## 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 $a b=$ $10 \mathrm{a}+\mathrm{b}$.
- 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 $a b c=100 a+10 b+c .100 a$ and $10 b$ 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 .

