

H

Roll No.

TCS-343

B. TECH. (CSE) (THIRD SEMESTER)

MID SEMESTER

EXAMINATION, Oct., 2023

MATHEMATICAL FOUNDATION FOR AI

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any *one* of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) Solve the system of linear equations :

(CO1)

$$x + y + z = 6$$

$$3x - 2y - z = 4$$

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

OR

(b) Explain all basic properties of real vector space.

(CO1)

P. T. O.

(2)

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2. (a) Define Affine space with example. (CO1)

OR

- (b) Find the rank of matrix A by using the row echelon form : (CO1)

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 4 \\ 3 & 0 & 5 \end{bmatrix}$$

3. (a) Solve the following system of linear equations, by Gaussian elimination method : (CO1)

$$4x + 3y + 6z = 25,$$

$$x + 5y + 7z = 13,$$

$$2x + 9y + z = 1.$$

OR

- (b) Write short notes on different types of matrices : square matrix, diagonal matrix, lower triangular matrix and conjugate transpose of any given matrix with example. (CO1)

(3)

4. (a) What is Analytical Geometry ? Explain the coordinate plane and coordinates of a point with example. (CO2)

OR

- (b) Are the two lines $7x + 2y + 3 = 0$ and $6x - 4y + 2 = 0$ perpendicular ? Are they parallel ? If they are not parallel, what is their point of intersection ? (CO2)

5. (a) Find the angle θ between two lines in the x, y -plane, if they are given by the following equations : (CO2)

$$3x - 4y + 1 = 0 \text{ and } 2x + y - 5 = 0.$$

OR

- (b) A line on the x, y -plane is given by the equation $2x - 3y + 24 = 0$. Find : (i) any two points on the line; (ii) the slope of the line; (iii) the x -and y -intercepts. (CO2)