

## Exercise - (Number System)

### SET-1

#### CONTENT AS PER CAT LEVEL

1. What is the least perfect square divisible by 8, 9 and 10?  
A] 4000                      B] 6400                      C] 3600                      D] 14641
2.  $4a56$  is a four-digit numeral divisible by 33. What is the value of  $a$ ?  
A] 3                      B] 4                      C] 5                      D] 6
3. The sum of five distinct whole numbers is 337. If 60 is the smallest of them, what is the maximum value the largest number can have?  
A] 91                      B] 70                      C] 97                      D] 274
4. Let  $X = 4851 * 689 * 5481$ , what is the remainder when  $X$  is divided by 13?  
A] 2                      B] 0                      C] 1                      D] 4
5. Find the remainder when  $64(1295)^{592}$  is divided by 13.  
A] 11                      B] 0                      C] 12                      D] 1
6. If  $a$ ,  $b$  and  $c$  are positive integers such that  $a^{b-c} * b^{c-a} * c^{a-b} = 1$ , then how many sets of solutions are possible for  $a$ ,  $b$  and  $c$ ?  
A] 1                      B] 2                      C] infinite                      D] only integer values
7. For how many values of  $n$  are  $n - 8$ ,  $n$ ,  $n + 12$  all prime numbers between 1 and 70?  
A] 3                      B] 4                      C] 6                      D] none of these
8. The product of HCF and LCM of two distinct natural numbers is equal to 23. In another set of two numbers HCF = LCM. However, none of the second set of numbers is the square or cube of any natural number. Which among the following is the sum of the product of numbers in the first set and the sum of the two numbers in the second set?  
A] 31                      B] 29                      C] 25                      D] 39
9. Given that  $x$  is any even number greater than 2,  $x^{17} - x$  is a multiple of  
A] 11                      B] 13                      C] 60                      D] None of these
10. X and Y are consecutive positive integers. Find the value of Z.  
$$\begin{array}{r} X \ X \ Y \ X \\ + \ X \ Y \ Y \ Y \\ \hline Y \ Z \ P \ Z \\ \hline \end{array}$$
11. Which one of the following is 7<sup>th</sup> digit from the left in  $(203)^3$ ?  
A] 3                      B] 9                      C] 7                      D] None of these

12. Which one of the following statements is true?  
 A]  $5^{400} > 4^{500}$       B]  $5^{400} < 4^{500}$       C]  $5^{400} = 4^{500}$       D] Can't say
13. The positive number X69955385Y is divisible by 88, where X and Y are single digit numbers. What are the values of X and Y respectively?  
 A] 1, 6      B] 6, 1      C] 3, 5      D] 5, 3
14. A Physical Trainer wants to arrange his students in different rows with equal number of students in each row. The number of students in a row is equal to the total number of rows. The number of students is 2436. How many more students are needed so that not a single student would be left outside this arrangement?  
 A] 0      B] 35      C] 64      D] None of these
15. Find the smallest value of  $n$  for which  $352^n$  and  $353^n$ , when divided by 9, leave the same remainder.  
 A] 3      B] 5      C] 6      D] None of these
16. Find the remainder when  $9^{271}$  is divided by 7.  
 A] 1      B] 2      C] 3      D] 6
17. Find the value of  $a$  and  $b$  when  $\frac{3}{4 + \sqrt{7}} = a + b\sqrt{7}$ .  
 A] 4, 3      B] 4, -3      C]  $\frac{4}{3}, \frac{1}{3}$       D]  $\frac{4}{3}, -\frac{1}{3}$
18. In an examination, a student was asked to find  $\frac{8}{15}$  of a given number. By mistake, he found  $\frac{5}{17}$  of the number, which is 26 less than the correct answer. Find the given number.  
 A] 108      B]  $106\frac{32}{61}$       C]  $108\frac{42}{61}$       D] None of these
19.  $17^n - 1$  is  
 A] always divisible by 8      B] always divisible by 18  
 C] is never divisible by 17      D] Both [A] and [C] are true
20. Let  $x = 1 * 1! + 2 * 2! + 3 * 3! + 4 * 4! + \dots + n * n!$ . Find the remainder when  $x + 3$  is divided by  $(n + 1)!$   
 A] 1      B]  $n + 1$       C] 2      D]  $n + 2$

## Exercise - (Number System)

### SET -2

#### CONTENT AS PER CAT LEVEL

1) Which of the following is /are true?

1.  $\pi$  is an irrational number.

2.  $22/7$  is an irrational number.

3. 0 is an irrational number.

a) only 1      b) only 2      c) both 1 and 2      d) both 1 and 3      e) neither 1 nor 2 nor 3

2) In T. Nagar the building were numbered from 1 to 100. Then how many 4's will be present in the numbers

(a) 18      (b) 19      (c) 20      (d) 21

3) Which of the following is largest ?

(a)  $(5^2)^3$       (b)  $5^{2^3}$       (c)  $5^5$       (d)  $5^{3^2}$

4) The Positive square root of  $31 + 4\sqrt{57}$  ?

(a)  $19 + 4\sqrt{3}$       (b)  $\sqrt{19} + 2\sqrt{3}$       (c)  $17 + \sqrt{14}$       (d)  $\sqrt{17} + 3\sqrt{14}$

5)  $999\frac{1}{7} + 999\frac{2}{7} + 999\frac{3}{7} + \dots + 999\frac{6}{7}$

(a) 5994      (b) 5997      (c) 2997      (d) 2994

6) P is a Prime number greater than 5. What is the remainder when P is divided by 6.?

1) 5      2) 1      3) 1 or 5.      4) 4      5) 3.

7)  $(11011)_2 + (10110)_2 = ?$

a) 27      b)  $(110001)_2$       c)  $(101101)_2$       d) Both a and b      e) None of these

8) The greatest of  $\sqrt{2}, \sqrt[3]{4}, \sqrt[4]{5}, \sqrt[5]{3}$  is :

(a)  $\sqrt{2}$       (b)  $\sqrt[3]{4}$       (c)  $\sqrt[4]{5}$       (d)  $\sqrt[5]{3}$

9) Which one among the following is greatest?

$\sqrt{7} + \sqrt{3}, \sqrt{6} + 2, \sqrt{5} + \sqrt{5}, \sqrt{2} + \sqrt{8}$

(a)  $\sqrt{7} + \sqrt{3}$       (b)  $\sqrt{6} + 2$       (c)  $\sqrt{5} + \sqrt{5}$       (d)  $\sqrt{2} + \sqrt{8}$

10) If  $n^3$  is odd, then which of the following must be true ?

(i) n is odd

(ii)  $n \times n$  is odd

(III)  $n \times n$  is even

- (a) (I) & (II)    (b) (I) & (III)    (c) (II) & (III)    (d) (I),(II) & (III)

11) If  $x = -0.5$ , then which of the following has the smallest value?

- (a)  $2^{1/x}$     (b)  $1/x$     (c)  $1/x^2$     (d)  $2^x$

12). Find the HCF and LCM of 1024, 432, 648?

- a)  $2^{10}, 2^{10} \times 3^3$     b)  $2^3, 2^{10} \times 3^4$     c) 4, 1024    d) 8, 27

13). Find the LCM and HCF of  $10^{-83}, 10^{-82}, 10^{-192}, 10^{-3}, 10^{-37}$ .

- a)  $10^{-3}, 10^{-192}$     b)  $10^{-83}, 10^{-82}$ ,    c)  $10^{-82}, 10^{-192}$ ,    d)  $10^{-3}, 10^{-37}$

14) Which of the following numbers is exactly divisible by 99?

- a) 3572403    b) 135732    c) 913464    d) 803358    e) 114345

15) If X, Y, Z are odd positive integers, then which of the following is not necessarily true.

1)  $x^2 Y^2 Z^2$  is odd.    2)  $3(X^3 + Y^3)Z^2$  is even    3)  $5X + Y + Z^4$  is odd.    4)  $Z^2(X^4 + Y^2)/2$  is even.    5) None of these.

16) Convert 2.52145145145..... into a fraction.

- a) 25398/9990    b) 25893/9900    c) 25139/9900    d) 251873/99900    e) 251839/99900.

17) A number when divided by a divisor leaves a remainder of 24. When twice the original number is divided by the same divisor, the remainder is 11. What is the value of the divisor?

- a) 13    b) 59    c) 35    d) 37

18) 1) If A is a number, which of the following must be true for any A?

A.  $A > 1/A$

B.  $A^2 > A$

C.  $(A - 1)^2 = A^2 - 2A + 1$

D.  $\sqrt{A^2} = A$

E.  $\frac{5A^2}{A}$  is an integer

19) The product of four consecutive odd natural numbers added to 16 is always :

- a) a prime number    b) a perfect square    c) a cube    d) None of these

20) How many numbers from 287 to 803 will contain 2 as one of its digit?

- (a) 108    (b) 107    (c) 109    (d) None of these

21) If  $p$  and  $q$  are two different odd prime numbers, such that  $p < q$ , then which of the following must be true?

- A.  $(2p + q)$  is a prime number
- B.  $p + q$  is divisible by 4
- C.  $q - p$  is divisible by 4
- D.  $(p + q + 1)$  is the difference between two perfect squares of integers
- E.  $p^2 + q^2$  is the difference between two perfect squares of integers

22) A number  $N$  when divided by 23 leaves remainder 17. what is the remainder when  $5N^2 + 10$  is divided by 23.?

- a) 0                      b) 21                      c) 22                      d) none

23) Arrange the following in the ascending order.  $12^{1/3}, 16^{1/4}, 18^{1/5}, 20^{1/6}$ ,

- a)  $12^{1/3}, 16^{1/4}, 18^{1/5}, 20^{1/6}$     b)  $18^{1/5}, 12^{1/3}, 16^{1/4}, 20^{1/6}$     c)  $20^{1/6}, 12^{1/3}, 16^{1/4}, 18^{1/5}$     d)  $12^{1/3}, 16^{1/4}, 20^{1/6}, 18^{1/5}$   
e) none

24) what is the square root of :  $11 - \sqrt{96}$

- a)  $\sqrt{8} - \sqrt{3}$                       b)  $\sqrt{8} + \sqrt{3}$                       c)  $\sqrt{6} - \sqrt{2}$                       d)  $\sqrt{8} - \sqrt{2}$                       e) none

25)  $(51 + 52 + 53 + 54 + \dots + 100) = ?$

- (a) 1275                      (b) 5050                      (c) 3775                      (d) 5000

26) How many numbers are there from 1 to 500 in which the digit '4' comes at any place ?

- (a) 180                      (b) 176                      (c) 100                      (d) None of these

27) Shaurya writes first hundred whole numbers. Let, 'A' and 'B' be the number of times he writes '0' and '9' respectively. Find the value of  $A+B$ .

- 1) 31                      2) 30                      3) 34                      4) 32                      5) 33.

28)  $1421 \times 1423 \times 1425$  is divided by 12. What is the remainder?

- a) 3                      b) 5                      c) 0                      d) 7

29) Convert the binary number 1011010 to hexadecimal?

- a) 5B                      b) 5F                      c) 5A                      d) 5C                      e) None of these

30) What is the decimal value of the hexadecimal number 777?

- a) 191                      b) 1911                      c) 19                      d) 19111                      e) None of these

## Exercise –(Number System)

### SET -3

- 1) Lcm of two numbers is 72.how many such pair of numbers are possible?  
a) 18      b) 17      c) 12      d) 15
- 2) A number N when divided by 7 leaves remainder 3 ,when divided by 5 leaves remainder 2.what is the maximum such three digit number possible?  
a) 997      b) 983      c) 999      d) none
- 3) A number N has 8 factors .how many factors  $N^2$  will have?  
a) 15      b) 21      c) 27      d ) all three are possible
- 4) How many numbers are their which are less than n and are co prime to n where  $n=2^4 \times 3^3 \times 5^2$  ?  
a) 2800      b) 2880      c) 2420      d) 2330
- 5) How many zeroes will be there at the end of  $12!$  expressed in base 6?  
a) 8      b) 6      c) 5      d) 10
- 6) Find out the H.c.f of  $(2^{100} - 1)$  and  $(2^{120} - 1)$  ?  
a)  $2^{20} + 1$       b)  $2^{40} - 1$       c)  $2^{20} - 1$       d)  $2^{10} - 1$ .
- 7) What is the remainder when  $15!$  is divided by  $10^4$ ?  
a)  $8 \times 10^3$       b)  $1 \times 10^3$       c) 8      d)  $6 \times 10^3$
- 8) What is the remainder when  $2^{2004}$  is divided by 2004?  
a) 844      b) 211      c) 2002      d) 712
- 9) Decimal value of  $100!$  is written down and converted into some other base V,so that the number of zeroes is same as in the original number.what is the maximum value of V?  
a) 81      b) 720      c) 24      d) 1440
- 10) What is the remainder when  $(81^{21} + 27^{21} + 9^{21} + 3^{21} + 1)$  is divided by  $3^{20} + 1$ ?  
a) 60      b)  $3^{10} + 1$       c)  $3^{20}$       d)  $3^{20} - 1$
- 11) What is the remainder when  $(n^{13} - n)$  is divided by 78?  
a) 26      b) 0      c) 3      d) can't be determined
- 12) What is the remainder when (444444..... 100 times ) is divided by 7?  
a) 0      b) 5      c) 4      d) 6
- 13) A decimal number N when converted into base 5 ends with 1,when converted into 7 ends with 1.what is the max three digit number N possible?  
a) 981      b) 999      c) 971      d) none of these.

- 14) A two digit decimal number N in base 5 when converted into base 9 the digit gets reversed.how many such two digit number exists?  
a) 2              b) 3              c) 4              d) 5
- 15) If  $x = (16^3 + 17^3 + 18^3 + 19^3)$ , then x divided by 70 leaves remainder of:  
a) 1              b) 32              c) 0              d) 7
- 16) Let  $n! = 1 \times 2 \times 3 \times \dots \times n$  for n greater or equal to 1. if  $p = 1! + 2 \times 2! + 3 \times 3! + \dots + 10 \times 10!$ , then p+2 when divided by 11! Leaves remainder of:  
a) 2              b) 1              c) 0              d) 11
- 17) Sum of 20 distinct numbers is 801. What is the minimum lcm of those 20 numbers possible?  
a) 360              b) 800              c) 801
- 18) Sum of two natural number a and b is 949.lcm of those two numbers is 2628.what is the hcf of a and b?  
a) 36              b) 9              c) 73              d) 147
- 19)  $(20^{2004} + 16^{2004} - 3^{2004} - 1)$  is divisible by:  
a) 323              b) 19              c) 133              d) 238
- 20)  $10000! = (100!)^k \times p$ . where p and k are integers . What can be the maximum value of k?  
1. 101              b) 102              c) 103              d) 104