2021-July
Session-20-07-2021-shift-2-21-30

EE24BTECH11038 - MALAKALA BALA SUBRAHMANYA ARAVIND

21) Consider a triangle having vertices $\mathbf{A}(-2,3)$, $\mathbf{B}(1,9)$, $\mathbf{C}(3,8)$. if a line L passing through the circumcentre of triangle ABC, bisects the line BC, and intersects the Y-axis at $\left(0, \frac{\alpha}{2}\right)$, then the value of real number α is
22) Let $\{a_n\}_{n=1}^{\infty}$ be a sequence such that $a_1 = 1, a_2 = 1\, and a_{n+2} = 2a_{n+1} + a_n$ for all $n \geq 1$. Then the value of $47\sum_{n=1}^{\infty} \frac{a_n}{2^{3n}}$ is equal to $\cdots$
23) The number of solutions of the equation $\log_{(x+1)}^{\left(2x^2+7x+5\right)} + \log_{(2x+5)}^{(x+1)^2} -4 = 0,\ x > 0$, is
24) If $\lim_{x\to 0} \frac{\alpha x e^x - \beta \log_e^{1+x} + \gamma x^2 e^{-x}}{x \sin^2 x} = 10$,$\alpha,\ \beta,\ \gamma \in \mathbf{R}$, then the value of $\alpha + \beta + \gamma$ is
25) For $p > 0$, a vector $\mathbf{v}_2 = 2\hat{i} + (p+1)\,\hat{j}$ is obtained by rotating the vector $\mathbf{v}_1 = \sqrt{3}p\hat{i} + \hat{j}$ by an angle θ about the origin in a counter clock wise direction if $\tan\theta = \frac{\alpha\sqrt{3}-2}{4\sqrt{3}+3}$, then the value of α is
26) Let A=$\left\{a_{ij}\right\}$ be a 3 x 3 matrix, where

$$a_{ij} = \begin{cases} (-1)^{j-i} & if\, i < j, \\ 2\ if\ i = j, \\ (-1)^{i+j} & if\, i > j, \end{cases}$$

Then $det\left(3Adj\left(2A^{-1}\right)\right)$ is equal to

27) Let a curve $y = y(x)$ be given by solution of the differential equation

$$\cos\left(\frac{1}{2}\cos^{-1}\left(e^x\right)\right)dx = \sqrt{e^{2x}-1}\,dy$$

if it intersects y-axis at y=-1, and the intersection point of the curve with x-axis is $(\alpha, 0)$, then e^{α} is equal to

28) Let a function g: $[0,4] \to \mathbf{R}$ be defined as

$$g(x) = \begin{cases} \max\limits_{0\leq t\leq x}\left\{t^3 - 6t^2 + 9t - 3\right\}, & 0 \leq x \leq 3 \\ 4 - x, & 3 < x \leq 4 \end{cases}$$

then the number of points in the interval $(0,4)$ where $g(x)$ is NOT differentiable, is

29) For k∈N, let

$$\frac{1}{\alpha(\alpha+1)(\alpha+2)\cdots(\alpha+20)} = \sum_{k=0}^{20} \frac{A_k}{\alpha+k}$$

where $\alpha > 0$ then the value of $100\left(\frac{A_{14}+A_{15}}{A_{13}}\right)^2$ is equal to

30) If the point on the curve $y^2 = 6x$, nearest to the point $\left(3, \frac{3}{2}\right)$ is (α, β), then the value of $2(\alpha + \beta)$ is