



(i) no solution (ii) a unique solution (iii) an infinite number of solutions [10]

	OR		
12	Solve $2x + y + z = 10$ , $3x + 2y + 3z = 18$ , $x + 4y + 9z = 16$ by Gauss elimination method. [10]	L4	CO1
13	Show that the matrix satisfies Cayley - Hamilton theorem and also find the value of the Matrix $A^8 - 5A^7 + 7A^6 - 3A^5 + A^4 - 5A^3 + 8A^2 - 2A + I$  Where $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$ [10]	L4	CO2
	OR		
14	Reduce the following quadratic form to canonical form by orthogonal transformation $Q = 3x^2 + 5y^2 + 3z^2 - 2xy - 2yz + 2xz$ [10]	L4	CO2
15	Show that the series $1 + \frac{1}{2^2} + \frac{2^2}{3^3} + \frac{3^3}{4^3} + \dots$ is divergent. [10]	L3	CO3
	OR		
16	A. Test for convergence of the series $\sum \log(1 + \frac{1}{n})$ [5] B. Discuss the convergence of the series by integral test $\sum_{n=2}^{\infty} \frac{1}{n(\log n)^2}$ [5]	L3 L3	CO3 CO3
17	Verify $JJ^1 = 1$ for the following functions $x = u$ , $y = u \tan v$ , $z = w$ [10]	L2	CO4
	OR		
18	A rectangular box open at the top is to have a volume of 32 cubic units, find the dimensions of the box requiring least material for its construction. [10]	L4	CO4
19	Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{x+y+z} dz \cdot dy \cdot dx$ [10]	L5	CO5
	OR		
20	Evaluate $\int \int \int z^2 dx dy dz$ taken over the volume bounded by $x^2 + y^2 = a^2$ , $x^2 + y^2 = z$ and $z = 0$ [10]	L5	CO5