CDS-AFCAT 1 2025

SSBCrack EXAMS

LIVE

MATHS

NUMBER SYSTEM - 1

MCQS

NAVJYOTI SIR

30 Jan 2025 Live Classes Schedule

9:00AM	30 JANUARY 2025 DAILY DEFENCE UPDATES	DIVYANSHU SIR
10:00AM	30 JANUARY 2025 DAILY CURRENT AFFAIRS	RUBY MA'AM

AFCAT 1 2025 LIVE CLASSES

12:30PM	REASONING - CODING DECODING	RUBY MA'AM
3:00PM	STATIC GK - UNIVERSE & SOLAR SYSTEMS	DIVYANSHU SIR
4:30PM	ENGLISH - ANTONYMS - CLASS 2	ANURADHA MA'AM
5:30PM	MATHS - NUMBER SYSTEM - CLASS 1	NAVJYOTI SIR

NDA 1 2025 LIVE CLASSES

10:00AM	MATHS - ANALYTICAL GEOMETRY 3D	NAVJYOTI SIR
11:30AM	MODERN HISTORY - CLASS 2	RUBY MA'AM
1:00PM	PHYSICS - WORK ENERGY POWER	NAVJYOTI SIR
4:30PM	ENGLISH - ANTONYMS - CLASS 2	ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

11:30AM	MODERN HISTORY - CLASS 2	RUBY MA'AM
1:00PM	PHYSICS - WORK ENERGY POWER	NAVJYOTI SIR
4:30PM	ENGLISH - ANTONYMS - CLASS 2	ANURADHA MA'AM
5:30PM	MATHS - NUMBER SYSTEM - CLASS 1	NAVJYOTI SIR

Q) What is the remainder after dividing the number 37^{1000} by 9?

(a) 1 (b) 3
(c) 7 (d) 9

$$37^{1000} = (9\times4+1)^{1000}$$

$$\frac{37^{1000}}{9} = \frac{(9\times4+1)^{1000}}{9} = \frac{1^{1000}}{9} = \left(\frac{1}{9}\right) = 1$$

$$9\overline{)\,1\,(\,0} \qquad -0 \qquad 1$$

1 Remainder

Q) What is the remainder after dividing the number 37^{1000} by 9?

(a) 1 (b) 3

(c) 7 (d) 9

Ans: (a)

Q) What is the remainder when $27^{27} - 15^{27}$ is divided by 6?

(a) 0 (b) 1 (c) 3 (d) 4

$\frac{a^n - b^n}{a - b}$ ⟶ remainder = 0

$27 - 15 = 12$

$27^{27} - 15^{27}$ is divisible by 12.

So, $27^{27} - 15^{27}$ is also divisible by factors of 12. ⇒ It is divisible by 6.

Q) What is the remainder when $27^{27} - 15^{27}$ is divided by 6?

(*a*) 0 (*b*) 1 (*c*) 3 (*d*) 4

Ans: (a)

Q) What is the maximum value of m, if the number $N = 90 \times 42 \times 324 \times 55$ is divisible by 3^m?

(a) 8 (b) 7

(c) 6 (d) 5

$N = 90 \times 42 \times 324 \times 55$

$90 \rightarrow 9 \times 10 \rightarrow 3^2$

$42 \rightarrow 6 \times 7 \rightarrow 3^1$

$324 \rightarrow (18)^2 \rightarrow (3^2)^2 = 3^4$

$55 \rightarrow 11 \times 5 \rightarrow 3^0$

$3^{2+1+4} = 3^7$

$\Rightarrow m = 7$

Q) What is the maximum value of m, if the number $N = 90 \times 42 \times 324 \times 55$ is divisible by 3^m?

(a) 8 (b) 7

(c) 6 (d) 5

Ans: (b)

Q) The digit in the unit's place of the number represented by $(7^{95} - 3^{58})$ is:

(a) 0 (b) 4

(c) 6 (d) 7

$7^{95} - 3^{58}$

Remainder

$95 \div 4 = 3$ $58 \div 4 = 2$

Power	7	3
$4k+1$	7	3
$4k+2$	9	1
$4k+3$	3	7
$4k+0$	1	1

$3 - 9 = -6 + 10 = 4$

Q) The digit in the unit's place of the number represented by $(7^{95} - 3^{58})$ is:

(a) 0 (b) 4

(c) 6 (d) 7

Ans: (b)

Q) The sum of $5^2 + 6^2 + 7^2 + \ldots + 15^2$ is

(a) 1110 (b) 1120

(c) 1310 (d) 1210

$$1^2+2^2+3^2+\ldots n^2 = \frac{n(n+1)(2n+1)}{6}$$

$$(1^2+2^2+3^2+\ldots 15^2) - (1^2+2^2+3^2+4^2)$$

$$\frac{15(15+1)(2\times15+1)}{6} - \frac{4(4+1)(2\times4+1)}{6}$$

$$= \frac{\overset{5}{\cancel{15}}\times16\times31}{\cancel{6}_2} - \frac{4\times5\times\overset{3}{\cancel{9}}}{\cancel{6}_2} = \frac{(80\times31)-60}{2} = \frac{2480-60}{2} = \frac{2420}{2}$$

$$= 1210$$

Q) The sum of $5^2 + 6^2 + 7^2 + \ldots + 15^2$ is

(a) 1110 (b) 1120

(c) 1310 (d) 1210

Ans: (d)

Q) If x 959 y is divisible by 44 and y >5, then what are values of the digit x and y ?

(a) x = 7, y = 6 ✓ (b) x = 4, y = 8

(c) x = 6, y = 7 (d) None of these

x 9 5 9 y

44 = 11 × 4

96 —

79596

7 + 5 + 6 = 18

9 + 9 = 18) difference = 0

(a) x = 7 ; y = 6

Q) If x 959 y is divisible by 44 and y >5, then what are values of the digit x and y ?

(a) $x=7, y=6$ (b) $x=4, y=8$

(c) $x=6, y=7$ (d) None of these

Ans: (a)

Q) The number of prime factors in the expression $(6)^{10} \times (7)^{17} \times (11)^{27}$ is:

(a) 54 (b) 64 (c) 71 (d) 81

$2^{10} \times 3^{10} \times 7^{17} \times 11^{27}$

no. of prime factorisation $= 10 + 10 + 17 + 27$

$= 20 + 44$

$= 64$

Q) The number of prime factors in the expression $(6)^{10} \times (7)^{17} \times (11)^{27}$ is:

(a) 54 (b) 64 (c) 71 (d) 81

Ans: (b)

Q) The seven digit number 876p37q is divisible by 225. The values of p and q can be respectively

(a) 9, 0 (b) 0, 0

(c) 0, 5 (d) 9, 5

$225 = 25 \times 9$

8 7 6 p 3 7 q — $q = 5$

$\begin{cases} 0, 5 & \checkmark \\ 9, 5 & \checkmark \end{cases}$

$q = 5$

$31 + p + 5 = 36 + p$

$p = 0$ and $p = 9$

Q) The seven digit number 876p37q is divisible by 225. The values of p and q can be respectively

(a) 9, 0 (b) 0, 0

(c) 0, 5 (d) 9, 5

Ans: (c) and (d)

Q) The sum of three fractions is $2\frac{11}{24}$. When the largest fraction is divided by the smallest, the fraction thus obtained is $\frac{7}{6}$ which is $\frac{1}{3}$ more than the middle one. The fractions are:

(a) $\frac{3}{5}, \frac{4}{7}, \frac{2}{3}$ (b) $\frac{7}{8}, \frac{5}{6}, \frac{3}{4}$

(c) $\frac{7}{9}, \frac{2}{3}, \frac{3}{5}$ (d) None of these

$2\frac{11}{24} = \frac{59}{24}$

(a) $\frac{63+60+70}{105} = \frac{193}{105} = 1$

(b) $\frac{42+40+36}{48} = \frac{118}{48} = \frac{59}{24}$ ✓

(c) $\frac{35+30+27}{45} = \frac{94}{45}$

$\frac{\frac{42}{48}}{\frac{36}{48}} = \frac{42}{36} = \frac{7}{6}$

$\frac{7}{6} \xrightarrow{+2/6} \frac{5}{6} \xrightarrow{} \frac{1}{3}$

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(a) $\frac{3}{5}, \frac{4}{7}, \frac{2}{3}$

(b) $\frac{7}{8}, \frac{5}{6}, \frac{3}{4}$

(c) $\frac{7}{9}, \frac{2}{3}, \frac{3}{5}$

(d) None of these

Ans: (b)

Q) If the sum of two numbers is 55 and the H.C.F. and L.C.M. of these numbers are 5 and 120 respectively, then the sum of the reciprocals of the numbers is equal to:

(a) $\frac{55}{601}$ (b) $\frac{601}{55}$ (c) $\frac{11}{120}$ (d) $\frac{120}{11}$

$a + b = 55$

$a \times b = LCM(a,b) \times HCF(a,b)$

$a \times b = 120 \times 5 = 600$

$\frac{1}{a} + \frac{1}{b}$

$\frac{a+b}{ab} = \frac{55}{600}$

$= \left(\frac{11}{120}\right)$

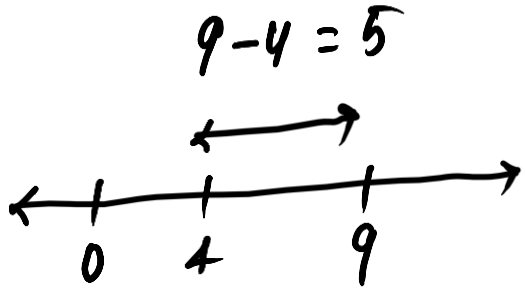
Q) If the sum of two numbers is 55 and the H.C.F. and L.C.M. of these numbers are 5 and 120 respectively, then the sum of the reciprocals of the numbers is equal to:

(a) $\frac{55}{601}$ (b) $\frac{601}{55}$ (c) $\frac{11}{120}$ (d) $\frac{120}{11}$

Ans: (c)

Q) If the points P and Q represent real numbers $0.7\overline{3}$ and $0.5\overline{6}$ on the number line, then what is the distance between P and Q?

(a) $\frac{1}{6}$ (b) $\frac{1}{5}$ (c) $\frac{16}{45}$ (d) $\frac{11}{90}$



distance = difference

$$0.7\overline{3} = \frac{73-7}{90} = \frac{66}{90}$$

$$0.5\overline{6} = \frac{56-5}{90} = \frac{51}{90}$$

$$\frac{66}{90} - \frac{51}{90} = \frac{15}{90} = \frac{1}{6}$$

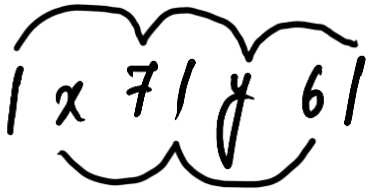
Q) If the points P and Q represent real numbers $0.7\overline{3}$ and $0.5\overline{6}$ on the number line, then what is the distance between P and Q?

(a) $\frac{1}{6}$ (b) $\frac{1}{5}$ (c) $\frac{16}{45}$ (d) $\frac{11}{90}$

Ans: (a)

Q) Minimum difference between x and y such that 1x 71y 61 is exactly divisible by 11 is

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



$1+7+y+1 = 9+y$

$x+1+6 = x+7$

$y-x+2 = 0$

$x-y = 2$

$y-x+2 = 11$

$y-x = 9$

Q) Minimum difference between x and y such that 1x 71y 61 is exactly divisible by 11 is

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

Ans: (a)

Q) The value of

$$\frac{1}{\sqrt{7}-\sqrt{6}}-\frac{1}{\sqrt{6}-\sqrt{5}}+\frac{1}{\sqrt{5}-2}-\frac{1}{\sqrt{8}-\sqrt{7}}+\frac{1}{3-\sqrt{8}} \text{ is}$$

(a) 0 (b) 1 (c) 5 (d) 7

$$\frac{1}{\sqrt{7}-\sqrt{6}}-\frac{1}{\sqrt{6}-\sqrt{5}}+\frac{1}{\sqrt{5}-\sqrt{4}}-\frac{1}{\sqrt{8}-\sqrt{7}}+\frac{1}{\sqrt{9}-\sqrt{8}}$$

$$= \sqrt{7}+\sqrt{6}-(\sqrt{6}+\sqrt{5})+(\sqrt{5}+\sqrt{4})-(\sqrt{8}+\sqrt{7})+(\sqrt{9}+\sqrt{8})$$

$$= \sqrt{4}+\sqrt{9} = 2+3 = \boxed{5}$$

$$\frac{1}{\sqrt{7}-\sqrt{6}} \times \frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}+\sqrt{6}} = \sqrt{7}+\sqrt{6}$$

difference = 1

Q) The value of

$$\frac{1}{\sqrt{7}-\sqrt{6}}-\frac{1}{\sqrt{6}-\sqrt{5}}+\frac{1}{\sqrt{5}-2}-\frac{1}{\sqrt{8}-\sqrt{7}}+\frac{1}{3-\sqrt{8}} \text{ is}$$

(a) 0 (b) 1 (c) 5 (d) 7

Ans: (c)

Q) If the number 413283P759387 is divisible by 13, then what is the value of P?

(a) 3 (b) 6 (c) 7 (d) 8

Q) If the number 413283P759387 is divisible by 13, then what is the value of P?

(a) 3 (b) 6 (c) 7 (d) 8

Ans: (d)

Q) What is the unit digit in the expansion of 67^{32}?

(a) 1 (b) 3 (c) 7 (d) 9

Q) What is the unit digit in the expansion of 67^{32}?

(a) 1 (b) 3 (c) 7 (d) 9

Ans: (a)

Q) One pendulum ticks 57 times in 58 seconds and another 608 times in 609 seconds. If they started simultaneously, find the time after which they will tick together.

(a) $\frac{211}{19}$ s

(b) $\frac{1217}{19}$ s

(c) $\frac{1218}{19}$ s

(d) $\frac{1018}{19}$ s

Q) One pendulum ticks 57 times in 58 seconds and another 608 times in 609 seconds. If they started simultaneously, find the time after which they will tick together.

(a) $\frac{211}{19}$ s

(b) $\frac{1217}{19}$ s

(c) $\frac{1218}{19}$ s

(d) $\frac{1018}{19}$ s

Ans: (c)

Q) The sum of first 47 terms of the series

$$\frac{1}{4}+\frac{1}{5}-\frac{1}{6}-\frac{1}{4}-\frac{1}{5}+\frac{1}{6}+\frac{1}{4}+\frac{1}{5}-\frac{1}{6}\ldots\ldots \text{ is}$$

(a) 0

(b) $-\frac{1}{6}$

(c) $\frac{1}{6}$

(d) $\frac{9}{20}$

Q) The sum of first 47 terms of the series

$$\frac{1}{4}+\frac{1}{5}-\frac{1}{6}-\frac{1}{4}-\frac{1}{5}+\frac{1}{6}+\frac{1}{4}+\frac{1}{5}-\frac{1}{6}\ldots\ldots \text{ is}$$

(a) 0

(b) $-\frac{1}{6}$

(c) $\frac{1}{6}$

(d) $\frac{9}{20}$

Ans: (b)

Q) If 10^n divides $6^{23} \times 75^9 \times 105^2$, then what is the largest value of n?

(a) 20 (b) 22 (c) 23 (d) 28

Q) If 10^n divides $6^{23} \times 75^9 \times 105^2$, then what is the largest value of n?

(a) 20 (b) 22 (c) 23 (d) 28

Ans: (a)

Q) What is the remainder when $(17^{23} + 23^{23} + 29^{23})$ is divided by 23 ?

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

Q) What is the remainder when $(17^{23} + 23^{23} + 29^{23})$ is divided by 23 ?

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

Ans: (a)

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