

THE OPEN UNIVERSITY OF SRI LANKA

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

CONTINUOUS ASSESSMENT TEST 1(CAT 1) -2021/2022

ADU4303/ADE4303 –Applied Linear Algebra and Differential Equations



DURATION: ONE HOUR

Date: 07.01.2023

Time: 09.00 a.m. – 10.00 a.m.

ANSWER ALL QUESTIONS.

1. Determine the rank of the following matrix:

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

2. (i) Find the adjoint of the co-efficient matrix (A) of the following system of equations:

$$x + 2y + 3z = 2$$

$$2x + 4y + 5z = 3$$

$$3x + 5y + 6z = 3$$

- (ii) Hence find the inverse of matrix A and also, find the solution of the system of equations in part (i).

3. Verify the Cayley Hamilton Theorem for the matrix B , where

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

Hence find B^4 .

4. Find the eigen values and eigen vectors of the following matrix.

$$\begin{pmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{pmatrix}.$$

