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

Course Code: 0541-121 | Course Title: Linear Algebra and Complex Variable
Section: A, B, C, D, E, F, G | Level-Term: L1-T2 | Teacher's Initial: HRP, SS
Full Marks: 25 | Date: February 26, 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-Symmetric Matrix ii) Inconsistent SLE
iii) Hermitian Matrix iv) Homogeneous System

b) **Show** that the following system of linear equations is not consistent. — **CO-1 (C2)** — **[3]**

$$x + y + z = -3$$
$$3x + y - 2z = -2$$
$$2x + 4y + 7z = 7$$

Q2. a) **Express** A as the sum of symmetric matrix and skew-symmetric matrix, — **CO-1 (C2)** — **[5]**

where $A = \begin{pmatrix} \sin 90^\circ & \frac{d}{dx}(x^2 - x)\Big|_{x=2} & e^0 \\ \ln 1 & \int_0^2 \int_0^1 (x+y)dy\,dx & -2 \\ |-3| & -\frac{3}{4} & 3! \end{pmatrix}$

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

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

Q3. a) **Categorize** the values of 'β' so that the following SLE has (i) No solution (ii) Infinitely many solutions (iii) Unique solution — **CO-1 (C2)** — **[5]**

$$x + 2y - z = 3$$
$$3x - y + 2z = 3$$
$$4x + y + (\beta^2 - 8)z = \beta + 3$$

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

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