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Daffodil International University

Faculty of Science & Information Technology (FSIT)
Department of Computer Science and Engineering (CSE)
Final Examination, Summer 2025
Course Code: CSE 226, Course Title: Numerical Methods

Time: 02 Hours **Level-2, Term-3** **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: $2x+5y=16$ $y-2z=11$ $2z+x=6$	[5]	CO2
	b)	**Solve the System of Linear Equations by using the Gauss Seidel's Method:** $2x+5y=6$ $3x+y=1$ $2z=5$ Use the initial guess $x_0 = y_0 = z_0 = 0$ and iterate until the solution converges three decimal places.	[5]	
2		**Solve** the following first order Ordinary Differential Equation using 4th order **Runge-Kutta** Method to find out the values of $y(0.4)$ and $y(0.8)$, $\frac{dy}{dx} = x^3 e^x \sin x + y^2;\ y(0) = 0.5$	[10]	
3		**Identify** the best method among **Trapezoidal, Simpson's 1/3, Simpson's 3/8** by solving the integral $I = \int_{0.2}^{1.4} \frac{3}{1+\cot x} dx$.	[10]	CO3
4	a)	**Develop** the Second Degree Polynomial by using Least Square method which fits to the following data: Hence, find $y(1)$.	[5]	
	b)	**Apply** Least Square method to find out the value of $y(10)$ for which the following data fits the exponential equation $y = ae^{bx}$	[5]	

x	0.2	0.4	0.6	0.8
y	4.1	9.3	15.5	22.7

x	1.04	1.06	1.08	2.01	2.02
y	2.0	3.5	5.5	6.5	7.5