The Open University of Sri Lanka
B.Sc. /B.Ed. Degree Programme
Pure Mathematics – Level 04
PEU4302/PEE4302 – Linear Algebra
No Book Test (NBT) – 2017/2018

DURATION: ONE HOUR

Date: 10.07.2018. **Time: 16:15h – 17:15h**

ANSWER **ALL** QUESTIONS.

1. (a) If $A = \begin{pmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{pmatrix}$ use Cayley-Hamilton Theorem to express A^4. Also find A^{-1}.

(b) Solve the following system by LU-decomposition:

$$2x + 3y + 4z = 11$$
$$x + 5y + 7z = 15$$
$$3x + 11y + 13z = 25$$

2. (a) Find a matrix P which diagonalizes the matrix

$A = \begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$. Verify that $P^{-1}AP = D$ where D is the diagonal matrix. Hence find A^6.

(b) Transform the quadratic form $10x_1^2 + 2x_2^2 + 5x_3^2 + 6x_2x_3 - 10x_3x_1 - 4x_1x_2$ to canonical form by orthogonal transformation.