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Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering
Mid-Term Examination, Summer – 2026

Course Code: 0541-113 | Course Title: Linear Algebra and Complex Variable
Section: A, B, C, D, E, F | Level-Term: L1-T1 | by- TanviR
Full Marks: 25 | Date: June 29, 2026 | Time: 1.5 Hours

[*Answer all the following questions*]
[The second right-most column indicates the Cos with the respective Bloom's level]
[The right-most column indicates the assigned marks]

Q1. a) **Explain** the following with example — **CO-1 (C2)** — **[2]**
i) Skew-Hermitian Matrix ii) Consistent SLE

b) **Identify** whether the following system of linear equations is consistent or inconsistent. — **CO-1 (C2)** — **[3]**

$$x + y - 2z + s + 3t = 1$$
$$2x - y + 2z + 2s + 6t = 2$$
$$3x + 2y - 4z - 3s - 9t = 3$$

Q2. a) Using only elementary row transformations to reduce Q to I, **identify** the inverse of Q when — **CO-1 (C2)** — **[5]**

$$Q = \begin{pmatrix} -1 & 2 & -3 \\ 2 & 1 & 0 \\ 4 & -2 & 5 \end{pmatrix}$$

b) **Identify** the echelon form, row reduced echelon form and normal form of the following matrix — **CO-1 (C2)** — **[5]**

$$M = \begin{pmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{pmatrix}$$

Q3. a) **Categorize** the values of 'δ' for which the following system of linear equations has — **CO-1 (C2)** — **[5]**
i) No solution
ii) Infinitely many solutions
iii) Unique solution

$$u + v - w = 1$$
$$2u + 3v + \delta w = 3$$
$$u + \delta v + 3w = 2$$

b) **Express** W as the sum of symmetric matrix and skew-symmetric matrix, — **CO-1 (C2)** — **[5]**

where $W = \begin{pmatrix} \tan 45^\circ & \frac{d}{dt}(t^2 + 4t)\Big|_{t=2} & e^0 \\ \ln e^2 & \left|\begin{pmatrix} 2 & 1 \\ 4 & 3 \end{pmatrix}^T\right| & \lim_{t \to 2}(t + 3) \\ |-5| & \frac{4!}{3!} & \sqrt{16} \end{pmatrix}$