GMA S2 01

Abstract Algebra and Discrete Mathematics

SEMESTER - II

Mathematics

BLOCK - 1



KRISHNA KANTA HANDIQUI STATE OPEN UNIVERSITY

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COURSE INTRODUCTION

'Abstract Algebra and Discrete Mathematics' is the second course of the programme B. A Mathematics (pass). The course is divided into two block. The first block consists of eight units and second block consists of six units.

Block 1 deals with the concept of relation and function. Theory and different types of groups are introduced in this block. Concepts of Homomorphism of groups are also covered in this block.

Block 2 deals with the theory of Rings, Integral domain and Field. Concept of Vector space is also introduced in this block. Concept of Combinaorics are also covered in this block. The Notion of Mathematical logic are introduced in this block. Theory of Boolean Algebra is also been introduced in this Block.

BLOCK INTRODUCTION

This is the first block of the course : “Abstract Algebra and Discrete Mathematics”. The block consists of eight units. The first unit deals with relations and functions. After going through this unit, you will be able to know various types of relations and function.

In second unit, we will discuss binary operation and its different types.

In third unit, we will discuss group and its properties.

The fourth unit deals with subgroups and cyclic groups. In this unit, we will also discuss properties of subgroup.

The fifth unit consists of group of permutation. In this unit, we define permutation and different type of permutations. Concept of permutation groups will also be discussed in this unit.

In sixth unit, we will discuss subgroup of a group and Lagrange’s subgroup order theorem.

In seventh unit, concept of normal subgroup and quotient group will be discussed.

The eight unit deals with the concept of homomorphism types of groups. In this unit, we will discuss different types of homomorphisms and properties of homomorphisms.

While going through a unit, you will notics some along boxes. which have been included to help you know some of the difficult, unseen terms. At the end of each section, you will get “CHECK YOUR PROGRESS” questions. These have been designed to self-check your progress of study. It will be better if you solve the problems put in these boxes immediately after you go through the section of the unit and then match your answer “ANSWERS TO CHECK YOUR PROGRESS” given at the end of each unit.

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UNIT 1: Relations and functions **Page : 7-30**

Relations and Types of relations, equivalence relation, function and types of function.

UNIT 2: Binary operations **Page : 31-40**

Binary Operation, Commutative Binary Operation, Associative Binary Operation, Identity Element, Inverse of an Element.

UNIT 3: Group **Page : 41-51**

Definitions and Examples of groups, Properties of groups.

UNIT 4: Subgroup **Page : 52-61**

Subgroups, cyclic groups.

UNIT 5: Groups of permutation **Page : 62-83**

Definition of Permutation, Examples, Multiplication of Permutation, Different Kinds of Permutation, Permutation Group.

UNIT 6: Cosets **Page : 84-90**

Coset, Lagrange's Subgroup order theorem.

UNIT 7: Normal subgroup & Quetion Group **Page : 91-97**

Normal subgroups, Quotient groups.

UNIT 8: Homomorphism of group **Page : 98-115**

Definition and examples, Types of Homomorphism, Properties of Homomorphism.