ourdiu.com | Shared by Shaker Abdullah

Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Final Examination, Spring 2026
Course Code: MAT102, Course Title: Mathematics II
Level: 1 Term: 2 Batch: 70

Time: 02:00 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)*	Given $M = \begin{bmatrix} 2 & 4 & -1 \\ 1 & 3 & 5 \\ 7 & 0 & 6 \end{bmatrix}$ and $Q = \begin{bmatrix} 2 & 0.5 & -1 \\ 1.5 & 1 & 2 \\ -1 & 4 & -2.5 \end{bmatrix}$ I. Identify M as a sum of symmetric and skew- symmetric matrix. II. Solve Q^{-1}	[3+5]	CO2
	b)	Construct RREF, and the Rank of $N = \begin{pmatrix} 1.5 & -2 & 1 & -1 \\ 2 & 2 & 2 & 1 \\ 0.5 & -2 & -3 & 2 \\ -0.5 & 1 & 2 & 1 \end{pmatrix}$	[5]	
2.		$x_1 + 2x_2 - 2x_3 - x_4 = 0.5$ $2x_1 + 5x_2 - 3x_3 - x_4 = 1.5$ $3x_1 + 8x_2 - 4x_3 + x_4 = 3.5$ $x_1 - x_2 + 2x_3 - 3x_4 = 2.5$ Discover the conditions for the existence of infinitely many solutions, and no solution of a system of linear equations and examine the system.	[2+5]	CO3
3.		Given, $R = \begin{bmatrix} 4 & 2 & 0 \\ 1 & 3 & 0 \\ 0 & 0 & 5 \end{bmatrix}$ I. List out of eigenvalues of R and RR^{-1} II. Classify R, inspect spectrum of R and trace of R^{-7}	[5+3]	CO3
4.	*a)*	Assess linear dependency of S where, $S = \{(2,1,3,-1), (2,3,1,2), (3,2,5,6), (2,7,3,8)\} \subset R^4$. Evaluate LDR of S and verify it.	[4+1]	CO4
	b)	Given, $F(a,b,c) = (3a + 2b - 4c, -4a + 3b + c, -5b - c - a,)$, $G(a,b,c,) = (-2b + a + 5c, -c - 2b - 4a, c,)$, $H(a,b) = (a + 2b, -a + 3b, -a^2)$, $I(a,b,c) = (0,0,0,-2a - b - 3c)$ i. Determine which are Linear Transformations ii. Estimate FoG	[4+3]	

ourdiu.com