

*Star*

# Groups and Rings

**B.Sc. III**

Fifth Semester  
Paper-II

**RISING STAR PUBLICATIONS**

# Syllabus

B.A. / B.Sc. III (Fifth Semester)

**Groups and Rings**  
M.D.U. Rohtak & K.U. Kurukshetra

**Maximum Marks : 50**

Time Allowed : 30

## SECTION-I

Definition of a group with example and simple properties of groups, Subgroup criteria, Generation of groups, cyclic groups, Cosets, Left and right cosets of a sub-group Coset decomposition, Lagrange's theorem and its consequences, subgroups, Quotient groups.

## SECTION-II

Homomorphisms, isomorphisms, automorphisms and inner automorphisms of a group, Automorphisms of cyclic groups, Permutations groups. Even and odd permutations, Alternating groups, Cayley's theorem, Center of a group and derived group of a group.

## SECTION-III

Introduction to rings, subrings, integral domains and fields, Characteristics of a ring, homomorphisms, ideals (principal, prime and Maximal) and Quotient rings, Field quotients of an integral domain.

## SECTION-IV

Euclidean rings, Polynomial rings, Polynomials over the rational field, The Eisenstein criterion, Polynomial rings over commutative rings, Unique factorization domain,  $R$  unique factorization domain implies so is  $R[X_1, X_2, \dots, X_n]$

**Note:** The examiner is requested to set **nine questions** in all, selecting two questions from each section and **one compulsory question** consisting of five or six parts distributed over all the four sections. Candidates are required to attempt **five questions in all**, selecting **at least one question** from each section and the compulsory question.

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