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Daffodil International University

Faculty of Science & Information Technology

Department of Software Engineering

Midterm Examination, Summer 2026

Course Code: Numerical Analysis; Course Title: SE341

Sections & Teachers: A, B, C, D (RT), E(TR)

Time: 1 Hour 30 Mins **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)***	A student measures the density of a material as 49.996 g/cm³, while the accepted value is 50.000 g/cm³. Round the measured value to four significant digits and **compute** the absolute error, relative error, and percentage error.	**[Marks-3]**	**CLO-1** *Level-2*
	b)	**Describe** the concept of accuracy and precision.	**[Marks-3]**	
	c)	A city planner develops a linear mathematical model to predict the population growth of a city, although the actual growth pattern is nonlinear. During the computation, the value of π is approximated as 3.1416 instead of its full value. The population data used in the model are collected using a sensor with a tolerance of ±0.5%, and while entering the data into the computer, an operator mistakenly records 25,000 as 2,500. **Explain** the type of error associated with each of the four situations.	**[Marks-4]**	
2.	***a)***	**Identify** the root of the given equation $f(x) = x^3 - 4x - 9 = 0$ using the Bisection Method when the true value is 2.7065 and stopping criteria is absolute error should be less than 0.0007. Additionally, **explain** the algorithm for the Bisection Method.	**[Marks-7]**	**CLO-2** *Level-4*
	b)	**Examine** the root of the equation $f(x) = sinx + 2x^2 - 4 = 0$ using the False Position method to find the root, rounding your result to five decimal places (8th iteration). Additionally, **illustrate** the merits and demerits of the False Position Method.	**[Marks-8]**	