

Chapter 6

Sequence and Series

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- 1) Sum of the first n terms of the series $\frac{1}{2} + \frac{3}{4} + \frac{7}{8} + \frac{15}{16} + \dots$ is equal to (1998-2 Marks)
 - a) $2^n - n - 1$
 - b) $1 - 2^{-n}$
 - c) $n + 2^{-n} - 1$
 - d) $2^n + 1$
- 2) The number $\log_2 7$ is (1990-2 Marks)
 - a) an integer
 - b) a rational number
 - c) an irrational number
 - d) a prime number
- 3) If $\ln(a+c), \ln(a-c), \ln(a-2b+c)$ are in A.P., then (1994)
 - a) a, b, c are in A.P.
 - b) a^2, b^2, c^2 are in A.P.
 - c) a, b, c are in G.P.
 - d) a, b, c are in H.P.
- 4) Let a_1, a_2, \dots, a_{10} be in A.P. and h_1, h_2, \dots, h_{10} be in H.P. If $a_1 = h_1 = 2$ and $a_{10} = h_{10} = 3$, then $a_4 h_7$ is (1992 - 2 Marks)
 - a) 2
 - b) 3
 - c) 5
 - d) 6
- 5) The harmonic mean of the roots of the equation $(5 + \sqrt{2})x^2 - (4 + \sqrt{5})x + 8 + 2\sqrt{5} = 0$ is (1999 - 2 Marks)
 - a) 2
 - b) 4
 - c) 6
 - d) 8
- 6) Consider an infinite geometric series with first term a and common ratio r . If its sum is 4 and the second term is $3/4$, then (2000S)
 - a) $a = 4/7, r = 3/7$
 - b) $a = 2, r = 3/8$
 - c) $a = 3/2, r = 1/2$
 - d) $a = 3, r = 1/4$
- 7) Let α, β be the roots of $x^2 - x + p = 0$ and γ, δ be the roots of $x^2 - 4x + q = 0$. If $\alpha, \beta, \gamma, \delta$ are in G.P., then the integral values of p and q respectively are (2001S)
 - a) $-2, -32$
 - b) $-2, 3$
 - c) $-6, 3$
 - d) $6, -32$
- 8) Let the positive numbers a, b, c, d be in A.P. Then abc, abd, acd, bcd are (2001S)
 - a) NOT in A.P./G.P./H.P
 - b) in A.P.
 - c) in G.P.
 - d) in H.P.
- 9) If the sum of the first $2n$ terms of the A.P. $2, 5, 8, \dots$, is equal to the sum of the first n terms of the A.P. $57, 59, 61, \dots$, then n equals (2001S)
 - a) 10
 - b) 12
 - c) 11
 - d) 13
- 10) Suppose a, b, c are in A.P. and a^2, b^2, c^2 are in G.P. if $a < b < c$ and $a + b + c = 3/2$, then the value of a is (2002S)
 - a) $\frac{1}{2\sqrt{2}}$
 - b) $\frac{1}{2\sqrt{3}}$
 - c) $\frac{1}{2} - \frac{1}{\sqrt{3}}$
 - d) $\frac{1}{2} - \frac{1}{\sqrt{2}}$
- 11) An infinite G.P. has first term ' x ' and sum ' 5 ' then x belongs to (2004S)
 - a) $x < -10$
 - b) $-10 < x < 0$
 - c) $0 < x < 10$
 - d) $x > 10$
- 12) In the quadratic equation $ax^2 + bx + c = 0$, $\Delta = b^2 - 4ac$ and $\alpha + \beta, \alpha^2 + \beta^2, \alpha^3 + \beta^3$ are in G.P. where α, β are root of $ax^2 + bx + c = 0$, then (2005S)
 - a) $\Delta \neq 0$

- b) $b\Delta = 0$
- c) $c\Delta = 0$
- d) $\Delta = 0$

13) In the sum of first n terms of an A.P. is cn^2 , then the sum of squares of these n terms is (2009)

- a) $\frac{n(4n^2-1)c^2}{6}$
- b) $\frac{n(4n^2+1)c^2}{6}$
- c) $\frac{n(4n^2-1)c^2}{3}$
- d) $\frac{n(4n^2+1)c^2}{6}$

14) Let a_1, a_2, a_3, \dots be in harmonic progression with $a_1 = 5$ and $a_{20} = 25$. The least positive integer n for which $a_n < 0$ is (2012)

- a) 22
- b) 23
- c) 24
- d) 25

15) Let $b_i > 1$ for $i = 1, 2, \dots, 101$. Suppose $\log_e b_1, \log_e b_2, \dots, \log_e b_{101}$ are in Arithmetic Progression (A.P.) with the common difference $\log_e 2$. Suppose a_1, a_2, \dots, a_{101} are in A.P. such that $a_1 = b_1$ and $a_{51} = b_{51}$. If $t = b_1 + b_2 + \dots + b_{51}$ and $s = a_1 + a_2 + \dots + a_{53}$, then (JEE Adv. 2016)

- a) $s > t$ and $a_{101} > b_{101}$
- b) $s > t$ and $a_{101} < b_{101}$
- c) $s < t$ and $a_{101} > b_{101}$
- d) $s < t$ and $a_{101} < b_{101}$