

ANNAI VIOLET ARTS AND SCIENCE COLLEGE
DEPARTMENT OF MATHEMATICS
CONTINUOUS INTERNAL ASSESSMENT - I
Subject: Algebraic Structures

Class : III B.Sc., Mathematics

Date:01/09/2022-FN

Max.Marks: 50

Sub. Code:

PART A (5 × 2 = 10 Marks)

Answer any FIVE questions

1. Define group.
2. Find identity element of $\begin{pmatrix} x & x \\ x & x \end{pmatrix}$ where $x \in \mathbb{R}$ under matrix multiplication.
3. Define Subgroup
4. Explain Homomorphism?
5. Define abelian group
6. Define Normal sub group
7. What is cyclic group.

13. Prove that a subgroup N of G is normal iff the product of two right cosets of N is again a right coset of N .

Prepared by
Mr.K.Ponnarasu
Asst.Prof - Mathematics.

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PART B – (2 × 5 = 10 Marks)
Answer any TWO questions

8. Prove that identity element of G is unique.
9. Prove that H be a subgroup of index 2 in a group G . Then H is a normal subgroup of G .
10. If H and K are subgroups of G and $o(G) > \sqrt{o(H) \cdot o(K)}$; then $H \cap K \neq \{e\}$:?

PART C – (3 × 10 = 30 Marks)
Answer ALL questions

11. State and prove Euler's theorem.
12. If H and K are subgroups of a finite group G of orders $o(H)$ and $o(K)$ respectively, then $o(HK) = o(H)o(K)$:?