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Department of Electrical and Electronic Engineering, Faculty of Engine Mid-Term Examination, Fall – 2023 Course Code: 0541-121 Course Title: Linear Algebra and Complex variable	
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Section: A, B, C, DLevel-Term: L1-T2Teacher's Initial: NFull Marks: 25Date: 25 September, 2023Time: 1.5 Hours	IAA, SB

## [Answer all the following questions]

$\mathscr{A}$ 1. Express $(-2 - 3i)^5 - 7.3$ (4.9, 169°) in Matrix form. Also, locate the complex number in the complex plane.	CO-3 C(4)	[5]
Q2. i) Find $BA - 4I_3$ , where $A = \begin{pmatrix} -3 & 2 & -1 \\ 0 & 4 & 2 \\ 2 & \frac{1}{2} & -1 \end{pmatrix} \qquad B = \begin{pmatrix} -3 & 1 & \frac{1}{4} \\ 1 & 0 & -4 \\ 0 & -2 & 0 \end{pmatrix}$	CO-1 C(2)	[2]
Write A as the sum of a symmetric & a skew-symmetric matrix, where $A = \begin{pmatrix} \sin 90^{\circ} & (-1)^{3} & 0 \\ \ln 1 & \int_{-\infty}^{0} e^{x} dx & -2 \\  -2  & -\frac{7}{2} & 3! \end{pmatrix}$	CO-1 C(2)	[3]
Q3. Find the REF, RREF and NF of the matrix $B = \begin{pmatrix} 1 & -2 & 2 & -1 \\ 3 & -6 & 6 & 1 \\ -1 & -2 & 3 & -2 \\ -2 & 4 & -4 & 2 \end{pmatrix}$	CO-1 C(2)	[5]
Q4. <b>Find</b> the inverse of the matrix M. Also find $MM^{-1}$ , Where $M = \begin{pmatrix} 1 & -\frac{2}{3} & 3\\ 0 & 9 & 2\\ -1 & 0 & -7 \end{pmatrix}$	CO-1 C(2)	[3+2]
<ul> <li>L is 13 ×32, M is 12 × 13 order matrix. What will be the dimension of <i>ML</i> and <i>LM</i>?</li> <li>Write 1 difference between symmetric and orthogonal matrix.</li> <li>iii) How many matrices we can find with 165 entries?</li> <li>iv) Find the argument of the complex number -9i</li> <li>Write a sparse and a dense matrix with 16 elements.</li> </ul>	CO-1 C(2)	[1*5]