GALGOTIAS UNIVERSITY

ADMISSION NUMBER												

School of Computing Science and Engineering

Bachelor of Computer Applications
Mid Term Examination - May 2024

Duration : 90 Minutes
Max Marks : 50

Sem II - C1UC323T - Linear Algebra

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	Find the rank of a 3X2 matrix, whose every element is unity.	K2	(2)
2)	Explain whether the vectors (1, -2, 1), (2, 1, -1) and (7, -4, 1) are linearly dependent or not.	K1	(3)
3)	*Show that the polynomials 1,* x *and* x^2 *span* $p_2(x)$ *?*	K2	(4)
4)	Solve the system of equations $x_1 + x_2 + x_3 = 1,\ 3x_1 + x_2 - 3x_3 = 5$ and $x_1 - 2x_2 - 5x_3 = 10$ by Gauss elimination.	K2	(6)
5)	Classify the following sets of vectors as linearly dependent and linearly independent: a) {(1, -2, 1), (2, 1, -1), (7, -4, 1)} b) {(2, -5, 3), (1, -2, 1), (2, 1, -1), (7, -4, 1)}	K3	(6)
6)	*Let the linear transformation* T: $\mathbb{R}^2 \rightarrow \mathbb{R}^3$ *be defined by* T(x, y) = (x, x + y, y). *Then find rank of T?*	K3	(9)
7)	*Let the linear transformation* T: $\mathbb{R}^3 \rightarrow \mathbb{R}^3$ *be defined by* T(x, y, z) = (x + z, 2x + y + 3z, 2y + 2z). *Then find the dimension of the range space and null space of T?*	K4	(8)
8)	Under what condition, the rank of the following matrix A is 3? Is it possible for the rank to be 1? Why? $\begin{bmatrix} 2 & 4 & 2 \\ 3 & 1 & 2 \\ 1 & 0 & x \end{bmatrix}$	K4	(12)
	OR		
	If the nullity of the matrix $A = \begin{pmatrix} k & 1 & 2 \\ 1 & -1 & -2 \\ 1 & 1 & 4 \end{pmatrix}$ *is 1, then find the value of k?*	K4	(12)