CHAPTER

01

NUMBER AND NUMERIC SYSTEM

Number

In Hindu Arabic system, there are ten digits (i.e. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9). A number is formed by considering these digit as a group, which is called as numeral.

Systems

A numeric system is a set of characters and mathematical rules that are used to represent a number.

1. Indian system, **2.** International system

Indian/Hindu Arabic System

Periods	Crores		Lakhs		Thousands		Ones		
Values	Ten Crore 10,00,00,000	Crore 1,00,00,000	Ten Lakh 10,00,000	Lakh 1,00,000	Ten Thousand 10,000	Thousand 1,000	Hundred 100	Ten 10	One 1
Numeral	4	3	2	5	2	3	7	1	6

According to the Indian system, the above numeral is written as 43, 25, 23, 716. It is read as forty three crore twenty five lakh twenty three thousand seven hundred sixteen.

International System

Periods	Millions			Thousands			Ones		
Values	Hundred Million 100,000,000	Ten Million 10,000,000	Million 1,000,000	Hundred Thousand 100,000	Ten Thousand 10,000	Thousand 1,000	Hundred 100	Ten 10	One 1
Numeral	4	3	2	5	2	3	7	1	6

It is most commonly used system in the world. In this system above numeral is written as
432, 523, 716. It is read as four hundred thirty two million five hundred twenty three thousand seven hundred sixteen.

Example **1.** Write the following in words
(i) 8275 (ii) 76901 (iii) 1234578

Sol. (i) 8275 = Eight thousand two hundred seventy five.
(ii) 76901 = Seventy six thousand nine hundred one.
(iii) 1234578 = Twelve lakh thirty four thousand five hundred seventy eight.

Example **2.** Write the following in figures
(i) Seventy thousand three hundred sixty four.
(ii) One lakh twenty five thousand four hundred twenty.
(iii) Five crore fifty lakh five thousand five hundred five.

Sol. (1) 70364 (2) 125420 (3) 55005505

Face Value
The face value of a digit in a numeral is equal to the digit number itself, irrespective of the place occupied.
e.g., In 364, face value of '6' is 6.

Place Value
The place value of a digit in a numeral depends on the place it occupies.
Place value of a digit = Face value of the digit × Value of the place occupied
e.g., In 3548 the place value of 5 is $5 \times 100 = 500$

Example **3.** Find the difference between face value and place value of 8 in 35829.
(1) 834
(2) 729
(3) 792
(4) None of the above

Sol. (3) In 35829
Face value = 8 and place value = $8 \times 100 = 800$
$\therefore$ Difference = $800 - 8 = 792$

Least and Greatest Numbers
We know that, 1 is the least one digit number and 9 is the greatest one digit number. For finding the least number of n digit, we write $(n-1)$ zeros in the right side of 1 and for greatest number of n digit, we write the number 9 n times.
e.g., Least 4 digit number = 1000
Greatest 4 digit number = 9999

Successor and Predecessor of a Number
Successor is the number just after the given number and predecessor is the number just before the given number. To get successor or predecessor of a number we add or subtract 1 from it.
e.g., Successor of 856979 is 856980 and predecessor is 856978.

Roman Numbers
The numbers which we use are called 'Arabric Numbers' but sometimes we use the another system for writing numbers called roman system.
Mostly, roman numbers are used to denote the class standard and position (Rank) of a candidate, in faces of clocks, in page numbering etc.
The letters used in roman numbers are
I = 1, V = 5, X = 10, L = 50, C = 100, D = 500, M = 1000

Roman Numerals Chart

Roman	Arabic	Roman	Arabic
I	1	XVII	17
II	2	XVIII	18
III	3	XIX	19
IV	4	XX	20
V	5	XXX	30
VI	6	XL	40
VII	7	L	50
VIII	8	XC	90
IX	9	C	100
X	10	D	500
XI	11	DI	501
XII	12	DL	550
XIII	13	CM	9000
XIV	14	MD	1500
XV	15	MM	2000
XVI	16		

Types of Numbers
There are following types of number

Natural Numbers
The counting numbers such as 1, 2, 3, 4, … are called as natural numbers.
The set of natural numbers is denoted by N.

$N = \{1, 2, 3, 4, \ldots\}$

(i) 1 is the smallest natural number.

(ii) 0 is not a natural number.

Whole Numbers

All natural numbers together with 0 (zero) are called whole numbers.

The set of whole numbers is denoted by W.

$$W = \{0, 1, 2, 3, 4, \ldots\}$$

Here, 0 is the smallest whole number.

Integer Numbers

All natural numbers together with 0 and negative numbers are called integer numbers.

The set of integer numbers is denoted by I.

$I = \{\ldots\ldots, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6, \ldots\}$

(i) $I^+ = 1, 2, 3, 4, \ldots$ are positive integers.

(ii) $I^- = -1, -2, -3, -4, \ldots$ are negative integers.

(iii) 0 (zero) is neither positive integer nor negative integer.

Even Numbers

The natural numbers which are divisible by 2 are called as even numbers. *e.g.*, 2, 4, 6, 8, 10, …

Here, 2 is the smallest even number.

Odd Numbers

The natural numbers which are not divisible by 2 are called as odd numbers. *e.g.*, 1, 3, 5, 7, 9, …

Here, 1 is the smallest odd number.

Rational Numbers

Numbers which can be written in the form $\frac{p}{q}$ $(q \neq 0)$, where p and q are integers, are called rational numbers.

e.g., $\frac{5}{4}, \frac{1}{7}, \frac{3}{8}$.

Irrational Numbers

Numbers which cannot be written in the form $\frac{p}{q}$ $(q \neq 0)$, where p and q are integers, are called irrational numbers. *e.g.*, $\sqrt{2}$, $\sqrt{5}$.

Prime Numbers

The natural numbers greater than 1 which are not divisible by any number except 1 and itself are called prime numbers. *e.g.*, 2, 3, 5, 7, …

(i) 2 is the smallest prime number and again it is the only even prime number.

(ii) The prime numbers upto 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97.

(iii) The elements in the set of natural numbers, prime numbers and whole numbers are infinite.

Composite Numbers

Numbers other than 1 which are not prime are called composite numbers. As 4, 6, 8, 9 are all composite numbers.

(i) 4 is the smallest composite number.

(ii) 1 is neither prime nor composite.

Entrance Corner

1. Which of the following statement is correct? **[JNV 2019]**

(1) Zero is an odd number
(2) Zero is an even number
(3) Zero is a prime number
(4) Zero is neither odd nor even number

2. What is the sum of the place value of 5 in the number 584356? **[JNV 2019]**

(1) 10 (2) 50050 (3) 5050 (4) 500050

3. The difference between the greatest and the smallest 5-digit numbers, formed by the digits 0, 3, 6, 7 and 9 without repetition, is **[JNV 2019]**

(1) 93951 (2) 67061 (3) 66951 (4) 60840

4. Find the differences between 5 digits greater and 5 digits smaller number with different digits. **[JNV 2018]**

(1) 41976 (2) 88531 (3) 98531 (4) 108999

5. Using the different digits, find the smallest number of 4 digits in which 9 is in tens place. **[JNV 2018]**

(1) 1290 (2) 1092
(3) 2091 (4) 2190

6. Which is the smallest 5 digit number formed by digits 5,1,6 when two digits can be used twice? **[JNV 2018]**

(1) 11565 (2) 51156
(3) 11556 (4) 11655

7. In which of the following numbers only one prime number lie. **[JNV 2018]**
(1) 40 and 50 (2) 60 and 70
(3) 80 and 90 (4) 90 and 100

8. What is quotient when 76076 is divided by 13? **[JNV 2018]**
(1) 5652 (2) 5852 (3) 5762 (4) 5662

9. Which one is the smallest number? **[JNV 2016]**
(1) 7413 (2) 7130 (3) 7985 (4) 7545

10. The difference between the smallest number of six-digits and the largest number of four-digits is **[JNV 2016]**
(1) 90001 (2) 91000 (3) 90100 (4) 90010

11. Which one of the following is the correct statement for the numbers 56 and 84? **[JNV 2016]**
(1) Both the numbers are prime
(2) Both the numbers are co-prime
(3) Both the numbers are multiple of 14
(4) Both the numbers are odd

12. Five digits greatest number to be formed with the help of 7, 2, 4, 8 and 0 is (each digit using once time) **[JNV 2015]**
(1) 80742 (2) 87042 (3) 87420 (4) 87402

13. Which statement is true for 11 and 21? **[JNV 2015]**
(1) Both are divisible numbers
(2) Both are even numbers
(3) Both are co-prime numbers
(4) Both are multiple of 3

14. Five digits greatest odd number to be formed with the help of 3, 5, 7, 9 and 0 is **[JNV 2014]**
(1) 90573 (2) 97530 (3) 97503 (4) 97053

15. Highest two digits prime number is **[JNV 2013]**
(1) 93 (2) 97 (3) 91 (4) 99

16. Find the greatest five digit even number using the 3, 0, 5, 7 and 8 digits. **[JNV 2013]**
(1) 83570 (2) 85703 (3) 87530 (4) 87350

17. Find the greatest five digit number using the 9, 6, 3 and 0 digits (Any one digit repeated twice.) **[JNV 2012]**
(1) 96630 (2) 96300 (3) 99630 (4) 90963

18. The difference between the place values of two 7s in 27307 is **[JNV 2011]**
(1) 6993 (2) 7300 (3) 307 (4) 40

19. Which one of the following is a prime number? **[JNV 2011]**
(1) 81 (2) 83 (3) 85 (4) 87

20. Eighty thousand nine hundred and five is represented in number form as **[JNV 2011]**
(1) 8095 (2) 80905 (3) 809005 (4) 8009005

21. Sixteen lakh eight hundred and thirteen may be written in digit as **[JNV 2010]**
(1) 16813 (2) 160830 (3) 1600813 (4) 160813

22. The place value of 5 in 214.56 **[JNV 2010]**
(1) 5×1 (2) 5×10
(3) 5×0.1 (4) 5×0.01

23. Find a prime even number out of the following numbers. **[JNV 2008]**
(1) 4 (2) 6
(3) 2 (4) 13

24. In a question of division if divisor is 51, quotient 16 and remainder 27, then the dividend will be **[JNV 2004, 1994]**
(1) 843 (2) 483
(3) 94 (4) 1393

Answers

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

Hints and Solutions

1. Zero is neither odd nor even number.

2. Given, 5 84 356

Place values of 5 → $\boxed{5}$ 84 3 $\boxed{5}$ 6

i.e. 500000 and 50

Sum of place values of 5 = 500000 + 50

= 500000

3. Given digits = 0, 3, 6, 7, 9

Greatest 5-digit number = 97630

Smallest 5-digit number = 30679

∴ The difference between the greatest and the smallest numbers = 97630 − 30679 = 66951

4. 5-digit largest number = 98765

5-digit smaller number = 10234

Required difference = 98765 − 10234 = 88531

5. The smallest number of four digits by using different digit = 1092

6. The 5-digit smallest number using digit 5,1, 6 by using two digits twice = 11556

7. Between 90 and 100 only one prime number '97' exist.

8.
$$13\overline{)76076}\ |\ 5852 \text{ quotient}$$
$$\begin{array}{r} 65 \\ \hline 110 \\ 104 \\ \hline 67 \\ 65 \\ \hline 26 \\ 26 \\ \hline 0 \end{array}$$
Remainder.

9. The smallest number is 7130.

10. Smallest number of 6-digits = 100000

Largest number of 4-digits = 9999

Then, the required difference = 100000 − 9999

= 90001

11. 56 = 14 × 4 and 84 = 14 × 6

It is clear from the above factors both numbers are multiple of 14.

12. Five digits greatest number to be formed with the help of 7, 2, 4, 8 and 0 digit = 87420

13. Both 11 and 21 are co-prime numbers.

14. Required odd number

Ten Th	Th	Hun	Ten	Unit
9	7	50	0	3

15. In the given number 97 is the two digits largest prime number.

16. Required largest five digits even number

= 87530

17. Required largest five digits (any one digit repeated twice) number = 99630

18. ∵ Place values of two 7s in 27307 are

= 7000 and 7

∴ Difference = (7000 − 7) = 6993

19. 83 is a prime number.

20. Eighty thousand nine hundred and five represented in number form as 80905

23. Prime number = 2, 3, 5, 7, 11, 13, 17 etc.

∴ Prime even number = 2

24. As we know,

Dividend = Divisor + Quotient + Remainder

Dividend = 51 × 16 + 27 = 816 + 27 = 843

Practice Exercise

1. 12 thousands + 13 hundreds + 2 tens is equal to

(1) 12132 (2) 13320

(3) 130132 (4) 121320

2. The difference between the greatest number of four digits and the smallest number of five digits is

(1) 1 (2) 11

(3) 1111 (4) 8999

3. The place value of 5 in 64532981 is

(1) five thousand (2) fifty thousand

(3) five lakh (4) fifty lakh

4. Ninety thousand and ninety nine may be written in digit as

(1) 90000909 (2) 9000099 (3) 90909 (4) 90099

5. The difference between the largest and the smallest numbers of three digits is

(1) 999 (2) 998 (3) 899 (4) 888

6. In number 36490, when the digits 6 and 9 are interchanged, then the difference between the original and the new number is
(1) 2870 (2) 2960 (3) 2970 (4) 3970

7. Find the sum of the face values of 9 and 6 in 907364.
(1) 15 (2) 20 (3) 9 (4) 18

8. Find the smallest number, which by adding or subtracting to or from an even number will be an odd number.
(1) 0 (2) 1 (3) 2 (4) 3

9. Using digits 1, 0, 5 and 7, the greatest 4 digit number formed is
(1) 1075 (2) 1057 (3) 5017 (4) 7510

10. The smallest 4-digits even number formed by the digits 0, 1, 2 and 3 is
(1) 1023 (2) 1032 (3) 3201 (4) 3210

11. The sum of the greatest and the smallest number of four digits is
(1) 8999 (2) 10999 (3) 11110 (4) 11111

12. Find the difference between largest and smallest 5 digit number, which are formed from digits 0, 2, 5, 6 and 8.
(1) 65925 (2) 69552 (3) 65952 (4) 65592

13. The smallest odd number formed by using the digits 1, 0, 3, 4 and 5 is
(1) 10345 (2) 10453 (3) 10543 (4) 10534

14. How many prime numbers are there between 80 and 100?
(1) 6 (2) 7 (3) 8 (4) 3

15. The number which when multiplied by 13 is increased by 180 is
(1) 15 (2) 5 (3) 12 (4) 25

16. The smallest number of four digits is
(1) 1001 (2) 0001 (3) 0010 (4) 1000

17. Sum of all prime numbers between 1 and 10 is
(1) 15 (2) 17 (3) 18 (4) 16

Answers

1. (2)	**2.** (1)	**3.** (3)	**4.** (4)	**5.** (3)	**6.** (3)	**7.** (1)	**8.** (2)	**9.** (4)	**10.** (2)
11. (2)	**12.** (3)	**13.** (1)	**14.** (4)	**15.** (1)	**16.** (4)	**17.** (2)			

Hints and Solutions

1. 12 thousands + 13 hundreds + 2 tens
$= 12000 + 1300 + 20 = 13320$

2. ∵ Smallest number of five digits = 10000
Greatest number of four digits = 9999
∴ Difference = (10000 − 9999) = 1

3. The place value of 5 in 64532981 is
= 500000 or 5 lakh

4. Ninety thousand and ninety nine = 90099

5. ∵ Difference = 999 − 100 = 899

6. ∵ Original number = 36490
New number = 39460
∴ Difference = (39460 − 36490) = 2970

7. The face value is the value of digit itself.
So, required sum = 9 + 6 = 15

8. 8 is an even number by adding or subtracting 1 to or from it, the result will be 9 and 7 respectively which are odd numbers.

9. 7510

10. 1032

11. Greatest number of four digit = 9999
Smallest number of four digit = 1000
Sum = 9999 + 1000 = 10999

12. Given, digits = 0, 2, 5, 6 and 8
Largest 5-digit number = 86520
Smallest 5-digit number = 20568
∴ Required difference = 86520 − 20568
= 65952

13. The required odd number formed is 10345.

14. 3 prime numbers are between 80 and 100.

15. $13 \times 15 - 15 = 180$

17. Prime number between 1 and 10
= 2 + 3 + 5 + 7 = 17

Self Practice

1. One lakh, thirty five thousand, four hundred and twenty six is written in figures as
(1) 133256 (2) 135426 (3) 153263 (4) 153353

2. The difference between the place value and face value of 4 in 45689, is
(1) 40000 (2) 39999 (3) 39996 (4) 39000

3. The predecessor of 8000 is
(1) 7999 (2) 8001 (3) 7989 (4) 7988

4. The greatest number of 5 digits which starts from 8 and ends with 7 is
(1) 89997 (2) 88997 (3) 88887 (4) 87987

5. The least number formed with the digit 0, 4, 2, 6 is
(1) 0462 (2) 4026 (3) 0246 (4) 2046

6. What is the greatest number that forms from the digits 3, 5, 0, 6?
(1) 6503 (2) 6530 (3) 6350 (4) 6053

7. How many numbers are of 4 digits?
(1) 9000 (2) 1000 (3) 900 (4) None of these

8. Find the least number formed by the digits 7, 0, 0 and 2.
(1) 7200 (2) 2007 (3) 2070 (4) 7020

9. In the given number 890436, if you write 0 in place of 4, by how much the resulting number be less than this given number?
(1) 40 (2) 400 (3) 436 (4) 36

10. The sum of all odd numbers less than 10 is
(1) 15 (2) 25 (3) 23 (4) 24

11. The sum of all prime numbers less than 15 is
(1) 39 (2) 42 (3) 41 (4) 45

12. How many prime numbers are there in between 1 and 10?
(1) 2 (2) 3 (3) 4 (4) 5

13. Which one of the following statements is true?
(1) All even numbers are composite numbers
(2) All odd numbers are prime numbers
(3) There are infinitely prime numbers
(4) A prime number can be written as the product of more than two natural numbers

14. The sum of 3 even numbers will be
(1) always even (2) always odd
(3) sometimes even and sometimes odd (4) None of these

15. What will remain after subtracting 11 ten times from 121?
(1) 0 (2) 11 (3) 22 (4) 10

Answers

1. (2)	**2.** (3)	**3.** (1)	**4.** (1)	**5.** (2)	**6.** (2)	**7.** (1)	**8.** (2)	**9.** (2)	**10.** (2)
11. (3)	**12.** (3)	**13.** (3)	**14.** (1)	**15.** (2)					