

**CHAPTER 9  
SEQUENCES AND SERIES**

common ratio and sum to  $n$  terms of this geometric progression. (3)

**DECEMBER 2020**

1. a) Sum of  $n$  terms of an A.P. is given by  $S_n = \frac{1}{2}(3n^2 - n)$ . Find the 10<sup>th</sup> term of the progression. (3)
2. a) If the common ratio of a Geometric Progression is  $-1$ , then which of the following will be sum of its first 20 terms? (1)
  - i)  $2^n$                                       ii) 20
  - ii) 0    iv)  $(-1)^{20}$
- b) Insert 4 numbers between 2 and 486 so that the resulting sequence is a Geometric Progression. (2)

**MARCH 2020**

3. a) If the sum of 20 terms of an A.P. is equal to the sum of first 30 terms, then the sum of first 50 terms is (1)
  - a) 50    b) 20
  - c) 0    d) 80
- b) Find the sum of infinite terms of the G.P  $-\frac{3}{4}, \frac{3}{16}, -\frac{3}{64}, \dots$  (2)

**IMPROVEMENT 2019**

4. a) In an arithmetic progression, the first term is 2 and the sum of the first five terms is one-fourth of the next five terms, show that 20<sup>th</sup> term is  $-112$ . (3)
- b) The sum of the first three terms of a geometric progression is 6 and sum of the next three terms is 128. Determine the first term,

**MARCH 2019**

5. The sum of first three terms of a Geometric progression is  $\frac{13}{12}$  and their product is  $-1$ . Find the common ratio and the terms. (3)
6. Consider the sequence: 3, 6, 9, 12, ..., 99.
  - a) How many terms are there in the given sequence? (1)
  - b) Find the mean of the sequence. (2)
  - c) Find the sum of squares of each term of the given sequence. (2)
  - d) Find the variance of the sequence. (1)

**IMPROVEMENT 2018**

7. a) How many terms of the GP,  $3, 3/2, 3/4, \dots$  are needed to give the sum  $\frac{3069}{512}$ ? (3)
- b) Insert five numbers between 8 and 26 such that the resulting sequence is an AP. (2)
- c) Find the sum to  $n$  terms of the series  $1 \times 2 + 2 \times 3 + 3 \times 4 + \dots$  (2)

**MARCH 2018**

8. a) Find the sum to  $n$  terms of the sequence  $4 + 44 + 444 + \dots$  (3)
- b) Find the  $n^{\text{th}}$  term of the sequence 3, 5, 7, ... (1)
- c) Find the sum to  $n$  terms of the series  $3 \times 1^2 + 5 \times 2^2 + 7 \times 3^2 + \dots$  (3)

**IMPROVEMENT 2017**

9. a) The  $n^{\text{th}}$  term of an AP is  $t_n = 3n - 2$ . Then the

common difference is ..... (1)

- b) In an AP the first term is 2 and the sum of the first five terms is  $1/4^{th}$  of the sum of the next five terms. Show that  $20^{th}$  term is -112. (4)

OR

- a) The common ratio of the G.P.  
 $\frac{5}{2}, \frac{5}{4}, \frac{5}{8}, \dots$  is ..... (1)
- b) Find the sum of n terms of the series  
 $8 + 88 + 888 + \dots$  (4)

**MARCH 2017**

10. a) The sum of the infinite series  $1, \frac{1}{3}, \frac{1}{9}, \dots$  is....
- a)  $\frac{3}{2}$                       ii)  $\frac{5}{2}$   
 iii)  $\frac{2}{3}$                       iv)  $\frac{7}{2}$  (1)
- b) Find the sum of all natural numbers lying between 100 and 1000 which are multiples of 5. (2)
- c) Find the sum of n terms of the sequence 8, 88, 888, ... (3)

OR

- a) The 6<sup>th</sup> term of the G.P.  $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \dots$  is.....
- i)  $\frac{1}{32}$                       ii)  $\frac{1}{64}$   
 iii)  $\frac{1}{16}$                       iv)  $\frac{1}{128}$  (1)
- b) The sum of the first three terms of a G.P is  $\frac{13}{12}$  and their product is -1. Find the common ratio and the terms. (3)
- c) Find the sum to n terms of the series:  
 $3 \times 1^2 + 5 \times 2^2 + 7 \times 3^2 + \dots$  (2)

**IMPROVEMENT 2016**

11. a) Which among the following represents the sequence whose  $n^{th}$  term is  $\frac{n}{n+1}$ ?
- i) 1, 2, 3, 4, 5, 6                      ii) 2, 3, 4, 5, 6  
 iii)  $2, \frac{3}{2}, \frac{4}{3}, \frac{5}{4}, \frac{6}{5}$                       iv)  $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}$  (1)
- b) Using progression, find the sum of first five terms of the series  $1 + \frac{2}{3} + \frac{4}{9} + \dots$  (2)
- c) Calculate:  $0.6 + 0.66 + 0.666 + \dots$  n terms. (3)

**MARCH 2016**

12. a) The  $n^{th}$  term of the G.P. 5, 25, 125, ... is.....
- i)  $n^5$                       ii)  $5^n$   
 iii)  $(2n)^5$                       iv)  $5^{2n}$  (1)
- b) Find the sum of all natural numbers between 200 and 1000 which are multiples of 10. (2)
- c) Calculate the sum of n-terms of the series whose  $n^{th}$  term is  $a_n = n(n+3)$ . (3)

**IMPROVEMENT 2015**

13. a) Geometric mean of 16 and 4 is ..... (1)
- i) 20                      ii) 4  
 iii) 10                      iv) 8
- b) Find the sum to n terms:  $5 + 55 + 555 + \dots$  (2)
- c) Find the sum to n terms of the A.P. whose  $k^{th}$  term is ..... (2)
- OR
- a) If the first 3 terms of an A.P. are  $x - 1, x + 1, 2x + 3$  then x is ..... (1)
- i) -2                      ii) 0  
 iii) 2                      iv) 4

b) Find the sum to  $n$  terms of the sequence  
 $1 \times 2 + 2 \times 3 + 3 \times 4 + \dots$  (2)

c) The  $n^{\text{th}}$  term of a G.P.  $5, \frac{-5}{2}, \frac{5}{4}, \frac{-5}{8}, \dots$  is  
 $\frac{5}{1024}$ . Find ' $n$ '. (2)

**MARCH 2015**

14. a) The  $3^{\text{rd}}$  term of the sequence whose  $n^{\text{th}}$  term  
 is  $\left(\frac{3}{2}\right)^{n+1}$  is ..... (1)

i)  $\frac{9}{4}$     ii)  $\frac{3}{2}$     iii)  $\frac{18}{3}$     iv)  $\frac{81}{16}$

b) Insert three numbers between 1 and 256 so  
 that the resulting sequence is a G.P. (2)

c) If  $m^{\text{th}}$  term of an A.P. is  $n$  and  $n^{\text{th}}$  term is  
 $m$ , where  $m \neq n$ , find  $p^{\text{th}}$  term. (3)

OR

a) The  $6^{\text{th}}$  term of the sequence whose  $n^{\text{th}}$  term  
 is  $a_n = \frac{2n-3}{6}$  is ..... (1)

i) 3    ii)  $\frac{1}{2}$     iii)  $\frac{3}{2}$     iv)  $\frac{1}{3}$

b) Find the sum infinity of the sequence  
 $1, \frac{1}{3}, \frac{1}{9}, \dots$  (2)

c) If  $a, b, c$  are in A.P. and  $a^{1/x} = b^{1/y} = c^{1/z}$ ,  
 prove that  $x, y, z$  are in A.P. (3)

**IMPROVEMENT 2014**

15. a) If the sum of a certain number of terms of A.P.  
 $25, 22, 19, \dots$  is 116, then find the last term. (2)

b) Find the sum to  $n$ - terms of the series

$1 \times 2 \times 3 + 2 \times 3 \times 4 + 3 \times 4 \times 5 + \dots$  (3)

OR

a) A man starts repaying a loan as a first  
 installment of Rs.1.000. If he increases the  
 installment by Rs. 150 every month, What  
 amount will he pay in the  $30^{\text{th}}$  installment? (2)

b) Find the sum to  $n$ -terms of the sequence:  
 $7, 77, 777, 7777, \dots$  (3)

**MARCH 2014**

16. a) If the sum of a certain number of terms of the  
 A.P  $25, 22, 19, \dots$  is 116, then find the last  
 term. (2)

b) Find the sum to  $n$  terms of the series  
 $1 \times 2 \times 3 + 2 \times 3 \times 4 + 3 \times 4 \times 5 + \dots$  (3)

**IMPROVEMENT 2013**

17. a) Find the sum of multiples of 7 between 200  
 and 400. (2)

b) The sum of first 3 terms of a Geometric  
 progression is  $\frac{39}{10}$  and their product is 1. Find  
 the terms. (3)

**MARCH 2013**

18. a) Find the 5th term of the sequence whose  $n^{\text{th}}$   
 term,  $a_n = \frac{n^2 - 5}{4}$  (1)

b) Find  $7+77+777+7777+\dots$  to  $n$  terms. (2)

c) Find the sum to  $n$  terms of the series.  
 $1 \times 2 + 2 \times 3 + 3 \times 4 + 4 \times 5 = \dots$  (2)

**IMPROVEMENT 2012**

19. a) What is the sum of the first 'n' natural numbers? (1)  
 b) Find the sum to 'n' terms of the series  $3 \times 8 + 6 \times 11 + 9 \times 14 + \dots$  (5)

**MARCH 2012**

20. a) Find the 10<sup>th</sup> term of an A.P whose n<sup>th</sup> terms is  $\frac{2n-3}{6}$ . (1)  
 b) Find the sum of the first 10 terms of the above A.P. (2)  
 c) Find the sum of first 10 terms of a G.P, whose 3<sup>rd</sup> term is 12 and 8<sup>th</sup> term is 384. (3)

**MARCH 2011**

21. a) Which of the following is the nth term of an A.P.?  
 a)  $3-2n$       b)  $n^2-3$   
 c)  $3^n-2$       d)  $2-3n^2$  (1)  
 b) Find the 10th term of the sequence  $-6, \frac{-11}{2}, -5, \dots$  (2)  
 c) The sum of first three terms of a G.P. is  $\frac{39}{10}$  and their product is 1. Find the common ratio and the terms. (3)

**IMPROVEMENT 2010**

22. a) In an A.P if m<sup>th</sup> terms is 'n' and n<sup>th</sup> terms is 'm',  $m \neq n$ , find the  $(m+n)^{th}$  term. (3)  
 b) If 3<sup>rd</sup>, 8<sup>th</sup> and 13<sup>th</sup> terms of a G.P. are x, y, z respectively, prove that x, y, z are in G.P. (2)  
 c) Prove that x, y, z in the above satisfies the

$$\text{equation } \frac{y^{10}}{(xz)^5} = 1 \quad (1)$$

**MARCH 2010**

23. a) In an AP, the first term is 2 and the sum of the first five terms is one fourth the sum of the next five terms. (1)  
 i) Find the common difference. (3)  
 ii) Find the 20<sup>th</sup> term. (1)  
 b) If A.M and G.M of two numbers are 10 and 8 respectively, find the numbers. (2)

**IMPROVEMENT 2009**

24. a) If the n<sup>th</sup> term of a sequence is  $\frac{n(n^2+5)}{4}$ , then find its first two terms. (1)  
 b) How many terms of the A.P.  $-6, -\frac{11}{2}, -5, \dots$  are needed to give the sum  $-25$ ? (2)  
 d) Find the 10<sup>th</sup> term of a G.P., whose 3<sup>rd</sup> term is 24 and 6<sup>th</sup> term is 192. (2)

**MARCH 2009**

25. a) Find the value of x in which the number  $\frac{-2}{7}, x, \frac{-7}{2}$  are in G.P. (1)  
 b) Find the sum of all natural numbers between 100 and 1000 which are multiples of 5. (2)  
 c) Prove that  $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$  (2)