



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 4 th 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]											
4	a)	Develop the Second Degree Polynomial by using Least Square method which fits to the following data: <table border="1"><tr><td>x</td><td>0.2</td><td>0.4</td><td>0.6</td><td>0.8</td></tr><tr><td>y</td><td>4.1</td><td>9.3</td><td>15.5</td><td>22.7</td></tr></table> Hence, find $y(1)$.	x	0.2	0.4	0.6	0.8	y	4.1	9.3	15.5	22.7	[5]	CO3
	x	0.2	0.4	0.6	0.8									
y	4.1	9.3	15.5	22.7										
b)	Apply Least Square method to find out the value of $y(10)$ for which the following data fits the exponential equation $y = ae^{bx}$ <table border="1"><tr><td>x</td><td>1.04</td><td>1.06</td><td>1.08</td><td>2.01</td><td>2.02</td></tr><tr><td>y</td><td>2.0</td><td>3.5</td><td>5.5</td><td>6.5</td><td>7.5</td></tr></table>	x	1.04	1.06	1.08	2.01	2.02	y	2.0	3.5	5.5	6.5	7.5	[5]
x	1.04	1.06	1.08	2.01	2.02									
y	2.0	3.5	5.5	6.5	7.5									