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EE24BTECH11033 - KOLLURU SURAJ

16) The number of ways, in which 5 girls and 7 boys can be seated at a round table so that no two girls sit together, is

a) $7\,(720)^2$ b) 720 c) $7\,(360)^2$ d) $126\,(5!)^2$

17) Let $f(x) = \frac{\sin x+\cos x-\sqrt{2}}{\sin x-\cos x}$, $x \in [0,\pi] - \left\{\frac{\pi}{4}\right\}$. Then $f\left(\frac{7\pi}{12}\right) f''\left(\frac{7\pi}{12}\right)$ is equal to

a) $\frac{-2}{3}$ b) $\frac{2}{9}$ c) $\frac{-1}{3\sqrt{3}}$ d) $\frac{2}{3\sqrt{3}}$

18) If the equation of the plane containing the line x + $2y$ + $3z$ - 4 =0, $2x$ + y - z + 5 =0 and perpendicular to the plane $\mathbf{r}= (\mathbf{i}-\mathbf{j}) + \lambda(\mathbf{i}+\mathbf{j}+\mathbf{k}) + \mu(\mathbf{i}-\mathbf{2j}+\mathbf{3k})$ is $ax+by+cz = 4$, then $(a-b+c)$ is equal to

a) 22 b) 24 c) 20 d) 18

19) Let A = $\begin{pmatrix} 2 & 1 & 0 \\ 1 & 2 & -1 \\ 0 & -1 & 2 \end{pmatrix}$. If $|adj\,|adj\,|adj 2A|||= (16)^n$, then n is equal to

a) 8 b) 9 c) 12 d) 10

20) Let $I(x) = \int \frac{(x+1)}{x(1+xe^x)^2}\,dx$, $x > 0$. If $\lim_{x\to\infty} I(x) = 0$, then $I(1)$ is equal to

a) $\frac{e+1}{e+2} - \log_e(e+1)$
b) $\frac{e+2}{e+1} + \log_e(e+1)$
c) $\frac{e+2}{e+1} - \log_e(e+1)$
d) $\frac{e+1}{e+2} + \log_e(e+1)$

21) Let $A = \{0,3,4,6,7,8,9,10\}$ and R be the relation defined on A such that $R = \{(x,y) \in A\times A : x-y$ is an odd positive integer or $x-y = 2\}$. The minimum number of elements that must be added to the relation R so that it is a symmetric relation is equal to
22) Let (t) denote the greatest integer $\leq t$. If the constant term in the expansion of $\left(3x^2 - \frac{1}{2x^5}\right)^7$ is α, then $[\alpha]$ is equal to
23) Let λ_1, λ_2 be the values of λ for which the points $\left(\frac{5}{2}, -1, \lambda\right)$ and $(-2,0,1)$ are at equal distance from the plane $2x+3y-6z+7 = 0$. If $\lambda_1 > \lambda_2$, then the distance of the point $(\lambda_1-\lambda_2, \lambda_2, \lambda_1)$ from the line $\frac{x-5}{1} = \frac{y-1}{2} = \frac{z+7}{2}$

24) If the solution curve of the differential equation $(y - 2\log_e x)\,dx + \left(x\log_e x^2\right)dy = 0$, $x > 1$ passes through the points $\left(e, \frac{4}{3}\right)$ and $\left(e^4, \alpha\right)$, then α is equal to

25) Let $\mathbf{a} = 6\mathbf{i} + 9\mathbf{j} + 12\mathbf{k}$, $\mathbf{b} = \alpha\mathbf{i} + 11\mathbf{j} - 2\mathbf{k}$ and $\mathbf{c}$ be vectors such that $\mathbf{a} \times \mathbf{c} = -\mathbf{a} \times \mathbf{b}$. If $\mathbf{a} \cdot \mathbf{c} = -12$, $\mathbf{c} \cdot (\mathbf{i} - 2\mathbf{j} + \mathbf{k}) = 5$, then $\mathbf{c} \cdot (\mathbf{i} + \mathbf{j} + \mathbf{k})$ is equal to

26) The largest natural number n such that 3^n divides 66! is

27) If a_a is the greatest term in the sequence $a_n = \frac{n^3}{n^4+147}$, n=1,2,3,...., then a is equal to

28) Let the mean and variance of 8 numbers x,y,10,12,6,12,4,8 be 9 and 9.25 respectively. If x¿y, then 3x-2y is equal to

29) Consider a circle $C_1 : x^2 + y^2 - 4x - 2y = \alpha - 5$. Let its mirror image in the line $y = 2x + 1$ be another circle $C_2 : 5x^2 + 5y^2 - 10fx - 10gy + 36 = 0$.Let r be the radius of C_2. Then α + r is equal to

30) Let $[t]$ denote the greatest integer $\leq t$. The $\frac{2}{\pi}\int_{\pi/6}^{5\pi/6}(8[\csc x] - 5[\cot x])\,dx$ is equal to ____________.