# Chapter – 16

# Playing With Numbers

- **Number in general form**: A number is said to be in a general form if it is expressed as the sum of the products of its digits with their respective place values.
- Numbers can be written in general form. Thus, a two digit number ab will be written as ab = 10a +b.
- The general form of numbers are helpful in solving puzzles or number games.
- The reasons for the divisibility of numbers by 10, 5, 2, 9 or 3 can be given when numbers are written in general form.
- **Tests of Divisiblity:**

  (i) **Divisibility by 2:** A number is divisible by 2 when its one's digit is 0, 2, 4, 6 or 8. Explanation: Given number abc = 100a +10b +c. 100a and 10b are divisible by 2 because 100 and 10 are divisible by 2. Thus given number is divisible by 2 only when a = 0, 2, 4, 6 or 8.

  (ii) **Divisibility by 3:** A number is divisible by 3 when the sum of its digits is divisible by 3. Example: given number = 61785. Sum of digits = 6+1+7+8+5 = 27 which is divisible by 3. Therefore, 61785 is divisible y 3.

  (iii) **Divisibility by 4:** A number is divisible by 4 when the number formed by its last two digits is divisible by 4. Example: 6216, 548, etc.

  (iv) **Divisibility by 5:** A number is divisible by 5 when its ones digit is 0 or 5. Example: 645, 540 etc.

  (v) **Divisibility by 6:** A number is divisible by 6 when it is divisible by both 2 and 3. Example: 246, 7230, etc.

  (vi) **Divisibility by 9:** A number is divisible by 9 when the sum of its digits is divisible by 9. Example: consider a number 215847. Sum of digits = 2+1+5+8+4+7 = 27 which is divisible by 9. Therefore, 215847 is divisible by 9.

  (vii) **Divisibility by 10:** A number is divisible by 10 when its ones digit is 0. Example: 540, 890, etc.

  (viii) **Divisibility by 11:** A number is divisible by 11 when the difference of the sum of its digits in odd places and the sum of its digits in even places is either o or a multiple of 11.

  Example: consider a number 462.

  Sum of digits in odd places = 4+2 = 6

  Sum of digits in even places = 6

  Difference = 6-6=0, which is zero. So, the number is divisible by 11.