

**BRAC UNIVERSITY**  
**Department of Computer Science and Engineering**

**Quiz 05**  
**Semester: Summer 2024**

**Duration: 30 min**  
**Full Marks: 15**

<b>Name:</b>	<b>ID:</b>	<b>Section:</b>
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**CSE 330: Numerical Methods**

1. A linear system is described by the following equations:

$$\begin{aligned} 3x + 6y - 7z &= 8 \\ -4x + 10y + 9z &= -2 \\ 6x - 10y - 14z &= 5 \end{aligned}$$

Based on these equations, answer the questions below..

- a. [3 marks] Construct the Frobenius matrices  $\mathbf{F}^{(1)}$  and  $\mathbf{F}^{(2)}$  from this system by computing multipliers  $\mathbf{m}_{21}$ ,  $\mathbf{m}_{31}$  and  $\mathbf{m}_{32}$ .
  - b. [6 marks] Compute the **upper triangular matrix U** and the **lower triangular matrix L** and find the solution of the linear system using the LU decomposition method.
2. A function is given,  $\mathbf{f(x) = 1/x - cosx + 6e^{-3x} + 1}$  which is to be integrated on the interval **[1, 3]**.
- a. (1 marks) Evaluate the **exact integral I(f)**.
  - b. (3 marks) Compute numerical integral  $\mathbf{C_{1,4}}$  and keep up to 5 significant digits.
  - c. (2 marks) Find the **relative percentage error**