# Daffodil International University

**Faculty of Science & Information Technology (FSIT)**
**Department of Computer Science and Engineering**
**Midterm Examination, Spring 2024**
**Course Code: CSE 235, Course Title: Numerical Methods**
**Level-2, Term-2**

**Time: 01:30 Hours** **Marks: 25**

**Answer ALL Questions:**

***[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially]***

| | | | | |
|---|---|---|---|---|
| 1 | *a)* | **Explain** Absolute Error and Relative Error. | [2] | CLO1 |
| | *b)* | **Interpret** the value of $\sqrt{331} + \sqrt{257} + \sqrt{191} + \sqrt{119}$ to 4 significant digits and find its **absolute, relative and percentage error**. | [3] | |
| 2 | *a)* | **Solve**, $3x + \text{Sin } x = e^x$ by using **Bisection method** to the accuracy of $10^{-3}$. | [6] | CLO2 |
| | *b)* | **Identify** the approximate root of $e^{-x}(3.2 \text{ Sin } x - 0.5 \text{ Cos } x) = 0$ that lies on [3, 4] accurate to 4 decimal places. | [4] | |
| 3 | *a)* | **Estimate** the value of x, when $\sqrt[3]{x} = 3.756$ from the given table by using **Lagrange's interpolation**: | [5] | CLO3 |
| | *b)* | **Evaluate** the difference table to **find the polynomial** which takes the values: | [5] | |

| x | 50 | 52 | 55 | 59 |
|---|---|---|---|---|
| $\sqrt[3]{x}$ | 3.684 | 3.732 | 3.779 | 3.825 |

| x | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| f(x) | 1 | 2 | 1 | 10 |

**Good Luck!!!**