The Open University of Sri Lanka

B.Sc/B.Ed. Degree Programme

Open Book Test 2016/2017

Level 04 Applied Mathematics

APU 2144/APE 4144– Applied Linear Algebra & Differential Equations

Duration: - One hour

Date: - 30-09-2017   **Time: -.1.00 p.m. to 2.00 p.m.**

Answer all questions.

1. (i) Check whether the following matrix is singular or non-singular

$$\begin{pmatrix} 2 & -1 & 3 & 4 \\ 0 & 3 & 4 & 1 \\ 2 & 3 & 7 & 5 \\ 2 & 5 & 11 & 6 \end{pmatrix}.$$

   (ii) Find the adjoint of the following matrix:

$$\begin{pmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{pmatrix}.$$

   Hence find the inverse of the given matrix.

2. (i) Define the consistency and the inconsistency of a system of linear simultaneous equations.

   (ii) Solve the following system of linear simultaneous equations:

$$x - 2y + 3z = 6$$
$$3x + y - 4z = -7$$
$$5x - 3y + 2z = 5.$$

   (iii) Find the eigenvalues and eigenvectors of the following matrix:

$$\begin{pmatrix} 1 & -1 & -1 \\ -1 & 1 & -1 \\ -1 & -1 & 1 \end{pmatrix}.$$