Assignment 1 - EE1030

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Section-B // JEE Main / AIEEE

1. If $1, \log_9(3^{1-x}+2), \log_3(4.3^x - 1$ are in A.P then x equals

[2002]

(a) $\log_1 4$
(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 $2^{\frac{1}{4}}.4^{\frac{1}{8}}.8^{\frac{1}{16}}\ldots\infty$ is

[2002]

(a) 1
(b) 2
(c) 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) 3/5
(c) 8/5
(d) 1/5

6. $1^3-2^3+3^3-4^3+...+9^3=$

[2002]

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

7. The sum of the series $\frac{1}{1.2}-\frac{1}{2.3}+\frac{1}{3.4}\cdots$ up to ∞ is equal to

[2003]

(a) $\log_e(\frac{4}{e})$
(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 rth 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 $1^2+2.2^2+3^2+2.4^2+5^2+2.6^2+\cdots$ 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 rth, $(r+1)$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 $x = \sum\limits_{n=0}^{\infty} a^n$, $y = \sum\limits_{n=0}^{\infty} b^n$, $z = \sum\limits_{n=0}^{\infty} c^n$ 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 $1+\frac{1}{4.2!}+\frac{1}{16.4!}+\frac{1}{64.6!}+\cdots\infty is$

[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) $\frac{11}{41}$