ourdiu.com | Shared by Robiul Karim Jesan

Daffodil International University

Faculty of Science & Information Technology (FSIT)

Department of Computer Science and Engineering (CSE)

Final Examination, Fall 2024

Course Code: CSE 226, Course Title: Numerical Methods

Time: 02 Hours | **Level: 2, Term: 2, Batch: 64** | **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: $a+x-3y+z=2$ $3x-5a-y+z=0$ $2y+a-z=1$ $a+x=0$	[5]	CO2
	b)	**Solve the System of Linear Equations using the Gauss Seidel's Method:** $2x+5y-z=16$ $3x+y+z=11$ $2z=5$ 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:** $\frac{dy}{dx} = x^3e^x + y\ ;\ y(0)=1$ **Find** the value of $y(0.3)$ **and** y (0.6), also **Find** the Percentage Error.	[10]	CO2
3		**Calculate** the approximate value of $I = \int_{0.2}^{2.4} \frac{(1+x)e^x}{cosec(xe^x)}dx$ by using **Simpson's 1/3, Simpson's 3/8** and **Weddle's rule**. Find the **Exact Value** of I and then **Compare** and **Comment** on it.	[10]	CO3
4	a)	**Determine** the Second Degree Polynomial using Least Square method which fits to the following data: Hence, find **y(8).**	[5]	CO3
	b)	**Estimate** the value of $y(10)$ for which the following data fits the **Exponential Equation** $y = ae^{bx}$	[5]	

x	1.2	2.4	3.6	4.8
y	6.1	11.3	18.5	27.7

x	1.4	2.6	3.8	4.1	5.2
y	2.0	3.5	5.3	6.0	7.5