# Assignment 1 - EE1030

ee24btech11018 - D. Swaraj Sharma

## I. 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]

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

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 $2^{\frac{1}{4}}\cdot 4^{\frac{1}{8}}\cdot 8^{\frac{1}{16}}\ldots\infty$ 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 $\frac{1}{1\cdot 2}-\frac{1}{2\cdot 3}+\frac{1}{3\cdot 4}\cdots$ up to $\infty$ 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 $1^2+2\cdot 2^2+3^2+2\cdot 4^2+5^2+2\cdot 6^2+\cdots$ is $\frac{n(n+1)^2}{2}$ when $n$ is even. When $n$ is odd the sum is [2004]

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

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 $1+\frac{1}{4\cdot 2!}+\frac{1}{16\cdot 4!}+\frac{1}{64\cdot 6!}+\cdots\infty$ 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]

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