

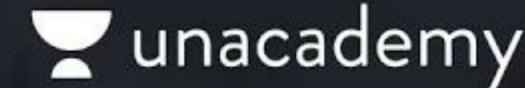
GATE 2021

GENERAL APTITUDE

धमाकेदार ट्रिक के साथ 🔥🔥



22



**NUMBER SYSTEM -5,
APPLICATION OF UNIT DIGIT**

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- Seating Arrangements
- Odd Man out
- Puzzle

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- Pipes & Cisterns
- Ratio & Proportion
- Number System
- Sequence & Series
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- Percentage
- Profit, Loss & Discount
- Average
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- 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
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✓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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Number System

Lecture-5

What will study in
Number System?



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

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Today's Class Agenda

- Questions based on Unit Digit
- Application of Unit Digit



Application of Power Cycle

✓) Direct question to find last digit of a power expression of the form a^b

eg $(3432)^{478}$

UNIT DIGIT → 4

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

$4 \boxed{78} / R = 2$

eg $(7429)^{799}$

UNIT DIGIT → 9

$9 \rightarrow 9, 1$

$\underline{\underline{299}} / R = 1$

9 $(3432)^{478} + (7429)^{799}$ 2 $(3432)^{478} \times (7429)^{799}$

4 + 9

13

4 × 9

36

Aptitude for GATE/ESE/PSUs/AE/JE/College Placement, Topic- Unit Digit



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

$$(8\cancel{72})^{\cancel{915}} \times (7\cancel{33})^{\cancel{700}} \times (1\cancel{47})^{\cancel{140}}$$

↓ ↓ ↓
8 1 1 = 8

2 → 2, 4, 8, 6

3 → 3, 9, 7, 1

7 → 7, 9, 3, 1

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2) The numerical in the unit position of $211^{870} + 146^{127} \times 3^{424}$ is.....

[GATE 2016]

$$(211)^{870} + (146)^{127} \times 3^{424}$$

$\downarrow \quad \downarrow \quad \downarrow$

$$1 + 6 \times 1 =$$

$(1) + (6) = (7)$

3 + 3, 9, 7, 1

(Note: The numbers 1, 6, 7, and 1 are circled in green, and the result 3, 9, 7, 1 is also circled in green. A green circle with a question mark is drawn over the original question text.)

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- 3) The last digit of $(2171)^7 + (2172)^9 + (2173)^{11} + (2174)^{13}$ is **[GATE 2017, CE-1, CH]**
- A) 2 B) 4 C) 6 D) 8

$$(2171)^7 + (2172)^9 + (2173)^{11} + (2174)^{13}$$

↓ ↓ ↓ ↓
 1 2 7 4 = 14

2 → 2, 4, 8, 6

3 → 3, 9, 7, 1

4 → 4, 6



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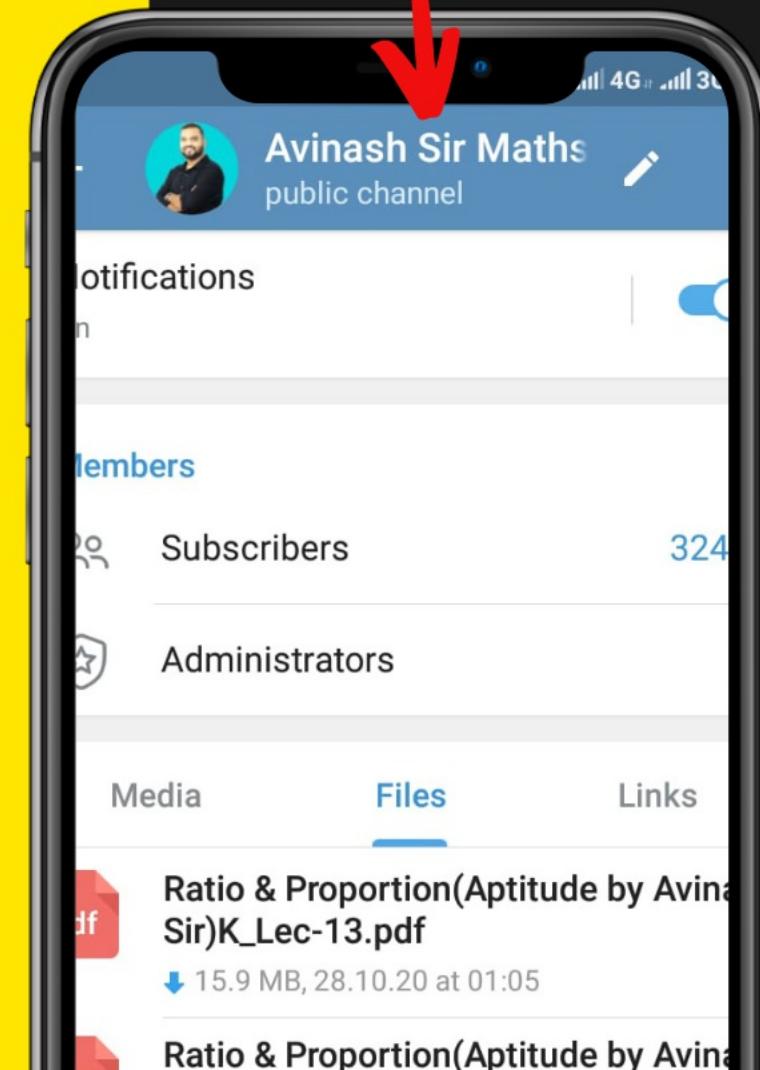


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4) Find the last digit of the expression of $122^{201} - 78^{86}$?

A) 2

UNIT

B) 4

C) 6

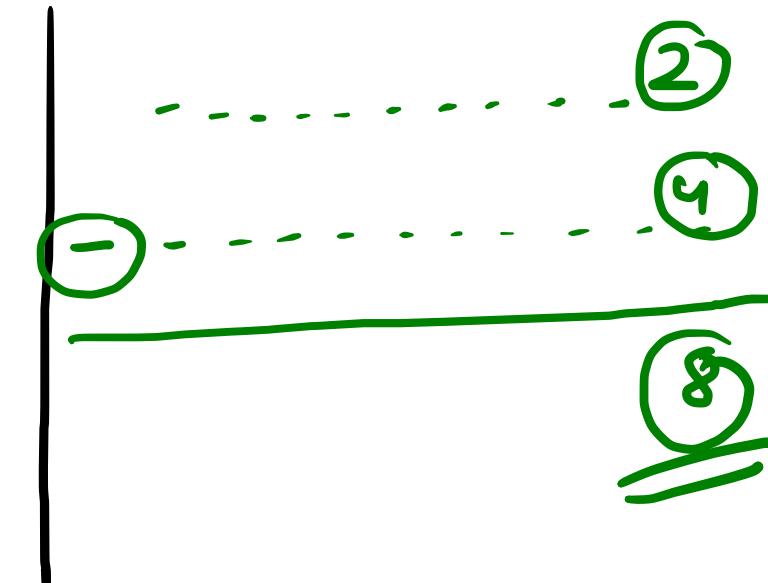
D) 8

$$(122)^{201} - (78)^{86}$$

↓ ↓

2 4

2, 4, 8, 6 8, 8, 4, 2, 6



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Application of Power Cycle

✓ 2) Remainder based on 2, 5, 10

For 2

$$\frac{129}{2} \mid_R = 1$$

$$\frac{99978}{2} \mid_R = 0$$

For 5

$$\frac{127}{5} \mid_R = 2$$

$$\frac{979859}{5} \mid_R = 4$$

For 10

$$\frac{92}{10} \mid_R = 2$$

$$\frac{743}{10} \mid_R = 3$$

$$\frac{997847}{10} \mid_R = 7$$

$$\frac{N}{10} \mid_R = \text{UNIT DIGIT}$$

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262,4,86

Ex $\frac{(372)}{s} \left|_R^{999}\right. = \frac{8}{s} \left|_R = 3\right.$

Ex $\frac{(7329)}{10} \left|_R^{929}\right. = \frac{9}{10} \left|_R = 9\right.$

Ex $\frac{(279)}{s} \left|_R^{978}\right. = \frac{1}{s} \left|_R = 1\right.$

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5) Find the remainder when 3^{75} is divided by 5?

A) 2

B) 7

C) 1

D) 6

$$\begin{array}{r} 3^{75} \\ \hline 5 | R = 3 \end{array}$$

$3^{75} \xrightarrow{\text{U.D}} 7$ $3 \rightarrow 3, 9, 7, 1$

$= 2$

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To find the number of zero in any expression

$$10 = 2 \times 5$$

① 2×5

$$= 10$$

1

② $2^2 \times 5$

$$\begin{array}{r} (2 \times 5) \times 2 \\ \hline 20 \end{array}$$

1

③ $2^3 \times 5^2 \times 3$

$$\begin{array}{r} (2^2 \times 5^2) \times 2 \times 3 \\ \hline 600 \end{array}$$

2

④ $2 \times 5^3 \times 6$

$$2 \times 5^3 \times 2 \times 3$$

$$2 \times 5^3 \times 3$$

$$(2^2 \times 5^2) \times 5 \times 3$$

$$1500$$

2

2

$$256 \times 25 \times 15$$

$$2^8 \times 5^2 \times 5 \times 3$$

$$(2 \times 5)^3 \times 2^5 \times 3$$

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129

1290

19000

$$72 \times 45 \times s^2$$

*Find Right Most
non-zero Integer*

$$(48 \times 9 \times 9 \times 5 \times s^2)$$
$$(2^3 \times 5^3) \times 9 \times 9 = \dots \dots \dots \boxed{1} 0 0 0$$

UNIT DIGIT

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Application of Power Cycle

3) To find the right most non-zero integer

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6) Find the rightmost non-zero integer of expression $2^{45} \times 5^2 \times 17^{21} \times 13^{50}$?

- A) 4 B) 3 C) 2 D) 1

$$\begin{aligned} & 2^{45} \times 5^2 \times 17^{21} \times 13^{50} \\ & (2^2 \times 5^2) \times [2^{43} \times 17^{21} \times 13^{50}] = \dots \rightarrow \boxed{4} \text{ } 6 \\ & 2 \rightarrow 2, 4, \cancel{8}, 6 \\ & 7 \rightarrow \cancel{7}, 9, 3, 1 \\ & 3 \rightarrow 3, \cancel{9}, 7, 1 \end{aligned}$$

The handwritten solution shows the simplification of the expression by canceling out factors of 2 and 5 from the first two terms. The remaining terms are $2^{43} \times 17^{21} \times 13^{50}$. The unit digits of these terms are circled and connected by arrows to show their product: 8 (from 2^{43}) times 7 (from 17^{21}) times 9 (from 13^{50}). The result of this multiplication is 504, with the unit digit being 4. The final answer is boxed as 4.

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7) What is the first non-zero integer from the right in $8330^{1957} + 8370^{1982}$

A) 3

B) 1

C) 9

D) NOTA

$$\begin{array}{r} (8330)^{1957} \\ + (8370)^{1982} \\ \hline \end{array}$$

Handwritten annotations:

- Red circle around the first digit of $(8330)^{1957}$: (833) 1957
- Red circle around the first digit of $(8370)^{1982}$: $3 \oplus 3, 9, 7, 1$
- Red bracket under (833) : 1957
- Red bracket under (8370) : 1982
- Red bracket under the sum total: 1957
- Red bracket under the first few digits of the result: $000 \dots 0000$
- Red bracket under the second part of the result: $000 \dots 0000$
- Red bracket under the third part of the result: $00000000 \dots 0000$
- Red bracket under the fourth part of the result: $000 \dots 0000$

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8) Find the rightmost non-zero integer of the expression $1430^{343} + 1470^{367}$?

A) 3

B) 9

C) 7

D) 1

$$\begin{aligned} & (143)^{343} \rightarrow 7 \\ & 3 \rightarrow 3, 9, 7, 1 \end{aligned}$$

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Home Work Question

~~✓~~ How many numbers of zeros are there in following expression?

$$2^{11} \times 125^3 \times 7^{11} + 3^{11} \times 7^{11} \times 2^{10} \times 5^1 + 11^{12} \times 2^{13} \times 5^{125}$$

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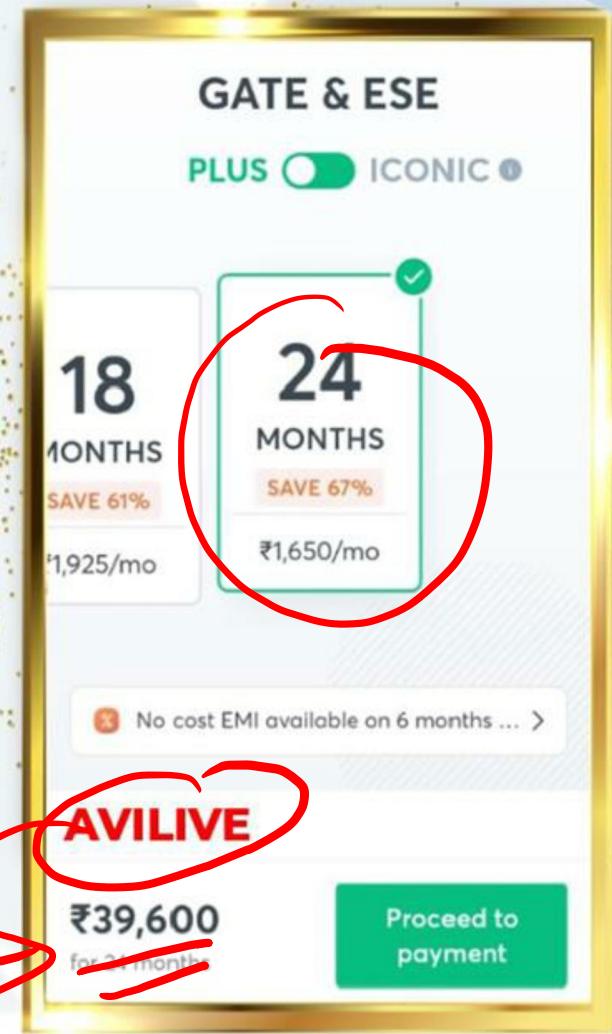
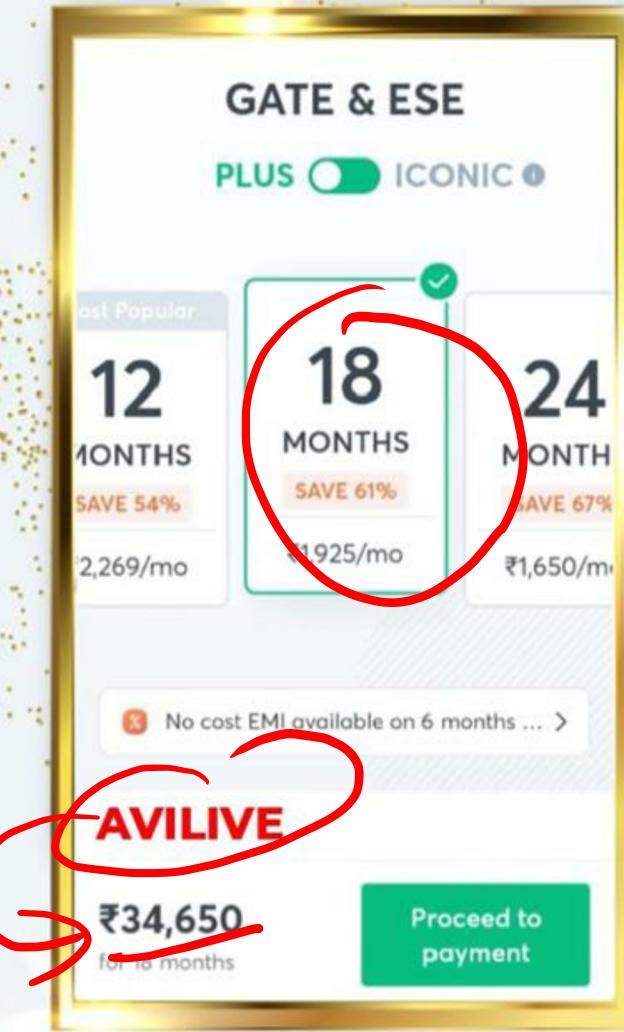
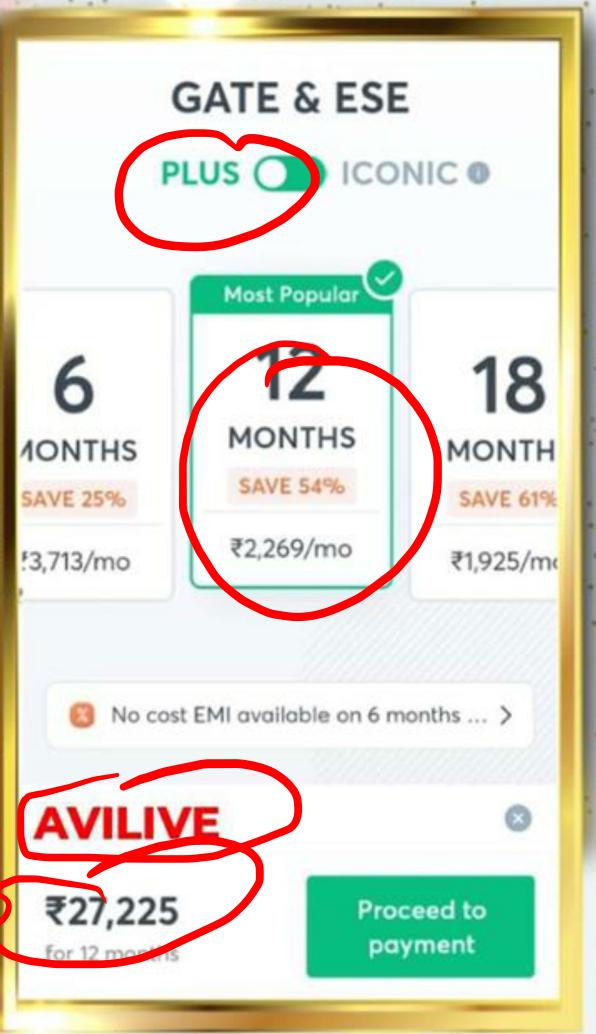
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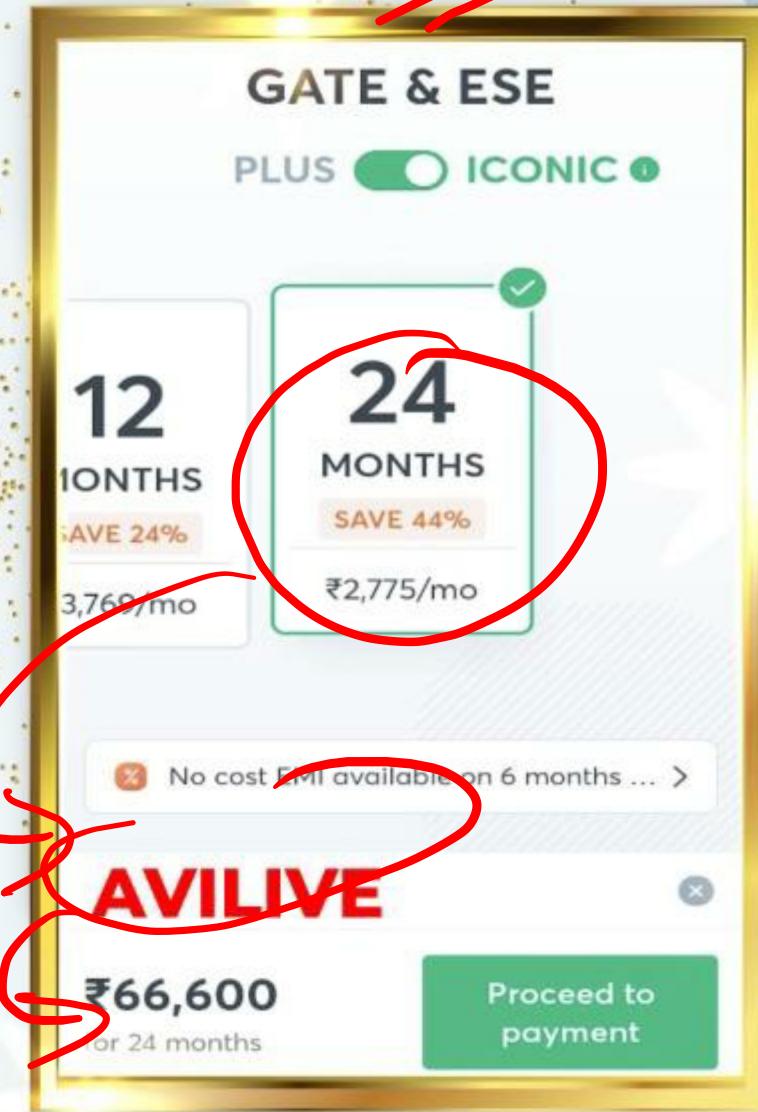
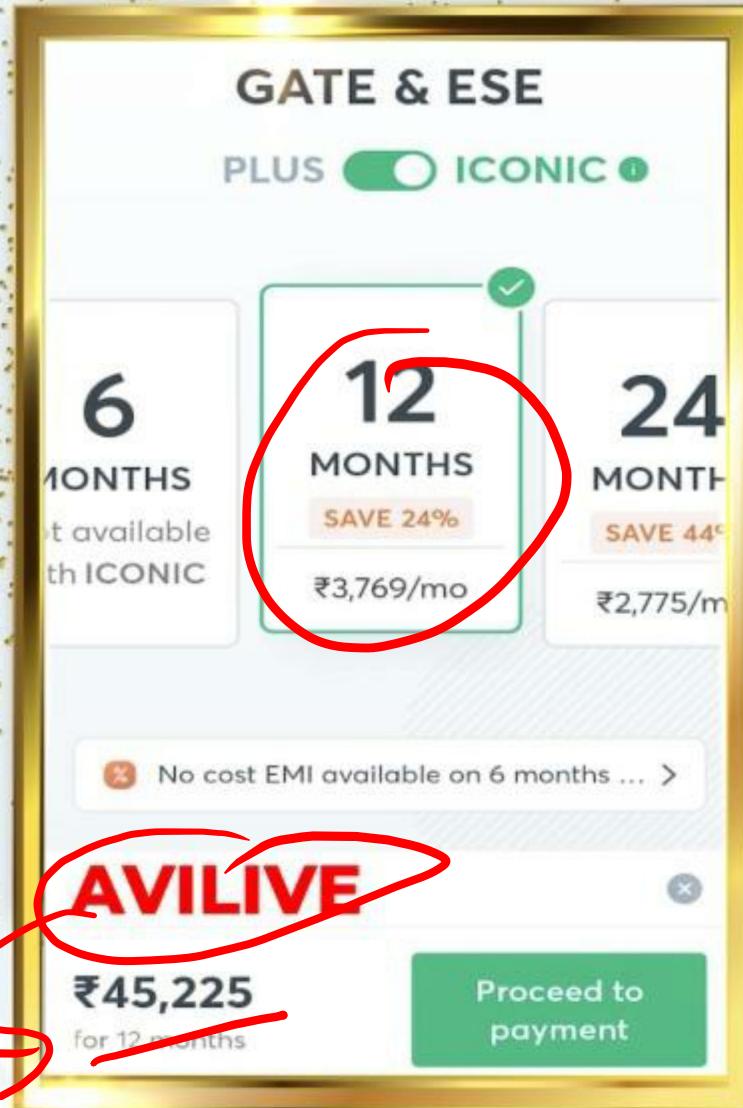
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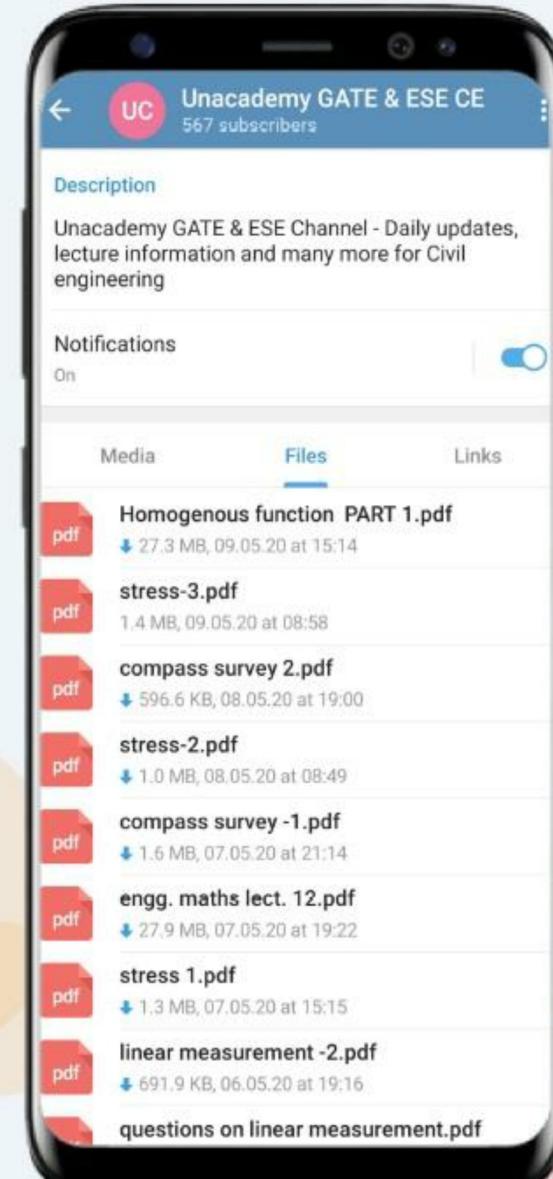


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