

**Work Sheet – 01 (Higher Mathematics), Chapter - Seven**

**Exercise – 7, Infinite Series**

**Creative Multiplication Choice Questions**

1. What is the  $n^{\text{th}}$  term of the series:  $2 + 5 + 8 + \dots$ ? [D.B.- 20]  
 a)  $n + 1$                       b)  $3n - 1$   
 c)  $2n$                               d)  $4n - 2$

Answer to the questions No. (2 – 3) from the following information:  $1 + \frac{2}{\sqrt{3}} + \frac{4}{3} + \frac{8}{3\sqrt{3}} + \frac{16}{9} + \dots$  is a series.

2. What is the  $7^{\text{th}}$  term of the series? [D.B.- 20]  
 a)  $\frac{32}{9\sqrt{3}}$                       b)  $\frac{32}{27}$   
 c)  $\frac{64}{27}$                               d)  $\frac{64}{27\sqrt{3}}$

3. What is the sum of the series? [D.B.- 20]  
 a)  $\frac{\sqrt{3}}{2 - \sqrt{3}}$                       b)  $\frac{\sqrt{3}}{\sqrt{3} - 2}$   
 c)  $\frac{2}{\sqrt{3} - 2}$                       d) Not possible

4.  $\{2, 0, 2, 0, \dots\}$  is a sequence whose – [My.B.- 20]  
 i. General term is  $1 + (-1)^{n+1}$ .  
 ii.  $10^{\text{th}}$  term is 2.  
 iii. Sum of the first 10 terms is 10.

Which one of the following is correct?

- a) i and ii                      b) ii and iii  
 c) i and iii                      d) i, ii and iii
5. What is the general ratio of the first term of a geometric series  $\frac{1}{3}$  and the infinite sum to  $\frac{5}{6}$ ? [R.B.- 20]

- a)  $\frac{1}{3}$                               b)  $\frac{2}{5}$   
 c)  $\frac{5}{6}$                               d)  $\frac{5}{3}$

6. Which one is the general term of  $\frac{1}{3}, \frac{1}{3^2}, \frac{1}{3^3}, \frac{1}{3^4}, \dots$ ? [R.B.- 20]  
 a)  $\frac{1}{3^n}$                               b)  $\frac{3}{3^{n+1}}$   
 c)  $\frac{n}{3^{n-1}}$                       d)  $\frac{n}{3^n}$

7. General term of the sequence  $\{1, \sqrt{3}, \sqrt{5}, \sqrt{7}, \dots\}$  is – [Dj.B.- 20]  
 a)  $\sqrt{2n + 1}$                       b)  $\sqrt{2n - 1}$   
 c)  $\sqrt{n + 1}$                       d)  $\sqrt{n - 1}$

8. What is the sum of the infinite geometric series:  $\frac{1}{4} + \frac{1}{4^2} + \frac{1}{4^3} + \dots$ ? [C.B.- 20]  
 a)  $\frac{1}{5}$                               b)  $\frac{1}{3}$   
 c)  $\frac{4}{5}$                               d)  $-\frac{4}{3}$

9. What is the sum up to the infinity of the geometric series:  $1 + \frac{1}{\sqrt{2}} + \frac{1}{2} + \frac{1}{2\sqrt{2}} + \dots$ ? [Ctg.B.- 20]  
 a)  $\frac{1}{2\sqrt{2}}$                       b)  $\frac{\sqrt{2}}{\sqrt{2} + 1}$   
 c)  $\frac{1}{\sqrt{2}}$                               d)  $\frac{\sqrt{2}}{\sqrt{2} - 1}$

10. In a sequence of  $n^{\text{th}}$  term,  $U_n = 4 + (-1)^n$  then – [S.B.- 20]  
 i.  $5^{\text{th}}$  term is 3.  
 ii. Difference between  $8^{\text{th}}$  term and  $5^{\text{th}}$  term is 2.  
 iii. The sum of the first 6 terms is 24.

Which one of the following is correct?

- a) i and ii                      b) ii and iii  
 c) i and iii                      d) i, ii and iii
11. What is the value of  $14^{\text{th}}$  term of the sequence:  $3, 6, 9, 12, \dots$ ? [S.B.- 20]  
 a) 48                              b) 42  
 c) 36                              d) 30

12.  $2 - 1 + \frac{1}{2} - \frac{1}{4} + \dots$  is a geometric series. Which one is the sum of the infinite series? [J.B.- 20]  
 a)  $-\frac{4}{3}$                               b)  $-\frac{3}{4}$   
 c)  $\frac{4}{3}$                               d)  $\frac{3}{4}$

Answer to the questions no. (13 – 14) according to the following information:  $1 + \frac{1}{4} + \frac{1}{16} + \dots$  is an infinite series.

13. What is the  $10^{\text{th}}$  term of the series? [B.B.- 20]  
 a)  $\frac{1}{4^9}$                               b)  $\frac{1}{4^{10}}$   
 c)  $\frac{1}{4^{11}}$                               d)  $\frac{1}{4^{12}}$

14. What is the sum of infinite series? [B.B.- 20]  
 a)  $\frac{4}{3}$                               b)  $\frac{5}{4}$   
 c)  $\frac{4}{5}$                               d)  $\frac{3}{4}$

Answer to the questions no. (15 – 16) according to the following information:  $2 + 0.2 + 0.02 + 0.002 + 0.0002 + \dots$

15. What is the 10<sup>th</sup> term of the series? [D.B.- 19]

- a)  $10^{-9}$                       b)  $10^9$   
c)  $2 \times 10^9$                     d)  $2 \times 10^{-9}$

16. What is the sum up to the infinity? [D.B.- 19]

- a)  $\frac{9}{5}$                                 b)  $\frac{10}{9}$   
c)  $\frac{20}{9}$                                 d)  $\frac{20}{11}$

Answer to the questions no. (17 – 18) on the basis of the information given below:  $5 + \frac{5}{4} + \frac{5}{16} + \frac{5}{64} + \dots$

17. Which is the sum of the given series up to infinity? [R.B.- 19]

- a) 4                                b) 5  
c)  $\frac{25}{4}$                                 d)  $\frac{20}{3}$

18. Which is the 7<sup>th</sup> term? [R.B.- 19]

- a)  $\frac{5}{4^7}$                                 b)  $\frac{5}{4^6}$   
c)  $\frac{20}{3} \left(1 - \frac{1}{4^7}\right)$                       d)  $\frac{20}{3} \left(1 - \frac{1}{4^6}\right)$

19. What is the 15<sup>th</sup> term of a sequence whose n<sup>th</sup> term =  $\frac{2 - (-1)^{3n}}{3}$ ? [Dj.B.- 19]

- a)  $\frac{1}{3}$                                 b) 1  
c) 15                                d)  $\frac{47}{3}$

20. What is the 20<sup>th</sup> term of a sequence whose n<sup>th</sup> term =  $\frac{1 - (-1)^n}{2}$ ? [C.B.- 19]

- a) 2                                b) 1  
c) 0                                d) -1

21. What is the sum of the infinite geometric series:  $\frac{1}{5} + \frac{1}{5^2} + \frac{1}{5^3} + \dots$ ? [Ctg.B.- 19]

- a)  $\frac{1}{6}$                                 b)  $\frac{1}{5}$   
c)  $\frac{1}{4}$                                 d)  $\frac{5}{4}$

22. Which one of the following is the geometric series when the common ratio is 3? [S.B.-19]

- a)  $\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots$   
b)  $\frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \dots$   
c)  $3 + 9 + 27 + \dots$   
d)  $64 + 32 + 16 + \dots$

23. If the common ratio of any geometric series is  $\frac{1}{2x+3}$  and sum up to the infinity is  $\frac{1}{2(x+1)}$ . Which one is the first term of the series? [J.B.- 19]

- a)  $\frac{1}{2x-3}$                             b)  $\frac{1}{2(x-1)}$   
c)  $\frac{1}{2x+2}$                             d)  $\frac{1}{2x+3}$

24. If the n<sup>th</sup> term of a sequence is  $3n - 5$ ,  $n \in \mathbb{N}$  then which one is the 9<sup>th</sup> term of sequence? [J.B.- 19]

- a) -2                                b) 22  
c) 27                                d) 32

25. What is the sum of the series:  $2 + 0.2 + 0.02 + \dots$  up to infinity? [B.B.- 19]

- a)  $\frac{9}{20}$                                 b)  $\frac{11}{20}$   
c)  $\frac{20}{11}$                                 d)  $\frac{20}{9}$

26. What is the sum of the series up to infinity:  $1 + \frac{1}{3} + \frac{1}{9} + \dots$ ? [All B.- 18]

- a)  $\frac{2}{3}$                                 b)  $\frac{3}{4}$   
c)  $\frac{13}{9}$                                 d)  $\frac{3}{2}$

27. What is the 15<sup>th</sup> term of a sequence whose n<sup>th</sup> term is  $\frac{1 - (-1)^n}{1+n}$ ? [D.B.- 17]

- a)  $-\frac{1}{8}$                                 b) 0  
c)  $\frac{1}{16}$                                 d)  $\frac{1}{8}$

28. What is the sum of first 30 terms of  $7 - 7 + 7 - 7 + \dots$ ? [R.B.- 17]

- a) 210                                b) 30  
c) 0                                d) -210

29. Which one is the summation of  $\frac{1}{3} + \frac{1}{3^2} + \frac{1}{3^3} + \dots$  up to infinity?

[R.B.- 17, J.B.- 16]

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

30. What is the sum of the first n terms of the series:  $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$ ?

[Dj.B.- 17]

- a)  $2 + \frac{1}{2^{n+1}}$                       b)  $2 - \frac{1}{2^{n+1}}$   
c)  $2 - \frac{1}{2^n}$                             d)  $2 - \frac{1}{2^{n-1}}$

31. What is the general term of the sequence:  $\frac{1}{2}, \frac{2}{2^2}, \frac{3}{2^3}, \frac{4}{2^4}, \dots$ ? [C.B.- 17]

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

32. Which is the sum of the series:  $0.12 + 0.0012 + 0.000012 + \dots$ ? [Ctg.B.- 17]

- a)  $\frac{4}{3}$                                       b)  $\frac{4}{33}$   
 c)  $\frac{4}{333}$                                       d)  $\frac{4}{3333}$

33. What is the 9<sup>th</sup> term of  $1 + \frac{1}{\sqrt{3}} + \frac{1}{3} + \dots$ ? [S.B.- 17]

- a)  $\frac{1}{81}$                                       b)  $\frac{1}{27}$   
 c)  $\frac{1}{9}$                                         d)  $\frac{1}{3}$

34. Which is the common ratio of  $0.23\dot{1}$ ? [J.B.- 17]

- a) 0.231                                  b) 0.0001  
 c) 0.001                                  d) 0.01

35. Under which condition on x the infinity series:  $\frac{1}{x+1} + \frac{1}{(x+1)^2} + \dots$

$\frac{1}{(x+1)^3} + \frac{1}{(x+1)^4} + \dots$  will have a sum?

[J.B.- 17]

- a)  $x \leq -2$  or  $x > 0$   
 b)  $-2 < x < 0$   
 c)  $x < -2$  or  $x \geq 0$   
 d)  $x < -2$  or  $x \geq 0$

36. Which one is the 19<sup>th</sup> term of the sequence  $\frac{1 - (-1)^n}{2}$ ? [B.B.- 17]

- a) -1                                      b) 0  
 c) 1                                        d) 2

Observe the following series and answer to the questions no. (37 – 39):

$1 + \frac{1}{3} + \frac{1}{9} + \dots$  is an infinity series.

37. Which one is the 15<sup>th</sup> term of the series? [B.B.- 17]

- a)  $\frac{1}{2^{14}}$                                       b)  $\frac{1}{2^{15}}$   
 c)  $\frac{1}{3^{14}}$                                       d)  $\frac{1}{3^{15}}$

38. What is the sum of the first five terms of the series? [B.B.- 17]

- a)  $\frac{21}{128}$                                       b)  $\frac{81}{121}$   
 c)  $\frac{121}{81}$                                         d)  $\frac{121}{18}$

39. What is the sum of the series upto infinity? [B.B.- 17]

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

40. Given that  $1 + 0.1 + 0.001 + \dots \infty$  then which is the summation of infinite series? [D.B.- 16]

- a)  $\frac{10}{9}$                                         b)  $\frac{9}{10}$   
 c)  $\frac{-10}{9}$                                         d)  $\frac{-9}{10}$

41. What is the 15<sup>th</sup> term of the sequence: 3, 5, 7, 9? [R.B.- 16]

- a) 23                                        b) 31  
 c) 33                                        d) 35

42. Find the infinity sum of the given series:  $\frac{1}{2} + \left(-\frac{1}{4}\right) + \frac{1}{8} + \left(-\frac{1}{16}\right) + \dots$ ? [R.B.- 16]

- a) 1                                        b)  $\frac{1}{2}$   
 c)  $\frac{1}{3}$                                         d)  $\frac{1}{4}$

43. What is the sum up to infinity of the series:  $0.2 + 0.02 + 0.002 + \dots$ ? [C.B.- 16]

- a)  $\frac{9}{2}$                                         b)  $\frac{2}{9}$   
 c)  $\frac{2}{11}$                                         d)  $\frac{1}{9}$

44. Find the sum of the  $(2n + 2)$  terms of the series:  $2 - 2 + 2 - 2 + \dots$ ? [C.B.- 16]

- a) 2                                        b) 1  
 c) 0                                        d)  $2n + 2$

45.  $1 + 0.1 + 0.01 + 0.001 + \dots$  [C.B.- 16]

- i. Is a geometric series.  
 ii. Common ratio of the series is 0.1.  
 iii. Infinite sum of the series is  $\frac{10}{9}$ .

Which one of the following is correct?

- a) i and ii                                  b) ii and iii  
 c) i and iii                                  d) i, ii and iii

46. What is the value of  $U_n$  of sequence

$U_n = \frac{1 - (-1)^n}{2}$  [Ctg.B.- 16]

- a) -1                                        b) 0  
 c) 1                                        d) 2

47. The  $n^{\text{th}}$  term of a sequence is  $U_n = \frac{1}{n}$  and  $U_n < \frac{1}{5^{-3}}$  then which one is correct? [S.B.- 16]

- a)  $n > \frac{1}{125}$                       b)  $n < \frac{1}{125}$   
 c)  $n > 5^3$                       d)  $n < 5^3$

48.  $-\frac{1}{3}, 1, \frac{1}{5}, \frac{1}{9}, \dots$  then which is the  $n^{\text{th}}$  term of the sequence? [B.B.- 16]

- a)  $\frac{1}{5n-8}$                       b)  $\frac{1}{3n-6}$   
 c)  $-\frac{1}{3n}$                       d)  $\frac{1}{4n-7}$

$1 + \frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \dots$  is an infinite series.

Now answer to the questions No. (49 - 51):

49. Which one is the 8<sup>th</sup> term of the series? [Dj.B.- 15]

- a)  $\frac{1}{32}$                       b)  $\frac{1}{64}$   
 c)  $\frac{1}{128}$                       d)  $\frac{1}{256}$

50. Which will be the summation of first five terms? [Dj.B.- 15]

- a)  $\frac{16}{31}$                       b)  $\frac{8}{31}$   
 c)  $\frac{31}{8}$                       d)  $\frac{31}{16}$

51. What will be the infinite summation of this series? [Dj.B.- 15]

- a) 1                      b) 2  
 c) 3                      d) 4

Observe the following series and answer to the questions no. (52 - 54):

$$8 + 2 + \frac{1}{2} + \frac{1}{8} + \frac{1}{32} + \dots$$

52. Which one is the 10<sup>th</sup> term of the series? [Ctg.B.- 15]

- a)  $\frac{1}{2^7}$                       b)  $\frac{1}{2^{11}}$   
 c)  $\frac{1}{2^{13}}$                       d)  $\frac{1}{2^{15}}$

53. Which is the sum of first five terms of the series? [Ctg.B.- 15]

- a)  $\frac{2^{10}-1}{2^8 \times 3}$                       b)  $8 \frac{2^{10}-1}{2^8 \times 3}$   
 c)  $8 \frac{2^8 \times 3}{2^{10}-1}$                       d)  $\frac{2^8 \times 3}{2^{10}-1}$

54. Which is the sum of the series upto infinity? [Ctg.B.- 15]

- a)  $\frac{19}{2}$                       b)  $\frac{32}{3}$   
 c)  $\frac{34}{3}$                       d)  $\frac{38}{3}$

55. What is the 12<sup>th</sup> term of the series: 1, 3, 5, 7.....?

- a) 12                      b) 13  
 c) 23                      d) 25

56. What is the 3<sup>rd</sup> term of a sequence whose  $n^{\text{th}}$  term =  $\frac{1}{n(n+1)}$ ?

- a)  $\frac{1}{3}$                       b)  $\frac{1}{6}$   
 c)  $\frac{1}{12}$                       d)  $\frac{1}{20}$

57. What is the 20<sup>th</sup> term of a sequence whose  $n^{\text{th}}$  term =  $\frac{1 - (-1)^n}{2}$ ?

- a) 0                      b) 1  
 c) -1                      d) 2

58. The  $n^{\text{th}}$  term of a sequence is  $U_n = \frac{1}{n}$  and  $U_n < 10^{-4}$ . The value of  $n$  is —

- i.  $n < 10^3$   
 ii.  $n < 10^4$   
 iii.  $n > 10^4$

Which one of the following is correct?

- a) iii                      b) i and iii  
 c) ii and iii                      d) i, ii and iii

59. If the  $n^{\text{th}}$  term of a sequence is  $U_n = 1 - (-1)^n$  then its --

- i. 10<sup>th</sup> term is 0.  
 ii. 15<sup>th</sup> term is 2.  
 iii. Sum of first 12 terms is 12.

Which one of the following is correct?

- a) i and ii                      b) i and iii  
 c) ii and iii                      d) i, ii and iii

Observe the following series and answer to the questions No. (60 - 62):

$$4 + \frac{4}{3} + \frac{4}{9} + \dots$$

60. What is the 10<sup>th</sup> term of the series?

- a)  $\frac{4}{3^{10}}$                       b)  $\frac{4}{3^9}$   
 c)  $\frac{4}{3^{11}}$                       d)  $\frac{4}{3^{12}}$

61. What is the sum of first 5 terms of the series?

- a)  $\frac{160}{27}$                       b)  $\frac{484}{81}$   
 c)  $\frac{12}{9}$                       d)  $\frac{20}{9}$

62. What is the sum of the series up to infinity?

- a) 0                      b) 5  
 c) 6                      d) 7

63. What is the  $n^{\text{th}}$  term of the series:

$1, \frac{2}{3}, \frac{3}{5}, \frac{4}{7}, \frac{5}{9}, \dots$ ?

a)  $\frac{n}{2n+1}$

b)  $\frac{n}{2n-1}$

c)  $\frac{n+1}{2n-1}$

d)  $\frac{2n}{2n+1}$

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