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GS PAPER- II (CSAT)

By Dhrub Sir

Remainder (शेषफल)

$$\frac{12 \times 8}{7} \rightarrow \frac{96}{7} \rightarrow (5)$$

$$\rightarrow \frac{5 \times 1}{7}$$

$$\rightarrow \frac{5}{7} \rightarrow (5)$$

7) $432 \overline{)61}$

42

12

7

5

Ex: $\frac{321 \times 432 \times 765}{7}$

$\rightarrow \frac{6 \times 5 \times 2}{7}$

$\rightarrow \frac{30 \times 2}{7} \rightarrow \frac{2 \times 2}{7} \rightarrow 4$

Prob: $332 \times 452 \times 675 + 13$

$=$

$\rightarrow \quad 2 \times 1 \times 4 + 2$

$=$

$\rightarrow \quad 8 + 2 \rightarrow 8 + 2$

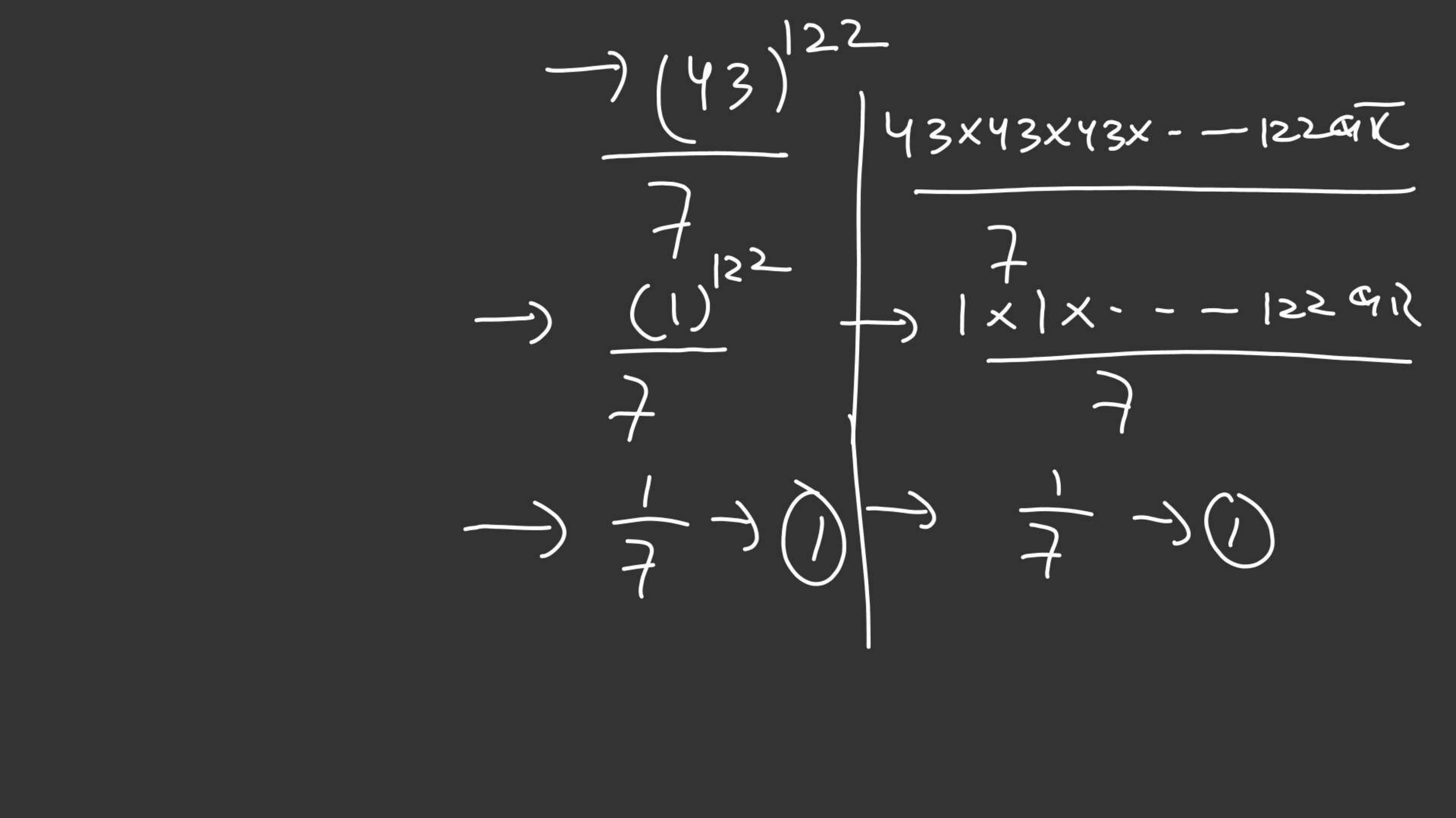
$$\rightarrow \frac{8234 \times 6293 \times 8214}{11}$$

$$\rightarrow \frac{6 \times 1 \times 8}{11}$$

$$\rightarrow \frac{48}{11} \rightarrow 4$$

$$\longrightarrow \frac{2357 \times 8234 \times 5747}{7}$$

$$\longrightarrow \frac{5 \times 2 \times \boxed{0}}{7} \rightarrow \boxed{0}$$


$\rightarrow (43)^{122}$
$\frac{(43)^{122}}{7}$
$43 \times 43 \times 43 \times \cdots 122$ बार
7
$\rightarrow \frac{(1)^{122}}{7}$
$\rightarrow 1 \times 1 \times \cdots 122$ बार
7
$\rightarrow \frac{1}{7} \rightarrow (1)$
$\rightarrow \frac{1}{7} \rightarrow (1)$

$\rightarrow \frac{-47}{7}$

$\rightarrow \frac{(-42)-5}{7}$

$\rightarrow \frac{0-5}{7} \rightarrow \frac{-5}{7}$

$\rightarrow (7-5) = 2$

$\frac{-5}{7} \rightarrow \frac{-7+2}{7}$

$\rightarrow \frac{0+2}{7}$ (2)

Prob $\frac{(43)^{122}+5}{7}$

$\rightarrow \frac{(1)^{122}+5}{7}$

$\rightarrow \frac{1+5}{7} \rightarrow \frac{6}{7} \rightarrow$ (6)

$\frac{-47}{7}$

$\rightarrow \frac{-49+2}{7}$

$\rightarrow \frac{0+2}{7}$

$\rightarrow$ (2)

Proof: $\frac{43^{122} - 5}{7}$

$\rightarrow \frac{-4}{7}$ $(7 - 4 = 3)$

$\rightarrow \frac{-7+3}{7}$

$\rightarrow \frac{0+3}{7} \rightarrow (3)$

$\rightarrow \frac{(1)^{122} - 5}{7}$

$\rightarrow \frac{1-5}{7}$

$\rightarrow \frac{(-1)^{122}}{7}$

$\rightarrow \frac{1}{7}$

$\rightarrow (1)$

$\rightarrow \frac{(41)^{122}}{7}$

$\rightarrow \frac{(6)^{122}}{7}$

$\rightarrow \frac{(7-1)^{122}}{7}$

$\rightarrow \frac{(0-1)^{122}}{7}$

$41 \times 41 \times 41 \times 41 \times \text{---} 122 \text{ बार}$

$\frac{}{7}$

$\rightarrow \frac{(6\times 6)\times(6\times 6)\times 6\times 6 - \text{---}}{7}$

$\rightarrow \frac{1\times 1\times \text{---} 61 \text{ बार}}{7}$

$\rightarrow \frac{1}{7} \rightarrow (1)$

$$\frac{(0-1)^{123}}{7}$$

$$\rightarrow \frac{(-1)^{123}}{7}$$

$$\rightarrow \frac{-1}{7} \quad (7-1 = 6)$$

$$\rightarrow \frac{-7+6}{7} \rightarrow \frac{0+6}{7} \rightarrow (6)$$

Prob $\frac{(41)^{123}}{7}$

$$\rightarrow \frac{(6)^{123}}{7}$$

$$\rightarrow \frac{(7-1)^{123}}{7}$$

$$\frac{(6\times6)\times6\times6 \text{ -- } 123\text{वार}}{7}$$

$$\rightarrow \frac{(6\times6)\times(6\times6)\text{ -- } \times6}{7}$$

$$\rightarrow \frac{1\times1\times1\text{ -- } 61\text{वार} \times6}{7}$$

$$\rightarrow \frac{6}{7} \rightarrow (6)$$

14. What will be the remainder obtained when $(9^{106} + 1)$ will be divided by 8 ?

a) 0
b) 3
c) 7
d) 2

14. $(9^{106} + 1)$ को 8 से विभाजित करने पर प्राप्त शेषफल कितना होगा ?

a) 0
b) 3
c) 7
d) 2

$$\frac{9^{106} + 1}{8}$$

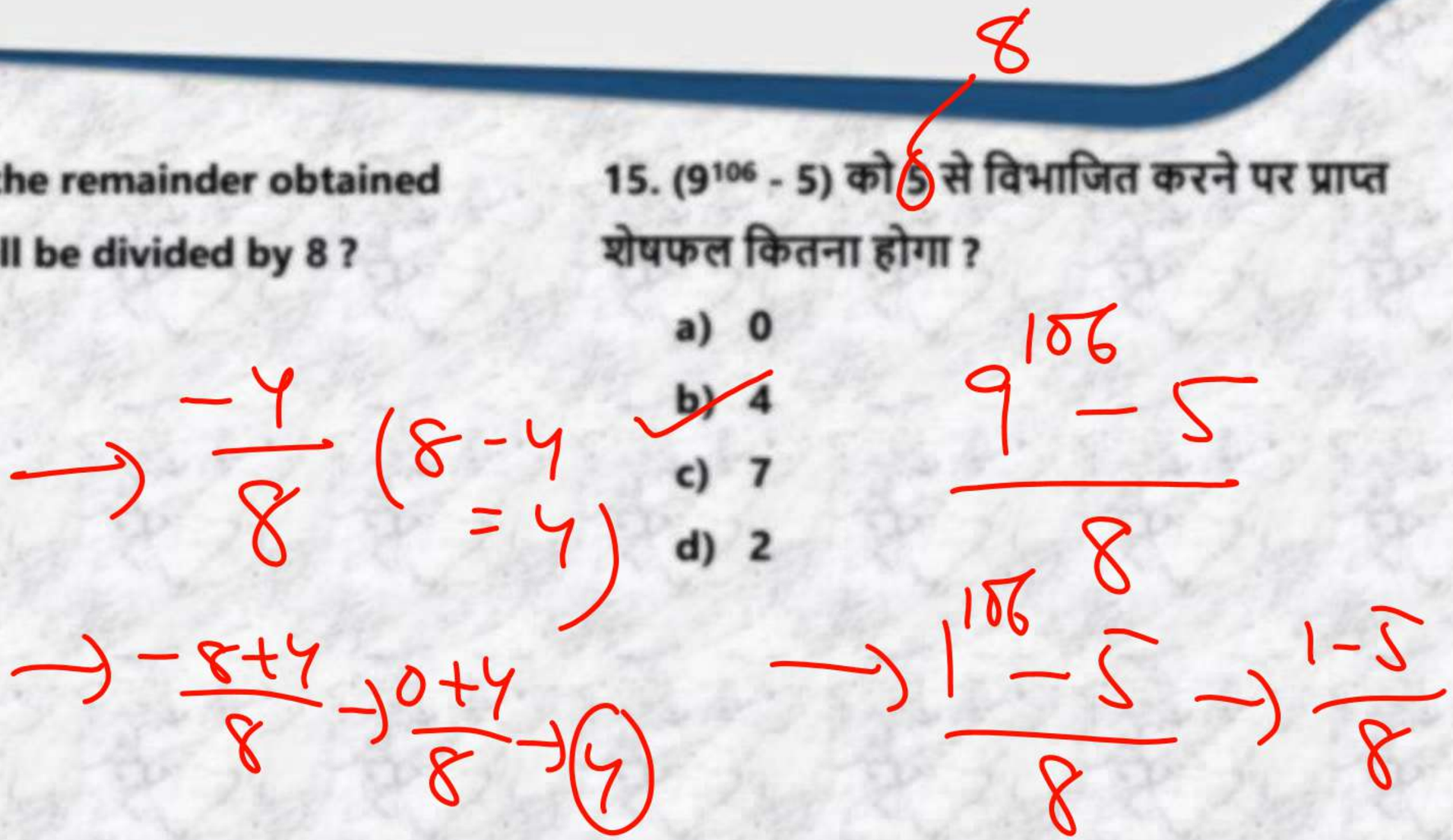
$$\rightarrow \frac{1^{106} + 1}{8} \rightarrow \frac{1+1}{8} \rightarrow 2$$

15. What will be the remainder obtained when $(9^{106} - 5)$ will be divided by 8 ?

a) 0
b) 4
c) 7
d) 2

15. $(9^{106} - 5)$ को 8 से विभाजित करने पर प्राप्त शेषफल कितना होगा ?

a) 0
b) 4
c) 7
d) 2



16. Find the remainder of 2^{1000} when divided by 3 ?

a) 1
b) 2
c) 4
d) 0

$\rightarrow \frac{(0-1)^{1000}}{3}$

$\rightarrow \frac{(-1)^{1000}}{3}$

$\rightarrow \frac{1}{3} \rightarrow (1)$

16. 2^{1000} को 3 से विभाजित करने पर प्राप्त शेषफल ज्ञात कीजिए।

a) 1
b) 2
c) 4
d) 0

$\frac{2^{1000}}{3}$

$\rightarrow \frac{(3-1)^{1000}}{3}$

$6^3 = 216$

18. What is the remainder of $6^{36} / 215$?

a) 0

b) 1

c) 2

d) None of these

$$\frac{(6^3)^{12}}{215}$$

$$\rightarrow \frac{(1)^{12}}{215} \rightarrow \frac{1}{215} \rightarrow (1)$$

18. $6^{36} / 215$ का शेषफल कितना है ?

a) 0

b) 1

c) 2

d) इनमें से कोई नहीं

$$\frac{6^{36}}{215}$$

$$3 \overline{)38} \; (12$$
$$3$$
$$8$$
$$6$$
$$2$$

$$38 = 3 \times 12 + 2$$

$$6^{38} = 6^{3 \times 12 + 2} = 6^{3 \times 12} \cdot 6^{2} = (6^{3})^{12} \cdot 6^{2}$$

$$\frac{6^{38}}{215} \longrightarrow \frac{(6^{3})^{12} \cdot 6^{2}}{215}$$

$$\frac{(1)^{12} \times 36}{215} \rightarrow \frac{36}{215} \rightarrow 36$$

- $a^m \times a^n = a^{m+n}$
- $(a^m)^n = a^{mn}$
- $\frac{a^m}{a^n} = a^{m-n}$

$$\rightarrow \frac{(44)^{102}}{7}$$

$3\overline{)102}\ (34)$

9

12

12

$\times\ \times$

$$\rightarrow \frac{(2)^{102}}{7} \rightarrow \frac{(2^3)^{34}}{7} \rightarrow \frac{(1)^{34}}{7}$$

$$\rightarrow \frac{1}{7}$$

$$\rightarrow (1)$$

$102 = 3 \times 34$

$2^{102} = 2^{3\times 34} = (2^3)^{34}$

56. What is the remainder when 91x 92 x 93 x 94 x 95 x 96 x 97 × 98 x 99 is divided by 1261 ?

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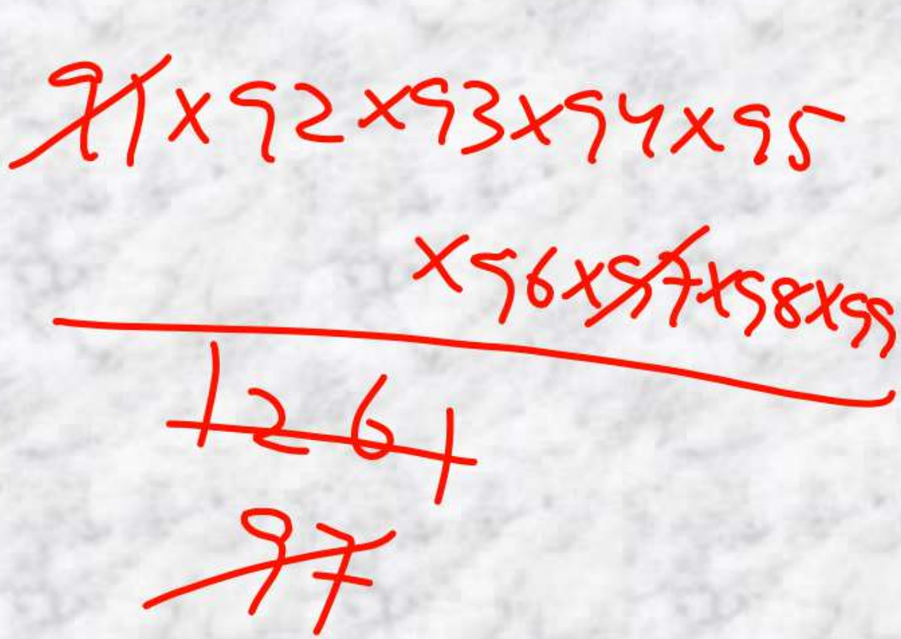
a) 3
b) 2
c) 1
d) 0

56. शेषफल क्या है जब 91x 92 x 93 x 94 x 95 x 96 x 97 × 98 x 99 को 1261 से विभाजित किया जाता है ?

a) 3
b) 2
c) 1
d) 0



60. What is the remainder when 85 × 87 × 89 × 91 × 95 × 96 is divided by 100 ?

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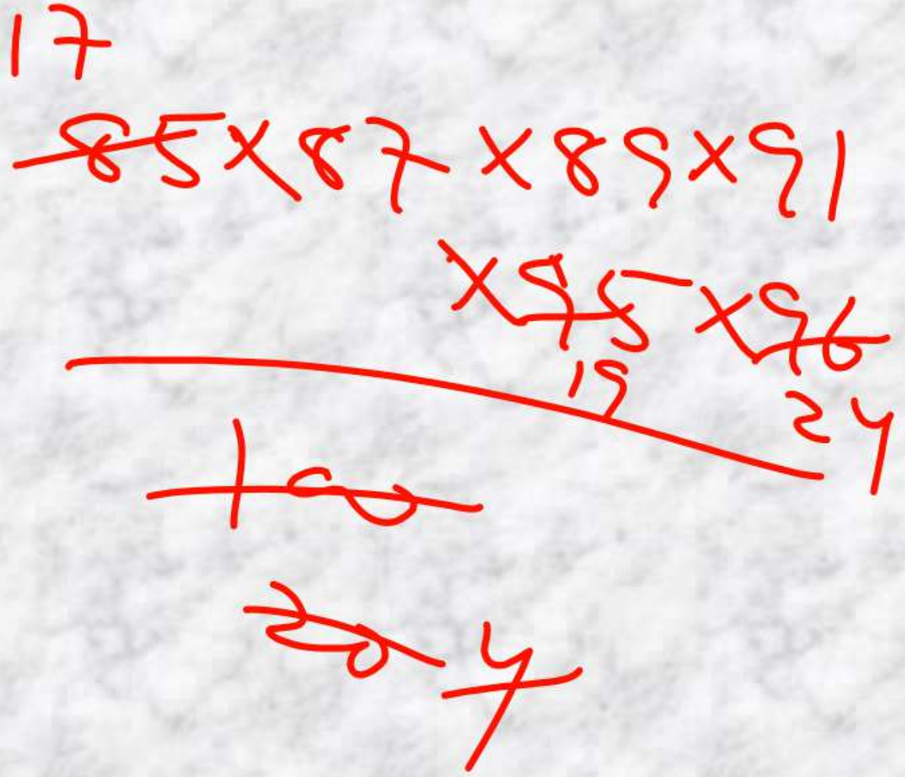
a) 0
b) 1
c) 2
d) 4

60. शेषफल कितना होगा, जब 85 × 87 × 89 × 91 × 95 × 96 को 100 से विभाजित किया जाता है ?

a) 0
b) 1
c) 2
d) 4



63
15
9 4 5

$(57242)^{9\times7\times5\times3\times1}$

61. What is the unit digit in the expansion of $(57242)^{9\times7\times5\times3\times1}$?

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a) 2
b) 4
c) 6
d) 8

61. व्यंजक $(57242)^{9\times7\times5\times3\times1}$ में इकाई अंक क्या है ?

a) 2
b) 4
c) 6
d) 8

9 (4 5)

2

→ 2^1 → (2)

$\frac{(3^3)^3 \cdot 3^1}{7} \rightarrow \frac{(28-1)^3 \times 3}{7} \rightarrow \frac{(0-1)^3 \times 3}{7} \rightarrow \frac{-3}{7} \rightarrow (4)$

10^{10}

76. If today is Sunday, then which day is it exactly on 10^{10} th day? UPSC PT 2023

a) Wednesday
b) Thursday
c) Friday
d) Saturday

$\frac{10^{10}}{7} \rightarrow \frac{(3)^{10}}{7} \rightarrow \frac{(3^2)^5}{7} \rightarrow \frac{2^5}{7} \rightarrow \frac{32}{7} \rightarrow (4)$

Sunday $+10^{10}$ =
Sunday $+4$:
Th.

76. यदि आज रविवार है, तो 10^{10} दिनों के बाद कौन-सा दिन होगा?

a) बुधवार
b) बृहस्पतिवार
c) शुक्रवार
d) शनिवार

THANK YOU!