# Session-02-01-2023-shift-1-16-30

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1) Let the image of the point P$(2,-1,3)$ in the plane $x+2y-z=0$ be $Q$. Then the distance of the plane $3x+2y+z+29=0$ from the point $Q$ is
   a) $\frac{22\sqrt{2}}{7}$
   b) $\frac{24\sqrt{2}}{7}$
   c) $2\sqrt{14}$
   d) $3\sqrt{14}$
2) Let $f(x)=\begin{pmatrix}1+\sin^2 x & \cos^2 x & \sin 2x\\ \sin^2 x & 1+\cos^2 x & \sin 2x\\ \sin^2 x & \cos^2 x & 1+\sin 2x\end{pmatrix}$, $x\in[\frac{\pi}{6},\frac{\pi}{3}]$.If $\alpha$ a $\beta$ respectively are the maximum and the minimum values of f,then
   a) $\beta^2-2\sqrt{\alpha}=\frac{19}{4}$
   b) $\beta^2+2\sqrt{\alpha}=\frac{19}{4}$
   c) $\alpha^2+\beta^2=4\sqrt{3}$
   d) $\alpha^2+\beta^2=\frac{9}{2}$
3) Let $f(x)=2x+\tan^{-1}x$ and $g(x)=\log_e\left(\sqrt{1+x^2}+x\right)$, $x\in[0,3]$ then
   a) There exists $x\in[0,3]$ such that $f'(x)<g'(x)$
   b) max $f(x)>maxg(x)$
   c) There exists $0<x_1<x_2<3$ such that $f(x)<g(x)$, $\forall x\in(x_1,x_2)$
   d) min $f'(x)$=1+max $g'(x)$
4) The mean and variance of 5 observations are 5 and 8 respectively. If 3 observations are $1,3,5$, then the sum of cubes of the remaining two observations is
   a) 1072
   b) 1792
   c) 1216
   d) 1456
5) The area enclosed by the closed curve C given by the differential equation $\frac{dy}{dx}+\frac{x+a}{y-2}=0$, $y(1)=0$ is $4\pi$ Let $P$ and $Q$ be the points of intersection of the curve $C$ and the y-axis. If normals at P and Q on the curve $C$ intersect x-axis at points $R$ and $S$ respectively, then the length of the line segment $RS$ is
   a) $2\sqrt{3}$
   b) $\frac{2\sqrt{3}}{3}$
   c) 2
   d) $\frac{4\sqrt{3}}{3}$
6) Let $a1=8,a_2,a_3,\cdots a_n$ be an A.P. If the sum of its first four terms is 50 and the sum of ts last four terms is 170, then the product of its middle two terms is
7) A$(2,6,2)$, B$(-4,0,\lambda)$, C$(2,3,-1)$ and D$(4,5,0)$, $|\lambda|\leq 5$ are the vertices of a quadrilateral $ABCD$. If its area is 18 square units, then $5-6\lambda$ is equal to
8) The number of $3-digit$ numbers, that are divisible by either 2 or 3 but not divisible by 7 is
9) The remainder when $19^{200}+23^{200}$ is divided by 49 is
10) if$\int_0^1\left(x^{21}+x^{14}+x^7\right)\left(2x^{14}+3x^7+6\right)^{\frac{1}{6}}$ where $l,m,n\in m$ and $n$ are co primes then l+m+n is equal to