THE OPEN UNIVERSITY OF SRI LANKA

B.Sc. /B.Ed DEGREE PROGRAMME - LEVEL 04

OPEN BOOK TEST-2017/2018

ADU4303/ADE4303 –Applied Linear Algebra and Differential Equations

DURATION: ONE HOUR

Date: 13.01.2019. **Time: 02.30 p.m. – 03.30 p.m.**

ANSWER ALL QUESTIONS.

01. (i) Check whether the following matrix is orthogonal or not;

$$\begin{pmatrix} 2 & 6 & 3 \\ 3 & 2 & -6 \\ 6 & -3 & 2 \end{pmatrix}.$$

(ii) Find the inverse of the following matrix using elementary row-transformations;

$$\begin{pmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{pmatrix}.$$

(iii) Find the rank of A, B and AB

where $A = \begin{pmatrix} 1 & 1 & -1 \\ 2 & -3 & 4 \\ 3 & -2 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & -2 & -1 \\ 6 & 12 & 6 \\ 5 & 10 & 5 \end{pmatrix}$.

02. (i) Find non-singular matrices P and Q such that PAQ is in the normal form

where $A = \begin{pmatrix} 9 & 7 & 3 & 6 \\ 5 & -1 & 4 & 1 \\ 6 & 8 & 2 & 4 \end{pmatrix}$.

(ii) Discuss the solution of the following system of liner equations;

$$\begin{aligned} x-3y-3z &= a \\ 4x+z &= 1 \\ -9x+3y+z &= 1. \end{aligned}$$

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

$$\begin{pmatrix} 2 & -4 \\ -1 & -1 \end{pmatrix}.$$