



Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering

Final Examination, Spring 2026

Course Code: CSE226, Course Title: Numerical Methods

Level: 2 Term: 3, Batch: 66

Time: 2:00 hrs.

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-Jacobi method to solve the following system of linear equations until converges correct to 3 decimal places by considering initial guess $x_0 = y_0 = z_0 = 0$. $4x - 10y + 3z = -3$ $x + 6y + 10z = -3$ $10x - 5y - 2z = 3$ (b) Identify the first derivative of $x=1.1$ from the following table <table><tr><td>x</td><td>1.0</td><td>1.1</td><td>1.2</td><td>1.3</td><td>1.4</td></tr><tr><td>y</td><td>7.989</td><td>8.403</td><td>8.781</td><td>9.129</td><td>9.451</td></tr></table>	x	1.0	1.1	1.2	1.3	1.4	y	7.989	8.403	8.781	9.129	9.451	[7]	CO2
x	1.0	1.1	1.2	1.3	1.4										
y	7.989	8.403	8.781	9.129	9.451										
		[3]													
2.	Apply Runge-Kutta method of 4 th order to calculate approximate value of y (0.1) and y (0.2) of $\frac{dy}{dx} = x - y^2$, $y(0)=1$ correct to 4 decimal places.	[10]													
3.	Identify the best method among Weddle's, Simpson's 1/3 rd and Simpson's 3/8 th to compare with the exact value, by solving the integral of $I = \int_{0.5}^{0.8} \sqrt{x} e^{-x} dx$	[10]													
4.	(a) Certain experimental data of x and y are given as (0,-1), (2, 5), (5, 12), (7, 20). If the straight line $y = a_0 + a_1x$ is fitted to the given data by applying least square method, find out the approximate values of a_0 and a_1 . (b) Develop the second degree polynomial by using least square method for the following data: <table><tr><td>x</td><td>1</td><td>3</td><td>4</td><td>6</td></tr><tr><td>y</td><td>0.63</td><td>2.05</td><td>4.08</td><td>10.78</td></tr></table>	x	1	3	4	6	y	0.63	2.05	4.08	10.78	[4]	CO3		
x	1	3	4	6											
y	0.63	2.05	4.08	10.78											
		[6]													