

# Assignment 1 - EE1030

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## I. SECTION-B // JEE MAIN / AIEEE

- If  $1, \log_9(3^{1-x} + 2), \log_3(4 \cdot 3^x - 1)$  are in A.P then  $x$  equals [2002]
  - $\log_1 4$
  - $1 - \log_3 4$
  - $1 - \log_4 3$
  - $\log_4 3$
- $l, m, n$  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]
  - 1
  - 2
  - 1
  - 0
- The value of  $2^{\frac{1}{4}} \cdot 4^{\frac{1}{8}} \cdot 8^{\frac{1}{16}} \dots \infty$  is [2002]
  - 1
  - 2
  - $\frac{3}{2}$
  - 4
- Fifth term of a GP is 2, then the product of its 9 terms is [2002]
  - 256
  - 512
  - 1024
  - none of these
- 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]
  - 5
  - $\frac{3}{5}$
  - $\frac{8}{5}$
  - $\frac{1}{5}$
- $1^3 - 2^3 + 3^3 - 4^3 + \dots + 9^3 =$  [2002]
  - 425
  - 425
  - 475
  - 475
- The sum of the series  $\frac{1}{1 \cdot 2} - \frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} \dots$  up to  $\infty$  is equal to [2003]
  - $\log_e \left( \frac{4}{e} \right)$
  - $2 \log_e 2$
  - $\log_e 2 - 1$
  - $\log_e 2$
- If  $S_n = \sum_{r=0}^n \frac{1}{n C_r}$  and  $t_n = \sum_{r=0}^n \frac{r}{n C_r}$ , then  $\frac{t_n}{S_n}$  is equal to [2004]
  - $\frac{2n-1}{2}$
  - $\frac{1}{2}n - 1$
  - $n - 1$
  - $\frac{1}{2}n$
- 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]
  - $\frac{1}{m} + \frac{1}{n}$
  - 1
  - $\frac{1}{mn}$
  - 0
- The sum of the first  $n$  terms of the series  $1^2 + 2 \cdot 2^2 + 3^2 + 2 \cdot 4^2 + 5^2 + 2 \cdot 6^2 + \dots$  is  $\frac{n(n+1)^2}{2}$  when  $n$  is even. When  $n$  is odd the sum is [2004]
  - $\left[ \frac{n(n+1)}{2} \right]^2$
  - $\frac{n^2(n+1)}{2}$
  - $\frac{n(n+1)^2}{4}$
  - $\frac{3n(n+1)}{2}$
- The sum of series  $\frac{1}{2!} + \frac{1}{4!} + \frac{1}{6!} + \dots$  is [2004]
  - $\frac{(e^2-2)}{n^2(n+1)}$
  - $\frac{e}{2}$
  - $\frac{n(n+1)^2}{2}$
  - $\frac{(e^2-1)}{2}$
- If the coefficients of  $r^{th}, (r+1)^{th}$ , and  $(r+2)^{th}$  terms in the binomial expansion of  $(1+y)^m$  are in A.P., then  $m$  and  $r$  satisfy the equation [2005]
  - $m^2 - m(4r-1) + 4r^2 - 2 = 0$
  - $m^2 - m(4r+1) + 4r^2 + 2 = 0$
  - $m^2 - m(4r+1) + 4r^2 - 2 = 0$
  - $m^2 - m(4r-1) + 4r^2 + 2 = 0$
- 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]
  - G.P.
  - A.P.
  - Arithmetic - Geometric Progression
  - H.P.
- The sum of the series  $1 + \frac{1}{4 \cdot 2!} + \frac{1}{16 \cdot 4!} + \frac{1}{64 \cdot 6!} + \dots \infty$  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  $a_1, a_2, a_3 \dots$  be terms on A.P. If  $\frac{a_1+a_2+\dots+a_p}{a_1+a_2+\dots+a_q} = \frac{p^2}{q^2}, p \neq q$ , then  $\frac{a_6}{a_{21}}$  equals [2006]

$$(a) \frac{41}{11}$$

$$(b) \frac{7}{2}$$

$$(c) \frac{2}{7}$$

$$(d) \frac{11}{41}$$