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

Course Code: 0541-113 | Course Title: Linear Algebra and Complex Variable
Section: A, B, C, D, R | Level-Term: L1-T1 | Teacher's Initial: HRP
Full Marks: 25 | Date: November 02, 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) Augmented Matrix ii) Hermitian Matrix

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

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

Q2. **a)** **Categorize** the values of 'λ' for which the following system of linear equations has — **CO-1 (C2)** — **[5]**
i) No solution
ii) Infinitely many solutions
iii) Unique solution

$$u + 2v - w = 3$$
$$3u - v + 2w = 3$$
$$4u + v + (\lambda^2 - 8)w = \lambda + 3$$

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

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

Q3. **a)** **Express** P as the sum of symmetric matrix and skew-symmetric matrix, — **CO-1 (C2)** — **[5]**

where $P = \begin{pmatrix} \cos 0^\circ & \frac{d^2}{dt^2}(t^3 + 2t^2)\Big|_{t=1} & e^0 \\ \log_{10} 100 & \left|\begin{pmatrix} 2 & 1 \\ 3 & 2 \end{pmatrix}^T\right| & \lim_{t\to 2}(t+2) \\ \sqrt{4} & \frac{3!}{2!} & |-2| \end{pmatrix}$

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

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