



Daffodil International University

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

Final Examination, Summer 2026

Course Code: CSE226, Course Title: Numerical Methods

Level: 2 Term: 3, Batch: 67

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-Seidel iteration method to solve the following system of linear equations until converges correct to 3 decimal places by considering initial guess $x_0 = y_0 = z_0 = 0$. $\begin{aligned} -2x + 7y + 2z &= 5 \\ 6x - 2y + z &= 11 \\ x + 2y - 5z &= -1 \end{aligned}$	[6]	CO2												
	(b) Identify the local maximum and local minimum values of y from the following data <table><tr><td>x</td><td>0</td><td>2</td><td>4</td><td>6</td></tr><tr><td>y</td><td>2</td><td>0</td><td>-50</td><td>-196</td></tr></table>	x		0	2	4	6	y	2	0	-50	-196	[4]		
x	0	2	4	6											
y	2	0	-50	-196											
2.	Apply Runge-Kutta method of 4 th order to calculate approximate values of $y(0.2)$ and $y(0.4)$ of $\frac{dy}{dx} = 1 + y^2$, $y(0) = 0$ 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 its exact value of $I = \int_0^{\pi/2} \sqrt{1 - 0.162 \sin^2 x} dx$	[10]													
4.	(a) Develop the second degree polynomial by using least squares method for the following data: <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>1</td><td>5</td><td>10</td><td>22</td><td>38</td></tr></table>	x	0	1	2	3	4	y	1	5	10	22	38	[5]	CO3
	x	0	1	2	3	4									
y	1	5	10	22	38										
(b) Certain experimental data of x and y are given respectively as (1, 2.473), (3, 6.722), (5, 18.274), (7, 49.673), (9, 135.026). If a curve $y = ae^{bx}$ is fitted to the given data, find out the desired curve by applying least squares method.	[5]														