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CSAT - 2025

NUMBER SYSTEM

QUESTIONS

CSAT PROGRAMS

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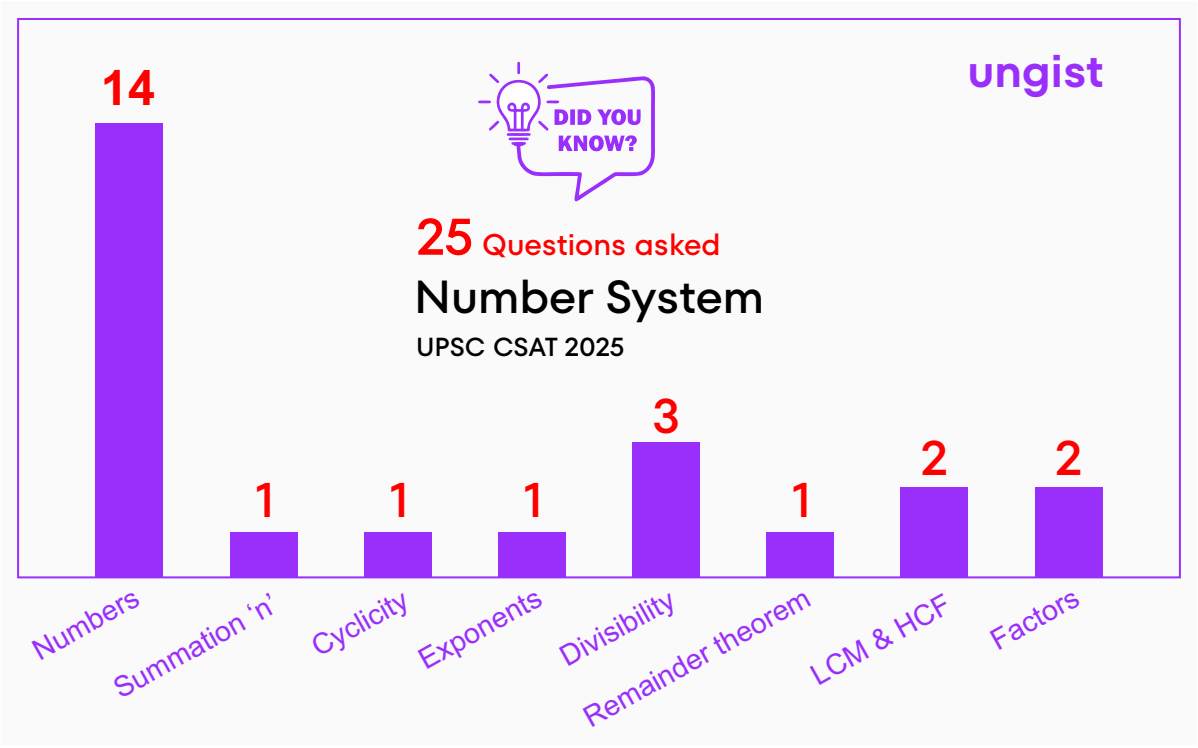
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DID YOU KNOW?
25 Questions asked
Number System
UPSC CSAT 2025
14
1
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Numbers
Summation 'n'
Cyclicity
Exponents
Divisibility
Remainder theorem
LCM & HCF
Factors

Previous Year Questions

Numbers

1. A natural number N is such that it can be expressed as $N = p + q + r$, where p, q and r are distinct factors of N. How many numbers below 50 have this property ?
   (a) 6 (b) 7
   (c) 8 (d) 9

2. Three prime numbers p, q and r, each less than 20, are such that $p - q = q - r$. How many distinct possible values can we get for $(p + q + r)$?
   (a) 4
   (b) 5
   (c) 6
   (d) More than 6

3. How many possible values of $(p + q + r)$ are there satisfying $\frac{1}{p}+\frac{1}{q}+\frac{1}{r}=1$, where p, q and r are natural numbers (not necessarily distinct) ?
   (a) None
   (b) One
   (c) Three
   (d) More than three

4. If $4 \le x \le 8$ and $2 \le y \le 7$, then what is the ratio of maximum value of $(x+y)$ to minimum value of $(x - y)$?
   (a) 6
   (b) $\frac{15}{2}$
   (c) $-\frac{15}{2}$
   (d) None of the above

5. Let both p and k be prime numbers such that $(p^2 + k)$ is also a prime number less than 30. What is the number of possible values of k ?
   (a) 4 (b) 5
   (c) 6 (d) 7

6. Let PQR be a 3-digit number, PPT be a 3-digit number and PS be a 2-digit number, where P, Q, R, S, T are distinct non-zero digits. Further, $PQR - PS = PPT$. If $Q = 3$ and $T < 6$, then what is the number of possible values of (R, S) ?
   (a) 2 (b) 3
   (c) 4 (d) More than 4

7. If $N^2 = 12345678987654321$, then how many digits does the number N have ?
   (a) 8
   (b) 9
   (c) 10
   (d) 11

8. Let $P = QQQ$ be a 3-digit number. What is the HCF of P and 481 ?
   (a) 1
   (b) 13
   (c) 37
   (d) 481

9. The 5-digit number PQRST (all distinct digits) is such that T ≠ 0. P is thrice T. S is greater than Q by 4, while Q is greater than R by 3. How many such 5-digit numbers are possible ?
   (a) 3
   (b) 4
   (c) 5
   (d) 6

10. A question is given followed by two Statements 1 and 2. Consider the Question and the Statements and mark the correct option.

Question: Let P, Q, R, S be distinct non-zero digits. If $PP \times PQ = RRSS$, where $P \leq 3$ and $Q \leq 4$, then what is Q equal to ?

Statement-1: $R = 1$.

Statement-2: $S = 2$.

Which one of the following is correct in respect of the above Question and the Statements ?

(a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other Statement alone.

(b) The Question can be answered by using either Statement alone.

(c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.

(d) The Question can be answered even without using any of the Statements.

11. A question is given followed by two Statements 1 and 2. Consider the Question and the Statements and mark the correct option.

Question: Is $(p + q)^2 - 4pq$, where p, q are natural numbers, positive ?

Statement-1: $p < q$.

Statement-2: $p > q$.

Which one of the following is correct in respect of the above Question and the Statements ?

(a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other Statement alone.

(b) The Question can be answered by using either Statement alone.

(c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.

(d) The Question can be answered even without using any of the Statements.

12. Let $p + q = 10$, where p, q are integers.

Value-I = Maximum value of $p \times q$ when p, q are positive integers.

Value-II = Maximum value of $p \times q$ when $p \geq -6$, $q \geq -4$.

Which one of the following is correct ?

(a) Value-I < Value-II.

(b) Value-II < Value-I.

(c) Value-I = Value-II.

(d) Cannot be determined due to insufficient data.

13. Consider a set of 11 numbers:

Value-I = Minimum value of the average of the numbers of the set when they are consecutive integers ≥ -5.

Value-II = Minimum value of the product of the numbers of the set when they are consecutive non-negative integers.

Which one of the following is correct ?

(a) Value-I < Value-II.

(b) Value-II < Value-I.

(c) Value-I = Value-II.

(d) Cannot be determined due to insufficient data.

14. Let x be a real number between 0 and 1. Which of the following statements is/are correct ?

I. $x^2 > x^3$.

II. $x > \sqrt{x}$.

Select the correct answer using the code given below:

(a) I only

(b) II only

(c) Both I and II

(d) Neither I nor II

Summation 'n' (Digit counting)

15. What is the 489^{th} digit in the number 123456789101112 ... ?
(a) 0 (b) 3
(c) 6 (d) 9

Cyclicity (unit digit)

16. What is the unit digit in the multiplication of $1 \times 3 \times 5 \times 7 \times 9 \times \ldots \times 999$?
(a) 1 (b) 3
(c) 5 (d) 9

Exponents

17. What is the maximum value of n such that $7 \times 343 \times 385 \times 1000 \times 2401 \times 77777$ is divisible by 35^n ?
(a) 3 (b) 4
(c) 5 (d) 7

Divisibility

18. Consider the first 100 natural numbers. How many of them are *not* divisible by any one of 2, 3, 5, 7 and 9 ?
(a) 20 (b) 21
(c) 22 (d) 23

19. What is the remainder when $9^3 + 9^4 + 9^5 + 9^6 + \ldots + 9^{100}$ is divided by 6 ?
(a) 0 (b) 1
(c) 2 (d) 3

20. The difference between any two natural numbers is 10. What can be said about the natural numbers which are divisible by 5 and lie between these two numbers ?
(a) There is only one such number.
(b) There are only two such numbers.
(c) There can be more than one such number.
(d) No such number exists.

Remainder theorem

21. If n is a natural number, then what is the number of distinct remainders of $(1^n + 2^n)$ when divided by 4 ?
(a) 0 (b) 1
(c) 2 (d) 3

LCM and HCF

22. A 4-digit number N is such that when divided by 3, 5, 6, 9 leaves a remainder 1, 3, 4, 7 respectively. What is the smallest value of N?
(a) 1068
(b) 1072
(c) 1078
(d) 1082

23. There are n sets of numbers each having only three positive integers with LCM equal to 1001 and HCF equal to 1. What is the value of n ?
(a) 6
(b) 7
(c) 8
(d) More than 8

Factors

24. Consider the following statements :
I. There exists a natural number which when increased by 50% can have its number of factors unchanged.
II. There exists a natural number which when increased by 150% can have its number of factors unchanged.
Which of the statements given above is/are correct ?
(a) I only
(b) II only
(c) Both I and II
(d) Neither I nor II

25. A question is given followed by two Statements 1 and 2. Consider the Question and the Statements and mark the correct option.

Question: What is the smallest 1-digit number having exactly 4 distinct factors ?

Statement-1: 2 is one of the factors.

Statement-2: 3 is one of the factors.

Which one of the following is correct in respect of the above Question and the Statements ?

(a) The Question can be answered by using one of the Statements alone, but cannot be answered using the other Statement alone.

(b) The Question can be answered by using either Statement alone.

(c) The Question can be answered by using both the Statements together, but cannot be answered using either Statement alone.

(d) The Question can be answered even without using any of the Statements.

ANSWER KEY

1. (c)	6. (b)	11. (b)	16. (c)	21. (c)
2. (a)	7. (b)	12. (c)	17. (b)	22. (c)
3. (c)	8. (c)	13. (c)	18. (c)	23. (d)
4. (d)	9. (b)	14. (a)	19. (a)	24. (c)
5. (b)	10. (d)	15. (d)	20. (c)	25. (d)

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