**COURSE: LINEAR ALGEBRA**
**Course Code: MA2.101**

Spring-2025

**Instructor:** Dr. Indranil Chakrabarty

**Assignment 2:** [Released date: **16.04.2025**] [Submission Date: **24.04.2025**]

**Full Marks- 25**

**1.** Let **A** have SVD; $\mathbf{A= USV^T}$ . Show $\mathbf{AA^T}$ has the columns of **U** as eigenvectors with associated eigenvalues $\mathbf{S^2}$ . **[5]**

**2.** Find the SVD of the matrix and also find the outer product form of the matrix

$A= \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}$ **[7+3=10]**

**3.** Diagonalize the quadratic forms in the following expressions by finding an orthogonal matrix **Q** such that the change of variable **x = Qy** transforms the given form into one with no cross product terms : $\mathbf{f(x_1,x_2)=x_1^2+8x_1x_2+x_2^2}$ **. [5]**

**4.** Find the orthogonal diagonalization of the matrix $\mathbf{A=}\begin{pmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{pmatrix}$**. [5]**

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