

CONTINUOUS ASSESMENT (C.A)

JANUARY 2022

Course Title : LINEAR ALGEBRA

Duration : 1 :30mins Level : II Speciality : Software Engineering ACADEMIC YEAR : 2021-2022

1. Given that $W_1; W_2; W_3$ and W_4 are four vectors such that
 $W_1 = (1, 1, 0, 0); W_2 = (0, 0, 1, 1); W_3 = (1, 2, 0, 0); W_4 = (0, 0, 1, -1)$.
Determine the rank of the system (W_1, W_2, W_3, W_4) using the practical method (4mks)

2. Calculate the determinant of B given that

$$B = \begin{pmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{pmatrix} : \text{Where } a, b \text{ and } c \text{ are real numbers.}$$

(3mks)

3. Consider the vectors $U_1 = (1, 2, -1), U_2 = (2, 1, -1)$ and $U_3 = (3, 0, 1)$ in the vector space of \mathbb{R}^3 . Show that the vectors U_1, U_2 and U_3 are linearly dependent (4mks)

4. Is the function $f(x, y) = 4x^{\frac{2}{3}}y + 2x^{\frac{5}{3}}$ homogenous? If yes to what degree? (2mks)

5. Give that $A = \begin{pmatrix} 1 & 3 & -3 \\ 0 & 3 & -2 \\ 0 & 1 & 0 \end{pmatrix}$

- i) Determine the characteristic polynomial of A
ii) Determine Eigen values of A and hence the Eigen vectors of A
iii) Is the matrix A diagonalisable (5mks)

6. Optimise the function $f(x, y) = x^2 + y^4 - 2y^2$ (2mks)

The end!!!!

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