North Gauhati College
Department of Mathematics

SEMESTER III(HONOURS)
HOME ASSIGNMENT 2022

MAT-HC-3026
Group Theory - I

January 2022   TOTAL MARKS: 30

INSTRUCTIONS TO CANDIDATES

1. This assignment paper contains **Eight (8)** questions and comprises **Two (2)** printed pages.

2. Each question carry **Five** marks. Answer any **Six** of all questions.

3. Submit the assignment as a single **PDF** file through the online portal of our college website under section "Assignments" and submit a hard copy in the Department of Mathematics.

4. Write your **Name**, **GU Roll No.**, and **Registration Number** in the assignment .

5. Submission **Due Date** is on or before 22nd January, 2022.

*(Answer any **Six**)*

1. Prove that set of natural number is a group with respect to addition.

2. Show that cyclic group is abelian.

3. Prove that if G is a finite group and H is a subgroup of G, then $O(H)$ divides $O(G)$.

4. If G is a finite group, show that for any $a \in G$, $a^{O(G)} = e$, where e is the identity element of the group G.

5. Prove that centre of a group G is a subgroup of the group G.

6. Prove that a finite group of prime order is abelian.

7. Prove that every quotient group of a cyclic group is cyclic.

8. 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