CONTENTS

CHAPTER I

THE GROUP CONCEPT

		PAGE
1.	Introduction	1
2.	The Axioms of Group Theory	2
3.	Examples of Infinite Groups	7
4.	Alternative Axioms for Finite Groups	9
5.	The Multiplication Table	11
6.	Examples of Finite Groups	14
7.	Isomorphic Groups	18
8.	The Order (Period) of an Element	21
9.	Cyclic Groups	24
	· ·	

CHAPTER II

COMPLEXES AND SUBGROUPS

10. The Calculus of Complexes	28
11. Subgroups	31
12. Lagrange's Theorem	33
13. Subgroups of a Cyclic Group	38
14. Intersection and Generators	40
15. The Direct Product	45
16. Survey of Groups up to Order 8	48
17. The Product Theorem	56
18. Decomposition relative to Two Subgroups	58

CHAPTER III

GROUPS OF PERMUTATIONS

19.	The Symmetric Group P_n	62
20.	Circular Permutations (Cycles)	66
	vii	

viii	CONTENTS

21. Classes of Permutations

23. The Alternating Group A_n

22. Transpositions

24. Cayley's Theorem

25. Transitive Groups

26. Primitive Groups	85
27. General Remarks about Transformations	87
28. Groups related to Geometrical Configurations	88
_	
CHAPTER IV	
INVARIANT SUBGROUPS	
29. Classes of Conjugate Elements	96
30. Invariant Subgroups	99
31. The Quotient (Factor) Group	102
32. The Centre	103
33. The Commutator Group	104
34. Homomorphisms and Isomorphisms	106
35. Automorphisms	109
36. The Isomorphism Theorems	110
37. The Jordan-Hölder Composition Theorem	113
38. Galois' Theorem on the Alternating Group	119
CHAPTER V	
SYLOW GROUPS AND PRIME POWER	GROUPS
39. A Lemma on Abelian Groups	126
40. Sylow's Theorems	127
41. Prime Power Groups	134
CHAPTER VI	
ABELIAN GROUPS	
42. Additive Notation	136
43. The Basis Theorem for Finite Abelian Group	140
44. Elementary Divisors and Invariants of a Finite	
Abelian Group	146
45. Finitely Generated Infinite Abelian Groups	150

PAGE

70

73

77

78

82

COMILIVIS				
CHAPTER VII				
GENERATORS AND RELATIONS				
46. Finitely Generated and Related Groups	PAGE 158			

47. Free Groups

49. Definition of Groups

BIBLIOGRAPHY

48. Relations

INDEX

CONTENTS

ix

158

162

163

167

169