

North Gauhati College
Department of Mathematics

SEMESTER III(HONOURS)
HOME ASSIGNMENT II 2021

M-302 (NON-CBCS)
Linear Algebra and Vector

August 2021

TOTAL MARKS: 25

INSTRUCTIONS TO CANDIDATES

1. This assignment paper contains **Six (6)** questions and comprises **Two (2)** printed pages.
2. Each question carry **Five** marks. Answer any **Five** of all questions.
3. Submit the assignment as a single **PDF** file through the online portal of our college website under section “Assignments” and send a copy to the email id mathngc1969@gmail.com.
4. Write your **Name**, **GU Roll No.**, and **Registration Number** in the assignment .
5. Submission **Due Date** is on or before **7th August, 2021**.

(Answer any **Five**)

1. Find the Eigen values and the corresponding Eigen vectors of the following matrix

$$\begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}.$$

2. Find the minimal polynomial of the matrix

$$\begin{bmatrix} 5 & -6 & -6 \\ -1 & 4 & 2 \\ 3 & -6 & -4 \end{bmatrix}.$$

3. State Cayley-Hamilton theorem and using it to find the inverse of the matrix

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

4. Verify the rank nullity theorem for the linear mapping

$$T : \mathbb{R}^3 \rightarrow \mathbb{R}^2, \text{ defined by } T(x, y, z) = (x + y, y + z).$$

5. Let V be the finite dimensional vector space. Prove that every basis of V has the same number of vectors.

6. Prove that the intersection of a finite collection of subspace of a vector space $V(F)$ is a subspace of $V(F)$. Is it true for union of subspaces ?

END OF PAPER