JEE MAIN : CHAPTER WISE TEST-5

SUBJECT :- MATHEMATICS | **DATE...**
CLASS :- 11th | **NAME...**
CHAPTER :- SEQUENCE & SERIES | **SECTION..**

(SECTION A)

1. n^{th} term of the series $3.8+6.11+9.14+12.17+.....$ will be
(A) $3n(3n+5)$ (B) $3n(n+5)$
(C) $n(3n+5)$ (D) $n(n+5)$

2. If $\log_3 2, \log_3(2^x-5)$ and $\log_3\left(2^x-\frac{7}{2}\right)$ are in A.P., then x is equal to
(A) $1, \frac{1}{2}$ (B) $1, \frac{1}{3}$
(C) $1, \frac{3}{2}$ (D) None of these

3. If a_m denotes the m^{th} term of an A.P. then a_m =
(A) $\frac{2}{a_{m+k}+a_{m-k}}$ (B) $\frac{a_{m+k}-a_{m-k}}{2}$
(C) $\frac{a_{m+k}+a_{m-k}}{2}$ (D) None of these

4. A number is the reciprocal of the other. If the arithmetic mean of the two numbers be $\frac{13}{12}$, then the numbers are
(A) $\frac{1}{4}, \frac{4}{1}$ (B) $\frac{3}{4}, \frac{4}{3}$
(C) $\frac{2}{5}, \frac{5}{2}$ (D) $\frac{3}{2}, \frac{2}{3}$

5. The first and last terms of a G.P. are a and l respectively; r being its common ratio; then the number of terms in this G.P. is
(A) $\frac{\log l-\log a}{\log r}$ (B) $1-\frac{\log l-\log a}{\log r}$
(C) $\frac{\log a-\log l}{\log r}$ (D) $1+\frac{\log l-\log a}{\log r}$

6. If the roots of the cubic equation $ax^3+bx^2+cx+d=0$ are in G.P., then
(A) $c^3a=b^3d$ (B) $ca^3=bd^3$
(C) $a^3b=c^3d$ (D) $ab^3=cd^3$

7. The sum of n terms of the following series $1+(1+x)+(1+x+x^2)+..........$ will be
(A) $\frac{1-x^n}{1-x}$ (B) $\frac{x(1-x^n)}{1-x}$
(C) $\frac{n(1-x)-x(1-x^n)}{(1-x)^2}$ (D) None of these

8. The sum of infinite terms of a G.P. is x and on squaring the each term of it, the sum will be y, then the common ratio of this series is
(A) $\frac{x^2-y^2}{x^2+y^2}$ (B) $\frac{x^2+y^2}{x^2-y^2}$
(C) $\frac{x^2-y}{x^2+y}$ (D) $\frac{x^2+y}{x^2-y}$

9. If S is the sum to infinity of a G.P., whose first term is a, then the sum of the first n terms is
(A) $S\left(1-\frac{a}{S}\right)^n$ (B) $S\left[1-\left(1-\frac{a}{S}\right)^n\right]$
(C) $a\left[1-\left(1-\frac{a}{S}\right)^n\right]$ (D) None of these

10. If A_1, A_2 are the two A.M.'s between two numbers a and b and G_1, G_2 be two G.M.'s between same two numbers, then $\frac{A_1+A_2}{G_1.G_2}=$
(A) $\frac{a+b}{ab}$ (B) $\frac{a+b}{2ab}$
(C) $\frac{2ab}{a+b}$ (D) $\frac{ab}{a+b}$

11. If the $(m+1)^{th}, (n+1)^{th}$ and $(r+1)^{th}$ terms of an A.P. are in G.P. and m, n, r are in H.P., then the value of the ratio of the common difference to the first term of the A.P. is
(A) $-\frac{2}{n}$ (B) $\frac{2}{n}$ (C) $-\frac{n}{2}$ (D) $\frac{n}{2}$

12. An A.P., a G.P. and a H.P. have the same first and last terms and the same odd number of terms. The middle terms of the three series are in
(A) A.P. (B) G.P.
(C) H.P. (D) None of these

13. If G_1 and G_2 are two geometric means and A be the arithmetic mean inserted between two numbers, then the value of $\frac{G_1^2}{G_2}+\frac{G_2^2}{G_1}$ is
(A) $\frac{A}{2}$ (B) A
(C) $2A$ (D) None of these

14. If first three terms of sequence $\frac{1}{16}, a, b, \frac{1}{6}$ are in geometric series and last three terms are in harmonic series, then the value of a and b will be

(A) $a = -\frac{1}{4}, b = 1$

(B) $a = \frac{1}{12}, b = \frac{1}{9}$

(C) (A) and (B) both are true

(D) None of these

15. The sum of first n terms of the given series $1^2 + 2.2^2 + 3^2 + 2.4^2 + 5^2 + 2.6^2 + ...$ is $\frac{n(n+1)^2}{2}$, when n is even. When n is odd, the sum will be

(A) $\frac{n(n+1)^2}{2}$ (B) $\frac{1}{2}n^2(n+1)$

(C) $n(n+1)^2$ (D) None of these

16. The sum of the series $1 + (1+2) + (1+2+3) + ...$ upto n terms, will be

(A) $n^2 - 2n + 6$ (B) $\frac{n(n+1)(2n-1)}{6}$

(C) $n^2 + 2n + 6$ (D) $\frac{n(n+1)(n+2)}{6}$

17. Let $S_1, S_2, ...$ be squares such that for each $n \ge 1$, the length of a side of S_n equals the length of a diagonal of S_{n+1}. If the length of a side of S_1 is $10 cm$, then for which of the following values of n is the area of S_n less then $1\ sq\ cm$

(A) 7 (B) 8 (C) 9 (D) 10

18. If $f(x)$ is a function satisfying $f(x+y) = f(x)f(y)$ for all $x, y \in N$ such that $f(1) = 3$ and $\sum_{x=1}^{n} f(x) = 120$. Then the value of n is

(A) 4 (B) 5

(C) 6 (D) None of these

19. In a G.P. the sum of three numbers is 14, if 1 is added to first two numbers and subtracted from third number, the series becomes A.P., then the greatest number is

(A) 8 (B) 4 (C) 24 (D) 16

20. n^{th} term of the series $\frac{1^3}{1} + \frac{1^3 + 2^3}{1+3} + \frac{1^3 + 2^3 + 3^3}{1+3+5} + ...$ will be

(A) $n^2 + 2n + 1$ (B) $\frac{n^2 + 2n + 1}{8}$

(C) $\frac{n^2 + 2n + 1}{4}$ (D) $\frac{n^2 - 2n + 1}{4}$

(SECTION B)

21. If $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$ be the A.M. of a and b, then $n =$

22. The first term of a G.P. whose second term is 2 and sum to infinity is 8, will be

23. The product $(32)(32)^{1/6}(32)^{1/36}$ ...... to ∞ is

24. If the A.M. and H.M. of two numbers is 27 and 12 respectively, then G.M. of the two numbers will be

25. In the four numbers first three are in G.P. and last three are in A.P. whose common difference is 6. If the first and last numbers are same, then first will be

26. If A.M. of two terms is 9 and H.M. is 36, then G.M. will be

27. Three non-zero real numbers form an A.P. and the squares of these numbers taken in the same order form a G.P. Then the number of all possible common ratios of the G.P. is

28. If $a_1, a_2, a_3 ....a_{24}$ are in arithmetic progression and $a_1 + a_5 + a_{10} + a_{15} + a_{20} + a_{24} = 225$ then $a_1 + a_2 + a_3 .... + a_{23} + a_{24} =$

29. Let $n (> 1)$ be a positive integer, then the largest integer m such that $(n^m + 1)$ divides $(1 + n + n^2 + ... + n^{127})$, is

30. A G.P. consists of an even number of terms. If the sum of all the terms is 5 times the sum of the terms occupying odd places, then the common ratio will be equal to