



**Daffodil International University**  
**Faculty of Science & Information Technology**  
**Department of Computer Science & Engineering**  
**Midterm Examination, Spring 2026**  
**Course Code: CSE226, Course Title: Numerical Methods**  
**Level: 2 Term: 3, Batch: 66**

Time: 1:30 hrs.

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) Identify the number of significant digits of 10000, 12.000300, 0.00025, and 2.0005                                                                                                                                                                                                                                                                                              | 2        | CO1  |      |      |      |      |      |                |      |      |      |      |      |      |   |     |
|                                                                                                                                                                                                                                              | (b) Explain $E_A$ , $E_R$ , and $E_P$ after finding the sum of $-\sqrt{11} + \sqrt{21} + \sqrt{31}$ correct to 5 significant digits.                                                                                                                                                                                                                                                | 3        |      |      |      |      |      |      |                |      |      |      |      |      |      |   |     |
| 2.                                                                                                                                                                                                                                           | (a) Apply Bisection method to find a real root of $x^2 + 4\sin x = 0$ that lies on $(-2, -1)$                                                                                                                                                                                                                                                                                       | 5        | CO2  |      |      |      |      |      |                |      |      |      |      |      |      |   |     |
|                                                                                                                                                                                                                                              | (b) Apply Newton-Raphson method to find a real root of $x^3 + x^2 - 1 = 0$ belonging in $(0, 1)$                                                                                                                                                                                                                                                                                    | 5        |      |      |      |      |      |      |                |      |      |      |      |      |      |   |     |
| 3.                                                                                                                                                                                                                                           | (a) The population of a village in the last six censuses was recorded as follows:<br><table border="1"><tr><td>Year (x)</td><td>1941</td><td>1951</td><td>1961</td><td>1971</td><td>1981</td><td>1991</td></tr><tr><td>Population (y)</td><td>2500</td><td>2800</td><td>3200</td><td>3700</td><td>4350</td><td>5225</td></tr></table><br>Determine the population for the year 1945 | Year (x) | 1941 | 1951 | 1961 | 1971 | 1981 | 1991 | Population (y) | 2500 | 2800 | 3200 | 3700 | 4350 | 5225 | 5 | CO3 |
|                                                                                                                                                                                                                                              | Year (x)                                                                                                                                                                                                                                                                                                                                                                            | 1941     | 1951 | 1961 | 1971 | 1981 | 1991 |      |                |      |      |      |      |      |      |   |     |
| Population (y)                                                                                                                                                                                                                               | 2500                                                                                                                                                                                                                                                                                                                                                                                | 2800     | 3200 | 3700 | 4350 | 5225 |      |      |                |      |      |      |      |      |      |   |     |
| (b) A polynomial passes through the given set of points, determine the polynomial.<br><table border="1"><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>5</td></tr><tr><td>f(x)</td><td>2</td><td>3</td><td>12</td><td>147</td></tr></table> | x                                                                                                                                                                                                                                                                                                                                                                                   | 0        | 1    | 2    | 5    | f(x) | 2    | 3    | 12             | 147  | 5    |      |      |      |      |   |     |
| x                                                                                                                                                                                                                                            | 0                                                                                                                                                                                                                                                                                                                                                                                   | 1        | 2    | 5    |      |      |      |      |                |      |      |      |      |      |      |   |     |
| f(x)                                                                                                                                                                                                                                         | 2                                                                                                                                                                                                                                                                                                                                                                                   | 3        | 12   | 147  |      |      |      |      |                |      |      |      |      |      |      |   |     |

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