Assignment 1 - EE1030

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I. Section-B // JEE Main / AIEEE

1. If $1, \log_9\left(3^{1-x}+2\right), \log_3\left(4.3^x-1\right)$ are in A.P then x equals [2002]

(a) $\log_1 4$ (c) $1-\log_4 3$
(b) $1-\log_3 4$ (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 (c) 1
(b) 2 (d) 0

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

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

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

(a) 256 (c) 1024
(b) 512 (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 (c) $\frac{8}{5}$
(b) $\frac{3}{5}$ (d) $\frac{1}{5}$

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

(a) 425 (c) 475
(b) -425 (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) $\log_e\left(\frac{4}{e}\right)$ (c) $\log_e 2-1$
(b) $2\log_e 2$ (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) $\frac{2n-1}{2}$ (c) $n-1$
(b) $\frac{1}{2}n-1$ (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) $\frac{1}{m}+\frac{1}{n}$ (c) $\frac{1}{mn}$
(b) 1 (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) $\left[\frac{n(n+1)}{2}\right]^2$ (c) $\frac{n(n+1)^2}{4}$
(b) $\frac{n^2(n+1)}{2}$ (d) $\frac{3n(n+1)}{2}$

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

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

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 $1+\frac{1}{4.2!}+\frac{1}{16.4!}+\frac{1}{64.6!}+\cdots\infty$ is [2005]

(*a*) $\frac{e-1}{\sqrt{e}}$ (*c*) $\frac{e-1}{2\sqrt{e}}$

(*b*) $\frac{e+1}{\sqrt{e}}$ (*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*) $\frac{41}{11}$ (*c*) $\frac{2}{7}$

(*b*) $\frac{7}{2}$ (*d*) $\frac{11}{41}$