



Daffodil International University
Faculty of Science & Information Technology (FSIT)
Department of Computer Science and Engineering (CSE)
Final Examination, Spring 2024
Course Code: CSE 235, Course Title: Numerical Methods

Time: 02 Hours**Level-2, Term-2****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: $\begin{aligned} x + 3y + 2z &= 5 \\ 2x + 4y - 6z &= -4 \\ x + 5y + 3z &= 10 \end{aligned}$	[4]	CO2											
	b)	Solve the System of Linear Equations using the Gauss Seidel's Method: $\begin{aligned} 12x + 3y - 5z &= 1 \\ x + 5y + 3z &= 28 \\ 3x + 7y + 13z &= 76 \end{aligned}$ Use the initial guess $x_0 = y_0 = z_0 = 0$ and iterate until the solution converges three decimal places.	[6]												
2		Solve the following first order Ordinary Differential Equation using 4 th order Runge-Kutta Method: $y' = x^3 + y$ With initial condition $y(0) = 2$. Find the value of $y(0.2)$ & $y(0.4)$ with step length, $h=0.2$	[10]	CO2											
3		Evaluate the approximate value of $I = \int_0^5 \frac{1}{4x+5} dx$ 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: <table border="1"><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>6</td><td>11</td><td>18</td><td>27</td></tr></table> Hence, find $y(10)$.	x	1	2	3	4	y	6	11	18	27	[5]	CO3	
x	1	2	3	4											
y	6	11	18	27											
	b)	Estimate the value of $y(25)$ for which the following data fits the Exponential Equation $y = ab^x$ <table border="1"><tr><td>x</td><td>4</td><td>6</td><td>8</td><td>10</td><td>12</td></tr><tr><td>y</td><td>20</td><td>35</td><td>53</td><td>60</td><td>75</td></tr></table>	x	4	6	8	10	12	y	20	35	53	60	75	[5]
x	4	6	8	10	12										
y	20	35	53	60	75										