

**GATE 2021**

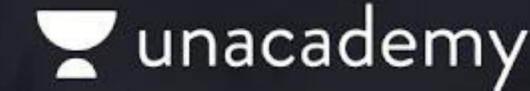
# **GENERAL APTITUDE**

धमाकेदार ट्रिक के साथ 🔥🔥

**NUMBER SYSTEM -4,  
CONCEPT OF UNIT DIGIT**



**21**



**AVINASH SIR**

# AVINASH SINGH SIR

## GATE | EE (CE)



Secured Score 99.86% in  
CAT (Quantitative Section)



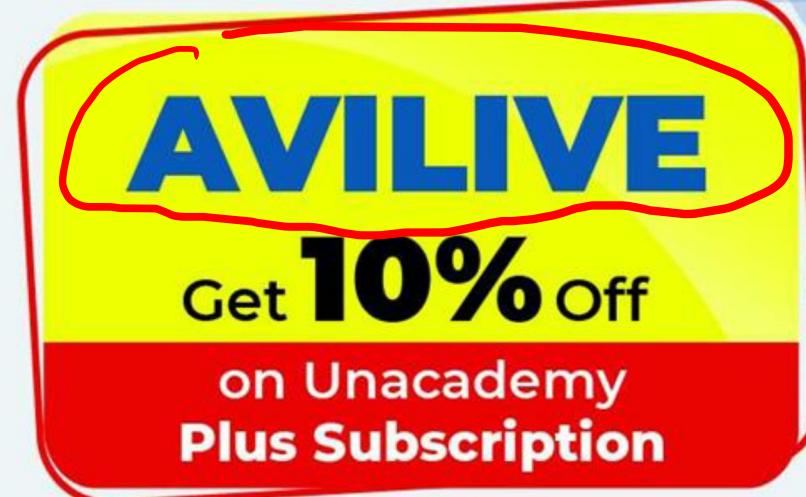
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7+ Years Teaching Experience  
Mentored 25k+ Students for  
GATE, ESE & PSUs



### **Subjects Taken:**

General Aptitude  
Engineering Mathematics  
Digital Electronics





### Study Planner

Customized study plan and track your performance.



### Study Booster Sessions

Receive Essential Guidelines via Regular workshops



### Personal Coach

One on one guidance on preparation strategy.



### Personalised Test Analysis

Get in-depth analysis of tests by section & question type.



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Crash Courses



Weekly Tests



Doubt Solving



RIB



English & Hindi



### Preparatory Study Material

Specialised notes & practice sets.

# Complete Package To CRACK GATE/ESE

The image displays a grid of 15 educational modules for GATE/ESE preparation, arranged in three rows. Each module includes the subject title, the teacher's name, and a small profile picture of the instructor.

- FLUID MECHANICS** by Mrigank Sir
- STRENGTH OF MATERIALS** by Abhishek Sir
- DESIGN OF STEEL STRUCTURE** by Babul Sir
- GEOTECHNICAL ENGINEERING** by Abhishek Sir
- REINFORCED CEMENT CONCRETE (RCC)** by Aishwary Sir
- RCC** by Kshitij Sir
- OPEN FLOW CHANNEL** by Mrigank Saurav Sir
- IRRIGATION ENGINEERING** by Chetan Sir
- STRUCTURAL ANALYSIS** by Aishwary Sir
- SURVEYING** by Kshitij Sachan Sir
- GEOTECHNICAL ENGINEERING** by Aishwary Sir
- ENVIRONMENTAL ENGG** by Mrigank Saurav Sir
- ENGINEERING HYDROLOGY** by Chetan Sir
- HIGHWAY ENGINEERING** by Kshitij Sachan Sir

## Analytical Aptitude

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

## Quantitative Aptitude

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

## 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

The ratio of two numbers is 3 : 4 and their H.C.F is 4. Their L.C.M is

A) 12

B) 16

C) 24

D) 48

$$\frac{a}{b} = \frac{3}{4}$$

$$\underline{\text{HCF}(a, b) = 4},$$

$$\underline{\text{LCM}(a, b) = ?}$$

$$a = 3 \times 4 = 12$$

$$b = 4 \times 4 = 16$$

$$a \times b = \text{LCM}(a, b) \times \text{HCF}(a, b)$$

$$12 \times 16 = \text{LCM}(a, b) \times 4$$

$$\text{LCM}(a, b) = \underline{\text{48}}$$

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What will study in  
Number System?



- Classification of number
- Sum of series
- Concept of LCM & HCF
- Concept of Unit digit
- Factorization
- Reminder theorem
- Divisibility Rule
- Factorial
- Bases & Base conversion

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# ~~Today's Class Agenda~~

- Concept of Unit Digit
- Questions based on Unit Digit

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## UNIT DIGIT

$$\rightarrow 27\textcircled{9}$$

$$\rightarrow 123 \times 129$$

$$\begin{array}{r} 123 \\ \times 129 \\ \hline \dots \quad \boxed{7} \\ \dots \quad 6 \\ \dots \quad 3 \\ \hline 7 \end{array}$$

$$12\textcircled{3} \times 12\textcircled{9} \Rightarrow \textcircled{7}$$
$$3 \times 9 = 2\textcircled{7}$$

$$\rightarrow 12\textcircled{6} \times 26\textcircled{2} \times 79\textcircled{8} \times 92\textcircled{7} = \textcircled{2}\textcircled{2}$$
$$6 \times 2 \times 8 \times 7 = 2\textcircled{2} \times 5\textcircled{6}$$

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$a^b \rightarrow$  unit digit

$$\text{Ex} \quad (77)^4 = 7\cancel{7} \times 7\cancel{7} \times 7\cancel{7} \times 7\cancel{7} \Rightarrow \cancel{\text{①}}$$

$7 \times 7 \times 7 \times 7$   
 $\underbrace{\qquad\qquad}_{4\text{g}} \quad \underbrace{\qquad\qquad}_{4\text{g}}$   
 $\underbrace{\qquad\qquad\qquad}_{8\text{①}}$

$$(77)^{77} = (77 \times 77 \times 77 \times \dots \times 77) \quad \text{(77 times)}$$

↓

Power Cycle

$a^b$

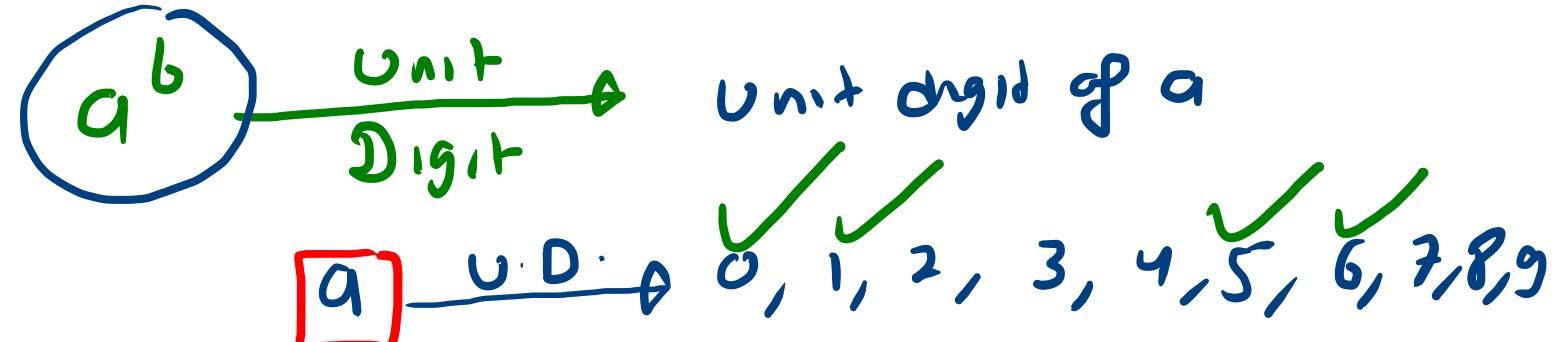
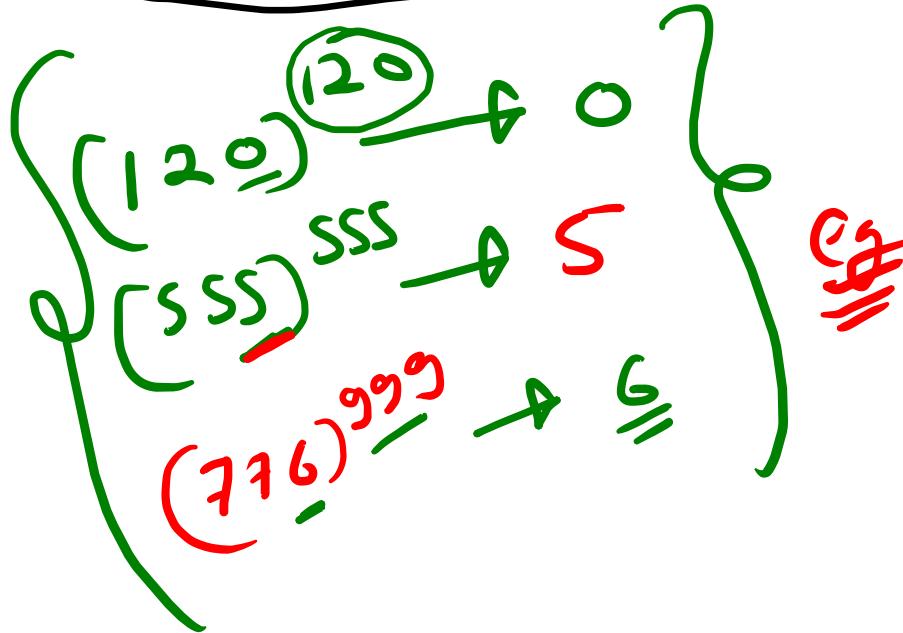
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Power cycle :-



$$(100)^3 = 0$$

$$(101)^3 = 1$$

$$(105)^3 = 5$$

$$(106)^4 = 6$$

$$S^2 = 25, S^3 = 625$$

$$6^2 = 36 \quad (10)^2 = 256$$

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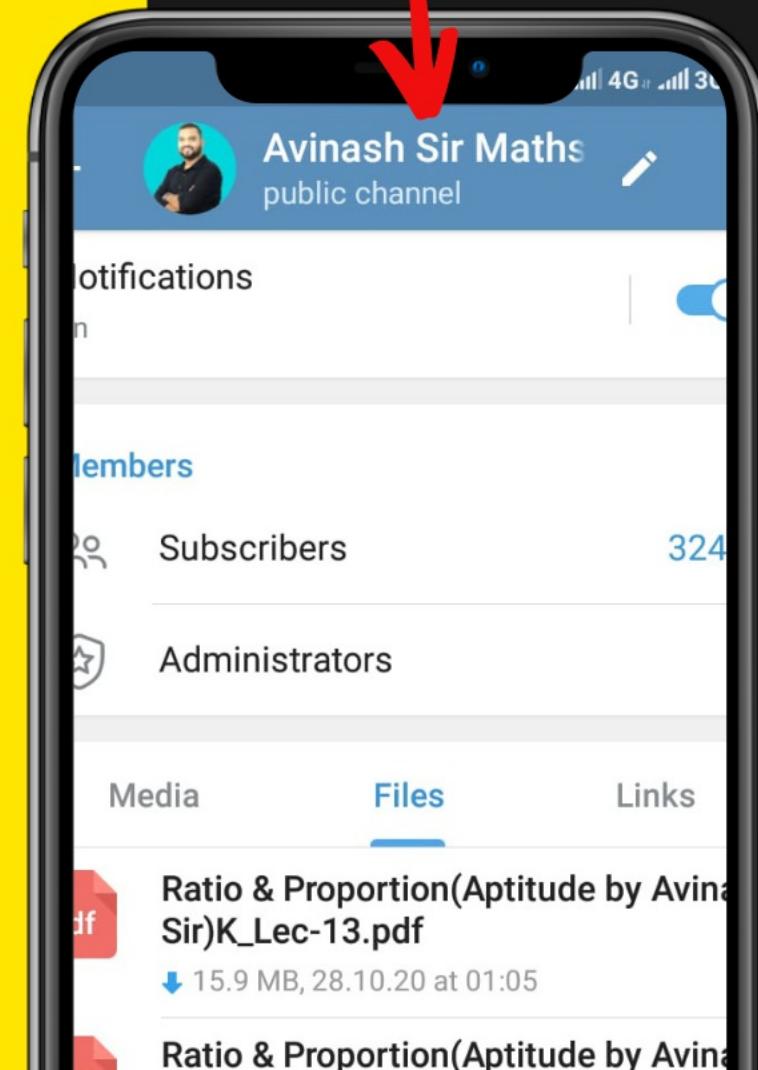


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$$\left( \dots \dots 0 \right)^n \rightarrow 0$$
$$\left( \dots \dots 1 \right)^n \rightarrow 1$$
$$\left( \dots \dots 5 \right)^n \rightarrow 5$$
$$\left( \dots \dots 6 \right)^n \rightarrow 6$$

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Ex:  $(1232)^{1232}$   
 $\rightarrow 2, 4, 8, 16$   
 $(2323)^{999}$   
 $\rightarrow 3, 9, 27, 81$

$a \xrightarrow{\text{U.D.}} \{2, 3, 4, 7, 8, 9\} \setminus \{0, 1, 5, 6\}$

$$2^1 = 2$$

$$2^2 = 4$$

$$2^3 = 8$$

$$2^4 = 6$$

$$2^5 = 2$$

$$2^6 = 4$$

$$2^7 = 8$$

$$2^8 = 6$$

$$2^9 = 2$$

$$\boxed{2 \rightarrow 2, 4, 8, 6}$$

$$3^1 = 3$$

$$3^2 = 9$$

$$3^3 = 7$$

$$\cancel{3^4 = 1}$$

$$3^5 = 3$$

$$3^6 = 9$$

$$3^7 = 7$$

$$\cancel{3^8 = 1}$$

$$3^9 = 3$$

$$\boxed{3 \rightarrow 3, 9, 7, 1}$$

$$4^1 = 4$$

$$\cancel{4^2 = 6}$$

$$4^3 = 4$$

$$\cancel{4^4 = 6}$$

$$4^5 = 4$$

$$4^6 = 6$$

$$\boxed{4 \rightarrow 4, 6}$$

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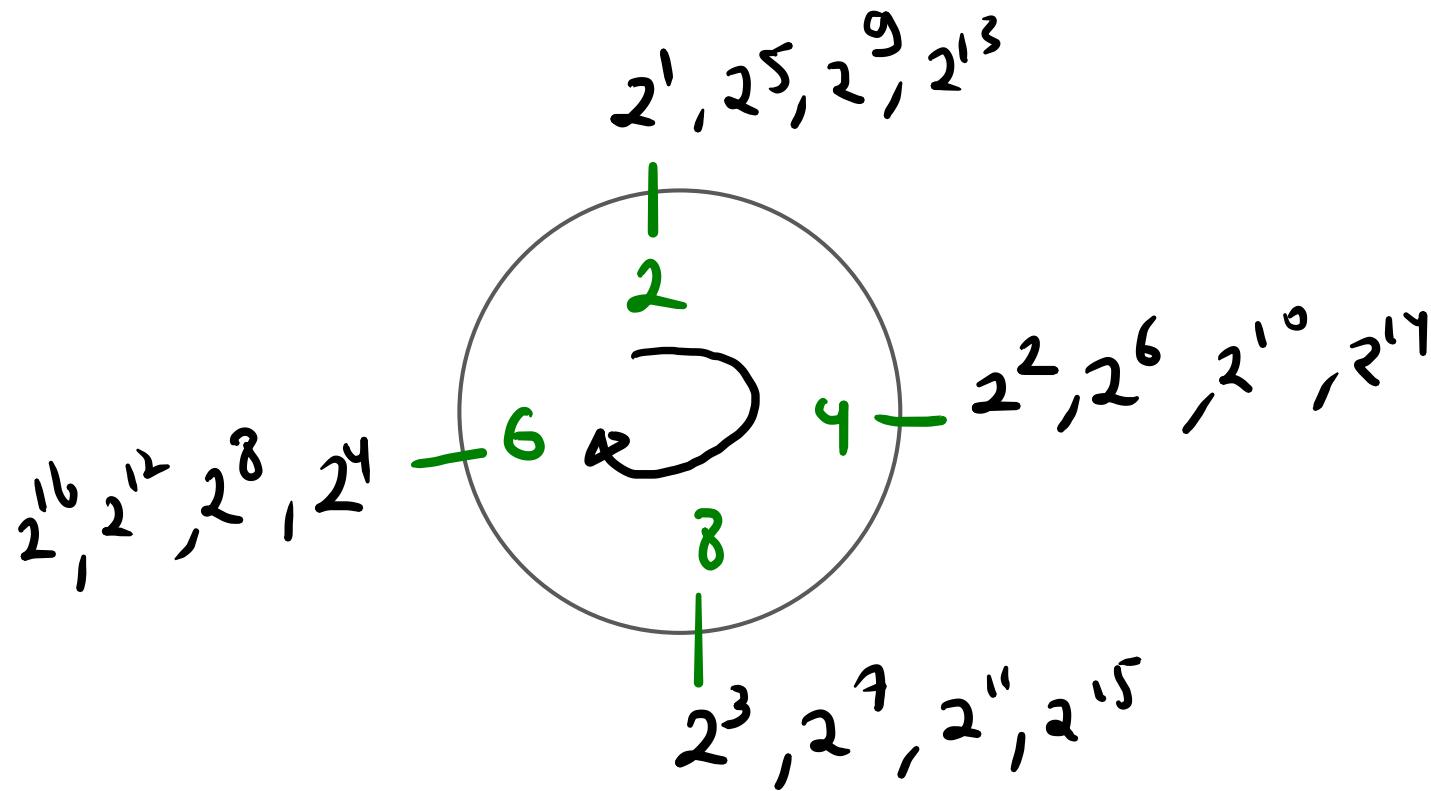
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$$2 \rightarrow 2, 4, 8, 6$$

$$\frac{2}{6} \frac{(272)}{(2)} = \underline{\underline{9}}$$



$$\frac{274}{4} | R = 2$$

$\Rightarrow R = 1, 2$

$\Rightarrow R = 2, 4$

$\Rightarrow R = 3, 8$

$\Rightarrow R = 0, 6$

U.D.

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$$(792)^{792} \approx (2)^{792} = 6$$

$2 \rightarrow \underline{2, 4, 8, 6}$

$$\frac{792}{4} \mid_R = 0$$

$$(733)^{333} \approx (3)^{333} = 3$$

$3 \rightarrow \underline{3, 9, 7, 1}$

$$\frac{333}{4} \mid_R = 1$$

$$(24)^{47} \approx (4)^{47} = 4$$

$$4 \rightarrow \underline{4, 6}$$

$$\frac{47}{4} \mid_R = 1$$

$$\begin{cases} (\dots 4)^{\text{odd}} \Rightarrow 4 \\ (\dots 4)^{\text{even}} \Rightarrow 6 \end{cases}$$

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10, 1, 5, 6

UNIT DIGIT	POWER CYCLE	Frequency
2	2, 4, 8, 6	4
3	3, 9, 7, 1	4
4	4, 6	2
7	7, 9, 3, 1	4
8	8, 4, 2, 6	4
9	9, 1	2

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$$\textcircled{1} \quad (1 \ 2 \ 3)^{123} \approx \textcircled{7}$$

$3 \rightarrow [3, 9, 7, 1]$

$\frac{123}{4} \text{ R} = \textcircled{3}$

$$\textcircled{2} \quad (145)^{552}$$

$5$

$$\textcircled{3} \quad (738)^{999} \approx \textcircled{2}$$

$8 \rightarrow [8, 4, 2, 6]$

$\frac{999}{4} \text{ R} = \textcircled{3}$

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$$\textcircled{1} \quad (2\ 3\ 4)^{\overbrace{5\ 5\ 5}}$$

$4 \rightarrow (4), 6$

$\begin{array}{c} 4 \\ \hline 4 \end{array}$

$$\textcircled{2} \quad (2\ 7\ 3)^{\overbrace{7\ 7\ 9}}$$

$3 \not\in \{3, 9, 7, 1\}$

$\frac{7\ 7\ 9}{4} \not\in R = \{3\}$

$\begin{array}{c} 7 \\ \hline 7 \end{array}$

$$\textcircled{3} \quad (9\ 9\ 9)^{\overbrace{9\ 9\ 9}}$$

$9 \rightarrow (9), 1$

$\frac{9\ 9\ 9}{2} \not\in R = \{1\}$

$\begin{array}{c} 9 \\ \hline 9 \end{array}$

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$4 \Rightarrow 4, 6$

$$(-\dots - 4)^{\text{odd}} \rightarrow 4$$

$$(-\dots - 4)^{\text{even}} \rightarrow 6$$

$9 \Rightarrow 9, 1$

$$(-\dots - 9)^{\text{odd}} \rightarrow 9$$

$$(-\dots - 9)^{\text{even}} \rightarrow 1$$

## ~~Home Work Question~~

1) Find the last digit of the expression of  $872^{915} \times 733^{700} \times 147^{140}$ ?

- A) 8
- B) 4
- C) 0
- D) 2

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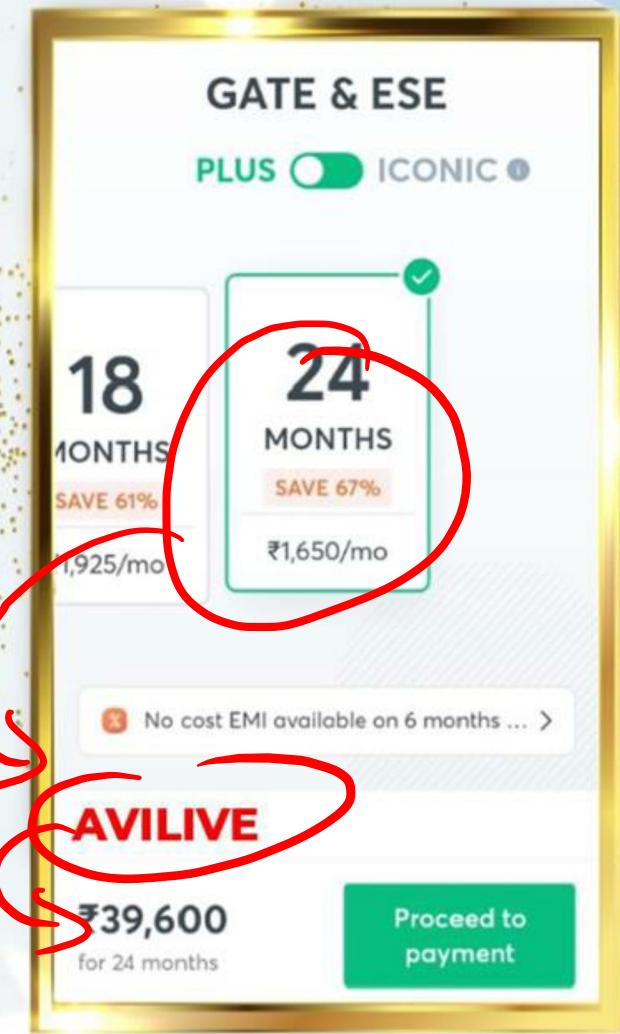
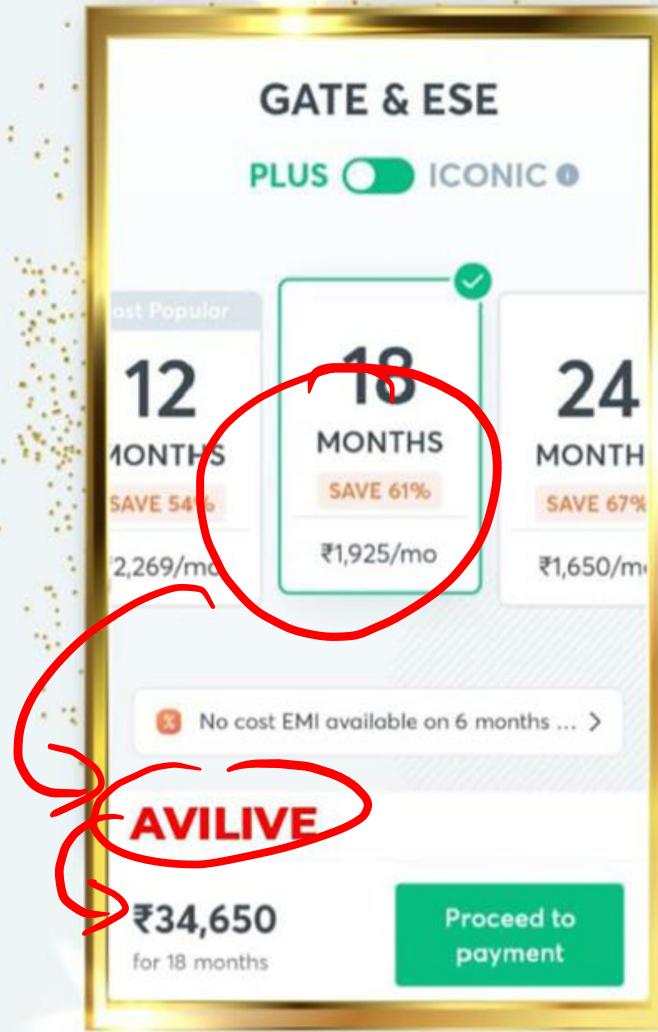
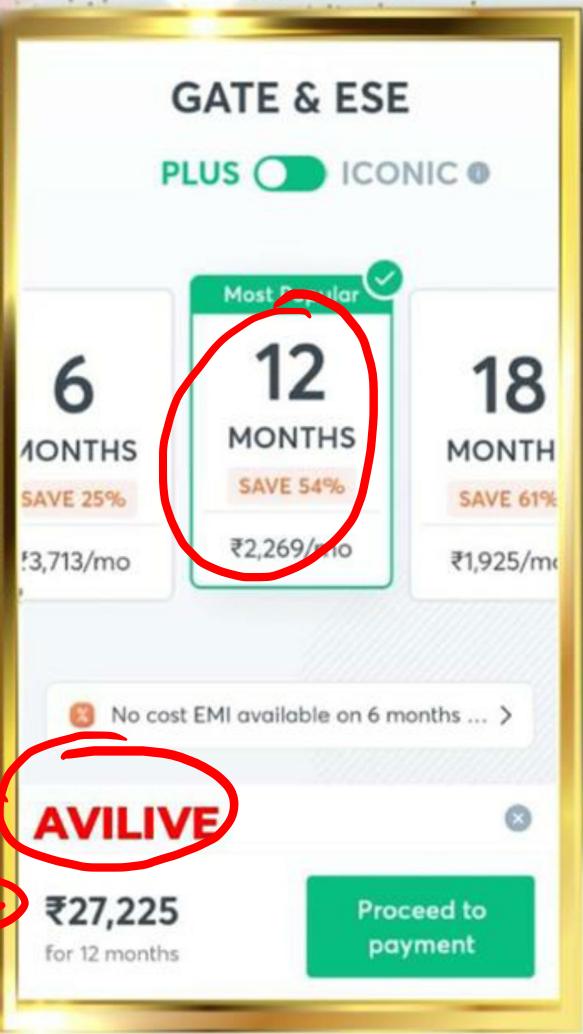
S: wpm → Reasoning

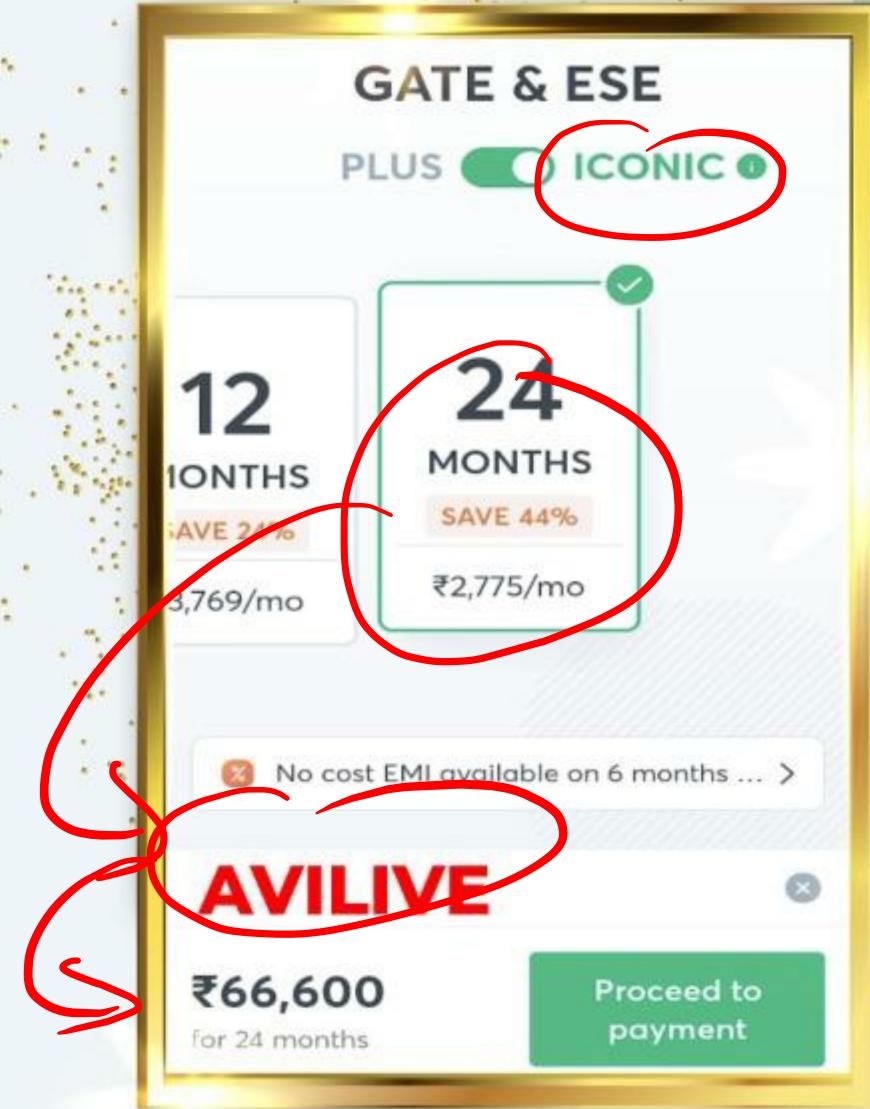
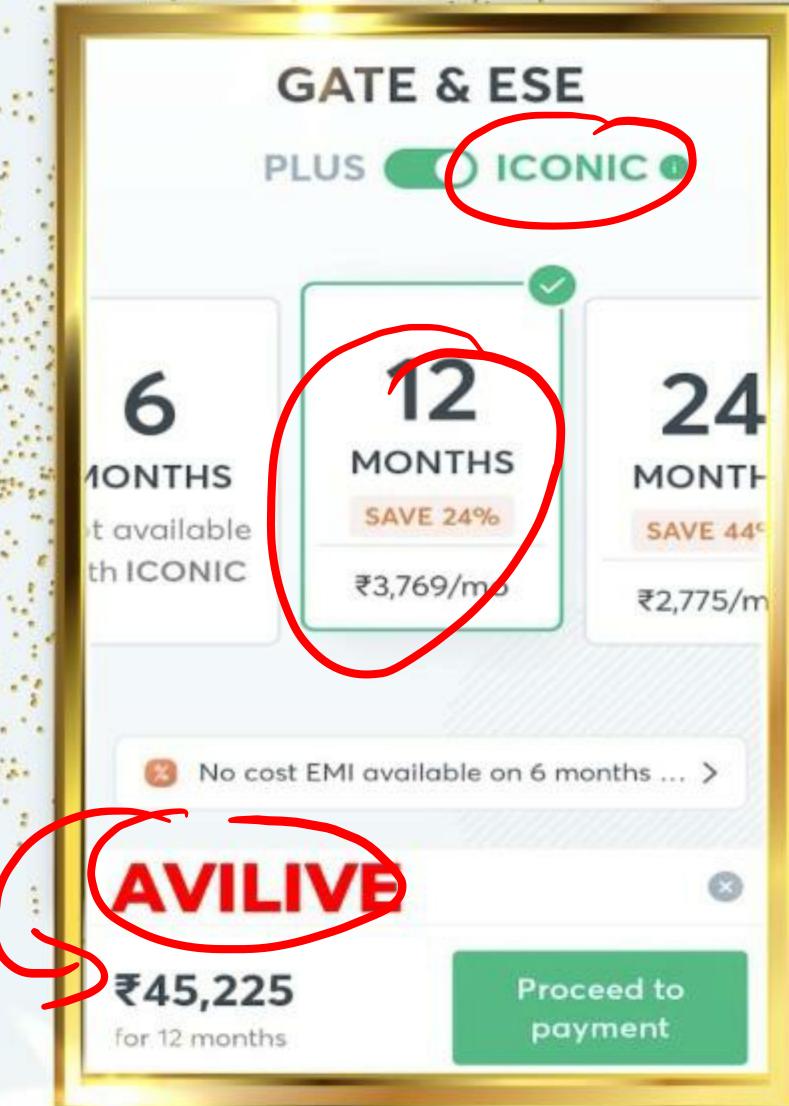
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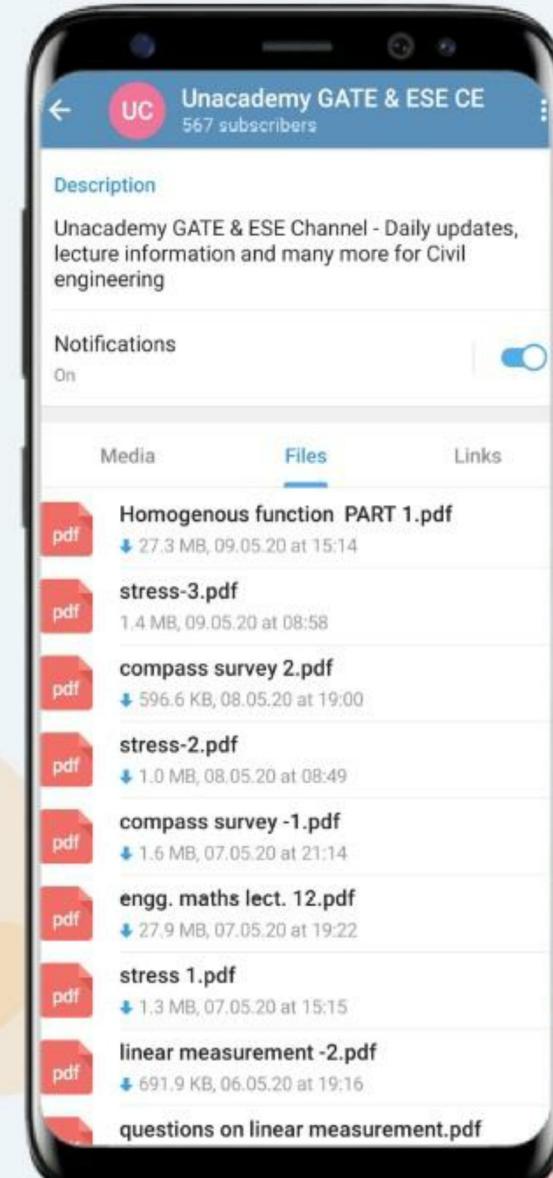
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