National University of Computer and Emerging Sciences, Lahore Campus

Course:	Linear Algebra	Course Code:	MT1004
Program:	BS (CS and Robotics)	Semester:	Fall 2023
Duration:	60 Minutes	Total Marks:	40
Paper Date:	Oct 2, -23	Weight	12.5%
Section:	ALL	Page(s):	1
Exam:	Sessional-1	Roll No:	[redacted]

Instruction/Notes:

1. Programmable calculators are not allowed.
2. Wrong calculation wok found (if any) at a step will not be further marked. Marks will be awarded till the correct calculations.
3. Do all the questions in the given order as mentioned in the paper.
4. Your kind cooperation will be appreciable for obeying the instructions.

Question # 1 (CLO-1) [10]: Write the given augmented matrix into set of linear system of equations and then solve the augmented matrix. Explain geometrically what these system of linear equations represents.

$$\begin{bmatrix} 2 & -4 & 1 & 6 \\ -4 & 0 & 3 & -1 \\ 0 & 1 & -1 & 3 \end{bmatrix}$$

Question # 2 (CLO-1)[10]: Determine condition(s) on $b_i's$, if any, in order to gurantee that the linear system is consistent

$$\begin{aligned} 2x_1 + 2x_2 + 2x_3 &= b_1 \\ -2x_1 + 5x_2 + 2x_3 &= b_2 \\ 8x_1 + x_2 + 4x_3 &= b_3 \end{aligned}$$

Question # 3 (CLO-1) [10]: Use Inverse Algorithm (i.e. by Elementary Row Operations) to find the inverse of the following matrix

$$A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{bmatrix}$$

Question # 4 (CLO-2) [10]: Find the determinant of the matrix by using Elementary Row Operations (ONLY).

$$\begin{bmatrix} 1 & -3 & 0 \\ -2 & 4 & 1 \\ 5 & -2 & 2 \end{bmatrix}$$

GOOD LUCK

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