SEMESTER- IV

MJC-06: Group Theory

Course Outcomes

After the completion of the course, the student will be able to:

CO1: Recognize the mathematical objects that are groups, and classify them as abelian, cyclic and permutation groups, etc.

CO2: Explain the significance of the notion of cosets, normal subgroups, and factor groups.

CO3: Understand Automorphism, Class Equation and Sylow's theorem.

MJC-06 : Group Theory (5 credits) Full Marks: 100		
Unit	**Topics to be covered**	**No. of Lectures**
1	Definition and examples of groups, Elementary properties of groups, Subgroups and examples of subgroups, Generator of a group, Cyclic group, Properties of cyclic groups.	10
2	Permutations Group, Even and odd permutations, Alternating Group, Cosets and its properties, Lagrange's theorem, Fermat's Little theorem, Euler's theorem, Normal subgroups, Quotient groups, Center of a group, Normalizer of an element, Normalizer of a subgroup.	10
3	Group homomorphisms, Kernel of a group homomorphism, Fundamental theorem of group homomorphism, Isomorphisms, Properties of Isomorphisms, First, Second and Third isomorphism theorems for groups, Cayley's theorem.	10
4	Automorphism, Inner automorphism, Group of Automorphisms, Group Automorphisms of finite and infinite cyclic groups, Commutator subgroup.	08
5	Conjugacy classes, Class equation, p-groups, Cauchy's theorem for finite abelian groups, Sylow's theorems.	12
	TOTAL	50

Book References:

1. Gallian, Joseph. A. (2013). Contemporary Abstract Algebra (8th ed.). Cengage Learning India Private Limited, Delhi. Fourth impression, 2015.
2. Herstein I.N. (2003). Topics in Algebra (2nd ed.). John Wiley & Sons.
3. Khanna, Vijay K. & Bhambri, S. K. A Course in Abstract Algebra (5th ed.). Vikash Publishing House Private Limited, New Delhi.
4. Fraleigh, John B. (2002). A Course in Abstract Algebra (7th ed.). Pearson Education.

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