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 $x_0 = y_0 = z_0 = 0$. **[6]** **CO2**

$$-2x+7y+2z=5$$
$$6x-2y+z=11$$
$$x+2y-5z=-1$$

(b) Identify the local maximum and local minimum values of y from the following data **[4]**

x	0	2	4	6
y	2	0	-50	-196

2. Apply Runge-Kutta method of 4th 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 1/3rd and Simpson's 3/8th to compare with its exact value of $I=\int_0^{\pi/2}\sqrt{1-0.162\sin^2 x}\,dx$ **[10]** **CO3**

4. (a) Develop the second degree polynomial by using least squares method for the following data: **[5]**

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]**