SEQUENCE AND SERIES
PREVIOUS YEAR QUESTIONS

1. The remainder left out when $8^{2n} - (62)^{2n+1}$ is divided by 9 is: [AIEEE 2009]

   (a) 2 (b) 7

   (c) 8 (d) 0

2. The coefficient of x^7 in the expansion of $(1-x-x^2+x^3)^6$ is:

   (a) 144 (b) –132 [AIEEE 2011]

   (c) -144 (d) 132

3. Statement–I : For each natural number n, $(n+1)^7 - n^7 - 1$ is divisible by 7.

   Statement–II : For each number n, $n^7 - n$ is divisible by 7. [AIEEE 2011]

4. If n is a positive integer, then $(\sqrt{3}+1)^{2n} - (\sqrt{3}-1)^{2n}$ is

   (a) an odd positive integer

   (b) an even positive integer [AIEEE 2012]

   (c) a rational number other than positive integers

   (d) an irrational number

5. The term independent of x in expansion of $\left(\frac{x+1}{x^{2/3}-x^{1/3}+1} - \frac{x-1}{x-x^{1/2}}\right)^{10}$ is [JEE MAIN 2013]

   (a) 210 (b) 310

   (c) 4 120

6. The coefficients of the three consecutive terms of $(1+x)^{n+5}$ are in the ratio 5 : 10 : 14. Then n = ……

   [JEE ADVANCE 2013]

7. If the coefficient of x^3 and x^4 in the expansion of $(1 + ax + bx^2)(1- 2x)^{18}$ in powers of x are both zero, then (a, b) is equal to [JEE MAIN 2014]

   (a) (14, 272/3) (b) (16, 272/3)

   (c) (16, 251/3) (d) (14, 251/3)

8. Coefficient of x^{11} in the expansion of $(1 + x^2)^4 (1 + x^3)^7 (1 + x^4)^{12}$ is

   (a) 1051 (b) 1106 [JEE ADVANCED 2014]

   (c) 1113 (d) 1120

9. The sum of coefficients of integral powers of x in the binomial expansion of $(1 - 2\sqrt{x})^{50}$ is:

   (a) ½ $(3^{50} + 1)$ (b) ½ (3^{50}) [JEE MAINS 2015]

   (c) ½ $(3^{50} - 1)$ (d) ½ $(2^{50} + 1)$

10. The first two terms of a geometric progression add up to 12. The sum of the third and the fourth terms is 48. If the terms of the geometric progression are alternately positive and negative, then the first term is

(a) -12 (b) 12

(c) 4 (d) -4 [AIEEE 2008]

11. The sum to infinity of the series

$$1+\frac{2}{3}+\frac{6}{3^2}+\frac{10}{3^3}+\frac{14}{3^4}+....\text{is :}$$

(a) 3 (b) 4

(c) 6 (d) 2 [AIEEE 2009]

12. A person is to count 4500 currency notes. Let a_n denote the number of notes he counts in the n^{th} minute. If $a_1 = a_2 = ... = a_{10} = 150$ and $a_{10}, a_{11}, ...$ are in an AP with common difference – 2, then the time taken by him to count all notes is

(a) 24 minutes (b) 34 minutes

(c) 125 minutes (d) 135 minutes [AIEEE 2010]

13. If the sum of first n terms of an A.P. is cn^2, then the sum of squares of these n terms is

(a) $\frac{n(4n^2-1)c^2}{6}$ (b) $\frac{n(4n^2-1)c^2}{3}$ [IIT 2009]

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

14. Let $a_1, a_2, a_3, ... a_{11}$ be real numbers satisfying $a_1 = 15$, $27 - 2a_2 > 0$ and $a_k = 2a_{k-1} - a_{k-2}$ for $k = 3, 4, ..., 11$. If $\frac{a_1^2+a_2^2+....+a_{11}^2}{11} = 90$, then the value of $\frac{a_1+a_2+....+a_{11}}{11}$ is equal to

[IIT 2010]

15. Let a_n be the n^{th} term of an A.P. If $\sum_{r=1}^{100} a_{2r} = \alpha$ and $\sum_{r=1}^{100} a_{2r-1} = \beta$, then the common difference of the A.P is

(a) $\frac{\alpha-\beta}{200}$ (b) $\alpha-\beta$ [AIEEE 2011]

(c) $\frac{\alpha-\beta}{100}$ (d) $\beta-\alpha$

16. A man saves Rs.200 in each of the first three months of his service. In each of the subsequent months his saving increases by Rs.40 more than the saving of immediately previous month. His total saving from the start of service will be Rs. 11040 after:

(a) 18 months (b) 19 months [AIEEE 2011]

(c) 20 months (d) 21 months

17. The minimum value of the sum of real numbers a^{-5}, a^{-4}, $3a^{-3}$, 1 , a^{8}, and a^{10} with a > 0 is [IIT 2011]

18. Let a_1, a_2 , a_3 , ……, a_{100} be an arithmetic progression with $a_1 = 3$ and $S_p = \sum_{i=1}^{P} a_i$, $1 \le p \le 100$.

For any integer n with $1 \le n \le 20$, let m = 5n. If $\frac{S_m}{S_n}$ does not depend on n, then a_2 is [IIT 2011]

19. If 100 time the 100th term of an A.P. with non zero common difference equals the 50 times is 50th term, then the 150th term of this AP is

(a) 150 times its 50th term (b) 150 [AIEEE 2012]

(c) zero (d) -150

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

(a) 22 (b) 23 [IIT 2012]

(c) 24 (d) 25

21. The sum of first 20 terms of the sequence 0.7, 0.77, 0.777,…., is [JEE MAIN 2013]

(a) $\frac{7}{81}(179 + 10^{-20})$ (b) $\frac{7}{9}(99 + 10^{-20})$

(c) $\frac{7}{81}(179 - 10^{-20})$ (d) $\frac{7}{9}(99 - 10^{-20})$

22. If x, y, z are in A.P. and $\tan^{-1}x$, $\tan^{-1}y$ and $\tan^{-1}z$ are also in A.P., then [JEE MAIN 2013]

(a) 6x = 3y = 2z (b) 6x = 4y = 3z

(c) x = y = z (d) 2x = 3y = 6z

23. Let $S_n = \sum_{k=1}^{4n} (-1)^{\frac{k(k+1)}{2}} k^2$. Then S_n can take value (s) [JEE ADVANCE 2013]

(a) 1056 (b) 1088

(c) 1120 (d) 1332

24. If $(10)^9 + 2(11)^1(10)^8 + 3(11)^2(10)^7 + \ldots\ldots + 10(11)^9 = k(10)^9$, then k is equal to

(a) 100 (b) 110 [JEE MAIN 2014]

(c) 121/10 (d) 441/100

25. Three positive numbers form an increasing G.P. If the middle term in this G.P. is doubled, the new numbers are in A.P. Then the common ratio of the G.P. is [JEE MAIN 2014]

(a) $2 - \sqrt{3}$ (b) $2 + \sqrt{3}$

(c) $\sqrt{2} + \sqrt{3}$ (d) $3 + \sqrt{2}$

26. Let a, b, c be positive integers such that $\frac{b}{a}$ is an integer. If a, b, c are in geometric progression and the arithmetic mean of a, b, c is b + 2, then the value of $\frac{a^2+a-14}{a+1}$ is [JEE ADVANCED 2014]

27. If m is A.M. of two distinct real numbers l and n (l, n > 1) and G_1, G_2 and G_3 are three geometric means between l and n, then $G_1^4 + 2G_2^4 + G_3^4$ equals

(a) $4\,l^2mn$ (b) $4\,lm^2n$ [JEE MAINS 2015]

(c) $4\,lmn^2$ (d) $4\,l^2m^2n^2$

28. The sum of first 9 terms of the series $\frac{1^3}{1} + \frac{1^3+2^3}{1+3} + \frac{1^3+2^3+3^3}{1+3+5} + \ldots$ is:

(a) 71 (b) 96 [JEE MAINS 2015]

(c) 142 (d) 192

ANSWERS

1	A	11	A	21	A
2	C	12	B	22	C
3	B	13	B	23	AD
4	D	14	0	24	A
5	A	15	C	25	B
6	6	16	D	26	4
7	B	17	8	27	B
8	C	18	9	28	B
9	A	19	C		
10	A	20	D		