School of Basic and Applied Sciences

Mathematics

CAT1 - Apr 2022

Time : 90 Minutes **Marks : 30**

Sem II - BBS01T1003 - Linear Algebra and Differential Equations

Your answer should be specific to the question asked

Draw neat labeled diagrams wherever necessary

1. Find the value of constant λ, if the matrix $\begin{pmatrix} \lambda & 1 & 2 \\ 0 & -1 & 5 \\ 2 & 0 & 1 \end{pmatrix}$ is singular. CO1 (2)

2. Show that set of intergers over $\mathbb{R}$ is not a vector space. CO2 (2)

3. Find the inverse of the matrix by Gauss Jordan method: CO1 (5)

$$\begin{bmatrix} 2 & -1 & 3 \\ 1 & 1 & 1 \\ 1 & -1 & 1 \end{bmatrix}$$

4. Show that $T : \mathbb{R}^2 \to \mathbb{R}^2$ such that $T(x, y) = (3x, 2x + y)$ is linear transformation. CO2 (5)

5. Find the solution of the following system of equations by Gauss elimination method: CO1 (8)

$$x + y - z = 0$$
$$2x - y + z = 3$$
$$4x + 2y - 2z = 2$$

6. Suppose T is a linear transformation from $\mathbb{R}^2$ to P_2 s.t. $T(1, 1) = 2 - 3x + x^2$ and $T(2, 3) = 1 - x^2$. Find $T(-1, 2)$ and $T(a, b)$. CO2 (8)