

# Key Notes

## 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 Divisibility:**
  - (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 by 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 0 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.