CHAPTER 9

SEQUENCES AND SERIES

(4)

IMPROVEMENT 2018

1. a) How many terms of the GP, 3,3/2,3/4, … 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 $1\times 2+2\times 3+3\times 4+.....$ (2)

MARCH 2018

2. a) Find the sum to n terms of the sequence $4 \quad +44+444+\ldots$ (3)

   b) Find the n^{th} term of the sequence 3, 5, 7, … (1)

   c) Find the sum to n terms of the series. $3\times 1^2+5\times 2^2+7\times 3^2+...$ (3)

IMPROVEMENT 2017

3. a) The n^{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 GP $\frac{5}{2},\frac{5}{4},\frac{5}{8},...$ is ……. (1)

   b) Find the sum of n terms of the series $8 + 88 + 888 + …..$ (4)

MARCH 2017

4. a) The sum of the infinite series $1,\frac{1}{3},\frac{1}{9},...$ 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^{th} term of the G.P. $\frac{1}{2},\frac{1}{4},\frac{1}{8},...$ 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: $3\times 1^2+5\times 2^2+7\times 3^2+...$ (2)

IMPROVEMENT 2016

5. 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 $1+\frac{2}{3}+\frac{4}{9}+...$ (2)

   c) Calculate : $0.6+0.66+0.666+...$ n terms. (3)

MARCH 2016

6. 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

7. 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+… (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 $1\times 2+2\times 3+3\times 4+.....$ (2)

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

MARCH 2015

8. a) The 3rd term of the sequence whose n^{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) Interest three numbers between 1 and 256 so that the resulting sequence is a G.P. (2)

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

OR

a) The 6^{th} term of the sequence whose n^{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 $1, \frac{1}{3}, \frac{1}{9}, \ldots$ (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

9. a) If the sum of a certain number of terms of A.P. 25,22,19,…. Is 116, then find the last term. (2)

b) Find the sum to n- terms of the series $1\times 2\times 3+2\times 3\times 4+3\times 4\times 5+...$ (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^{th} installment? (2)

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

MARCH 2014

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

   b) Find the sum to n terms of the series $1\times2\times3+2\times3\times4+3\times4\times5+...$ (3)

IMPROVEMENT 2013

9. 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

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

    b) Find 7+77+777+7777+… to n terms. (2)

    c) Find the sum to n terms of the series.

    $1\times2+2\times3+3\times4+4\times5=...$ (2)

IMPROVEMENT 2012

11. a) What is the sum of the first 'n' natural numbers? (1)

    b) Find the sum to 'n' terms of the series `

    $3\times8+6\times11+9\times14+...$ (5)

MARCH 2012

12. a) Find the 10th term of an A.P whose nth 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 3rd term is 12 and 8th term is 384. (3)

MARCH 2011

13. 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 $-6,\frac{-11}{2},-5,...$ (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

14. a) In an A.P if mth terms is 'n' and nth terms is 'm', $m\neq n$, find the $(m+n)^{th}$ term. (3)

    b) If 3rd, 8th and 13th 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 equation $\frac{y^{10}}{(xz)^5}=1$ (1)

MARCH 2010

15. 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^{th} term. (1)

b) If A.M and G.M of two numbers are 10 and 8 respectively, find the numbers. (2)

IMPROVEMENT 2009

16. a) If the n^{th} term of a sequence is $\frac{n\left(n^2+5\right)}{4}$, then find its first two terms. (1)

b) How many terms of the A.P. $-6, -\frac{11}{2}, -5, \ldots$ are needed to give the sum –25? (2)

c) Find the 10^{th} term of a G.P., whose 3^{rd} term is 24 and 6^{th} term is 192. (2)

MARCH 2009

17. 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

$$1^2+2^2+3^2+....+n^2=\frac{n(n+1)(2n+1)}{6}$$ (2)