ASSIGNMENT-3

EE24BTECH11043 - Murra Rajesh Kumar Reddy

1) The shortest distance between the lines $\frac{x+7}{-6} = \frac{y-6}{7} = z$ and $\frac{7-x}{2} = y-2 = z-6$ is
   a) $2\sqrt{29}$
   b) 1
   c) $\sqrt{\frac{37}{29}}$
   d) $\sqrt{\frac{29}{2}}$
2) Let $\mathbf{a} = \hat{i} - \hat{j} + 2\hat{k}$ and let $\mathbf{b}$ be a vector such that $\mathbf{a} \times \mathbf{b} = 2\hat{i} - \hat{k}$ and $\mathbf{a} \cdot \mathbf{b} = 3$ Then the projection of $\mathbf{b}$ on the vector $\mathbf{a} - \mathbf{b}$ is :
   a) $\frac{2}{\sqrt{21}}$
   b) $2\sqrt{\frac{3}{7}}$
   c) $\frac{2}{3}\sqrt{\frac{7}{3}}$
   d) $\frac{2}{3}$
3) If the mean deviation about median for the number $3, 5, 7, 2k, 12, 16, 21, 24$ arranged in the ascending order, is 6 then the median is
   a) 11.5
   b) 10.5
   c) 12
   d) 11
4) $2\sin\left(\frac{\pi}{22}\right)\sin\left(\frac{3\pi}{22}\right)\sin\left(\frac{5\pi}{22}\right)\sin\left(\frac{7\pi}{22}\right)\sin\left(\frac{9\pi}{22}\right)$ is eqaul to :
   a) $\frac{3}{16}$
   b) $\frac{1}{16}$
   c) $\frac{1}{32}$
   d) $\frac{9}{32}$
5) Consider the following statements :
   P : Ramu is intelligent.
   Q : Ramu is rich.
   R : Ramu is not honest.
   The negation of the statement "Ramu is intelligent and honest if and only if Ramu is not rich" can be expressed as :
   a) $((P \cap (\sim R)) \cap Q)\,((\sim Q) \cap ((\sim P) \cup R))$
   b) $((P \cap R) \cap Q) \cup ((\sim Q) \cap ((\sim P) \cup (\sim R)))$
   c) $((P \cap R) \cap Q) \cap ((\sim Q) \cap ((\sim P) \cup (\sim R)))$
   d) $((P \cap (\sim R)) \cap Q) \cup ((\sim Q) \cap ((\sim P) \cap R))$
6) Let $A = \{1, 2, 3, 4, 5, 6, 7\}$.Define $B = \{T \subset A$: eitther $1 \notin T$or $2 \in T\}$ and $C = \{T \subset A : T$the sum of all the elen
   the number of elements in the set $B \cup c$ is .
7) Let $f(x)$ be a quadractic polynomial with leading coefficient 1 such that $f(0) = p, p \neq 0$. and $f(1) = \frac{1}{3}$.If the equation $f(x) = 0$ and $fofofofof(x) = 0$ have a common real root, then $f(-3)$ is eqaul to .

8) Let $A=\begin{pmatrix}1 & a & a\\ 0 & 1 & b\\ 0 & 0 & 1\end{pmatrix}, a,b\in R$.If for some $n\in N, A^n=\begin{pmatrix}1 & 48 & 2160\\ 0 & 1 & 96\\ 0 & 0 & 1\end{pmatrix}$ then $n+a+b$ is equal to .

9) The sum of the maximum and minimum values of the function $f(x)=|5x-7|+\left[x^2+2x\right]$ in the interval $\left[\frac{5}{4},2\right]$, where $[t]$ is the greatest integer $\leq t$, is .

10) Let $y=y(x)$ be the solution of the differential equation
$\frac{dy}{dx}=\frac{4y^3+2yx^2}{3xy^2+x^3}, y(1)=1$.
If for some $n\in N, y(2)\in\ [n-1\ ,\ n)$, then n is equal to .

11) let f be twice differentiable function on R.If $f'(0)=4$ and $f(x)+\int_0^x(x-1)f'(t)\,dt=\left(e^{2x}+e^{-2x}\right)\cos 2x+\frac{2}{a}x$,th
$(2a+5)^5a^2$ is equal to .

12) Let $a_n=\int_{-1}^{n}\left(1+\frac{x}{2}+\frac{x^2}{3}+\cdots+\frac{x^{n-1}}{n}\right)dx$// for every $n\in N$.Then the sum of all the elments of the set $\{n\in N: a_n\in(2,30)\}$ is .

13) If the circles $x^2+y^2+6x+8y+16=0$ and $x^2+y^2+2\left(3-\sqrt{x}\right)x+2\left(4-\sqrt{6}\right)y=k+6\sqrt{3}+8\sqrt{6}, k\geq 0$,touch internally at the point $P(\alpha,\beta)$, then $\left(\alpha+\sqrt{3}\right)^2+\left(\beta+\sqrt{6}\right)^2$ is equal to .

14) Let the area enclosed by the x-axis, and the tangent and normal drawn to the curve $4x^3-3xy^2+6x^2-5xy-8y^2+9x+14=0$ at the point $(-2,3)$ be A. Then $8A$ is equal to .

15) Let $x=\sin\left(2\tan^{-1}\alpha\right)$ and $y=\sin\left(\frac{1}{2}\tan^{-1}\frac{4}{3}\right)$.If $S=\left\{\alpha\in R: y^2=1-x\right\}$, then $\sum_{\alpha\in S}16\alpha^3$ is equal to .