International Institute of Information Technology, Hyderabad
(Deemed to be University)

Course Code: MA2.101:
LINEAR ALGEBRA
Second Tutorial Quiz Examination

Max. Time: 40 min   **Max. Marks: 25**

Roll No: **Programme: __   _____**   **Date of Exam:**

Room no: **Invigilator's Signature:**

General Instructions to the students

1 Place your Permanent / Temporary Student ID card on the desk during the examination for verification by the Invigilator.
2 Reading material such as books (unless open book exam) are not allowed inside the examination hall.
3 Borrowing writing material or calculators from other students in the examination hall is prohibited.
4 If any student is found indulging in malpractice or copying in the examination hall, the student will be given 'F' grade for the course and may be debarred from writing other examinations.
5 No extra pages will be given

Best of Luck

1. Find the singular value decomposition (SVD) of the following matrix

$A=\begin{pmatrix} 0 & -2 \\ -3 & 0 \end{pmatrix}$ Also find its outer product form of the SVD.   **[8+2=10]**

2. Find the orthogonal diagonalization of the following matrix

$A=\begin{pmatrix} 5 & 0 & 0 \\ 0 & 1 & 3 \\ 0 & 3 & 1 \end{pmatrix}$ **[8]**

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 : $7x^2 + 7y^2 + 7z^2 + 8xy + 8xz - 16yz$.   **[5]**

4. If A and B are orthogonally diagonalizable and $AB=BA$. Show that AB is orthogonally diagonalizable   **[2]**