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THE OPEN UNIVERSITY OF SRI LANKA

B.Sc. /B.Ed., Continuing Education Degree Programme

No Book Test (NBT)-2023/2024

PURE MATHEMATICS- LEVEL 04

PEU4302/PEE4302 –Linear Algebra

DURATION: ONE (01) HOUR

Date: 01.09. 2023 **Time: 1.00.p.m. –2:00 p.m.**

ANSWER ALL QUESTIONS.

1. Find the eigen values and eigen vectors of matrix $A=\begin{pmatrix}3 & 1 & 4\\ 0 & 2 & 6\\ 0 & 0 & 5\end{pmatrix}$

2. Let $A=\begin{pmatrix}1 & -1 & 0\\ -1 & 0 & 1\\ 0 & 1 & 1\end{pmatrix}$. Find the model matrix P, diagonal matrix D and hence find A^5.

3. Solve the following system of equations by LU-decomposition.

$$\begin{pmatrix}4 & 8 & 4 & 0\\ 1 & 5 & 4 & -3\\ 1 & 4 & 7 & 2\\ 1 & 3 & 0 & -2\end{pmatrix}\begin{pmatrix}x_1\\ x_2\\ x_3\\ x_4\end{pmatrix}=\begin{pmatrix}28\\ 13\\ 23\\ 4\end{pmatrix}$$

4.Show that $A=\begin{pmatrix}1 & 2+3i & 3+i\\ 2-3i & 2 & 1-2i\\ 3-i & 1+2i & 5\end{pmatrix}$ is Hermitian and $B=\begin{pmatrix}\frac{1+i}{2} & \frac{-1+i}{2}\\ \frac{1+i}{2} & \frac{1-i}{2}\end{pmatrix}$ is unitary.