

North Gauhati College  
Department of Mathematics

SEMESTER III(HONOURS)  
HOME ASSIGNMENT II 2021

**M-301 (NON-CBCS)**  
**Abstract Algebra**

August 2021

TOTAL MARKS: 30

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INSTRUCTIONS TO CANDIDATES

1. This assignment paper contains **Four (4)** questions and comprises **Two (2)** printed pages.
2. Each question carry **Ten** marks. Answer any **Three** 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 **Three**)

1.  $H$  is a normal subgroup of  $G$  if and only if  $H'$  is a normal subgroup of  $G'$ , and if  $H'$  is normal in  $G'$ , then  $\frac{G'}{H'} \cong \frac{G}{H}$ .
2. State and prove Cayley's theorem on a group  $G$ .
3. Define Euclidean domain. Show that the ring integers  $Z$  is a Euclidean domain. Prove that every ideal in a Euclidean domain is a principal ideal.
4. Let  $G$  be a group and  $p$  be a prime such that  $p|O(G)$ . Prove that there exist  $x \in G$ , such that  $O(x) = p$ .

**END OF PAPER**