Kathmandu University

First In-semester Examination-2025
Department of Artificial Intelligence, Panchkhal

Level: B.Tech Artificial Intelligence   Course: AIMA 203

Year: I   Semester: II

Time: 15 minutes   F.M. : 10

Name: Roll No: Marks-Scored:

SECTION"A"   [10 Q × 1 = 10 marks] (***Do any ten***).

Fill in the blanks by writing the most appropriate word(s) or symbol(s).

1. Give an example of a vector and its scalar. —————————————————.

2. Give an example of a subspace of $\mathbb{R}^2$: —————————————————.

3. Give an example of 3×4 row echelon for matrix. —————————————————.

4. Find the rank of the matrix $\begin{bmatrix} 1 & 3 & 5 \\ 2 & 6 & 10 \\ 4 & 12 & 20 \end{bmatrix}$. —————————————————.

5. Determine whether the system has unique solution, no unique solution or no solution.
$\begin{bmatrix} 1 & 0 & | & 0 \\ 0 & 1 & | & 0 \\ 0 & 0 & | & -1 \end{bmatrix}$ —————————————————.

6. Write a basis of the vector space $\{0\}$. —————————————————.

7. Suppose a 4×7 matrix A has four pivot columns. Is $Col(A) = \mathbb{R}^4$? Is $Nul(A) = \mathbb{R}^3$
? —————————————————.

8. Is the set of vectors linearly dependent?$\{(1, 2, 4) \ \ (2, 4, 8)\}$ —————————————————.

9. What are the eigenvalues of a triangular matrix? —————————————————.

10. Explain why there are infinitely many eigenvalues associated with an eigenvalue.

—————————————————.

11. If $Ax = 2x$ then, $AAx =$? —————————————————.

12. Can you explain the case where zero is an eigenvalue of a matrix?

—————————————————.