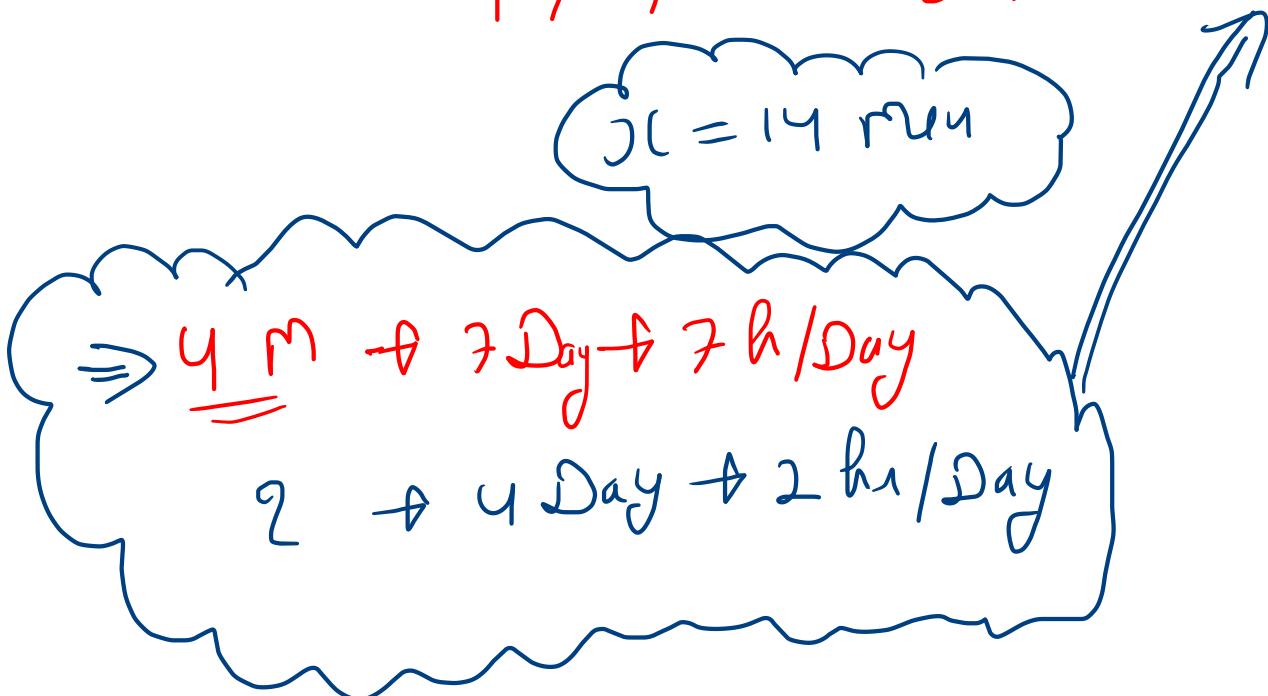
A) 17 men

B) 14 men

C) 13 men

D) 16 men

$$m_1 \ D_1 = m_2 \ D_2$$
$$4 \times 7 = 14 \times 2$$



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$$\# \text{ of men} \rightarrow 7 \text{ Day} \rightarrow 8 \text{ h/day}$$
$$? \rightarrow 4 \text{ day} \rightarrow 2 \text{ h/day}$$
$$\underline{\quad}$$

$$M_1 D_1 = M_2 D_2$$

$$4 \times \overbrace{7 \times 8} = M_2 \times \overbrace{4 \times 2}$$

$$M_2 = \overbrace{28 \text{ men}}$$

$$M_1 D_1 H_1 = M_2 D_2 H_2$$

Work  
= Constant

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6) A contractor undertakes to complete a work in 130 days. He employs 150 men for 25 days and they complete  $\frac{1}{4}$  of the work. He then reduces the number of men to 100, who work for 60 days, after which there are 10 days holidays. How many men must be employed for the remaining period to finish the work?

$$\begin{aligned}
 & \text{130 Day} \rightarrow 25 + 60 + 10 + 35 \\
 & \text{1st } \cancel{150 \times 25} \times \frac{1}{4} = \text{Total Work} \\
 & \cancel{150 \times 25} \rightarrow 1000 \\
 & \cancel{150 \times 25} \times 3 \rightarrow \text{Remaining}
 \end{aligned}$$

$$\begin{aligned}
 & 150 \times 60 + \boxed{0} + \boxed{M \times 35} \\
 & = 150 \times 25 \times 3 \\
 & 1200 + 7M = 2250 \\
 & 7M = 1050 \\
 & M = 150
 \end{aligned}$$



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- Q7) 12 men complete a work in 9 days. After they have worked for 6 days, 4 more men join them. How many days will they take to complete the remaining work ?
- A ) 2 days      B) 2.5 days      C) 2.25 days      D) 3 days

$$12 \times 9 = 12 \times 6 + (12 + 4) \times D$$
$$12 \times 3 = 16 D$$

$$3 \frac{12 \times 3}{16} = D$$

$$2.25 = D$$

## Men, Women, children based concept

$$\begin{array}{c} \# 2m \& 6w \rightarrow 4 \text{ Day} \\ \times \frac{1}{2} \curvearrowright 1m \& 3w \rightarrow ? \end{array}$$

8 Day



work = Constant

$$n \propto \frac{1}{T}$$

$$n \times c$$

$$T \times \frac{1}{c}$$

## Men, Women, children based concept

#  $15 \text{ M} + 20 \text{ W} \rightarrow 10$

$\times \frac{1}{5}$

$3 \text{ M} + 4 \text{ W} \rightarrow 2$

$\times 5$

$15 \text{ M} + 20 \text{ W} \rightarrow 10$

$\times 8$

$24 \text{ M} + 32 \text{ W} \rightarrow 50$

$\times \frac{1}{8}$

$3 \text{ M} + 4 \text{ W} \rightarrow 50$

$= \frac{25}{4} \text{ Day}$

$3 : 5$  ✓

$12 \text{ M} + 20 \text{ W} \rightarrow 14$

$18 \text{ M} + 32 \text{ W} \rightarrow ?$

$9 : 16$  ✓

C.N.D.

## Men, Women, children based concept

$$2M + 7B \rightarrow 14 \checkmark$$

$$3M + 8B \rightarrow 11 \checkmark$$

①  $12M + 32B \rightarrow ?$

$$\frac{11}{4}$$

②  $10M + 35B \rightarrow ?$

$$\frac{14}{5}$$

## Men, Women, children based concept

#

$$2M + 7B \rightarrow 14$$

(↑ 2 : 7)

$$3M + 8B \rightarrow 11$$

(↑ 3 : 8)

$$8M + 6B \rightarrow 9$$

(↑ 4 : 3)

$$8M + 6B$$

(↑ 8 × 2 + 6 × 1)

$$= 22 \text{ unit/day}$$

$$(2M + 7B) \times 14 \stackrel{(1)}{\underset{(1)}{\underset{\curvearrowleft}{\text{equal}}}} (3M + 8B) \times 11$$

$$28M + 98B = 33M + 88B \Rightarrow 10B = 5M$$

$$1M = 2B$$

$$TW = (2 \times 2 + 7 \times 1) \times 14$$

$$= \frac{11 \times 14}{22} \text{ unit}$$

$$\text{Time} = \frac{11 \times 14}{22}$$

$$\text{Time} = 7 \text{ Day}$$

$$\frac{M}{B} = \frac{2}{1}$$

Efficiency

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- ~~(8)~~ 3 men, 4 women and 6 children can complete a work in 7 days. A woman does double the work a man does and a child does half the work a man does. How many women alone can complete this work in 7 days ?
- A) 6      B) 9      C) 5      ~~D) 7~~

$$3m + 4w + 6c \rightarrow 7 \text{ Days}$$

$$\eta \rightarrow \begin{matrix} m & w \\ (1 : 2) \times 2\eta \rightarrow & 1 \end{matrix} \quad \begin{matrix} m & c \\ 1 : 1 \rightarrow & 1 \end{matrix}$$

$$\boxed{2} : 4$$

$$\eta \rightarrow \begin{matrix} m & w & c \\ 2 & : \boxed{4} & : 1 \end{matrix} \quad \left| \begin{array}{l} x \times 4 \times 7 = 28 \times 7 \\ \boxed{x = 7} \end{array} \right.$$

$$\begin{aligned} \text{Total work} &= (3m + 4w + 6c) \times 7 \\ &= (3 \times 2 + 4 \times 4 + 6 \times 1) \times 7 \\ &= 28 \times 7 \text{ unit} \end{aligned}$$

Q9) If 6 men and 8 boys can do a piece of work in 10 days while 26 men and 48 boys can do the same in 2 days what is time taken by 15 men and 20 boys?

- A) 4 days      B) 6 days      C ) 7 days      D) 5 days

$$\begin{aligned} & \text{Given: } 6M + 8B \rightarrow 10 \text{ days} \\ & \text{Given: } 26M + 48B \rightarrow 2 \text{ days} \\ & \text{Let } 15M + 20B \rightarrow x \text{ days} \\ & \text{We have: } \frac{6M}{26M} = \frac{8B}{48B} = \frac{10}{x} \\ & \text{Simplifying: } \frac{3}{13} = \frac{1}{6} = \frac{10}{x} \\ & \text{From } \frac{1}{6} = \frac{1}{x}, \text{ we get } x = 6 \end{aligned}$$

$$\begin{aligned} & \text{Given: } \underline{\underline{6M}} + 8B \rightarrow 10 \text{ days} \\ & \text{Given: } \underline{\underline{26M}} + 48B \rightarrow 2 \text{ days} \\ & \text{Let } \underline{\underline{15M}} + 20B \rightarrow \underline{\underline{4}} \text{ days} \\ & \text{We have: } \frac{6M}{26M} = \frac{8B}{48B} = \frac{10}{4} \\ & \text{Simplifying: } \frac{3}{13} = \frac{1}{6} = \frac{10}{4} \\ & \text{From } \frac{1}{6} = \frac{1}{4}, \text{ we get } x = 4 \end{aligned}$$



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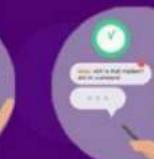
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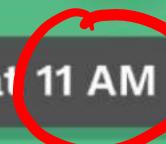
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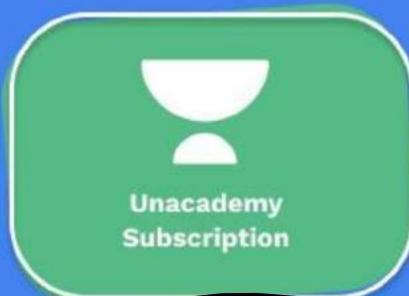
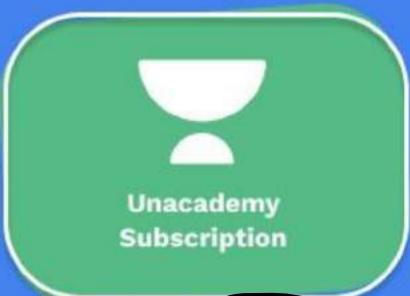
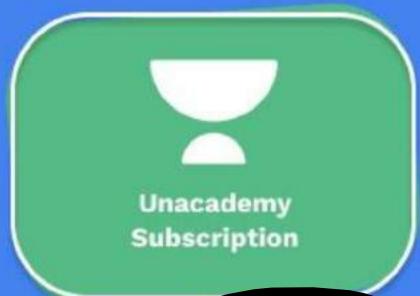


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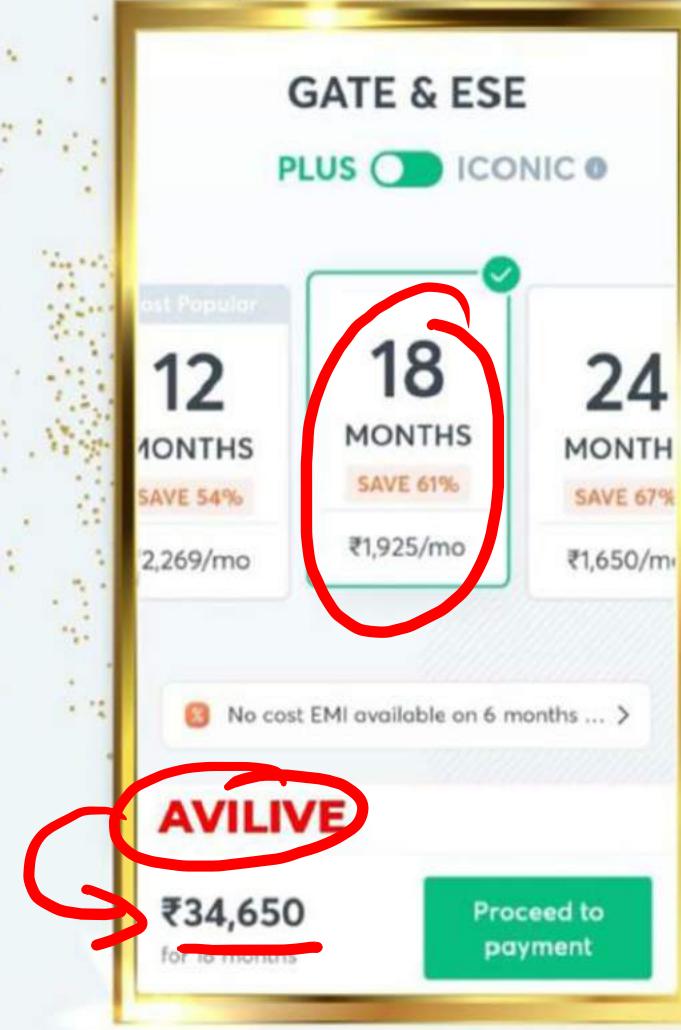
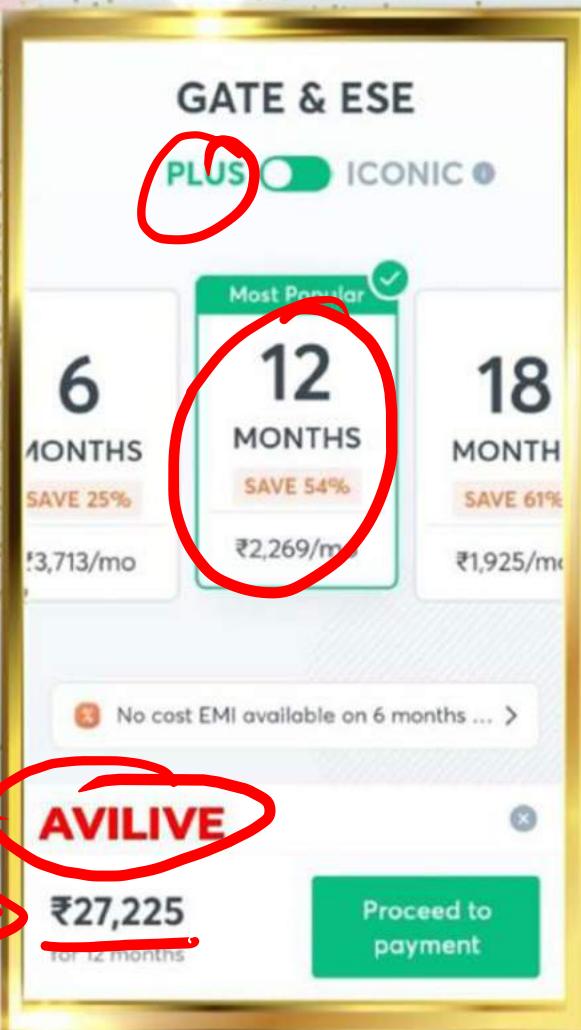
Avinash Sir  
की सारी **Class** का  
**Link** एक जगह पे !

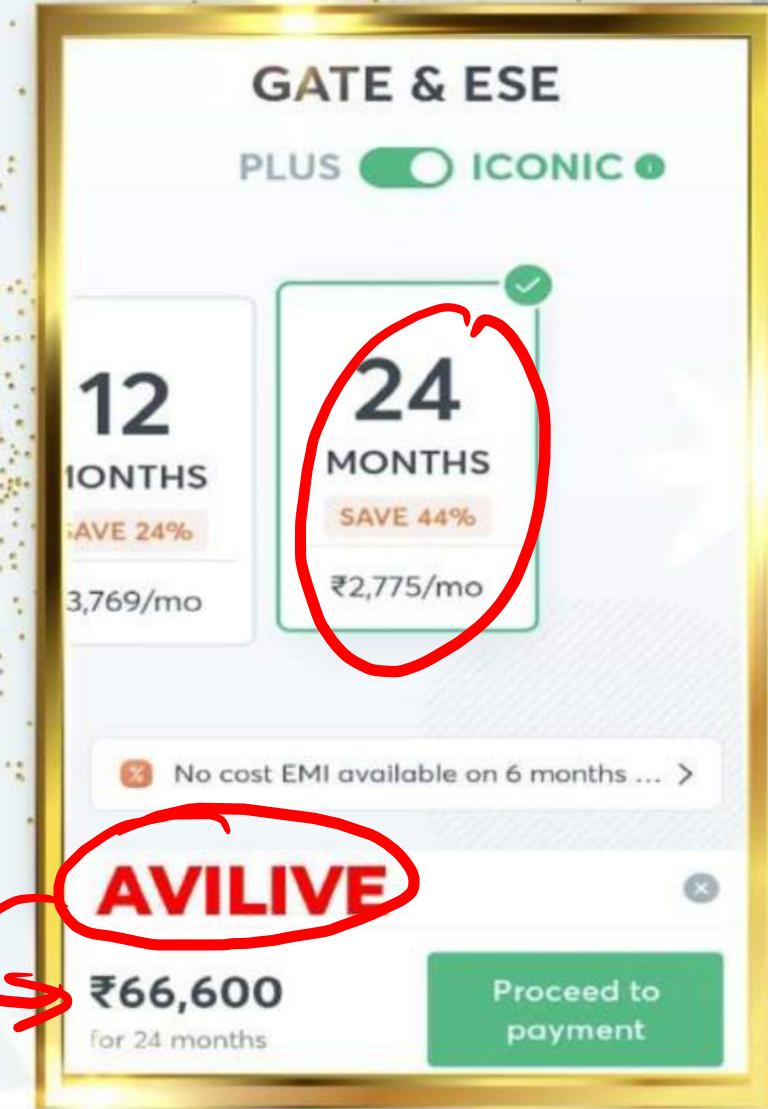
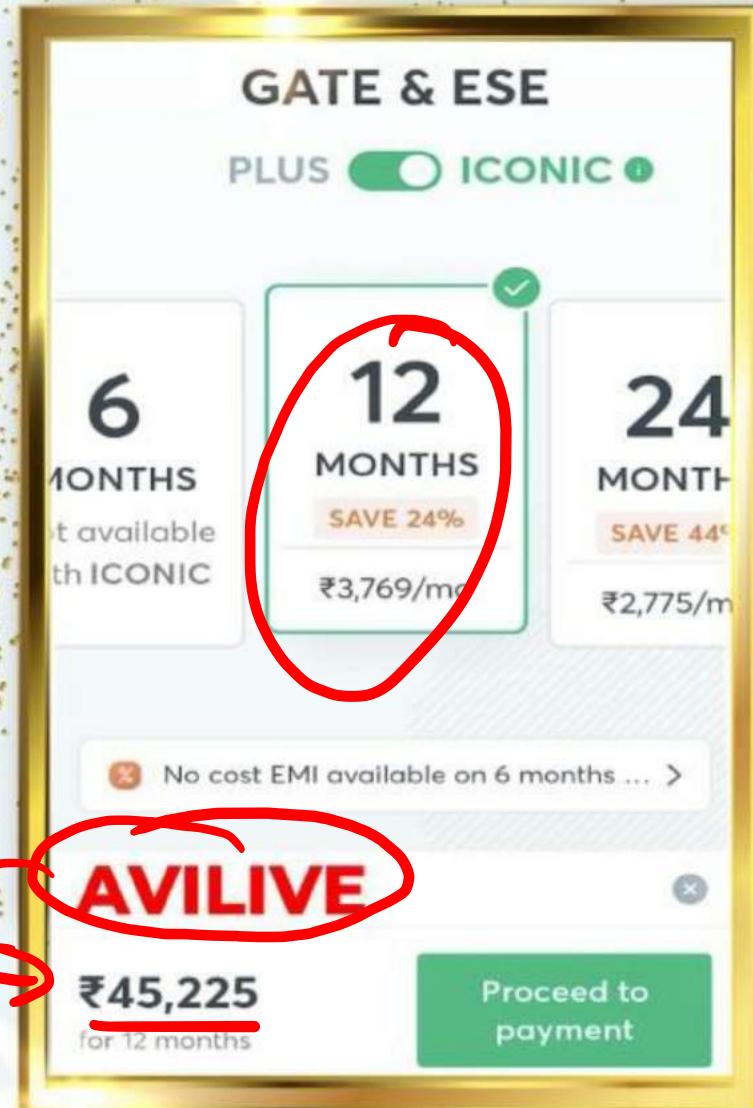
YouTube Class  
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Special Class

Click Given Below Link



<https://tinyurl.com/AvinashSirMaths>







## Avinash Singh

#1 Educator in Mathematics - GATE & ESE

7 Yr Teaching Exp Cracked GATE Multiple Times CAT-99.86%(Quant) Teaching isn't my job,  
it's my Passion

2M Watch mins

144K Watch mins (last 30 days)

5K Followers

263 Dedications



Use Invite  
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### Special Classes

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SEE ALL



LIVE

HINDI GENERAL APTITUDE

1000+ Most Expected GK/CA MCQ  
for All PSUs Exam | Test - 11

Lesson 1 - Started at 8:30 PM

Avinash Singh



LIVE

HINDI GENERAL APTITUDE

Reasoning Practice Sessions for all  
PSUs (Analogy) - 1

Lesson 1 - Started at 5:00 PM

Avinash Singh



HINDI GENERAL APTITUDE

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Ended on Apr 20, 2021

Avinash Singh

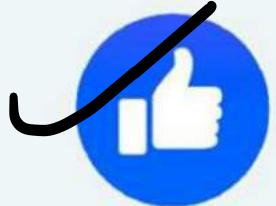
### Educator highlights

- Worked at GATE ACADEMY
- Cracked GATE Exam Multiple time
- Lives in Durg, Chhattisgarh, India
- Unacademy Educator since 29th September, 2020
- 35,900 live minutes taught in last 30 days
- Knows Hindi and English

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