JEE (Main + Advanced):NURTURE COURSE

TARGET : JEE (M + A) 2021

TOPIC : SEQUENCE & SERIES — DPP - 5

1. If the sum of the first 11 terms of an arithmetical progression equals that of the first 19 terms, then the sum of its first 30 terms, is
(a) equal to 0 (b) equal to – 1
(c) equal to 1 (d) non unique

2. Consider a decreasing G.P. : $g_1, g_2, g_3, \ldots\ldots g_n \ldots\ldots$ such that $g_1 + g_2 + g_3 = 13$ and $g_1^2 + g_2^2 + g_3^2 = 91$ then which of the following is true?
(a) The greatest term of the G.P. is 8 (b) The greatest term of the G.P. is 7
(c) The greatest term of the G.P. is 9 (d) The greatest term of the G.P. is 10

3. The limiting sum of the infinite series, $\frac{1}{10} + \frac{2}{10^2} + \frac{3}{10^3} + \ldots.$ whose n^{th} term is $\frac{n}{10^n}$ is equal to
(a) $\frac{1}{9}$ (b) $\frac{10}{81}$
(c) $\frac{1}{8}$ (d) $\frac{17}{72}$

4. Let $a_1, a_2, a_3, \ldots\ldots, a_{10}$ are in G.P. with $a_{51} = 25$ and $\sum_{i=1}^{101} a_i = 125$, then the value of $\sum_{i=1}^{101}\left(\frac{1}{a_i}\right)$ equals
(a) 5 (b) $\frac{1}{5}$
(c) $\frac{1}{25}$ (d) $\frac{1}{125}$

5. If a, b, c are non-zero real numbers then the minimum value of the expression
$\left(\frac{(a^8 + 4a^4 + 1)(b^4 + 3b^2 + 1)(c^2 + 2c + 2)}{a^4 b^2}\right)$ equals
(a) 24 (b) 30
(c) 48 (d) 12

6. If the sum of three numbers of an infinite G.P. is 21 and the sum of their squares is 189 then the common ratio of G.P. is
(a) 3 (b) $\frac{1}{2}$
(c) $\frac{1}{3}$ (d) $\frac{1}{4}$

7. The sum of $51 + 52 + 53 + \ldots\ldots + 100$ is equal to
(a) 2775 (b) 3775
(c) 2275 (d) 1275

8. The harmonic mean of the roots of the equation $(5+\sqrt{2})x^2-(4+\sqrt{5})x+8+2\sqrt{5}=0$ is
(a) 2 (b) 4
(c) 6 (d) 8

9. If the positive numbers a, b, c are in G.P., then $\log_a 2$, $\log_b 2$, $\log_c 2$ are in
(a) A.P. (b) G.P.
(c) H.P. (d) none of these

10. Let $a_1, a_2, ..., a_{10}$ be in A.P. and $h_1, h_2, ..., h_{10}$ be in H.P. If $a_1 = h_1 = 2$ & $a_{10} = h_{10} = 3$ then $a_4 h_7$ is:
(a) 2 (b) 3
(c) 5 (d) 6

11. $\sqrt{1+2(0.4)+3(0.4)^2+4(0.4)^3+.....\infty}$ has the value equal to
(a) $\frac{5}{3}$ (b) $\frac{5}{4}$
(c) 1 (d) $\frac{6}{5}$

12. The geometric series $a+ar+ar^2+ar^3+.....\infty$ has a sum of 7 and the terms involving odd powers of r has a sum of 3. The value of $(a+r)$ equals
(a) 4/3 (b) 10/7
(c) 5/2 (d) 7/3

13. The roots of $64x^3-144x^2+92x-15=0$ are in A.P. The magnitude of the difference between the largest and smallest roots is
(a) 2 (b) 1
(c) $\frac{1}{2}$ (d) $\frac{3}{8}$

14. If the roots of the cubic equation $x^3-5x^2+kx-27=0$ are in G.P. then the value of k is
(a) 15 (b) 12
(c) 9 (d) 6

15. The sum of the infinite series $1+\left(1+\frac{1}{5}\right)\left(\frac{1}{2}\right)+\left(1+\frac{1}{5}+\frac{1}{5^2}\right)\left(\frac{1}{2^2}\right)+.....$
(a) $\frac{20}{9}$ (b) $\frac{10}{9}$
(c) $\frac{5}{9}$ (d) $\frac{5}{3}$

16. If $\log_{(5.2^x+1)} 2$; $\log_{(2^{1-x}+1)} 4$ and 1 are in Harmonical Progression then
(a) x is a positive real (b) x is a negative real
(c) x is rational which is not integral (d) x is an integer

17. In an arithmetic progression the first term is 2, last term is 29, and sum of all the terms is 155. The common difference of arithmetic progression is
(a) 3 (b) 2
(c) $\frac{27}{19}$ (d) $\frac{13}{9}$

18. The positive integral value of n such that $1.2^1+2.2^2+3.2^3+4.2^4+.....+n.2^n=2+2^{n+5}$, is
(a) 15 (b) 16
(c) 17 (d) 18

19. Let $S = \frac{1}{2}+\frac{2^2}{2^2}+\frac{3^2}{2^3}+\frac{4^2}{2^4}+\ldots\ldots\infty$. Then S equals

(a) $\frac{3}{2}$ (b) 6

(c) $\frac{13}{2}$ (d) 8

20. Let a_r be the r^{th} term of an A.P. If $a_{11} = 45$ then the common difference that would make the value of $a_2 a_6 a_{11}$ least is equal to

(a) 14 (b) 7

(c) 4 (d) 3