Assignment 1 - EE1030

ee24btech11018 - D. Swaraj Sharma

1 Section-B // JEE Main / AIEEE

1. If $1, \log_9\left(3^{1-x}+2\right), \log_3\left(4\cdot 3^x-1\right)$ are in A.P then x equals [2002]

   a) $\log_3 4$
   b) $1-\log_3 4$
   c) $1-\log_4 3$
   d) $\log_4 3$

2. l, m, n are the p^{th}, q^{th} and r^{th} term of a G.P. all positive, then $\begin{vmatrix} \log l & p & 1 \\ \log m & q & 1 \\ \log n & r & 1 \end{vmatrix}$ equals [2002]

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

3. The value of $2^{\frac{1}{4}}\cdot 4^{\frac{1}{8}}\cdot 8^{\frac{1}{16}}\ldots\infty$ is [2002]

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

4. Fifth term of a GP is 2, then the product of its 9 terms is [2002]

   a) 256
   b) 512
   c) 1024
   d) none of these

5. Sum of infinite number of terms of a GP is 20 and sum of their square is 100. The common ratio of GP is [2002]

   a) 5
   b) $\frac{3}{5}$
   c) $\frac{8}{5}$
   d) $\frac{1}{5}$

6. $1^3-2^3+3^3-4^3+\ldots+9^3=$ [2002]

   a) 425
   b) -425
   c) 475
   d) -475

7. The sum of the series
   $\frac{1}{1\cdot 2}-\frac{1}{2\cdot 3}+\frac{1}{3\cdot 4}\cdots$ up to ∞ is equal to [2003]

a) $\log_e\left(\frac{4}{e}\right)$
b) $2\log_e 2$
c) $\log_e 2 - 1$
d) $\log_e 2$

8. If $S_n = \sum_{r=0}^{n} \frac{1}{{}^nC_r}$ and $t_n = \sum_{r=0}^{n} \frac{r}{{}^nC_r}$, then $\frac{t_n}{S_n}$ is equal to [2004]

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

9. Let T_r be the r^{th} term of an A.P. whose first term is a and common difference is d. If for some positive integers $m, n, m \neq n, T_m = \frac{1}{n}$ and $T_n = \frac{1}{m}$, then $a - d$ equals [2004]

a) $\frac{1}{m} + \frac{1}{n}$
b) 1
c) $\frac{1}{mn}$
d) 0

10. The sum of the first n terms of the series $1^2 + 2 \cdot 2^2 + 3^2 + 2 \cdot 4^2 + 5^2 + 2 \cdot 6^2 + \cdots$ is $\frac{n(n+1)^2}{2}$ when n is even. When n is odd the sum is [2004]

a) $\left[\frac{n(n+1)}{2}\right]^2$
b) $\frac{n^2(n+1)}{2}$
c) $\frac{n(n+1)^2}{4}$
d) $\frac{3n(n+1)}{2}$

11. The sum of series $\frac{1}{2!} + \frac{1}{4!} + \frac{1}{6!} + \cdots$ is [2004]

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

12. If the coefficients of $r^{th}, (r+1)^{th}$, and $(r+2)^{th}$ terms in the bionomial expansion of $(1+y)^m$ are in A.P., then m and r satisfy the equation [2005]

a) $m^2 - m(4r-1) + 4r^2 - 2 = 0$
b) $m^2 - m(4r+1) + 4r^2 + 2 = 0$
c) $m^2 - m(4r+1) + 4r^2 - 2 = 0$
d) $m^2 - m(4r-1) + 4r^2 + 2 = 0$

13. If $x = \sum_{n=0}^{\infty} a^n$, $y = \sum_{n=0}^{\infty} b^n$, $z = \sum_{n=0}^{\infty} c^n$ where a, b, c are in A.P and $|a| < 1, |b| < 1, |c| < 1$ then x, y, z are in [2005]

a) G.P.
b) A.P.
c) Arithmetic - Geometric Progression
d) H.P.

14. The sum of the series $1 + \frac{1}{4 \cdot 2!} + \frac{1}{16 \cdot 4!} + \frac{1}{64 \cdot 6!} + \cdots \infty$ is [2005]

a) $\frac{e-1}{\sqrt{e}}$
b) $\frac{e+1}{\sqrt{e}}$
c) $\frac{e-1}{2\sqrt{e}}$
d) $\frac{e+1}{2\sqrt{e}}$

15. Let $a_1, a_2, a_3 \cdots$ be terms on A.P. If $\frac{a_1+a_2+\cdots a_p}{a_1+a_2+\cdots a_q} = \frac{p^2}{q^2}, p \neq q$, then $\frac{a_6}{a_{21}}$ equals [2006]

a) $\frac{41}{11}$
b) $\frac{7}{2}$
c) $\frac{2}{7}$
d) $\frac{11}{41}$