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) $\frac{11}{41}$