

DURATION: - 2½ hrs

832211024

MARKS:- 75

Note: - (1) All questions are compulsory.

(2) Figures to the right indicate full marks

(3) Answer to each question must be on a new page

Q.1) Attempt the following (Any 5)

15M

1) Express $Z = 4 + 6i$ in polar form

CO1-A

2)

If $A = \begin{bmatrix} 1 & 3 & 6 \\ 2 & 4 & 8 \\ 1 & 4 & 3 \end{bmatrix}$, Find a) AB b) A+B c) A

CO1-A

3) Find adjoint of matrix $A = \begin{bmatrix} 2 & -3 \\ 4 & 1 \end{bmatrix}$

CO1-A

4) Enlist the properties of matrix

CO1-C

5) WAP i) To display M in Matrix format ii) find the transpose of M in python

CO3-C

6) Define dot product for vector matrix multiplication

CO3-R

7) Explain linear combination of vector

CO1-R

Q.2) Attempt the following (Any 4)

20M

1) If $U = (2, 3, -1)$ & $V = (6, -3, -2)$ find a) $d(u, v)$ b) $u \cdot v$ c) $2u + 3v$

CO1-A

2) Show that vector $V_1 = (1, 0, 1)$ $V_2 = (2, 1, 4)$ $V_3 = (1, 1, 3)$ do not span the vector space

CO1-A

3) Let $A = \begin{bmatrix} 2 & 2 \\ 1 & 1 \\ 0 & 6 \end{bmatrix}$ $B = \begin{bmatrix} 5 & 4 \\ 2 & 2 \\ 1 & 0 \end{bmatrix}$ $C = \begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix}$ $D = [2 \ 4 \ 3 \ 1]$

CO1-A

Compute the following if they exist: i) $A+B$ ii) $A-B$ iii) $3A$ iv) $B+2D$ 4) Find the square root of a complex number : $-5 + 12i$

CO1-A

5) Verify and check whether the vectors are linearly dependent or not:

CO1-C

 $V_1 = (1, -2, 1)$ $V_2 = (2, 1, -2)$ $V_3 = (7, -4, 1)$

6) WAP to write vector-vector multiplication

CO1-C

Q.3) Attempt the following (Any 4)

20M

1) Solve the following using Gauss Elimination method:

CO2-A

$$2x + 5y + 2z - 3w = 3;$$

$$4x + 5y + 14z + 14w = 1;$$

$$3x + 6y + 5z + 4w = 4;$$

$$5x + 10y + 8z + 4w = 4.$$

2) If $A = \begin{bmatrix} 1 & 3 & 6 \\ 2 & 8 & 4 \\ 1 & 4 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 6 & 2 \\ 1 & 4 & 2 \\ 3 & 2 & 4 \end{bmatrix}$ Find : i) $A+B$ ii) $2A+3B$

CO2-A

iii) $A-B$ iv) AB 3) Find A^{-1} By Adjoint method ; if $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & 1 & 2 \end{bmatrix}$

CO2-C

Syce
(ATICT)

- 4) Find Coordinate Representation of $V = [1, 3, 5, 3]$ in term of a_1, a_2, a_3 CO2-C
 $a_1 = [1, 1, 0, 0]$ $a_2 = [0, 1, 1, 0]$ $a_3 = [0, 0, 1, 1]$
- 5) Enlist the properties of vector space CO2-C
- 6) WAP to find transpose of matrix CO2-C
- Q.4) Attempt the following (Any 4) 20M**
- 1) Shorts notes on : Internet worm CO3-R
- 2) Explain Markov chain process model CO3-U
- 3) Verify Pythagoras theorem for : $U = (1, 0, 2, -4)$ $V = (0, 3, 4, 2)$ CO3-A
- 4) Find Eigen value and Eigen vector for $A = \begin{bmatrix} 0 & 1 \\ 2 & -3 \end{bmatrix}$ CO3-A
- 5) Let $A = \begin{bmatrix} 3 & 1 \\ 2 & 2 \end{bmatrix}$ $V_1 = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$ $V_2 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ Then Express the theorem for diagonalization and evaluate if $F(t) = t^3 - 5t^2 + 3t + 6$ CO3-A
- 6) Explain the term: i) Minimal polynomial CO3-A
ii) characteristics polynomial
