NUMBERS

SYNOPSIS - 1

1. Representing a number is called, **Notation.**
2. Expressing a number in words is called, **Numeration.**
3. 0 1 2 3 4 5 6 7 8 9

   All the other nmbers are written using these 10 symbols which are otherwise universally called as **digits**.
4. A group of digits denoting a number is called, **Numeral.**
5. We use place system to represent a number.
6. For a given numeral, we start from the extreme right as, Units. Tens, Hundreds, Thousands, Lakhs, Ten lakhs, Crores, Ten crores.

Indo - Arabic system	International system
Ten Crores	Hundred Millions
Crores	Ten Millions
Ten Lakhs	Millions
Lakhs	Hundred Thousands
Ten Thousands	Ten Thousands
Thousands	Thousands
Hundereds	Hundreds
Tens	Tens
Units	Units

8. Place value of a digit depend on its position in the numeral
9. The place value of 0 is called local value.
10. The face value of a digit does not depend on its position in the numeral
11. The face value of 5 in 234567 is 5.
12. The place value of 6 in 1963 is 60.
13. Smallest 2, 3, 4, 5 digit numbers are 10, 100, 1000, 10000 ...
14. Largest 2, 3, 4, 5 digit numbers are 99, 999, 9999, 99999 ...
15. The difference of the places of 9 in 19239 is, 9000 – 9 = 8991.
16. Number of 5 digit numbers are 99999 – 9999 = 90000.

    The number that comes just after a given number is called its “Successor”.

    The number that comes just before a given number is called its “Predecessor”.

    Comparision of Numbers by using Symbols.

    $5 = 5$, $10 > 9$, $20 < 35$

WORK SHEET - 1

SINGLE ANSWER TYPE

1. The place value of 9 in 1983 is
   1) 9 2) 100 3) 10 4) 900
2. The face value of 5 in 1451983 is
   1) 1 2) 10000 3) 5 4) 50000
3. The sum of place values of 6 in 16376 is
   1) 12 2) 6006 3) 6000 4) 606
4. The difference of place values of 3 in 123453
   1) 2997 2) 3003 3) 0 4) 3
5. The sum of place and face value of 2 in 2013 is
   1) 2002 2) 4 3) 2 4) 1998
6. The largest 4-digit numnber that can be formed by using the digits 1, 3, 8 and 9 is
   1) 1983 2) 1389 3) 9831 4) 9813
7. The difference of largest and smallest 3-digit numbers is
   1) 999 2) 899 3) 100 4) 1
8. The sum of smallest 4-digit number and largest 3-digit number
   1) 9899 2) 1999 3) 10099 4) 1
9. The difference of 3 digit numbers and the number of 2 digit numbers in base 10 system is
   1) 900 2) 901 3) 810 4) 910
10. The smallest 5 digit number having 4-different digits is
    1) 10023 2) 10021 3) 10121 4) 10320
11. 6 laksh is equal to how many thousands
    1) 60 2) 600 3) 6000 4) 6
12. 4 millions is equal to how many lakhs
    1) 4 2) 40 3) 400 4) 4000
13. In the international system 10 crores is equal to
    1) 100 lakhs 2) 10 millions 3) 100 millians 4) 1000 lakhs
14. In the Indian system, 1 million is equal to
    1) 10 lakhs 2) 100 lakhs 3) 1 crore 4) 10 crores
15. The successor of 123789 is
    1) 123788 2) 123790 3) 123800 4) 123900
16. The predecessor of 987326 is
    1) 987325 2) 987327 3) 987328 4) 987324

17. The place value of 5 in the numeral 18, 56, 22, 387

1) 50 millians 2) 50 lakhs 3) 5 crores 4) 50 crores

MULTI ANSWER TYPE

18. Which of the following statements is/are true

1) The face value of a digit does not depend on its position in the numeral

2) The place value of a digit depend on its position in the numeral

3) The number of 5 digit numbers 90000

4) The face value of 6 in 2060 is 60

19. The numeral 60000000 is equal to

1) 6 crores 2) 60 millians 3) 60 lakhs 4) 600 millians

REASONING ANSWER TYPE

20. **Statement - I:** The place value of 7 in 17834 is 7

Statement - II: The face values of a digit does not depend on its position in the numeral

1. Both Statements I and II are correct
2. Both statement I and II are incorrect
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

21. **Statement - I:** The difference of largest 5 digit number and predecessor of smalllest 6 digit number is zero

Statement - II: Smallest 6 digit number is 10000

1. Both Statements I and II are correct
2. Both statement I and II are incorrect
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

COMPREHENSION TYPE

If the given the digits are 0, 1, 2, 3, 4, 5

22. The largest 6 digit number formed is

1) 543210 2) 504321 3) 534120 4) 541230

23. The smallest 6 digit number formed is

1) 123450 2) 102345 3) 012345 4) 103245

24. The difference of largest and smallest 6 digit number is

1) 140855 2) 130855 3) 130755 4) 140755

MATRIX MATCHING TYPE

25.

Column - I	Column - II
(A) 654, 123, 789	(P) 900
(B) Largest 5 digit number	(Q) English system
(C) Place value of 9 in 1947	(R) 99999
(D) Smallest 3 digit number	(S) International system
	(T) 100

INTEGER ANSWER TYPE

26. The difference of successor of 1983 and predecessor of 1985 is ___

27. The face value of 3 in 319840 is ____

SYNOPSIS - 2

1. Roman Numerals for 1, 5, 10, 50, 100, 500, 1000 are I, V, X, L, C, D, M
2. Roman Numeral can be maximum repeated three times.

Points to remember

3. V, L and D are never subtracted.

   I can be subtracted only from V and X.

   X can be subtracted from L and C.

   C can be subtracted from D and M.

   0 cannot be represented in Roman number system.

   The numerals I, V and X are used to write numbers from 1 to 39.

   When a bar is used above the Roman numerals it indicates that Roman numeral is multiplied by 1000.

4. **Rule - 1 :** If a digit is repeated a number of times, the value of the digit is added as many times as it occurs.
5. **Rule - 2 :** To write a number in which the smallest digit always comes to the right of the greatest digit, we add the values of all the digits.
6. **Rule - 3 :** To write a number in which the smaller digit is placed before the greater digit, we subtract the value of the smaller digit from that of the greater digit.

WORK SHEET - 2

SINGLE ANSWER TYPE

1. The number of alphabets used for Roman number system are

   1) 5 2) 6 3) 7 4)8

2. Which of the following cannot be represented in Roman number system

   1) 0 2) 11 3) 999 4) 1001

3. The number I can be substracted from

   1) X 2) L 3) C 4) D

4. X cannot be substracted from

   1) V 2) D 3) M 4) All the three

5. Which of the following are never be substracted

   1) V 2) L 3) D 4) All the three

6. The Roman numeral 36 is

   1) XXXIV 2) XXXVI 3) XXXIV 4) IVXXXX

7. XII + VIII + XXXIV

   1) 54 2) 34 3) 56 4) 48

8. The roman numeral corresponding to successor of 1000
   1) M 2) IM 3) MI 4) DI
9. The sum of 584 and 634 is
   1) IIMCCXX 2) MCCXVIII 3) MCCIIXX 4) MCCXV
10. The product of VI and CVI is
   1) DCXXXVI 2) VIDCXXX 3) DCXIVL 4) DCVILC
11. The difference of MDCLVI and DCLXI
   1) 995 2) 996 3) 895 4) 896
12. The sum of DCLXI and MDCLVI
   1) MMCCCXVII 2) MDDCLXVI 3) MMCCCIIIXX 4) MMCCCXXI

MULTI ANSWER TYPE

13. The sum of MCCXL and DLX is
   1) 2190 2) MCC 3) MDCCC 4) 1800
14. The product of XI and XV is
   1) 605 2) DCV 3) 506 4) DVI

REASONING ANSWER TYPE

15. **Statement - I:** In a roman number if the smaller digit is placed after the larger digit, the smaller digit is added to the larger digit

    Statement - II: In a roman number, if the smaller digit is placed before the larger digit, the smaller digit is substracted from the larger digit
    1. Both Statements I and II are correct
    2. Both statement I and II are incorrect
    3. Statement I is true, Statement II is false.
    4. Statement I is false, Statement II is true.

COMPREHENSION TYPE

The numbers 1, 5, 10, 50, 100, 500, 1000 are represented by I, V X, L, C, D, M
respectively in roman numeral system.

16. The roman numeral corresonding to 1010 is
   1) LX 2) CX 3) DX 4) MX
17. Which of the following is equal to 905?
   1) $\overline{IXV}$ 2) CMV 3) DMV 4) LMV
18. LX + CX + DX =
   1) 680 2) 1080 3) 780 4) 480

MATRIX MATCHING TYPE

19.

Column - I	Column - II
(A) SUm of 700 and 14	(P) CCCXX
(B) DCXXXIII - ? = DC	(Q) LXXV
(C) Product of V and XV	(R) XXXIII
(D) DIfferent of 540-210	(S) DCCIVX

INTEGER ANSWER TYPE

20. The difference of XL - XXXV = _____

21. DL - D - L = _____

SYNOPSIS - 3

1. In Binary system only 0, 1 are used.
2. Place value in the binary system starts from 2^0, 2^1, 2^2, 2^3, 2^4 ...
3. Numerals in
   Binary system are 0, 1, 10, 11, 100, 101, 110, 111, 1000, 1001.
   Decimal system are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

   Ex: $101010_{(2)} = 1\times32 + 0\times16 + 1\times8 + 0\times4 + 1\times2 + 0\times1$

   $32 + 8 + 2 = 42$

WORK SHEET - 3

SINGLE ANSWER TYPE

1. In binary system, thebase is always
   1) 2 2) 5 3) 9 4) 10
2. Binary system of numerals is also called
   1) Base - 10 system 2) Base - 2 system
   3) Base - 5 system 4) Base - 9 system
3. The number of digits used to write the numbers in binary system is
   1) 9 2) 10 3) 1 4) 2
4. The number 34 is written in binary system is
   1) $100010_{(2)}$ 2) $100001_{(2)}$ 3) $100100_{(2)}$ 4) $110011_{(2)}$
5. The sum of 120 and 36 is written in binary system is
   1) $10100110_{(2)}$ 2) $10110010_{(2)}$ 3) $1100001_{(2)}$ 4) $10010110_{(2)}$
6. The difference of $11100_{(2)}$ and $1010_{(2)}$ expressed in the binary system is
   1) $1111_{(2)}$ 2) $1010_{(2)}$ 3) $1110_{(2)}$ 4) $10010_{(2)}$
7. The product of $101_{(2)}$ and $110_{(2)}$ expressed in the binary system
   1) $11111_{(2)}$ 2) $11110_{(2)}$ 3) $11101_{(2)}$ 4) $10111_{(2)}$

MULTI ANSWER TYPE

8. The decimal equivalent of $101101_{(2)}$ is greater than
   1) 44 2) 42 3) 45 4) 46
9. The decimal equivalent of $1110010_{(2)}$ is less than
   1) 104 2) 105 3) 106 4) 103

REASONING ANSWER TYPE

10. Statement-I: The product of least even and odd composite numbers in binary system is $100100_{(2)}$.

Statement - II: The least even composite is 4 and least odd composite is 9.

1. Both Statements I and II are correct
2. Both statement I and II are incorrect
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

COMPREHENSION TYPE

$P=101_{(2)}$, $Q=110_{(2)}$ and $R=111_{(2)}$ then

11. $P+Q+R$

1) $10010_{(2)}$ 2) $10110_{(2)}$ 3) $11001_{(2)}$ 4) $10101_{(2)}$

12. $(P+Q)R$

1) $1001100_{(2)}$ 2) $1001101_{(2)}$ 3) $1100111_{(2)}$ 4) $111100_{(2)}$

13. $P(R-Q)=$

1) P 2) Q 3) R 4) P + Q

MATRIX MATCHING TYPE

14.

1) $1101_{(2)}$	(A) 45
2) $100011_{(2)}$	(B) 57
3) $101101_{(2)}$	(C) 13
4) $111001_{(2)}$	(D) 36
	[E] 35

INTEGER ANSWER TYPE

15. $P=10_{(2)}$, $Q=11_{(2)}$ then the product of P and Q is equal to _____

16. The Hindu Arabic value of $1001_{(2)}$ = _____

SYNOPSIS - 4

1. The numbers which are useful for counting are called natural numbers. Natural numbers starts from 1, 2, 3, 4..... (which is infinite set)
2. The natural numbers are expanded to whole members by including zero. Zero : The number which is representing for nothing.
3. Whole numbers are represented by W.
4. W = { 0, 1, 2, 3 ... } represents an infinite set. The least whole number is O. All natural numbers are present in whole numbers.

PROPERTIES OF WHOLE NUMBERS

5. If a, b, c are whole numbers

	Addition	Subtraction	Multiplication	Division
Closure Law	$a+b \in W$	$a-b \notin W$	$ab \in W$	$\frac{a}{b} \notin W$
Commutative Law	$a+b=b+a$	$a-b \neq b-a$	$ab=ba$	$\frac{a}{b} \neq \frac{b}{a}$
Associative Law	$a+(b+c)$ $=(a+b)+c$	$a-(b-c)$ $\neq(a-b)-c$	$(ab)c=a(bc)$	$(a\div b)\div c$ $\neq a\div(b\div c)$
Identity	0	Does not exist	1	Does not exist
Inverse	Does not exist	Does not exist	Does not exist	Does not exist
Distributive	$a(b+c)=ab+ac$			

Note : If a is a whole number then $-a$ is not a whole number.

If a is a whole number then $\frac{1}{a}$ is not a whole number.

If a, b are whole numbers then $a-b$ is not a whole number when $b>a$.

If a, b are whole numbers then $\frac{a}{b}$ is not a whole number unless $a=bk$, $k \in N$.

WORK SHEET - 4

SINGLE ANSWER TYPE

1. The difference of smallest whole number and smaller natural number is
   1) -1 2) 0 3) 1 4) 2
2. Additive identify in natural number is
   1) 0 2) 1 3) -1 4) Does not exist
3. Multiplicative identify in whole numbers is
   1) 0 2) 1 3) -1 4) 2
4. Additive inverse 6 in natural number system is
   1) -6 2) 6 3) 0 4) Does not exist
5. Multiplicative inverse of 9 in whole numbers is
   1) 1/9 2) -9 3) -1/9 4) Does not exist
6. The number of elements in natural number system
   1) 10000000 2) Finite 3) 0 4) Infinite
7. The natural number which does not have a predecessor in
   1) 0 2) 1 3) 1000000 4) -1
8. Which of the following is closure property
   1) $a+b=b+a$ 2) $a+(b+c)=(a+b)+c$
   3) $a(b+c)=ab+ac$ 4) $a\in w, b\in w \rightarrow a+b\in w$
9. Which of the following is associative property with respect to division in whole number system
   1) $a+(b+c)=(a+b)+c$ 2) $a\div(b\div c)=(a\div b)\div c$
   3) $a(bc)=(ab)c$ 4) Does not exist
10. Commutative property with respect to substraction in whole number system
    1) $a-b=b-a$ 2) $a-b=b+a$ 3) $a+b=b-a$ 4) Does not exist

MULTI ANSWER TYPE

11. Which of the following is/are false
    1) Set of natural numbers in finite
    2) Set of natural numbers in infinite
    3) Set of whole numbers is finite
    4) Set of whole numbers in infinite
12. The whole numbers doesnot satisfying which of the following properties under division
    1) Closure 2) Commutative 3) Associatic 4) Distributive
13. The whole numbers do not satisfy commutative property under
    1) Addition 2) Substraction 3) Multplication 4) Division

REASONING ANSWER TYPE

14. Statement - I : If a, b are whole numbers then $a \times \frac{1}{b} = b \times \frac{1}{a}$ is not commutative property in whole number system

Statement - II: If $a(+1)$ is a whole number then $\frac{1}{a}$ is not a whole number

1. Both Statements I and II are correct
2. Both statement I and II are incorrect
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

MATRIX MATCHING TYPE

15. If a, b,c are whole numbers

Column - I	Column - II
1) Closure property under substraction	(A) $a+(b+c)=(a+b)+c$
2) Commutative under addition	(B) $a(bc)=(ab)c$
3) Addititive identify	(C) $a-b \in W$
4) Associative under multiplication	(D) 0
	(E) Does not exist
	(F) $a+b=b+a$

COMPREHENSION TYPECOMPREHENSION TYPE

If a, b, c are whole numbers

16. Which of following is possible in whole number system

1) $a-b=b-a$ 2) $a \div b = b \div a$ 3) $a+b=b+a$ 4) $a \times b = a \div b$

17. If $a \times 1 = 1 \times a = a$ is ____ property

1) Additive identify 2) Multiplicative identify
3) Additive inverse 4) Multiplicative inverse

18. Additive inverse of b in whole number system is

1) -b 2) b 3) 0 4) Does not exist

SYNOPSIS - 5

1. The product we get when a number is multiplied by the number 1, 2, 3, 4 .... are called multiple of the given number.

   Eg: 3, 6, 9, 12, 15... are multiples of 3.

2. When we multiply two or more numbers we get a product. The product is a multiple of each of the numbers multiplied. Each number multiplied is a factor of the product.

   Eg : The factors of 8 are 1, 2, 4, 8

3. All numbers divisible by 2 are called Even numbers.
   Eg : 2, 4, 6, 8....
4. Numbers which are not divisible by 2 are called Odd numbers.
   Eg : 1, 3, 5, 7, 9 .....

Properties of even and odd numbers

1. *The sum or product of any number of even numbers is even.*
2. *The difference of two even numbers is even.*
3. *The sum of odd numbers depends on the number of numbers.*
   a) If the number of numbers is odd, the sum is odd
   b) If the number of numbers is even, the sum is even.
4. *If the product of a certain number of numbers is even, then atleast one of them is even.*
5. *If the product of a certain number of numbers is odd, then none of the numbers is even. i.e., the product of any number of odd numbers is odd.*
6. *Every odd number is obtained by adding 1 to every even number.*

7. The natural number which have only two factors (1 and itself) are called prime numbers.
   Eg : 2, 3, 5, 7, 11, 13.... (2 is even prime and remaining all are odd primes)

Sieve of Eratosthenes :

To find primes between 1 to 20 by sieve method.

~~1~~ ② ③ ~~4~~ 5 ~~6~~ 7 ~~8~~ ~~9~~ ~~10~~

11 ~~12~~ 13 ~~14~~ ~~15~~ ~~16~~ 17 ~~18~~ 19 ~~20~~

Procedure :

i) We first cross out 1 as it is not a prime or composite.
ii) We then encircle 2 and cross out every other multiple of 2. i.e., 4, 6, 8 ...
iii) We then encircle '3' and cross out every other mltiple of 3 i.e., 6, 9, 12 ....
∴ The prime numbers between 1 to 20 are 5, 7, 11, 13, 17, 19

1. The natural numbers which have more than two factors are called composite numbers.
   Eg : 4, 6, 8, 9, 10 ....
2. 4 is smallest even composite number.
   9 is smallest odd composite number.
3. Pairs of primes whose difference is 2 are twin primes.
   Eg : 3, 5 ; 5 , 7
4. A number in which sum of all factors is equal to twice the number is called a perfect number.
   Eg : The factors of 6 are 1, 2, 3 and 6 sum of the factors of 6 = 1 + 2 + 3 + 6 = 12 = 2 x

WORK SHEET - 5

SINGLE ANSWER TYPE

1. If a number is multplied by the numbers 1, 2, 3,..... THen the resultants are called
   1) Multplies 2) Factors 3) Divisors 4) Remainders
2. If 'a' is exactly divisible by b then 'b' is said to be _____ of 'a'.
   1) Multiple 2) Factor 3) Remainder 4) None
3. The least factor of every number is
   1) 0 2) 1 3) 2 4) -1
4. The greatest factor of every number is
   1) 1 2) 0 3) -1 4) Numer it self
5. Which of the following is not a factor of 128
   1) 2 2) 3 3) 4 4)8
6. Which of the following is not a multiple of 24
   1) 12 2) 24 3) 48 4) 72
7. Every number is a factor of
   1) 0 2) 1 3) 2 4) 10
8. The least non-zero multple of a
   1) -1 2) 0 3) 1 4) Number itself
9. The common factor of 15, 25 and 75
   1) 3 2) 5 3) 15 4) 25
10. The number of factors of given number is
    1) Finite 2) Infinite 3) Undefined 4) None
11. Sum of two even numbers is
    1)even number 2) Odd Number
    3)even and odd 4)Neither even nor odd
12. The least prime number is
    1) 3 2)1 3)2 4)5
13. The greatest prime that is less than 25 is
    1) 24 2)21 3)19 4) 23
14. Total number of primes that are between 40 and 60 is
    1) 4 2)5 3)6 4) 7
15. The number of pairs of twin primes between 1 and 100 is
    1)7 2)8 3)9 4)10
16. If two numbers do not have a common factor other than 1, then they are know as
    1) Twin primes 2) Co-Primes
    3) Perfect number 4)Odd number
17. The number of composite numbers upto 100 is
    1) 75 2) 73 3) 76 4) 74

18. The number of pairs of prime number with digits reversed upto 100 is

1) 3 2) 5 3) 6 4) 4

19. The number of times that 11 is contained in 109648 is

1)9958 2)9948 3)9978 4) 9968

MULTI ANSWER TYPE

20. The factors of 24 are

1) 1 2) 12 3) 6 4) 24

21. Multiplies of 13 is/are

1) 26 2) 52 3) 48 4) 72

22. Prime number between 50 and 60

1) 53 2)57 3)59 4)55

23. Composite number between 80 and 99 is

1)87 2)91 3) 89 4)97

REASONING ANSWER TYPE

24. Statement - I: 8 is a factor of 24.
Statement - II: If 'P' divides exactly 'Q'. Then 'P' is called the factor of 'Q'
1. Both Statements I and II are correct
2. Both statement I and II are incorrect
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

25. Statement - I: The number of multiplies of a given number is finite
Statement - II: The number of factors of a given number is infinite.
1. Both Statements I and II are correct
2. Both statement I and II are incorrect
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

26. *Statement I* : 29 is a prime number and an odd number
Statement II: All prime numbers are odd numbers.
1. Both Statements are true, Statement II is the correct explanation of Statement I.
2. Both Statements are true, Statement II is not correct explanation of Statement I.
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

27. *Statement I* : (59, 61) and (89, 91) are twin primes.
Statement II: If the difference between a pair of prime numbers is 2, then they are called twin primes.
1. Both Statements are true, Statement II is the correct explanation of Statement I.
2. Both Statements are true, Statement II is not correct explanation of Statement I.
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

COMPREHENSION TYPE

Writeup-1:

Which we multiply two or more numbers, we get a product. Each number is called a factor of the product. The product is called a multiple of each of the numbers.

28. Every number is a multiple of
    1) 1 2) 0 3) 3 4) 2
29. The largest multiple of a number is
    1) 1 2) 0 3) 3 4) Does not exist
30. _____ is a factor of every number
    1) 1 2) 0 3)3 4) 2

Writeup-2:

A natural numbers having factors 1 and itself is known as a 'Prime number' A natural number having more than 2 factors is called a "composite number'

31. Number of even prime numbers is
    1) 1 2)2 3)0 4) Infinite
32. Which of the follwing is a prime number ?
    1) 21 2)31 3) 49 4) 65
33. The composite number between 10 and 90 is
    1) 47 2) 97 3) 81 4)9

MATRIX MATCHING TYPE

34.

Column - I	Column - II
1) Multiples of 8	a) 1
2) No. of factors of 24 is	b) 6
3) 23 is a multiple of	c) 8
4) 3 is a factor of	d) 16
	e) 24

35.

Column-I	Column-II
a) Number of primes below 100	1) 23
b) Number of composite numbers below 100	2) 48
c) Number of odd primes below 100	3) 24
d) Numeber of even composite numbers below100	4) 25
	5) 74

36.

Column-I	Column-II
a) Greatest prime less than 42 is	1) 6
b) Number of twin prime pairs below 50	2) 41
c) Sum of the prime numbers less then 15 is	3) Between 9 and 100
d) Two digit composite numbers lies	4) 5
	5) Between 10 and 100

INTEGER ANSWER TYPE

37. The number of factors of every prime number is _____
38. The other factor of 23 is _____

39. Least odd composite number is _____
40. Sum of the least and highest odd prime numbers below 100 is ___

SYNOPSIS - 6

Divisibility rules :-

i) A natural number is divisible by 2 if and only if the digit in its units place is either 2, 4, 6, 8 or 0.

ii) A natural number is divisible by '3' if and only if the number obtained by adding it's digits is divisible by 3.

iii) A natural number is divisible by '4' if and only if the number formed by the last two digits of the given number is divisible by 4.

iv) A natural number is divisible by '5' if and only if its last digit is either 5 or 0.

v) A natural number is divisible by '6' if and only if it is divisible by '2' and '3'.

vi) A natural number is divisible by '8' if the number formed by the last three digits of the given number is divisible by 8.

vii) A natural number is divisible by '9' if and only if the sum of its digits is divisible by 9.

viii) A natural number is divisible by 10. If and only if its last digit is 0.

ix) A natural number is divisible by '11' if and only if the difference of the numbers obtained on adding the alternate digits of the number separately is divisible by 11.

x). A natural number is divisible by 12. If and only if it is divisible by 3 and 4.

WORK SHEET - 6

SINGLE ANSWER TYPE

1. If a number is divisible by 2 then it has even digit in its
   1) Ten place 2) Hundred place 3) Units place 4) Thousands place
2. A number is divisible by 3 if the sum of its digits is divisible by
   1) 2 2) 3 3) 9 4) 10
3. A number is divisible by 4 if the number formed by last two digits is divisible by
   1) 2 2) 3 3) 4 4) 8
4. A number is divisible by 8 if the number formed by last three digits is divisible by
   1) 2 2) 3 3) 4 4) 8
5. If the number $517x324$ is completely divisible by 3, then the smallest whole number in place of x will be
   1) 0 2) 1 3) 2 4) 3
6. If the number $5x2$ is divisible by 6, then $x =$
   1) 2 2) 3 3) 6 4) 7

7. If the number $91876x2$ is completely divisible by 8, then the smallest whole number in place of x will be
   1) 1 2) 2 3) 3 4) 4
8. If the number $481x673$ is completely divisible by 9, then the smallest whole number in place of x will be
   1) 2 2) 5 3) 6 4) 7
9. If a number is divisible by 5, then its last must be
   1) 0 2) 5 3) 0 or 5 4) 4
10. A number is divisible by 10 if its last digit is ϕ
    1) 0 2) 5 3) 9 4) 2
11. Which one of the following numbers is exactly divisible by 11
    1) 235641 2) 245642 3) 315624 4) 415624
12. If the number 97215x6 is completely divisible by 11, then the smallest whole number in place of x will be
    1) 1 2) 2 3) 3 4) 5
13. Which one of the following numbers is completely divisible by 45?
    1) 181560 2) 331145 3) 202560 4) 2033550
14. If x and y are the two digits of the number 653xy such that this number is divisible by 80, then $x+y=$
    1) 2 2) 3 3) 4 4) 6
15. What smallest number should be added to 4456 so that the sum is completely divisible by 6 ?
    1) 1 2) 2 3) 3 4) 4

MULTI ANSWER TYPE

16. If any number is divisible by 6 then that is also divisible by
    1) 2 2) 3 3) 4 4) 8
17. If any number is divisible by 12 then it is also divisible by
    1) 2 2) 3 3) 4 4) 6
18. The number 2730 is divisible by
    1) 2 2) 3 3) 5 4) 6
19. Which of the following numbers divisible by 3 ?
    1) 4536 2) 10072 3) 1431 4) 789
20. Which of the following number are divisible by 9 ?
    1) 1233 2) 436527 3) 356731 4) 739243
21. Which of the following numbers are divisible by 8 ?
    1) 95624 2) 842128 3) 658134 4) 532154
22. Which of the following numbers are divisible by 11 ?
    1) 3150719 2) 9071326 3) 1111 4) 11111

REASONING ANSWER TYPE

23. Statement - 1: The number 12342 is divisible by 6

    Statement - 2: A number is divisible by 6 then the sum of digits formed by number is also divisible by 6.

24. Statement - 1: The number 284120 is divisible by 8

    Statement - 2: A number is divisible by 8 then it is also divisible by 2 and 4

25. Statement - 1: The number 35861 is divisible by 7.

    Statement - 2: The digit 7 is both odd and prime.

COMPREHENSION TYPE

Writeup - 1

A number is divisible by 2 if the units digit of the number is divisible by 2. A number is divisible by 3 and 9 if the sum of digits of the number is divisible 3 and 9 respectively

26. Which of the following number is divisible by 9 ?

    1) 200409 2) 124678 3) 32197 4) 320418

27. The number which is divisible by both 2 and 3 is

    1) 120360 2) 123031 3) 20709 4) 5632

28. The number which is divisible by 3 but not by 9 is

    1) 1080 2) 46782 3) 112233 4) 35685

Writeup-2

A number is divisible by 6 if it is divisible by both 2, 3 and a number is divisible by 8 if the number formed by last three digits is divisible by 8

29. The number 2358132 is divisible by

    1) 2 2) 3 3) 8 4) Both 1&2

30. Which of the following is divisible by 8 ?

    1) 41384 2) 236134 3) 56019 4) 31563

31. The number which is divisible by 8 but not by 6 is

    1) 35610 2) 124672 3) 52183 4) 369276

MATRIX MATCHING TYPE

32.

Column - I Number	Column - II Divisible by
1) 31224	p) 2
2) 32456	q) 3
3) 343678	r) 4
4) 97478	s) 6
	t) 8

33.

Column - I Number	Column - II Divisible by
1) 11816	p) 5
2) 3116365	q) 10
3) 3572404	r) 7
4) 379110	s) 11
	t) 35

INTEGER ANSWER TYPE

34. If a number is divisible by 9, then it must be divisible by _____
35. The number 1234x is divisible by 3 then the least possible whole number in place of x will be _____
36. The number 97215x6 is divisible by 8 then the least possible whole number in place will be _____

SYNOPSIS - 7

Highest Common Factor :

i) The greatest number which is the common factor of two or more given numbers is called H.C.F. or G.C.D.

H.C.F. can be determined in different methods

H.C.F. of 144, 198 by prime factorisation method.

$144 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 2^4 \times 3^2$

$198 = 2 \times 3 \times 3 \times 11 = 2 \times (3)^2 \times 11$

$\therefore$ G.C.D. of 144, 198 $= 2 \times (3)^2 = 9 \times 2 = 18$

ii) H.C.F. of 144, 198 by division method

The G.C.D. of 144, 198 is 18, since the last divisor is 18.

i.e.,

```
144 ) 198 ( 1
      144
    ------
     54 ) 144 ( 2
          108
        ------
         36 ) 54 ( 1
              36
            ----
            18 ) 36 ( 2
                 36
               ----
                 0
               ----
```

Note : HCF of two distinct prime numbers is one.

HCF of two co-primes is one.

HCF of an even number and an odd number is one.

HCF of two consecutive even numbers is two.

L.C.M. :

The least common multiple of two or more numbers is the smallest number which is a multiple of each of the numbers.

i) **To find L.C.M. of 24, 36 and 40 by prime factorisation method**

$24 = 2 \times 2 \times 2 \times 3 = 2^3 \times 3$

$36 = 2 \times 2 \times 3 \times 3 = 2^2 \times 3^2$

$40 = 2 \times 2 \times 2 \times 5 = 2^3 \times 5$

$\therefore$ L.C.M. of 24, 36, 40 is $2^3 \times 3^2 \times 5 = 360$.

ii) **To find L.C.M of 24, 36 and 40 by division method**

2	24, 36, 40
2	12, 18, 20
2	6, 9, 10
3	3, 9, 5
	1, 3, 5

$\therefore$ L.C.M. of 24, 36 and 40 is $2 \times 2 \times 2 \times 3 \times 3 \times 5 = 8 \times 9 \times 5 = 360$.

Note : If two numbers are relatively primes, then their LCM is equal to their product.

In the given two numbers if the first number is a multiple of second number, then their LCM is equal to the first number.

The least common multiple of two prime numbers is their prodduct.

The LCM of two numbers is neven less than either of the two numbers.

iii. **LCM and GCD of fractions**

The LCM and GCD of fractions can be determined by the following relations:

$$\text{LCM of fractions} = \frac{\text{LCM of numerators}}{\text{GCD of denominators}}$$

$$\text{GCD of fractions} = \frac{\text{GCD of numerators}}{\text{LCM of denominators}}$$

Example:

Find the HCF and LCM of $\frac{4}{5}, \frac{2}{5}$ and $\frac{3}{4}$.

$$\text{LCM}\left(\frac{4}{5}, \frac{2}{5}, \frac{3}{4}\right) = \frac{LCM\,(4,2,3)}{HCF\,(5,5,4)} = \frac{4 \times 3}{1} = 12$$

$$HCF = \left(\frac{4}{5}, \frac{2}{5}, \frac{3}{4}\right) = \frac{HCF\,(4,2,3)}{LCM\,(5,5,4)} = \frac{1}{5 \times 4} = \frac{1}{20}$$

Note: The given fractions should be reduced to their lowest terms, before finding the GCD or LCM.

Example:

If the LCM/GCD of $\frac{2}{4}$ and $\frac{6}{9}$ has to be found, first $\frac{2}{4}$ and $\frac{6}{9}$ have to be expressed as $\frac{1}{2}$ and $\frac{2}{3}$ and LCM/GCD should be found.

WORK SHEET - 7

SINGLE ANSWER TYPE

1. The L.C.M of 24, 36 and 40 is
   1) 120 2) 240 3) 360 4) 480
2. The L.C.M of 22, 54, 108, 135 and 198 is
   1) 330 2) 1980 3) 5940 4) 11880
3. The L.C.M of $\frac{1}{3},\frac{5}{6},\frac{2}{9},\frac{4}{27}$ is
   1) $\frac{1}{54}$ 2) $\frac{10}{27}$ 3) $\frac{20}{3}$ 4) $\frac{3}{20}$
4. The L.C.M of $\frac{2}{3},\frac{3}{5},\frac{4}{7},\frac{9}{13}$ is
   1) 36 2) $\frac{1}{36}$ 3) $\frac{1}{1365}$ 4) $\frac{12}{455}$
5. The L.C.M of $2^3\times3^2\times5\times11$, $2^4\times3^4\times5^2\times7$ and $2^5\times3^3\times5^3\times7^2\times11$
   1) $2^3\times3^2\times5$ 2) $2^5\times3^4\times5^3$
   3) $2^3\times3^2\times5\times7\times11$ 4) $2^5\times3^4\times5^3\times7^2\times11$
6. The L.C.M of 3, 2.7 and 0.09 is
   1) 2.7 2) 0.27 3) 0.027 4) 27
7. The H.C.F of 2923 and 3239 is
   1) 37 2) 47 3) 73 4) 79
8. The H.C.F of 204, 1190 and 1145 is
   1) 17 2) 18 3) 19 4) 21
9. The H.C.F of [redacted], [redacted] and [redacted]
   1) $2^2\times3^2\times5$ 2) $2^2\times3^2\times5\times7\times11$
   3) $2^4\times3^4\times5^5$ 4) $2^4\times3^4\times5^5\times7\times11$
10. The H.C.F of $2^4\times3^2\times5^3\times7$, $2^3\times3^3\times5^2\times7^2$ and $3\times5\times7\times11$ is
    1) 105 2) 1155 3) 2310 4) 27720

11. The H.C.F of $\frac{9}{10},\frac{12}{25},\frac{18}{35}$ and $\frac{21}{40}$ is

    1) $\frac{3}{5}$ 2) $\frac{252}{5}$ 3) $\frac{3}{2800}$ 4) $\frac{63}{700}$

12. The H.C.F of $\frac{2}{3},\frac{8}{9},\frac{64}{81}$ and $\frac{10}{27}$ is

    1) $\frac{2}{3}$ 2) $\frac{2}{81}$ 3) $\frac{160}{3}$ 4) $\frac{160}{81}$

13. The H.C.F of 1.75, 5.6 and 7 is
    1) 0.07 2) 0.7 3) 3.5 4) 0.35
14. The G.C.O of 1.08, 0.36 and 0.9 is
    1) 0.03 2) 0.9 3) 0.18 4) 470.108
15. The ratio of two numbers is $3:4$ and their H.C.F is 4. Their L.C.M is
    1) 12 2) 16 3) 24 4) 48
16. Three numbers are in the ratio $1:2:3$ and their H.C.F is 12. The numbers are
    1) 4, 8, 12 2) 5, 10, 15 3) 10, 20, 30 4) 12, 24, 36

MULTI ANSWER TYPE

17. If $A=7^2\times9\times5^3$, $B=7\times9^2\times5^2$ and $C=7^3\times9^3\times5$ then
    1) H.C.F of A, B, C is $7\times9\times5$
    2) G.C.D of A, B, C is $7^3\times9^3\times5^3$
    3) L.C.M of A, B, C is $7^3\times9^3\times5^3$
    4) L.C.M of A, B, C is $7\times9\times5$
18. The L.C.M of two numbers is 48. The numbers are in the ratio $2:3$. Then
    1) The numbers are 16, 48
    2) The numbres are 16, 24
    3) H.C.F of the is numbers is 8
    4) Difference of the numbers is 8
19. The Sum of two numbers is 216 and their H.C.F is 27. Then the numbers are
    1) 27, 189 2) 81, 135 3) 108, 108 4) 154, 762
20. Product of two Co-prime numbers is 117. Then
    1) The numbers are 1, 117
    2) The H.C.F of those two numbers is 1
    3) The L.C.M of those two numbers is 117
    4) The H.C.F of those two numbers is 117

REASONING ANSWER TYPE

21. **Statement - 1:** L.C.M of 15, 24, 32 and 36 is 1440.
Statement - 2: L.C.M of numbers is the least number which is divisible by each of the given number exactly.
1. Both Statements I and II are correct
2. Both statement I and II are incorrect
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

22. **Statement - 1:** Greatest number which divides 62, 132 and 237 to leave the same remainder in each Case is 35.
Statement - 2: Greatest number which divides a, b, c to leave the same remainder in each case is H.C.F of $(b-a),(c-b),(c-a)$
1. Both Statements I and II are correct
2. Both statement I and II are incorrect
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

COMPREHENSION TYPE

Writeup-1

LCM of numbers is the least number which is divisible by each of the given numbers.

23. LCM of 48, 108 and 280 is
1) 15120 2) 16150 3) 3950 4) 46790

24. LCM of 1134 and 2106 is
1) 15672 2) 14742 3) 49353 4) 97426

25. LCM of 72, 108, 144, 162 is
1) 676 2) 1579 3) 1296 4) 1892

Writeup-2

Greatest number which divides a, b, c to leave the same remainder in each case is H.C.F of $(b-a),(c-b),(c-a)$.

26. Find the largest number which divides 32, 122 and 157 to leave same remainder in each case ?
1) 5 2) 15 3) 30 4) 20

27. Find the largest number that will divide 43, 91 and 183 so as to leave the same remainder in each case ?
1) 4 2) 7 3) 9 4) 13

28. Find the largest number that will divide 1305, 4665 and 6905 leaving the same remainder in each case then sum of the digits in that number is
1) 4 2) 5 3) 6 4) 8

MATRIX MATCHING TYPE

29.

Column - I	Column - II
1) LCM of 168, 180 and 330	A) 1136
2) LCM of 16, 24, 36 and 54	B) 27720
3) LCM of 248 and 868	C) 5103
4) LCM of 567 and 729	D) 432
	E) 2601

30.

Column - I	Column - II
1) Common factor of 18 and 24	A) 3
2) GCD of 55 and 121 is	B) 6
3) Common factor of 38 and 57	C) 11
4) GCD of 3156 and 6	D) 19
	E) 1

INTEGER ANSWER TYPE

31. G.C.D of two Consecutive even numbers is _____

32. G.C.D of two Co-primes is _____

SYNOPSIS - 8

Relation between G.C.D and L.C.M. :

If 'a' and 'b' are any two natural numbers and L and G are respectively their L.C.M. and G.C.D. then a × b = L × G.

Eg 1 : If the G.C.D of two numbers is 16 and their product is 3072, then their

$$\text{L.C.M.} = \frac{\text{product of the given two numbers}}{\text{their G.C.D}} = \frac{3072}{16} = 192$$

Eg 2 : The L.C.M and G.C.D of two numbers respectively are 80 and 4. If one of the numbers is 16, then the other number is $b = \frac{L \times G}{a} = \frac{80}{16} = 5$

WORK SHEET - 8

SINGLE ANSWER TYPE

1. The H.C.F of two number is 11 and their L.C.M is 693. If one of the numbers is 77 then the other number is
   1) 9 2) 99 3) 69 4) 63
2. The H.C.F of two numbers is 11 and their LCM is 7700. If one of the number is 275, then the other is
   1) 279 2) 283 3) 308 4) 318
3. The H.C.F and L.C.M of two numbers are 84 and 21 respectively. If the ratio of the two numbers is $1:4$, then the larger of the two numbers is
   1) 12 2) 48 3) 84 4) 108
4. The product of two numbers is 1320 and their H.C.F is 6. The L.C.M of the numbers is
   1) 220 2) 1314 3) 1326 4) 7920

5. If the G.C.D of two numbers is 1, theb their LCM is equal to their
   1) Sum 2) Quotient 3) Different 4) Product
6. The LCM of two numbers is 1320. Their GCD is 12. If one of the number is 132 then another number is
   1) 123 2) 12 3) 120 4) 1200
7. The greater number that exactly divides 105, 100, and 2436 is
   1) 3 2) 7 3) 11 4) 21
8. The greatest possible length which can be used to measure exactly the lengths 7m, 3m 85 cm, 12m 95cm
   1) 15 cm 2) 25 cm 3) 35 cm 4) 42 cm
9. The maximum number of students among then 1001 pens and 910 pencils can be distributed in Such a way that each student gets the same number of pens and same number of pencils is
   1) 91 2) 910 3) 1001 4) 1911
10. The greatest number which can divide 1356, 1868 and 2764 leaving the same remainder 12 in each case is
    1) 64 2) 124 3) 156 4) 260
11. The least number of five digits which is exactly divisible by 12, 15 and 18 is
    1) 10010 2) 10015 3) 10020 4) 10080
12. The smallest number which when diminished by 7 is divisible by 12, 16, 18, 21 and 28 is
    1) 1008 2) 1015 3) 10020 4) 10080
13. The least number which when increased by 5 is divisible by each one of 24, 32, 36 and 54 is
    1) 427 2) 859 3) 869 4) 4320
14. The least number, which when divided by 12, 15, 20 and 54 leaves in each case remainder of 8 is
    1) 504 2) 536 3) 544 4) 548
15. Six belts Commence tolling together and toll at intervals of 2, 4, 6, 8, 10 and 12 seconds respectively. In 30 minutes, how many times do they toll together ?
    1) 4 2) 10 3) 15 4) 16

MULTI ANSWER TYPE

16. The H.C.F and LCM of two numbers is 10 and $10^{12} \times 7^2$. If one of the number is 10^{12} then the
    1) Other number is $10^{10} \times 7^2$ 2) Ratio of numbers is $100:49$
    3) Other number is $10^{12} \times 7^2$ 4) Ratio of numbers is $1:49$
17. H.C.F and LCM of two numbers $16^{20}, 32^{56}$ are
    1) $32^{16}, 32^{56}$ 2) $16^{20}, 32^{56}$ 3) $4^{40}, 128^{40}$ 4) $2^{80}, 2^{280}$

REASONING ANSWER TYPE

18. S.I : LCM of two numbers $2^{51}\times3^{18}$ and $2^{12}\times3^{42}\times5^{20}$ is $2^{51}\times3^{42}\times5^{20}$.
S.II : LCM of $a^p\times b^q\times c^r$ and $a^s\times b^t$ is $a^p\times b^q\times c^r$, if $p>s$ and $q>t$
1. Both Statements I and II are correct
2. Both statement I and II are incorrect
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

19. S.I : H.C.F of two numbers is 16 and their LCM is 160. If one of the numbers is 32, then the other number is 80.
S.I : Product of two numbers = Product of their HCF and LCM.
1. Both Statements I and II are correct
2. Both statement I and II are incorrect
3. Statement I is true, Statement II is false.
4. Statement I is false, Statement II is true.

COMPREHENSION TYPE

Realation between HCF and LCM of two numbres is product of two number = Product of their HCF and LCM.

20. The LCM of 248 and 868 is 1736, Then HCF is
1) 248 2) 124 3) 868 4) 1736

21. The product of two numbers is 15870 and their HCF is 23. Then LCM is
1) 238 2) 158 3) 700 4) 690

22. The HCF of two numbers is 31 and their LCM is 1488. If one of the numbers is 186. Then the other number is
1) 248 2) 134 3) 736 4) 688

MATRIX MATCHING TYPE

23. LCM and GCD of two numbers p and q are l and m respectively.

Column - I	Column - II
1) $p\times q$	A) m/p
2) p/m	B) $l\times m$
3) q/l	C) m/q
4) l/p	D) l/q
	E) q/m

INTEGER ANSWER TYPE

24. The product of LCM and GCD of the numbers 2 and 3 is _____

25. The product of numbers is 24 and LCM of the numbers is 12. Then their GCD is _____.

VERBAL REASONANING

1. R, U, X, A, D, ?
   a) F b) G c) H d) I
2. B, D, F, I, L, P, ?
   a) R b) S c) T d) U
3. H, I, K, N, ?
   a) O b) Q c) R d) S
4. A, G, L, P, S, ?
   a) U b) W c) X d) Y
5. A, D, H, M, ?, Z
   a) T b) G c) N d) S
6. Z, U, Q, ?, L
   a) I b) K c) M d) N
7. Z, Y, X, U, T, S, P, O, N, K, ?, ?
   a) H, G b) H, I c) I, H d) J, I
8. Z, X, S, I, R, R, ?, ?
   a) G, I b) J, I c) J, K d) K, M
9. A, B, B, D, C, F, D, H, E, ?, ?
   a) E, F b) F, G c) F, I d) J, F
10. C, Z, F, X, I, V, L, T, O, ?, ?
    a) O, P b) P, Q c) R, R d) S, R
11. Z, S, W, O, T, K, Q, G, ?, ?
    a) N, C b) N, D c) O, C d) O, D
12. AB, DEF, HIJK, ?, STUVWX
    a) LMNO b) LMNOP c) MNOPQ d) QRSTU
13. AZ, GT, MN, ?, YB
    a) JH b) SH c) SK d) TS
14. AZ, CX, FU, ?
    a) IR b) IV c) JQ d) KP
15. ajs, gpy, ?, sbk, yhq
    a) dmv b) mve c) oua d) qzi
16. BMX, DNW, FOU, ?
    a) GHO b) GPS c) HPS d) HPT
17. ABD, DGK, HMS, MTB, SBL, ?
    a) XKW b) ZAB c) ZKU d) ZKW
18. WFB, TGD, QHG, ?
    a) NIJ b) NIK c) NJK d) OIK

19. UPI, ?, ODP, MBQ, IAW
    a) RHJ b) SHJ c) SIJ d) THK
20. AYD, BVF, DRH, ?, KGL
    a) FMI b) GMJ c) GLJ d) HLK
21. A, CD, GHI, ?, UVWXY
    a) LMNO b) MNO c) MNOP d) NOPQ
22. ADVENTURE, DVENTURE, DVENTUR, ? , VENTU
    a) DVENT b) VENTURE c) VENTUR d) DVENTU

KEY & HINTS

W0RK SHEET – 1 (KEY)				
1) 4	2) 3	3) 2	4) 1	5) 1
6) 3	7) 2	8) 2	9) 3	10) 1
11) 2	12) 2	13) 3	14) 1	15) 2
16) 1	17) 2	18) 1,2,3	19) 1,2	20) 4
21) 3	22) 1	23) 2	24) 1	25) A-QS B-R C-P D-T
26) 0	27) 3			

W0RK SHEET – 2 (KEY)				
1) 3	2) 1	3) 1	4) 4	5) 4
6) 2	7) 1	8) 3	9) 2	10) 1
11) 1	12) 1	13) 3,4	14) 1,2	15) 1
16) 4	17) 2	18) 1	19) A-S B-R C-Q D-P	20) 5
21) 0				

W0RK SHEET – 3 (KEY)				
1) 1	2) 2	3) 4	4) 1	5) 1
6) 4	7) 2	8) 1,2	9) 2,3	10) 1
11) 1	12) 2	13) 1	14) 1-C 2-E 3-A 4-B	15) 6
16) 9				

WORK SHEET – 4 (KEY)				
1) 1	2) 4	3) 2	4) 4	5) 4
6) 4	7) 2	8) 4	9) 4	10) 4
11) 1,3	12) 1,2,3,4	13) 2,4	14) 1	15) 3
16) 2	17) 4	18) 1-E 2-F 3-D 4-B		

WORK SHEET – 5 (KEY)				
1) 1	2) 2	3) 2	4) 4	5) 2
6) 1	7) 1	8) 3	9) 2	10) 1
11) 1	12) 3	13) 4	14) 2	15) 3
16) 2	17) 3	18) 4	19) 4	20) 1,2,3,4
21) 1,2	22) 1,3	23) 1,2	24) 1	25) 3
26) 3	27) 4	28) 1	29) 4	30) 1
31) 1	32) 2	33) 3	34) 1-cde 2-c 3-a 4-be	35) A-3 B-5 C-1 D-2
36) A-2,3,5 B-1 C-2,3,5 D-3	37) 2	38) 1	39) 9	40) 100

WORK SHEET – 6 (KEY)				
1) 3	2) 2	3) 3	4) 4	5) 3
6) 1	7) 3	8) 4	9) 3	10) 1
11) 4	12) 2	13) 4	14) 3	15) 2
16) 1,2	17) 1,2,3,4	18) 1,2,3,4	19) 1,3,4	20) 1,2
21) 1,2	22) 1,2,3	23) 3	24) 1	25) 1
26) 4	27) 1	28) 3	29) 4	30) 1
31) 2	32) 1-pqrst 2-prt 3-pqs 4-p	33) 1-r 2-prt 3-s 4-pq	34) 3	35) 2
36) 3				

5. Key - (3)

$517x324$ is divisible by 3

$\therefore 5+1+7+x+3+2+4=22+x$ is also divisible by 3

$\therefore x=2$

6. (1)

If $5x2$ is divisible by 6 then it is also divisible by 2 and 3

$\therefore 5+x+2=7+x$ is also divisible by 3.

$\therefore x=2$

7. (3)

By using divisibility rule of 8, $6x2$ must be divisible by 8

$\therefore x=3$

8. (4)

$481x673$ is divisible by 9

$\therefore 4+8+1+x+6+7+3=29+x$ is also divisible by 9.

$\therefore x=7$

12. (2)

$97215x6$ is divisible by 11

$\therefore (9+2+5+6)-(7+1+x)$ is also divisible by 11.

$22-(9+x)$

$\therefore x=2$

13. If a number is divisible by 45 then it divisible by 5 and 9.
$\therefore$ By verification option (4) is Correct.

14. (3)
653xy is divisible by 80.
$\therefore$ It is divisible by both 10 & 8
$\therefore \ y=0, \ \Rightarrow \ x=4$ or 8
$\therefore x+y=4+0=4$

15. (2)
$4456+x$ is divisible by 6.
By Verification $x=2$

19. 1, 3, 4
Sum of the digits of the numbers are divisible by 3.

20. (1), (2)
Sum of the digits of the numbers are divisible by 9.

21. (1), (2)
Last Three digits of the number should be divisible by 8

22. 1, 2, 3
By using divisibility rule of 11.

26. By using divisibility rule of 9.
$\therefore$ Option (4) is Correct.

27. Option (2), (3) are not Correct because of odd numbers.
$\therefore 1+2+0+3+6+0=12$ is divisible by 3.
$\therefore$ option (1) is Correct

28. $1080 \rightarrow$ divisible by 9
$46782 \rightarrow$ divisible by 9
$112233 \rightarrow$ divisible by only 3 but not 9
$\therefore$ option (3) is Correct.

29. (4)
2358132 is even and sum of the digits is also divisible by 3.

30. By using divisibility rule of 8
option (1)

31. First Verify which is divisible by 8 after that by 6.
    Option (2) is Correct.
32. By using divisibility rules
    (1) $\rightarrow$ p, q, r, s, t
    (2) $\rightarrow$ p, r, t
    (3) $\rightarrow$ p, q, s
    (4) $\rightarrow$ p
33. By using divisibility rules
    (1) $\rightarrow$ r, (2) $\rightarrow$ p, r, t (3) $\rightarrow$ s, (4) $\rightarrow$ p, q
34. 3
35. $1+2+3+4+x=10+x$ must be divisible by 3.
    $\therefore x=2$
36. In $97215x6$, $5x6$ must be divisible by 8.
    $\therefore x=3$

WORK SHEET – 7 (KEY)				
1) 3	2) 3	3) 3	4) 1	5) 4
6) 4	7) 4	8) 1	9) 1	10) 1
11) 3	12) 2	13) 4	14) 3	15) 4
16) 4	17) 1,3	18) 2,3,4	19) 1,2	20) 1,2,3
21) 1	22) 1	23) 1	24) 2	25) 3
26) 1	27) 1	28) 1	29) 1-b 2-d 3-a 4-c	30) 1-abe 2-c 3-de 4-b
31) 2	32) 1			

1.

2	24 — 36 — 40
2	12 — 18 — 20
2	6 — 9 — 10
3	3 — 9 — 5
	1 — 3 — 5

L.C.M $= 2\times2\times2\times3\times3\times5 = 360$

3. Required L.C.M $= \dfrac{\text{L.C.M. of } 1, 5, 2, 4}{\text{H.C.F. of } 3, 6, 9, 27} = \dfrac{20}{3}$

4. Required L.C.M $= \dfrac{\text{L.C.M. of } 2, 3, 4, 9}{\text{H.C.F. of } 3, 5, 7, 13} = \dfrac{36}{1} = 36$

5. L.C.M = Product of highest powers of prime factors $= 2^5\times3^4\times5^3\times7^2\times11$

6. Given numbers are 3.00, 2.70 and 0.09 L.C.M of 300, 270 and 9 is 2700
$\therefore$ L.C.M of given numbers $= 27.00 = 27$

7. 2923

8. $204 = 2^2\times3\times17; 1190 = 2\times5\times7\times17; 1445 = 5\times17^2$
$\therefore$ H.C.F = 17.

10. H.C.F = Product of lowest powers of Common factors $= 3\times5\times7 = 105$

11. 

12. Required H.C.F $= \dfrac{\text{H.C.F of } 2, 8, 64, 10}{\text{L.C.M of } 3, 9, 81, 27} = \dfrac{2}{81}$

13. Given numbers with two decimal places are 1.75, 5.60 and 7.00 with out decimal places these numbers are 175, 560 and 700 whose H.C.F is 35
$\therefore$ H.C.F of given numbers $= 0.35$

14. Given numbers are 1.08, 0.36 and 0.90 H.C.F of 108, 36 and 90 is 18
$\therefore$ H.C.F of given numbers $= 0.18$

15. Let the number be $3\times$ and $4\times$ then , their H.C.F $= \times.50, \times = 4$
so the numbers are 12 and 16

L.C.M of 12 and 16 $=48$

16. Let the required numbers be $\times$, $2\times$ and $3\times$ then their H.C.F $=\times$. So, $\times=12$

$\therefore$ The numbers are 12, 24 and 36

17. $A=7^2\times9\times5^3,\quad B=7\times9^2\times5^2,\quad C=7^3\times9^3\times5$

$\therefore$ H.C.F $=7\times9\times5$ (Least powers)

L.C.M $=7^3\times9^3\times5^3$ (Greatest powers)

18. Numbers are $2x,3x$

$\therefore$ L.C.M is $6x=48$

$x=8$

$\therefore$ The numbers are 16, 24

H.C.F of 16, 24 is 8

Difference of 16, 24 is also 8

19. Let the required number be 27a and 276.

Then, $27a+27b=216 \Rightarrow a+b=8$.

Now, Co-primes with Sum 8 is (1, 7) and (3, 5)

$\therefore$ Required numbers are $(27\times1,27\times7)$ and $(27\times3,27\times5)$

$\therefore 27,189$ or $81,135$

20. $\therefore$ The numbers are 1, 117

G.C.D of Co-primes is 1.

L.C.M is product of Co-primes.

21. (1)

22. (1)

G.C.D of $(132-62),(237-132),(237-62)$

G.C.D of $70,105,175=35$

26. G.C.D of $(122-32),(157-122),(157-32)$

G.C.D of $90,35,125=5$

27. G.C.D of $(91-43),(183-91),(103-43)$

G.C.D of $48,92,140$ is 4.

28. G.C.D of $(4665-1305),(6905-4665),6905-(1305)$

G.C.D is 4.

29. $(1)\to B,\quad (2)\to D,\quad (3)\to A,\quad (4)\to C$

30. $(1)\to A,B,E,\quad (2)\to C,\quad (3)\to D,E,\quad (4)\to B$

WORK SHEET – 8 (KEY)				
1) 2	2) 3	3) 3	4) 1	5) 4
6) 3	7) 2	8) 3	9) 1	10) 1
11) 4	12) 2	13) 2	14) 4	15) 4
16) 1,2	17) 1,2,3,4	18) 1	19) 1	20) 2
21) 4	22) 1	23) 1-b 2-d 3-a 4-e	24) 6	25) 2

1. Other number $= \frac{11 \times 693}{77} = 99$

2. Other number $= \frac{11 \times 7700}{275} = 308$

3. Let the number be x and 4x.

   $\therefore \quad x \times 4x \;=\; 84 \times 21$

   $x^2 = \frac{84 \times 21}{4} = 21 \times 21$

   $\therefore$ Larger number $4x = 84$

4. L.C.M $= \frac{\text{Product of numbers}}{\text{H.C.F}} = \frac{1320}{6} = 220$

5. (4)

6. Other number $= \frac{1320 \times 12}{132} = 120$

7. H.C.F of 2436 and 1001 is 7.
   Also, H.C.F of 105 and 7 is 7.
   $\therefore$ H.C.F of 105, 1001, 2436 is 7.

8. Required length = H.C.F of 700 cm, 385 cm, 1295 cm
   $= 35$ cm

9. Required number of students = H.C.F of 1001 and 910
   $= 91$

10. Required number = H.C.F of $(1356-12),(1868-12)$ and $(2764-12)$

$= $ H.C.F of 1344, 1856 and 2752

$= 64$

11. Least number of 5 digits is 10000.
L.C.M of 12, 15 and 18 is 180.
On dividing 10000 by 180, the remainder is 100.

$\therefore$ Required number $= 10000+(180-100) = 10080$

12. Required number $= (\text{L.C.M of } 12, 16, 18, 21, 28)+7$

13. Required number $= (\text{L.C.M of } 24, 32, 36, 56)-5$

$= 859$

14. Required number $= (\text{L.C.M of } 12, 15, 20, 54)+8$

$540+8$

$= 548$

15. L.C.M of 2, 4, 6, 8, 10, 12 is 120
So, the bells will toll together after every 120 seconds.
i.e. 2 minutes.

In 30 minutes, they will toll together, $\frac{30}{2}+1=16$ times.

16. Othe number $= \frac{10^{10}\times 10^{12}\times 7^2}{10^{12}} = 10^{10}\times 7^2$

$\therefore$ Ratio of number is $10^{12}:10^{10}\times 7^2$

$100:49$

17. Given number are $16^{20}, 32^{56}$

$\therefore$ H.C.F is $16^{20} = 32^{16} = 4^{40} = 2^{80}$

L.C.M is $32^{56} = 128^{40} = 2^{280}$

18. (1)

19. (1)

20. $\therefore$ H.C.F $= \frac{\text{Product of numbers}}{\text{L.C.M}}$

$= \frac{248\times 868}{1736} = 124$

21. L.C.M $= \frac{15870}{23} = 690$

22. Other number $= \frac{1488\times 31}{186} = 248$

23. $(1) \to B,\ (2) \to D,\ (3) \to A,\ (4) \to E$

24. L.C.M $\times$ G.C.D = Product of number

$= 2 \times 3$

$= 6$

25. G.C.D $= \dfrac{\text{Product of numbers}}{\text{L.C.M}}$

$= \dfrac{24}{12}$

$= 2$

VERBAL REASONING (KEY)				
1) B	2) C	3) C	4) A	5) D
6) D	7) D	8) A	9) D	10) C
11) A	12) C	13) B	14) C	15) B
16) D	17) B	18) B	19) B	20) B
21) C	22) C			

1. (b) : $R \xrightarrow{+3} U \xrightarrow{+3} X \xrightarrow{+3} A \xrightarrow{+3} D \xrightarrow{+3} G$

2. (c) : $B \xrightarrow{+2} D \xrightarrow{+2} F \xrightarrow{+3} I \xrightarrow{+3} L \xrightarrow{+4} P \xrightarrow{+4} (T)$

3. (c) : $H \xrightarrow{+1} I \xrightarrow{+2} K \xrightarrow{+3} N \xrightarrow{+4} (R)$

4. (a) : $A \xrightarrow{+6} G \xrightarrow{+5} L \xrightarrow{+4} P \xrightarrow{+3} S \xrightarrow{+2} (U)$

5. (d) : $A \xrightarrow{+3} D \xrightarrow{+4} H \xrightarrow{+5} M \xrightarrow{+6} (S) \xrightarrow{+7} Z$

6. (d) : $Z \xrightarrow{-5} U \xrightarrow{-4} Q \xrightarrow{-3} (N) \xrightarrow{-2} L$

7. (d) : $(Z \to Y \to X) \xrightarrow{-3} (U \to T \to S) \xrightarrow{-3} (P \to O \to N) \xrightarrow{-3} (K \to (J) \to (I))$

8. (a) : $Z \xrightarrow{-2} X \xrightarrow{-5} S \xrightarrow{-10} I \xrightarrow{-17} R \xrightarrow{-26} R \xrightarrow{-37} (G) \xrightarrow{-50} (I)$

9. (d) : The given sequence is a combination of two series :

I. 1st, 3rd, 5th, 7th, 9th, 11th, terms *i.e.* $A, B, C, D, E, ?$

II. 2nd, 4th, 6th, 8th, 10th terms $i.e. B, D, F, H$?

Clearly, I consists of consecutive letters while II consists of alternate letters. So, the missing letter in I is F, while that in II is J.

So, the missing terms $i.e. 10th$ and $11th$ terms are J and F respectively.

10. (c) : The given sequence is a combination of two series :
I. C, F, I, L, O, ? and
II. Z, X, V, T, ?

The pattern in I is : $C \xrightarrow{+3} F \xrightarrow{+3} I \xrightarrow{+3} L \xrightarrow{+3} O \xrightarrow{+3} (R)$

The pattern in II is : $Z \xrightarrow{-2} X \xrightarrow{-2} V \xrightarrow{-2} T \xrightarrow{-2} (R)$

11. (a) :The given sequence is a combination of two series :
I. Z, W, T, Q, ? and II. S, O, K, G, ?

The pattern in I is : $Z \xrightarrow{-3} W \xrightarrow{-3} T \xrightarrow{-3} Q \xrightarrow{-3} (N)$

The pattern in II is : $S \xrightarrow{-4} O \xrightarrow{-4} K \xrightarrow{-4} G \xrightarrow{-4} (C)$

12. (c) : The number of letters in the terms of the given series increases by one at each step.
The first letter of each term is two steps ahead of the last letter of the preceding term. However, each term consists of consecutive letters in order.

13. (b) : 1st letter : $A \xrightarrow{+1} B \xrightarrow{+1} C \xrightarrow{+1} (D)$

2nd letter : $Z \xrightarrow{-6} T \xrightarrow{-6} N \xrightarrow{-6} (H) \xrightarrow{-6} B$

14. (c) : 1st letter : $A \xrightarrow{+2} C \xrightarrow{+3} F \xrightarrow{+4} (J)$

2nd letter : $Z \xrightarrow{-2} X \xrightarrow{-3} U \xrightarrow{-4} (Q)$

15. (b) : 1st letter : $a \xrightarrow{+6} g \xrightarrow{+6} (m) \xrightarrow{+6} s \xrightarrow{+6} y$

2nd letter : $j \xrightarrow{+6} p \xrightarrow{+6} (v) \xrightarrow{+6} b \xrightarrow{+6} h$

3rd letter : $s \xrightarrow{+6} y \xrightarrow{+6} e \xrightarrow{+6} k \xrightarrow{+6} q$

16. (d) : 1st letter : $B \xrightarrow{+2} D \xrightarrow{+2} F \xrightarrow{+2} (H)$

2nd letter : $M \xrightarrow{+1} N \xrightarrow{+1} O \xrightarrow{+1} (P)$

3rd letter : $X \xrightarrow{-1} W \xrightarrow{-2} U \xrightarrow{-1} (T)$

17. (b) : 1st letter : $A \xrightarrow{+3} D \xrightarrow{+4} H \xrightarrow{+5} M \xrightarrow{+6} S \xrightarrow{+7} (Z)$

2nd letter : $B \xrightarrow{+5} G \xrightarrow{+6} M \xrightarrow{+7} T \xrightarrow{+8} B \xrightarrow{+9} (K)$

3rd letter : $D \xrightarrow{+7} K \xrightarrow{+8} S \xrightarrow{+9} B \xrightarrow{+10} L \xrightarrow{+11} (W)$

18. (b) :1st letter : $W \xrightarrow{-3} T \xrightarrow{-3} Q \xrightarrow{-3} (N)$

2nd letter : $F \xrightarrow{+1} G \xrightarrow{+1} H \xrightarrow{+1} (I)$

3rd letter : $B \xrightarrow{+2} D \xrightarrow{+3} G \xrightarrow{+4} (K)$

19. (b) :1st letter : $U \xrightarrow{-2} (S) \xrightarrow{-4} O \xrightarrow{-2} M \xrightarrow{-4} I$

2nd letter : $P \xrightarrow{-8} (H) \xrightarrow{-4} D \xrightarrow{-2} B \xrightarrow{-1} A$

3rd letter : $I \xrightarrow{+1} (J) \xrightarrow{+6} P \xrightarrow{+1} Q \xrightarrow{+6} W$

20. (b) :1st letter : $A \xrightarrow{+1} B \xrightarrow{+2} D \xrightarrow{+3} G \xrightarrow{+4} (K)$

2nd letter : $Y \xrightarrow{-3} V \xrightarrow{-4} R \xrightarrow{-5} M \xrightarrow{-6} (G)$

3rd letter : $D \xrightarrow{+2} F \xrightarrow{+2} H \xrightarrow{+2} J \xrightarrow{+2} (L)$

21. (c) : Each term consists of consecutive letters in order. The number of letters in the terms goes on increasing by one at each step. Also, there is a gap of one letter between the last letter of the first term and the first letter of the second term; a gap of two letters between the last letter of the second term and the first letter of the third terml; and so on. So, there should be a gap of three letters between the last letter of the third term and the first letter of the desired term.

22. (c) : One letter from the beginning and one from the end of a term are removed, one by one, in alternate steps.