



	OR		
12	Investigate for what values of k the equations $x + y + z = 1$; $2x + y + 4z = k$; $4x + y + 10z = k^2$ have infinite number of solutions. [10M]	CO1	L5
13	Verify Cayley – Hamilton theorem for $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and find A^{-1} and A^4 . [10M]	CO2	L3
	OR		
14	Determine the Eigen values and Eigen vectors of the following matrices $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$ [10M]	CO2	L3
15	By change the order of integration, evaluate $\int_0^a \int_0^{\sqrt{a^2-x^2}} \sqrt{a^2-x^2-y^2} dy dx$. [10M]	CO3	L5
	OR		
16	Evaluate the integral by transforming into polar coordinates $\int_0^a \int_0^{\sqrt{a^2-x^2}} y \sqrt{x^2 + y^2} dx dy$. [10M]	CO3	L5
17	If $a < b$ P.T $\frac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{1+a^2}$ using Lagrange's mean value theorem. Deduce the following $\frac{\pi}{4} + \frac{3}{25} < \tan^{-1} \frac{4}{3} < \frac{\pi}{4} + \frac{1}{6}$. [10M]	CO4	L4
	OR		
18	P.T $\int_0^1 \frac{x^2}{\sqrt{1-x^4}} dx \cdot \int_0^1 \frac{dx}{\sqrt{1+x^4}} = \frac{\pi}{4\sqrt{2}}$. [10M]	CO4	L4
19	Find the extreme values of $f(x, y) = \sin x \cdot \sin y \cdot \sin(x + y)$ [10M]	CO5	L3
	OR		
20	If $u = \frac{x^2 + y^2}{\sqrt{x+y}}$, prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \frac{3}{2} u$. [10M]	CO5	L3