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Daffodil International University

Faculty of Science & Information Technology (FSIT)

Department of Computer Science and Engineering (CSE)

Final Examination, Spring 2024

Course Code: CSE 235, Course Title: Numerical Methods

Time: 02 Hours | **Level-2, Term-2** | **Marks: 40**

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)	**Apply Gauss Elimination Method** to solve the system of linear equations: $x + 3y + 2z = 5$ $2x + 4y - 6z = -4$ $x + 5y + 3z = 10$	[4]	CO2
	b)	**Solve the System of Linear Equations using the Gauss Seidel's Method:** $12x + 3y - 5z = 1$ $x + 5y + 3z = 28$ $3x + 7y + 13z = 76$ Use the initial guess $x_0 = y_0 = z_0 = 0$ and iterate until the solution converges three decimal places.	[6]	
2		**Solve** the following first order **Ordinary Differential Equation** using 4th order **Runge-Kutta Method:** $y' = x^3 + y$ With initial condition $y(0) = 2$. Find the value of $y(0.2)$ & $y(0.4)$ with step length, **h=0.2**	[10]	CO2
3		**Evaluate** the approximate value of $I = \int_0^5 \frac{1}{4x+5} dx$ by using **Simpson's 1/3, Simpson's 3/8** and **Weddle's rule**. Find the **Exact Value** of I and then **Compare** and **Comment** on it.	[10]	CO3
4	a)	**Determine** the Second Degree Polynomial using Least Square method which fits to the following data: Hence, find $y(10)$.	[5]	CO3
	b)	**Estimate** the value of $y(25)$ for which the following data fits the **Exponential Equation** $y = ab^x$	[5]	

x	1	2	3	4
y	6	11	18	27

x	4	6	8	10	12
y	20	35	53	60	75