

## PART (B) GEOMETRIC PROGRESSION (GP)

- **Geometric progression** →

In this progression, ratio between two consecutive terms is constant.

Where  $a = 1^{\text{st}}$  term

$$r = \text{common ratio} = t_2/t_1 = t_3/t_2 = t_4/t_3 = \dots$$

### Useful formula:

- nth term of series is given by:

$$t_n = a \cdot r^{n-1}$$

- Sum of n terms is given by:

$$S_n = a \frac{(r^n - 1)}{r - 1}$$

- Sum of infinite no. of terms is given by:

$$S_\infty = \frac{a}{1 - r}$$

### Do you know this:-

- Sum of n natural numbers is-

$$\sum n = \frac{n(n+1)}{2}$$

- Sum of squares of n natural numbers is-

$$\sum n^2 = \frac{n(n+1)(2n+1)}{6}$$

- Sum of cubes of n natural numbers is-

$$\sum n^3 = \left[ \frac{n(n+1)}{2} \right]^2$$

### ❖ **BASIC PROBLEMS of tn:**

1. The 4<sup>th</sup> term of the series 0.04 , 0.2, 1,... is  
a. 0.5 (b)  $\frac{1}{2}$  (c) 5 (d) none of these
2. For series 2,6,18,54,... find 8<sup>th</sup> term  
a) 4374 (b) 3455 (c)1255 d) none
3. The last term of series 1, -3, 9, -27, up to 7 term is  
(a) 297 (b) 729 (c) 927 (d) None of these
4. The last term of series 125, -25, 5, -1,, up to 8 term is  
(a) 1/625 (b) -625 (c) 625 (d) None of these

❖ **PROBLEMS of Sn**

5. The sum of 6 term of the G.P.  $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \dots$  is  
(a)  $\frac{83}{64}$  (b)  $\frac{63}{64}$  (c)  $\frac{1,023}{512}$  (d)  $\frac{63}{32}$
6. Sum of series  $1 + 3 + 9 + 27 + \dots$  is 364 the number of term  
a. 5 (b) 6 (c) 11 (d) none
7. The sum of how many terms of the sequence 256, 128, 64 ..... is 511.  
a) 8 (b) 9 (c) 7 (d) None of these.

❖ **WORD PROBLEMS :**

8. Find three numbers in G.P. such that their sum is 21, and the sum of their squares is 189  
:  
a) 5, 7, 9 (c) 3, 6, 12  
b) 3, 7, 11 (d) 4, 8, 9
9. Three numbers are in A.P. & their sum is 15. if 8,6,4 be added to them respectively the numbers are in G.P. then numbers are  
a. 2 ,6 ,7 (b) 4 ,6 ,5 , (c) 3 ,5 ,7 (d) none
10. The sum of four numbers in G.P is 60 & the A.M. of the 1<sup>st</sup> & the last is 18 .the number are  
a. 4 , 8 , 16 , 32 (b) 8, 4, 32, 16 (c) 4, 16, 8, 32 (d) none
11. A man borrows Rs. 8,190 & repays the loan in 12 months installment. If each installment is double than the preceding one, then the first & last installment are (in rupees)  
(a) 5 & 1200 (b) 2 & 4096 (c) 3 & 7200 (d) none of these
12. A man saves 1 paise today, 2 paise next day then 4 paise and say on.... Find his total saving in a week

- a) 2.27 Rs      b) 1.27 Rs      c) 5      d) none

13. The first, second and seventh term of A.P. are in G.P. and the common difference is 2, the 2<sup>nd</sup> term of A.P. is :

- a)  $\frac{5}{2}$       b) 2      c)  $\frac{3}{2}$       d)  $\frac{1}{2}$

❖ **PROBLEMS OF SUM UPTO INFINITY :**

14. Sum of infinite GP 3, 1,  $\frac{1}{3}$ , - - - - -

- b)  $\frac{2}{9}$     b)  $\frac{9}{2}$       c) 12      d) none

15. Sum of infinite GP 20, -10, 5, ....

- a)  $\frac{3}{40}$       b) 40    c)  $\frac{40}{3}$       d) none

16. The sum of the infinite GP  $14 - 2 + \frac{2}{7} - \frac{2}{49} + \dots$  is

- a.  $4\frac{1}{12}$     (b)  $12\frac{1}{4}$     (c) 12    (d) none

17. Find the sum to infinity of the following series :

$$1 - 1 + 1 - 1 + 1 - 1 + \dots \infty$$

- a) 1      b)  $\infty$       c)  $\frac{1}{2}$       d) Does not exist

18. The sum of terms of an infinite GP is 15. And the sum of the squares of the infinite term is 45. Find the common ratio.

- a)  $\frac{3}{2}$       b) 1      c)  $\frac{5}{2}$       d)  $\frac{2}{3}$

19. If  $x = 1 + \frac{1}{3} + \frac{1}{32} + \dots \infty$      $y = 1 + \frac{1}{4} + \frac{1}{42} + \dots \infty$  Find xy.

- a) 2      b) 1      c)  $\frac{8}{9}$       d)  $\frac{1}{2}$

❖ **OTHER PROBLEMS :**

20. Find the sum to n terms of the series :  $7+77+777+ \dots$ . To n terms :

- a)  $\frac{7}{9}(10^{n+1} - 10) - \frac{7n}{9}$   
 b)  $\frac{7}{9}(10^{n+1} - 10) + \frac{7n}{9}$   
 c)  $\frac{7}{81}(10^{n+1} - 10) - \frac{7n}{9}$   
 d)  $\frac{7}{81}(10^{n+1} - 10) + \frac{7n}{9}$

21. Four geometric means between 4 & 972 are

- a. 12,30,100,324      (b) 12,24,108,320  
 (c) 10,36,108,320      (d) none

22. If  $p, q$  &  $r$  are in A.P. &  $x, y, z$  are in G. P then  $x^{q-r} \cdot y^{r-p} \cdot z^{p-q}$  is equal to  
a. 0 (b) -1 (c) 1 (d) none

23. The sum of the series :  $0.5 + 0.55 + 0.555 + \dots$  To  $n$  terms is :

- a)  $\frac{5n}{9} + \frac{5}{9} [1 - (0.1)^n]$
- b)  $\frac{5n}{9} - \frac{5}{81} [1 - (0.1)^n]$
- c)  $\frac{5n}{9} + \frac{5}{81} [1 - (0.1)^n]$
- d)  $\frac{5n}{9} + \frac{5}{81} [1 + (0.1)^n]$