

North Gauhati College
Department of Mathematics

SEMESTER II(GENERIC & REGULAR)
HOME ASSIGNMENT

MAT-HG-2016/MAT-RC-2016
Algebra

October 2021

TOTAL MARKS: 30

INSTRUCTIONS TO CANDIDATES

1. This assignment paper contains **Three (3)** questions and comprises **Two (2)** printed pages.
2. Answer all questions. The marks for each question are indicated at the beginning of each question.
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 **8th October, 2021**.

Question 1.

[5+5=10]

- (i) Solve the equation $x^3 + 5x^2 + 2x - 8 = 0$ if one root of the equation is 1.
- (ii) If the roots of the equation $4x^4 - 4x^3 - 21x^2 + 11x + 10 = 0$ are in arithmetic progression, find the roots.

Question 2.

[4+6+5=15]

- (i) Define symmetric and skew-symmetric matrix. Give an example for each.
- (ii) Define orthogonal matrix. If A is an orthogonal matrix, then prove that A^T and A^{-1} are also orthogonal.
- (iii) Reduce the following matrix into Echelon form and hence deduce rank

$$A = \begin{bmatrix} 1 & 2 & 2 & 3 & 1 \\ 2 & 4 & 4 & 6 & 2 \\ 3 & 6 & 6 & 9 & 6 \\ 1 & 2 & 4 & 5 & 3 \end{bmatrix}$$

Question 3.

[3+2=5]

- (i) Define group. Show that $(\mathbb{N}, +)$ does not form a group.
- (ii) Prove that order of an element divides the order of the group.

END OF PAPER