NTSE - Foundation
Number System

Introduction

Number System is a method of writing numerals to represent numbers.

- Ten symbols 0,1,2,3,4,5,6,7,8,9 are used to represent any number (however large it may b) in our number system.
- Each other symbols 0,1,2,3,4,5,6,7,8,9 is called a digit or a figure.

Integers

The set of integers is the set of natural number ,Zero and negative of natural number simultaneously. The st of integers is denoted by I or Z

- Z ={…...-4,-3,-2,-1,0,1,2,3,4….}

Natural Number

- Positive integers1,2,3,4…are called Natural numbers.
- Counting number 1,2,3,4,5…are called natural numbers.
- The set of natural number is denoted by N i.e, N=(1,2,3,4,5……)

Whole Number

- All natural number together with zero are called whole numbers, as 0,1,2,3,4…, are whole numbers.
- The set of whole number is denoted by W, i.e. W={1,2,3,4,5……}So , W=N $\cup${0},where N is the set of natural numbers..
- 0 is the smallest whole number , there is no largest whole number i.e. the number of the number of the elements in the set of whole numbers is infinite.
- Every natural number is a whole number .ie. N $\subset$ Wi.e. N is a subset of w.
- 0 is a whole number, but not a natural number i,e, $0 \in W$ but $0 \notin n$
- N is also a proper subset of W, i.e . $\subset$ W.

Even Numbers

- Whole numbers which are exactly divisible by 2 are called even numbers.
- The set of even numbers is denoted by 'E', such that E={0,2,4,6,8,…..}.

Odd Numbers

- Natural numbers which are not exactly divisible by 2 are called Odd numbers. O={1,3,5,7,9……}.

Prime Numbers

Natural numbers having exactly two distinct factors i.e. 1 and the number itself are called Prime numbers.

- 2 is the smallest and only even prime number.

Identification of Prime Number

Step (i) : Find approximate square root of given number

Step (ii) : Divide the given number by prime numbers less then approximately square root of number . if given number is not number is prime otherwise not .

Ex.1 is 131 a prime number?

Sol. Approximate square root = 12
Prime number < 12 are 2,3,5,7,11. But 131 is not divisible by any of these prim number. So 131 is a prime number .

Composite Numbers

Natural numbers having more than two factors are called Composite numbers.

- 4,6,8,9,10,12,14,15,16,18…are composite numbers.
- Number 1 is neither prime nor composite number.
- All even number except 2 are composite numbers.
- Every natural number except 1 is either prime or composite number.
- There are infinite prime numbers and infinite composite numbers.

Co- Prime Number or Relatively Prime Numbers

- Two natural numbers are said to be co- prime numbers or relatively prime numbers if they have only 1 as common factor. For ex.8,9; 15,16 ;26,33 etc. are co-prime numbers.
- Co- prime numbers may not themselves be prime numbers .As 8 and 9are co-prime numbers, but neither 8not 9is a prime number.
- Every two consecutive natural number are co-primes.

Twin primes

- Pairs of prime numbers which have only one composite number between them called Twin primes.
  3,5;5,7;11,13;17,19;29,31;41,43;59,61and 71,73etc. are twin primes.

Divisibility Test

Number	Divisibility
2	Unit digit should be 0 or even
3	The sum of digits of no. should be divisible by 3
4	The no. formed by last 2 digits of given no. should be divisible by 4.
5	Unit digit should be 0 or 5
6	No. should be divisible by 2& 3 both
8	The number formed by last 3 digits of given no. should be divisible by 8.
9	Sum of digits of given no should be divisible by 9
11	The difference between sums of the digits at even & at odd places should be zero or multiple of 11.
25	Last 2 digits of the number should be 00,25,50or 75

Ex.2 Which one of the following number is exactly divisible by 11 ?

(A) 235641 (B) 245642

(C) 315624 (D) 415624

Sol. (A) (1+6+3) –(2+5+4)=1 No

(B) (2+6+4) – (2+5+2)= No

(C) (4+6+1) – (2+5+3)= 1 No

(D) (4+6+1) – (2+5+4) = 0 (Yes).

Rational Numbers

These are real numbers which can be expressed in the form of p/q .where p and q are integers and $q \neq 0$ .e.g. 2/3, 37/15,-17/19.

- ❖ All natural numbers, whole numbers and integers are rational.
- ❖ Rational numbers include all integers and (without any decimal part to it), terminating fractions(fractions in which the decimal parts terminating e.g. 0.75,-0.02etc.)and also non-terminating but recurring decimals e.g. 0.666….,-2.333….,etc.

Fractions

(a) Common fraction : Fractions whose denominator is not 10.

(b) Decimal fraction : Fractions whose denominator is 10 or any power of 10.

(c) Proper fraction :

Numerator < Denominator i.e. $\frac{3}{5}$.

(d) Improper fraction :

Numerator > Denominator i.e. $\frac{5}{3}$.

(e) Mixed fraction :

Consists of integral as well as fractional pert i.e. $3\frac{2}{7}$.

(f) Compound fraction : Fraction whose numerator and denominator themselves are fractions. i.e. $\frac{2/3}{5/7}$

- ❖ Improper fraction can be written in the form of mixed fraction.

Irrational Numbers

All real number which are not rational are irrational numbers. These are non- recurring as well as non-terminating type of decimal numbers

e.g. $\sqrt{2}, \sqrt[3]{4}, 2+\sqrt{3}, \sqrt{2+\sqrt{3}}, \sqrt[4]{7\sqrt{3}}$ etc.

Pure Recurring Decimal

If in a decimal fraction , a figure or a set of figures is repeated continuously, then such a number is called recurring decimal.

Thus, $\frac{1}{3} = 0.333..... = 0.\overline{3}$

$\frac{22}{7} = 3.142857142857.... = 3.\overline{142857}$

Conversion of decimal numbers into rational numbers of the form plq.

Short method for pure recurring decimal : Write the repeated digit or digits only once in the numerator and take as many nines in the denominator as there are repeating digits in the given number.

e.g. (i) $0.\overline{3} = 3/9 \text{ or } 1/3$

(ii) $0.\overline{387} = 387/999$

Mixed Recurring Decimal

A decimal is said to be a mixed recurring decimal if there is at least one digit after the decimal point, which is not repeated.

Short cut method for mixed recurring decimal: Form a fraction in which numerator is the difference between the number formed by all the digits after the decimal point taking the repeated digits only once and that formed by the number formed by as many nines as there are repeated digits followed by as many zeros as the number of non- repeated digits.

Ex.3 Change $0.74\overline{35}$ in the form of p/q.

Sol. $0.74\overline{35} = \frac{7435-74}{9900} = \frac{7361}{9900}$

Compassion Fractions

Suppose some fractions are to be arranged in ascending or descending order of magnitude. Then convert each one of the given fractions in the decimal form, and arrange them accordingly,

Now, $\frac{3}{5} = 0.6, \frac{6}{7} = 0.857 \frac{7}{9} = 0.777....$

Since 0.857 > 0.777….>0.6, so $\frac{6}{7} > \frac{7}{9} > \frac{3}{5}$

Real Numbers

❖ The sets of rational numbers and irrational numbers taken together are known as a set of real numbers.

Modulus of a Real Numbers

The absolute value of a real number |x| is defined as

$$|x| = \begin{cases} x, \text{if } x \geq 0 \\ x, \text{if } x < 0 \end{cases}$$

For example :

$|2| = 2; 2 > 0$ and $|-2| = -(-2) = 2; -2 < 0.$

Bodmas Rule

This rule depicts the correct sequence in which the operations are to be executed so as to find the value of a given expression.

Here 'B' stands for 'Bracket', 'O' for 'D' for Division 'M' for Multiplication ', 'A' for 'Addition' and 'S' for subtraction'.

Thus, in simplifying and expression, first of all the brackets must be removed, strictly in the order (),{} and [].

(i) Of (ii) Division
(iii) Multiplication
(iv) Addition (v) Subtraction.

Vinculum (or Bar) : When an expression contains Vinculum, before applying under the Vinculum.

Ex.4 Simplify : $\left[3\frac{1}{3} \div \left\{1\frac{1}{2} - \frac{1}{2}\left(2\frac{1}{2} - \frac{1}{4} - \frac{1}{6}\right)\right\}\right]$

Sol. Given exp. $\left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{5}{2} - \frac{3-2}{12}\right)\right\}\right]$

$$= \left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{5}{2} - \frac{1}{12}\right)\right\}\right] = \left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{1}{2}\left(\frac{30-1}{12}\right)\right\}\right]$$

$$= \left[\frac{13}{4} \div \left\{\frac{5}{4} - \frac{29}{24}\right\}\right] = \left[\frac{13}{4} \div \left\{\frac{30-29}{24}\right\}\right]$$

$$= \left[\frac{13}{4} \div \frac{1}{24}\right] = \left[\frac{13}{4} \div 24\right] = 78.$$

Square and Square Roots

Squares : When a number is multiplied by itself then the product is called the square of that number.

Perfect Square : A natural number is called a perfect square if it is the square of any other natural number e.g. 1,4,9,… are the squares of 1,2,2,… respectively.

Ex. 5 Find the least perfect square which is exactly divisible by each of the numbers 6,9,15 and 20.

Sol

3	6,9,15,20
5	2,3,5,20
2	2,3,1,4
	1,3,1,2

$\therefore$ LCM = $3 \times 5 \times 2 \times 3 \times 2 = 180$

The least multiple of 180 which is a perfect square is 18 × 5=900.

Square roots : The square root of a number x is that number which when multiplied by itself gives x as the product . As we say square of 3 is 9, then we can also say that square root of 9 is 3.

The symbol use to indicate the square root of a number is '$\sqrt{\ }$',i.e.$\sqrt{81} = 9, \sqrt{225} = 15$ etc.

❖ We can calculate the square root of positive numbers only. However the square root of a positive number may be a positive or a negative number.

e.g. $\sqrt{25} = +5 \text{or} -5$

Properties of Square Roots :

(i) If the unit digit of a number is 2,3,7 or 8, then it does not have a square root in N
(ii) If a number ends in an odd number of zeros, then it does not have a square root in N
(iii) The square root of an even number is even and square root of an odd number is odd.

e.g. $\sqrt{81} = 9, \sqrt{256} = 16, \sqrt{324} = 18 \ldots$etc

(iv) Negative numbers have no square root in set of real numbers.

Ex.6 if $\sqrt{18225}$ =135 , then find the value of

$(\sqrt{182.25} + \sqrt{1.8225} + \sqrt{0.018225} + \sqrt{0.00018225})$

Sol. Given exp.

$$= \frac{\sqrt{18225}}{10^2} + \sqrt{\frac{18225}{10^4}} + \sqrt{\frac{18225}{10^6}} + \sqrt{\frac{18225}{10^8}}$$

$$= \frac{\sqrt{18225}}{10} + \frac{\sqrt{18225}}{10^2} + \frac{\sqrt{18225}}{10^3} + \frac{\sqrt{18225}}{10^4}$$

$$= \frac{135}{10} + \frac{135}{100} + \frac{135}{1000} + \frac{135}{10000}$$

$13.5 + 1.35 + 0.135 + 0.0135 = 14.9985.$

Cube and Cube Roots

Cube : if any number is multiplied by itself three times then the result is called the cube of that number.

Perfect cube : A natural number is said to be a perfect cube if it is the cube of any other natural number.

Cube roots : The cube root of a number x is that number whose cube gives x.

The cube root of x is denoted by symbol $\sqrt[3]{x}$. Thus ,

$\sqrt[3]{8} = 2, \sqrt[3]{27} = 3, \sqrt[3]{64} = 44, \sqrt[3]{125} = 5$ and so on.

Ex. 7 By what least number 675 be multiplied to obtain a number which is a perfect cube ?

Sol. $675 = 5 \times 5 \times 3 \times 3 \times 3$
To make it a perfect cube, it must be multiplied by .5.

Ex. 8 Find the cube root of .000216.
Sol.

$$(0.000216)^{1/3} = \left(\frac{216}{10^6}\right)^{1/3} = \left(\frac{6\times6\times6}{10^2\times10^2\times10^2}\right)^{1/3}$$

$$= \frac{6}{10^2} = \frac{6}{100} = 0.06$$

Factors and Multiples

Factors: 'a' is a factor of 'b' if there exists a relation such that a × n, where 'n' is any natural number.
Number of factors: For any composite number C, which can be expressed s $C = a^p \times b^q \times c^r \times$ ……where a,b,c….. are all prime factors and p,q,r are positive integers, then the number of factors is equal to (p+1) × (q+1) × (r + 1) = e.g. $36 = 22 \times 32$. So the factors of 36 = (2+1) × (2+1) = 3 × 3 = 9.

Ex.9 Find the total number of factors in the expression $(4)^{11} \times (7)5 \times (11)^2$
Sol. $(4)^{11} \times (7)5 \times (11)^2$
$= (2\times2)^{11} \times (7)^5 \times (11)^2$
$= 2^{22} \times 7^5 \times 11^2$
$\therefore$ Total number of factors =(22+1) (5+1) (2+1)=414.

Divisibility

Division Algorithm: General representation of result is ,

$$\frac{\text{Dividend}}{\text{Divisor}} = \text{Quotient} + \frac{\text{Remainder}}{\text{Divisor}}$$

Dividend = (Divisor × Quotient) + Remainder

Ex.10 On dividing 4150 by certain number, the quotient is 55 and the remainder is 25. Find the divisor.
Sol, $4150 = 55 \times x + 25$
$\Rightarrow 55x = 4125$
$\Rightarrow x = \frac{4125}{55} = 75$

Remainders

The method of finding the remainder without actually performing the process of division is termed as remainder theorem.

- Remainder should always be positive .For example if we divide -22 by 7, generally we -3 as quotient and – 1 as remainder .But this is wrong because remainder is never be negative is +6.We can also get remainder 6 by adding -1 to divisor 7 (7-1=6).

Ex. 11 A number when divided by 296 gives a remainder 75. When the same number is divided by 37, then find the remainder

Sol. Number = $(296\times Q)+75 = (37\times8Q)+(37\times2)+1)$
$= 37\times(8Q+2)+1.$
$\therefore$ Required remainder = 1.

Cyclicity

We are having 10 digits in our number systems and some of them shows special characteristics like they, repeat their unit digit after a cycle, for example 1 repeat its unit after every consecutive power . So, its cyclicity is 1 on the other hand digit 2 repeat its unit digit. The cyclicity os digits are as follows

Digit	**Cyclicity**
01,5 and 6	1
4and 9	2
2,3,7 and 8	3

S0, if we want to find the last digit of 2^{45} , divide 45 by 4. The remainder is 1 so the last digit of 2^{45} would be same as the last digit of 2^1 which is 2.

Ex.12 Find the unit digit in the product $(7^{71} \times 6^{59} \times 3^{65})$.
Sol. Unit digit in 7^4 is 1.
$\therefore$ Unit digit in 7^{68} is 1.
Unit digit in 7^{71} is 3.
[1 × 7 × 7 × 7 given unit digit 3]
Again , every power of 6 will give unit digit 6.
$\therefore$ Unit digit in 6^{59} is 6.
Unit digit in 3^4 is 1.
$\therefore$ Unit digit in 3^{64} is 1. Unit digit in 3^{65} is 3.
$\therefore$ Unit digit in $(7^{71} \times 6^{59} \times 3^{65})$
$\Rightarrow$ Unit digit in (6 × 6 × 3)=4.

EXERCISE

1. In numbers from 1to100 digit "o" appears _____ times.
   (A) 9 (B) 10
   (C) 11 (D) 12
2. How many numbers are there containing 2 digits.
   (A) 90 (B) 9
   (C) 100 (D) 89
3. 42(4+2) = (42×4) + (42×2) is an example of
   A) Closure property
   (B) Commutative property
   (C) Associative property
   (D) Distributive property
4. 38 +83 =83 + 38 is an example of :
   (A) Commutative property
   (B) Associative property
   (C) Closure property
   (E) Distributive property
5. Successor of 301999 is _____
   (A) 30200 (B) 302000
   (C) 302010 (D) 301100
6. Which of the following statement is true ?
   (A) Every whole number is a natural number
   (B) Every natural number is a whole number
   (C) '1' is the least whole number
   (D) None of these

7. What least number should be added to 1330 to get number exactly divisible by 43 ?
   (A) 46 (B) 1
   (C) 3 (D) 7
8. The smallest number which when divided by 20, 25,35 and 40 and leaves a remainder of 14, 19,29, and 34 respectively is :
   (A) 1394 (B) 1404
   (C) 1664 (D) 1406
9. The least number which when decreased by 7 is exactly divisible by 12, 16, 18, 21 and 28 is :
   (A) 1012 (B) 1008
   (C) 1015 (D) 1022
10. The greatest number that will divide 137, 182 and 422 leaving a remainder of 2 in each case is :
   (A) 15 (B) 12
   (C) 21 (D) None of these
11. The smallest number which when divided by 4,6,10,15 gives the same remainder 3 is :
   (A) 75 (B) 123
   (C) 63 (D) 39
12. Division of $\bar{5}.3716$ by 3 is given by :
   (A) - 2.4572 (B) $\bar{1}.7905$
   (C) $\bar{2}.4572$ (D) $\bar{2}.5472$
13. The last digit of the number $(373)^{333}$ is :
   (A) 1 (B) 2
   (C) 3 (D) 9
14. The two missing number shown with asterisk in the equation $5\frac{3}{*}\times *\frac{1}{2}$ = 19 are :
   (A) 6,3 (B) 7,3
   (C) 8,3 (D) 11,3
15. Given $\sqrt{5} = 2.236$ the value of $\sqrt{45}+\sqrt{605}-245$ correct to 3 decimal places is :
   (A) 15.652 (B) 11.180
   (C) 18.652 (D) 16.652
16. A student was asked to multiply a number by $\frac{3}{2}$ instead he divided the number $\frac{3}{2}$ and obtained a number smaller by $\frac{2}{3}$; the number is :
   (A) $\frac{4}{5}$ (B) $\frac{3}{5}$
   (C) $\frac{2}{3}$ (D) $\frac{1}{2}$
17. Which of the following statements is true ?
   (A) $\frac{-2}{3}<\frac{4}{-9}<\frac{-5}{12}<\frac{7}{-18}$
   (B) $\frac{7}{-18}<\frac{-5}{12}<\frac{4}{-9}<\frac{-2}{3}$
   (C) $\frac{4}{-9}<\frac{7}{-18}<\frac{-5}{12}<\frac{-2}{3}$
   (D) $\frac{-2}{3}<\frac{-5}{12}<\frac{4}{-9}<\frac{7}{-18}$
18.. Which of the following rational numbers lie between $\frac{-3}{7}$ and $\frac{-9}{8}$?
   (A) $\frac{-1}{2}$ (B) 0
   (C) $\frac{12}{15}$ (D) None of these
19. $0.\overline{018}$ can be expressed in the rational form as :
   (A) $\frac{18}{1000}$ (B) $\frac{18}{990}$
   (C) $\frac{18}{9900}$ (D) $\frac{18}{999}$
20 The least number which must be subtracted from 2509 to make it a perfect square is :
   (A) 6 (B) 9
   (C) 12 (D) 14
21. $\sqrt{1+\sqrt{1+\sqrt{+....}}}$
   (A) equal 1
   (B) lies between o and 1
   (C) lies between 1 and 2
   (D) is greater than 2
22. if × * y = $\sqrt{x^2+y^2}$, the value of $(1*2\sqrt{2})(1*-2\sqrt{2})$ is :
   (A) -7 (B) 0
   (C) 2 (D) 9
23. The value of $4-\cfrac{5}{1+\cfrac{1}{+\cfrac{1}{2\frac{1}{4}}}}$
   (A) $\frac{40}{31}$ (B) $\frac{4}{9}$
   (C) $\frac{1}{8}$ (D) $\frac{31}{40}$
24. If A and B are real numbers and $A^2 + B^2 = 0$ then :
   (A) A > 0, B > 0 (B) A < 0, B > 0
   (C) A > 0 = B (D) A = - B
25. A two digit number is divisible by 3 and 4,. Also the difference between the unit ‘s digit and the ten’s digit is equal to 4. The number is :
   (A) 96 (B) 48
   (C) 36 (D) 72
26. Choose the rational number high does not lie between rational numbers $-\frac{2}{5}$ and $-\frac{1}{5}$.
   (A) $-\frac{1}{4}$ (B) $-\frac{3}{20}$
   (C) $-\frac{3}{10}$ (D) $-\frac{7}{20}$
27. What least value must be assigned to * so that the number 197 * 5462 is invisible by 9?
   (A) 1 (B) 2
   (C) 4 (D) None of these

28. In the number 357 * 25 * is divisible by both 3 and 5, then the missing digit in the unit's place and the thousandth place respectively are :
(A) 0,6 (B) 5,6
(C) 5,4 (D) None of these

29. The sum of three consecutive odd number is always divisible by :
I. 2 II. 3 III. 5 IV. 6
(A) only I (B) only II
(C) only I and III (D) (D) only II and IV

30. $4^{61} + 4^{62} + 5^{63} + 5^{54}$ is divisible by :
(A) 3 (B) 10
(C) 11 (D) 13

31. Which of the following has fractions in ascending order ?
(A) $\frac{2}{3},\frac{3}{5},\frac{7}{9},\frac{9}{11},\frac{8}{9}$ (B) $\frac{3}{5},\frac{2}{3},\frac{9}{11},\frac{7}{9},\frac{8}{9}$
(C) $\frac{3}{5},\frac{2}{3},\frac{7}{9},\frac{9}{11},\frac{8}{9}$ (D) $\frac{8}{9},\frac{9}{11},\frac{7}{9},\frac{2}{3},\frac{3}{5}$

32. Which of the following fractions is less than $\frac{7}{8}$ and greater than $\frac{1}{3}$?
(A) $\frac{1}{4}$ (B) $\frac{23}{24}$
(C) $\frac{11}{12}$ (D) $\frac{17}{24}$

33. Simplify : $18 - [5 - \{6 + 2(7 - \overline{8-5})\}]$
(A) 13 (B) 15
(C) 27 (D) 32

34. $5-\left[\frac{3}{4}+\left\{2\frac{1}{2}-\left(0.5+\overline{\frac{1}{6}-\frac{1}{7}}\right)\right\}\right]$ is equal to :
(A) $2\frac{23}{84}$ (B) $3\frac{1}{6}$
(C) $3\frac{3}{10}$ (D) $5\frac{1}{10}$

35. If 2805 ÷ 2.55 = 1100, then 280.5 ÷ 25.5 =
(A) 1.1 (B) 1.01
(C) 0.11 (D) 11

36. The least number by which 294 must be multiplied to make it a perfect square, is :
(A) 2 (B) 3
(C) 6 (D) 24

37. The number of prime factors of $(3 \times 5)^{12}$ $(2 \times 7)^{10}$ $(10)^{25}$ is :
(A) 47 (B) 60
(C) 72 (D) None of these

38. On dividing a number 999, the quotient is 366 and th remainder is 103. The number is :
(A) 364724 (B) 365387
(C) 365737 (D) 366757

39. A number when divided by 3 leaves a remainder 1. When the quotient is divided by 2, it leaves a remainder 1. What will be the remainder when the number is divided by 6?
(A) 6 (B) 3
(C) 4 (D) 5

40. Evaluate : $\frac{8-[5-(-3+2)]\div 2}{|5-3|-|5-8|\div 3}$
(A) 2 (B) 3
(C) 4 (D) 5

41. The value of $\sqrt{214+\sqrt{130-\sqrt{88-\sqrt{44+\sqrt{25}}}}}$ **[NTSE Stage - I/Raj. 2007]**
(A) 14 (B) 15
(C) 16 (D) 17

42. Teacher dictated the same dividend to four students. He gave them four different divisors 42, 56, 112 and 126 respectively, and asked to divided that dividend. Each student got the same remainder as 11, then the dividend is : **[NTSE Stage - I/Raj./2007]**
(A) LCM of all divisors + 11
(B) HCF of all divisors + 11
(C) Sum of all divisors + 11
(D) None of these above

43. The value of $\sqrt{1\frac{1}{2}[1\frac{1}{2}-1\frac{1}{2}+(1\frac{1}{2}-\overline{1\frac{1}{2}-1\frac{1}{4}})]}$ is : **[NTSE Stage - I/Raj./2008]**
(A) $\frac{1}{2}$ (B) $\frac{1}{4}$
(C) $\frac{1}{16}$ (D) $1\frac{1}{5}$

44. If $\sqrt{121}=1.1$ then $\sqrt{.000121}$ is equal to : **[NTSE Stage - I/Raj./2008]**
(A) 0.0011 (B) 0.011
(C) 0.11 (D) 11.0

45. The value of $0.\overline{4}$ is : **[NTSE Stage - I/Raj./2008]**
(A) $\frac{4}{10}$ (B) $\frac{4}{9}$
(C) $\frac{4}{100}$ (D) $\frac{9}{4}$

46. If a and b are natural numbers such that $\left(\frac{1}{a}\right)^{\frac{1}{h}} = 0.\overline{3}$ then the value of ab is : **[NTSE Stage - II/2007]**
(A) 81 (B) 24
(C) 192 (D) 375

47. If the sum of the digits of a number $(10^n - 1))$ is 4707, when n is a natural number, then the value of n is : **[NTSE Stage - II/2007]**
(A) 477 (B) 523
(C) 532 (D) 704

48. The last digit in the decimal representation of $\left(\frac{1}{5}\right)^{2000}$ is : **[NTSE Stage - II/2007]**
(A) 2 (B) 4
(C) 5 (D) 6

49. Unit's digit in the product $(2137)^{753}$ is:

[NTSE Stage - II/2007]

(A) 1 (B) 3
(C) 7 (D) 9

50. The smallest possible integer x, for which 1260 x = N^3, where N is a positive integer is :

[NTSE Stage - II/2008]

(A) 1470 (B) 2450
(C) 3675 (D) 7350

51. The number $\frac{1}{1+\sqrt{5}}$ lies between the numbers :

[NTSE Stage - II/2008]

(A) $\frac{1}{3}$ and $\frac{1}{2}$ (B) $\frac{1}{2}$ and $\frac{1}{\sqrt{2}}$
(C) $\frac{1}{4}$ and $\frac{1}{3}$ (D) $\frac{1}{5}$ and $\frac{1}{4}$

52. If x < - 2, then |1 + |1 + x|| equals :

[NTSE Stage - II/2008]

(A) 2 + x (B) x
(C) –x (D) -(2 + x)

53. A number when divided by 195 leaves a remainder 47. If the same number is divided by 15, then the remainder will be :

[NTSE Stage - II/2008]

(A) 1 (B) 2
(C) 3 (D) 4

ANSWER – KEY

NUMBER SYSTEM

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	C	A	D	A	B	B	C	A	C	A
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	C	C	C	B	A	A	A	A	D	B
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	C	D	C	C	B	B	B	B	B	B
Que.	31	32	33	34	35	36	37	38	39	40
Ans.	C	D	C	A	D	C	D	C	C	D
Que.	41	42	43	44	45	46	47	48	49	50
Ans.	B	A	A	B	B	A	B	D	C	D
Que.	51	52	53							
Ans.	C	D	B							