

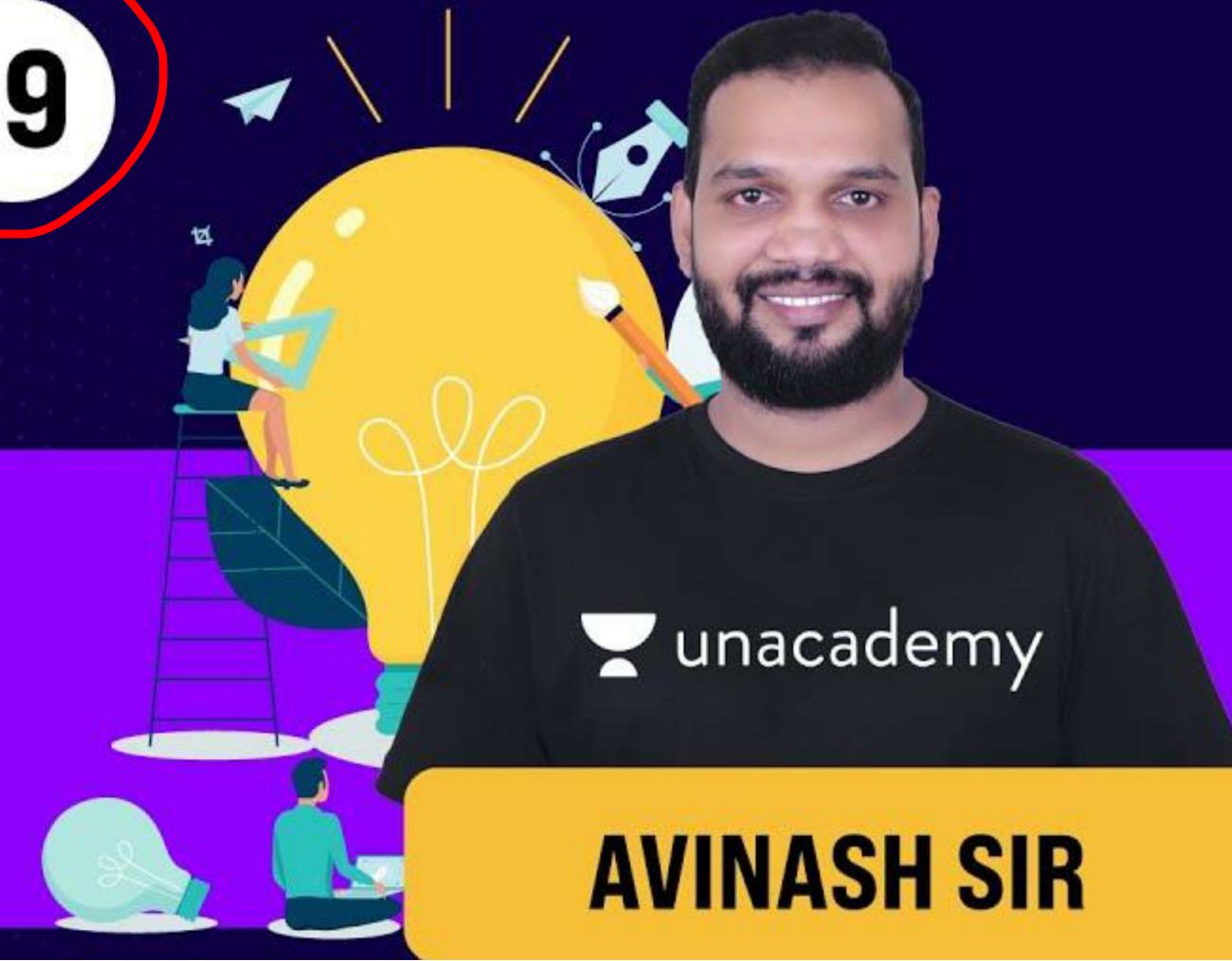
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GATE 2021

# GENERAL APTITUDE

NUMBER  
SYSTEM -2

19



AVINASH SIR

unacademy



# AVINASH SINGH SIR

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CAT (Quantitative Section)



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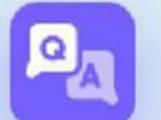
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# Complete Package To CRACK GATE/ESE

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
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- 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 - 1

A book has N pages. A teacher asked her students to add all the pages numbers starting from 1 to N and tell her the result. Which of the following answer given by her students can be right?

- A) 8674
- B) 9389
- C) 7875
- D) 7997

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# Number System

Lecture-2

What will study in  
Number System?



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

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# Today's Class Agenda

✓ Sum of Series

✓ Concept of LCM & HCF

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## Sum of Series

2, 3, 4

~~1, 2, 3, 4, 5, - - - - -~~

$T_n$   
n

$S_n$

$$\frac{n(n+1)}{2}$$

$1^2, 2^2, 3^2, 4^2, 5^2, \dots n^2$

$$\frac{n(n+1)(2n+1)}{6}$$

$1^3, 2^3, 3^3, 4^3, \dots n^3$

$$\left[ \frac{n(n+1)}{2} \right]^2$$

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~~Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Number System~~



1) A book has N pages. A teacher asked her students to add all the page numbers starting from 1 to N and tell her the result. Which of the following answer given by her students can be right?

- A) ~~8674~~

- ~~B) 9389~~

2, 4, 7, 9

$$\frac{n(n+1)}{2}$$

- 1 C) 7875

- D) ~~7997~~

1, 2, 3, 4, 5, 6, - - -

$$\left| \frac{n(n+1)}{2} \right|_{n=30} = \frac{30 \times 31}{2} = 31 \times 15 \leq 500$$

$$\frac{n(n+1)}{2} \Big|_{n=100} = \frac{100 \times 101}{2} = 101 \times 50 = 5050$$

$$\frac{n(n+1)}{2}$$

~~XXXX~~

$$\frac{n(n+1)}{2}$$

For any value of  $n$  Result will never end  
with  $\underline{\underline{2}}, \underline{\underline{4}}, \underline{\underline{7}}, \underline{\underline{9}}$

& Unit digit concept

$$\underline{\underline{n=25}}$$

$$\frac{25 \times 26}{2} = 25 \times 13$$
$$= \underline{\underline{325}}$$

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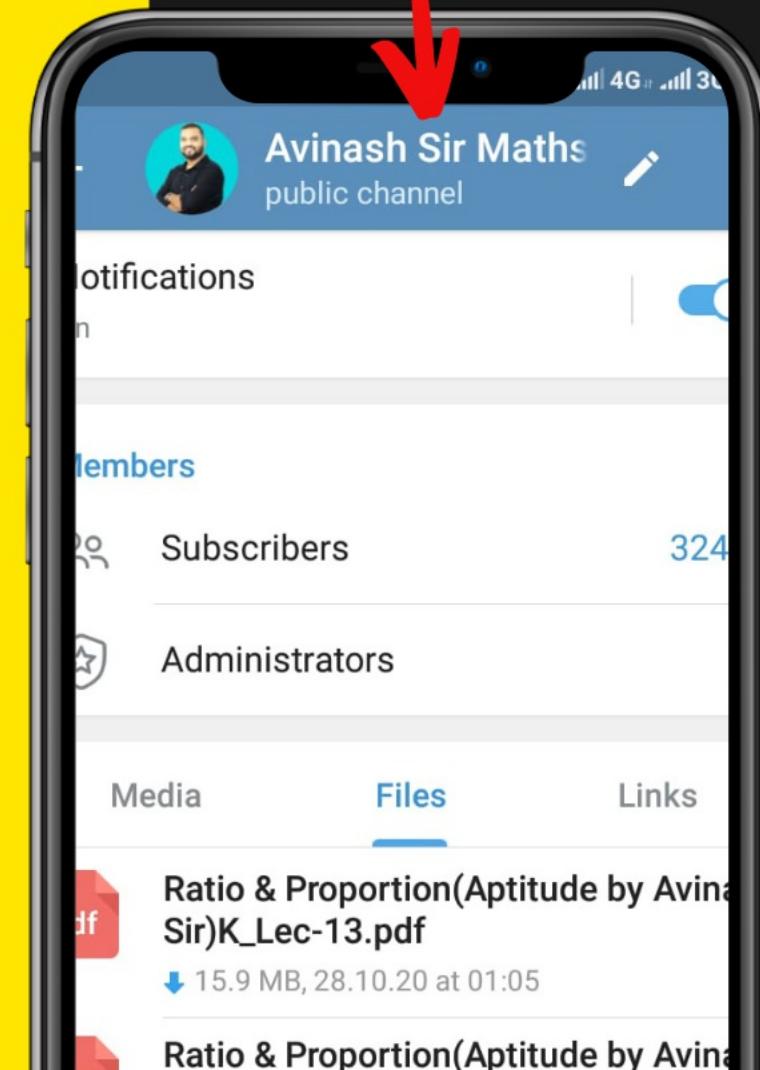


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# Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Number System



- 2) While adding the first few number continuous natural numbers, a candidate missed one of the numbers and wrote the answer as 177. What the number missed?
- A) 11      B) 12      C) 13      D) 14

$$1, 2, 3, 4, 5, 6, \dots - \boxed{x} \text{ miss} \quad \dots N = 177 + x$$
$$\frac{n(n+1)}{2} \quad |_{n=15} = \frac{15 \times 16}{2} = 15 \times 8 = 120$$

$$(1-15) \rightarrow 120$$
$$(1-16) \rightarrow 120 + 16 = 136$$
$$(1-17) \rightarrow 136 + 17 = 153$$
$$(1-18) \rightarrow 153 + 18 = 171$$
$$(1-\underline{19}) \rightarrow 171 + 19 = 190 = 177 + x$$

$x = 13$

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# Concept of LCM & HCF

LCM (Least Common Multiple):

two or more numbers

eg  $\text{LCM of } (2, 3) = 6$  + 2

A.P.  $\rightarrow$  multiples of 2 = 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, ...

A.P.  $\rightarrow$  3 = 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, ...

A.P.  $\rightarrow$  Common " " " (2, 3) = 6, 12, 18, ...

Least " " " (2, 3) = 6 + 6

$\text{LCM of } (2, 3) = 6$

\*1  $\frac{6}{2} \mid R = \frac{6}{3} \mid R = 0$

\*2 LCM of nos is always greater than or equal to larger nos

eg  $\text{LCM of } (4, 8) = 8$

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## Calculation of LCM:

LCM of (5, 12, 20)

$$\begin{array}{l} M-I \\ 6 = 2 \times 3 \\ 12 = 2^2 \times 3 \\ 20 = 2^2 \times 5 \end{array} \left. \begin{array}{l} \\ \\ \end{array} \right\} 2^2 \times 3 \times 5 = \underline{\underline{60}}$$

~~30, 60, 120, 180, 240, 300, 360, 420, 480, 540, 600, 660, 720, 780, 840, 900,~~

6, 12, 20

~~2 \* (3, 6, 10)~~  
~~30 \* 2 = 60~~

~~[18, 24]~~  
6 \* (3, 4)  
~~12 \* 6~~  
~~-72~~

~~[18, 99]~~  
9 \* (2, 11)  
~~22 \* 9~~  
~~= 198~~

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## HCF(Highest common factor):

→ two or more than 2

~~Eg~~  $HCF(4, 8) = 4$

Factor of 4 =  $\{1, 2, 4\}$

), 8 =  $\{1, 2, 4, 8\}$

Common factor of (4, 8) = 1, 2,  $\boxed{4}$

Highest

),

),

$(4, 8) = 4$

~~Eg~~ HCF of (4, 8) = 4

~~1~~  $\frac{4}{4}|_R = \frac{8}{4}|_R = 0$

~~2~~ HCF is less or equal to lower nos

~~Eg~~  $HCF(3, 7) = 1$

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## Calculation of HCF:

$$\text{HCF}(6, 18, 27) = \underline{\underline{3}}$$

~~$$\text{HCF}(2, 6, 9)$$~~

(eg)

$$\text{HCF}(3^6, 2^4, 10^8) = \underline{\underline{12}}$$

$$= 2 \times (3, 2, 9)$$

(eg)

$$\text{HCF}(12, 19, 37) = \underline{\underline{1}}$$

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# Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Number System



3) On a radio tower, a red light flashes every 6 seconds and a blue light flashes every 10 seconds. If both lights flash together at a certain time, how many seconds later will both lights flash together the next time?

A) 28

B) 30

C) 60

D) NOTA

AP  $\Rightarrow$  Red Light  $\rightarrow 6, 12, 18, 24, \textcircled{30}, 36, 42, 48, 54, \textcircled{60}$

AP  $\Rightarrow$  Blue Light  $\rightarrow 10, 20, \textcircled{30}, 40, 50, \textcircled{60}, \dots$

~~AP~~  $\Rightarrow$   $\textcircled{30}, \textcircled{60}, 90, 120, 150, 180, \dots$   
 $30, 80$

2 min  $\rightarrow 4$   
6 min  $\rightarrow 120$

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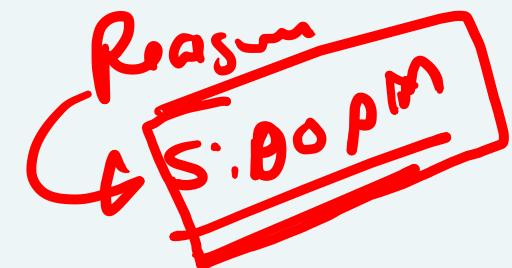
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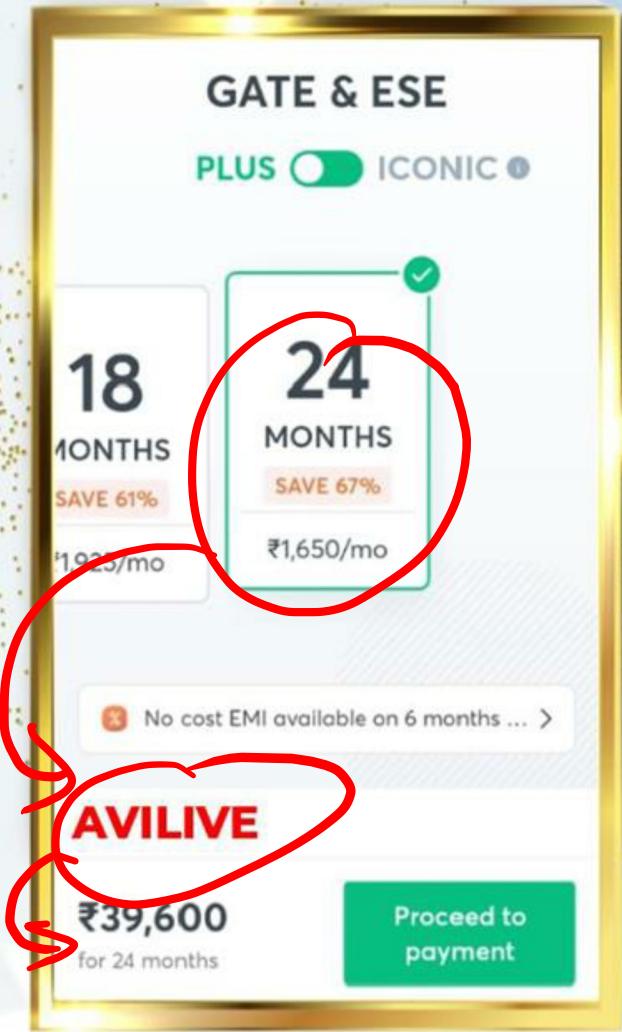
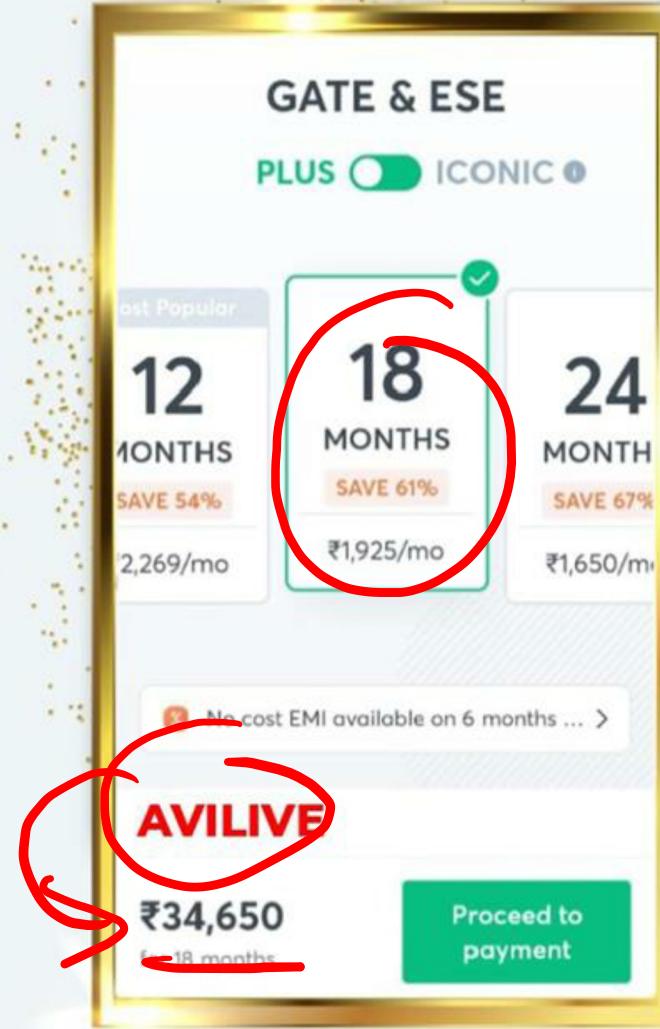
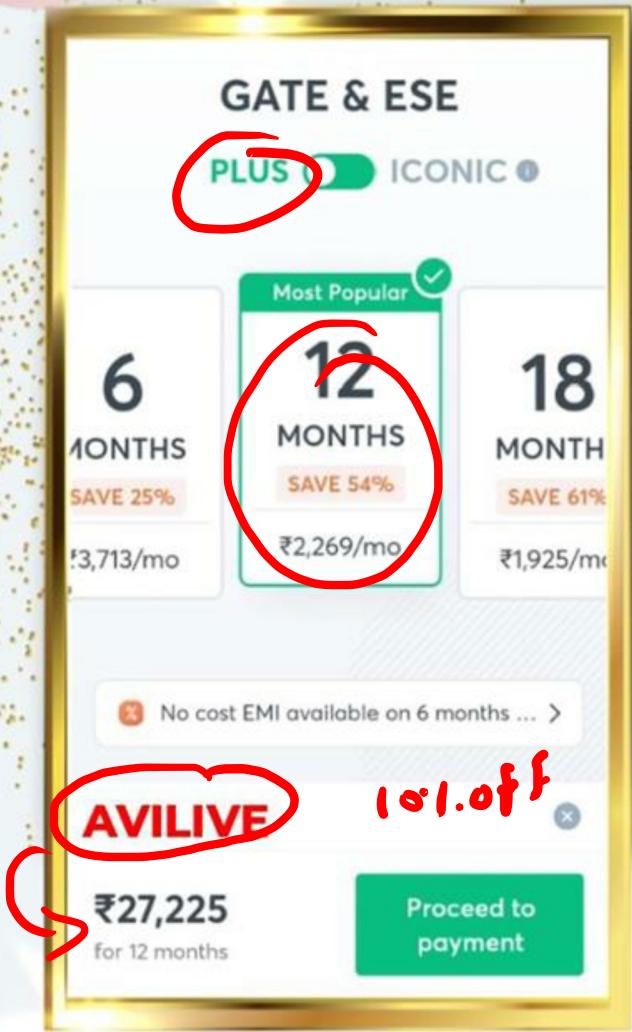
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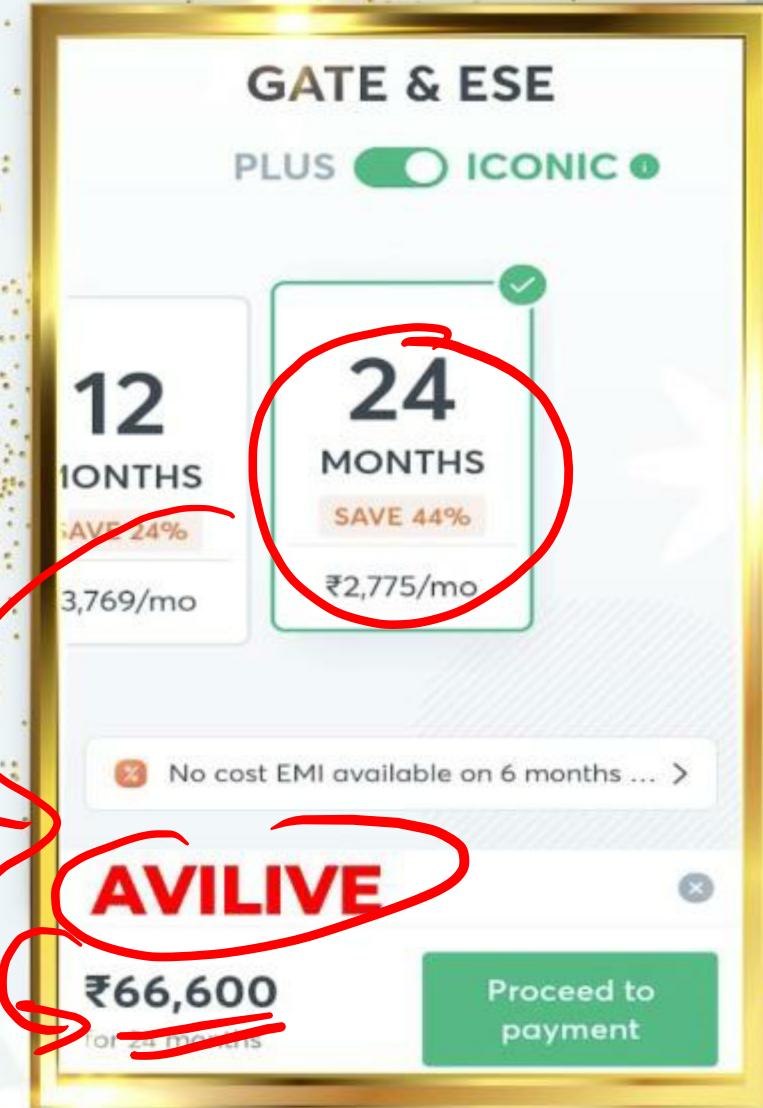
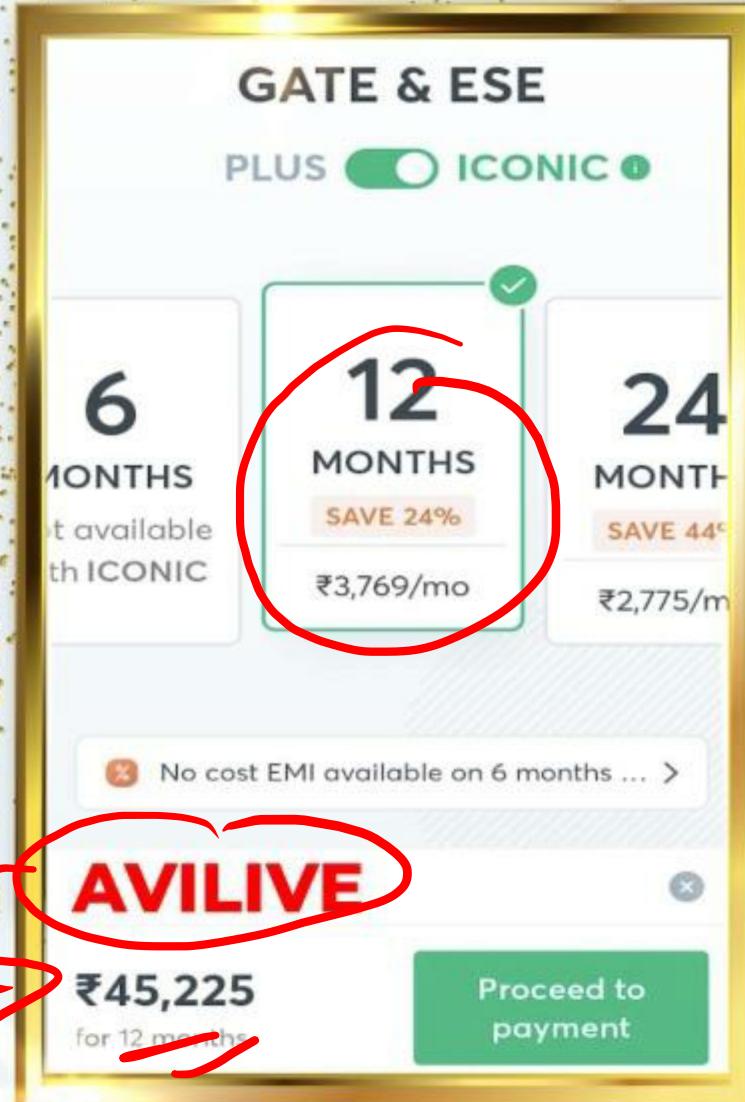
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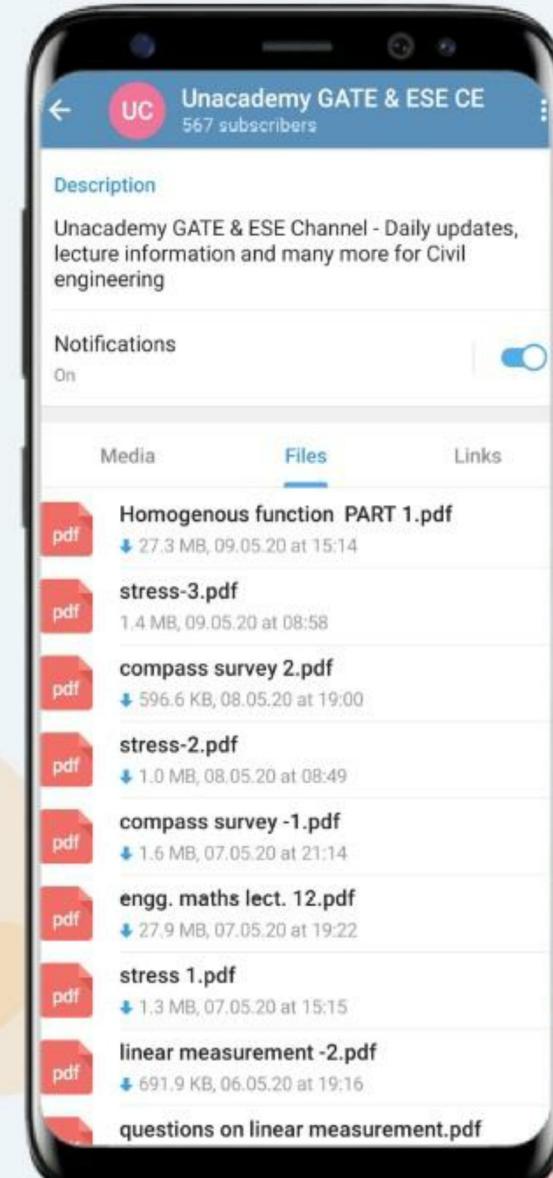








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