

North Gauhati College  
Department of Mathematics

SEMESTER III(HONOURS)  
HOME ASSIGNMENT I 2021

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

August 2021

TOTAL MARKS: 25

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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](mailto: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. Prove that

$$\left[ \vec{a} + \vec{b}, \vec{b} + \vec{c}, \vec{c} + \vec{a} \right] = 2 \left[ \vec{a}, \vec{b}, \vec{c} \right].$$

2. Show that  $\text{grad } \phi$  is a vector perpendicular to the surface  $\phi(x, y, z) = c$ , where  $c$  is a constant.

3. Show that the vector  $\vec{v} = yz\hat{i} + zx\hat{j} + xy\hat{k}$  is irrotational.

4. Prove that

$$\left[ \vec{b} \times \vec{c}, \vec{c} \times \vec{a}, \vec{a} \times \vec{b} \right] = 2 \left[ \vec{a}, \vec{b}, \vec{c} \right]^2.$$

5. Evaluate  $\iint_S \vec{r} \cdot \hat{n} \, dS$ , where  $S$  is a closed surface (Symbols with usual meaning).

6. Find the value of  $x$  so that the vectors  $2\hat{i} - \hat{j} + \hat{k}$ ,  $\hat{i} + 2\hat{j} + 3\hat{k}$  and  $3\hat{i} + x\hat{j} + 5\hat{k}$  are coplanar.

**END OF PAPER**