MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR
FIRST YEAR
B. Sc. MATHEMATICS 2016-17
PAPER-I
ALGEBRA

Duration: 3 Hours   **Max. Marks: 75**

UNIT-I

Symmetric, Skew Symmetric, Hermition and skew Hermition matrices. Linear independence of row and column matrices. Row rank, column rank and rank of a matrix. Equivalence of column and row ranks.

Eigen values, Eigen vectors and characteristic equation of a matrix. Cayley-Hamilton theorem and its use in finding inverse of a matrix. Theorems and examples of consistency of a system of linear equations.

UNIT- II

Relation between the roots and coefficients of general polynomial equation in one variable. Transformation of equations. Descarte's Rule of signs, solution of Cubic equations (Cardon method). Biquadratic equations. Horner's Method, Ferrari's Method.

UNIT-III

Groups and their defining theorems. Various examples, order of an element and related theorems, Permutation Groups, even and odd permutations, cyclic groups, subgroups, union, intersection of two and finite subgroups and various examples, product of two subgroups.

UNIT –IV

Left and right cosets and their properties, Lagrange's theorem, index of a subgroup. Normal subgroups their examples and elementary basic theorems, Quotient group. Simple group, centre of group, Normalizer of an element and that of a subgroup, Conjugacy relation, class equation for finite groups.

UNIT-V

Group homomorphism and isomorphism with elementary basic properties, Cayley's theorem for finite groups, fundamental theorem of homomorphism in groups. The three isomorphism theorems of groups. Automorphisms and inner automorphisms.

References:

1. I. N. Herstein   : Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
2. R. S. Agrawal   : A Textbook on Modern Algebra.
3. K. B. Datta   : Matrix and Linear Algebra Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
4. H. S. Hall and S.R. Knight : Higher Algebra, H.M. Publications, 1994.
5. Bansal, Bhargava, Agrawal : Amurt Beej Ganita.
6. Chandrika Prasad   : Text book on Algebra and Theory of Equations, Pothishala Pvt. Ltd, Allahabad.
7. Gokhroo, Saini   : Elements of Abstract Algebra
8. Sharma, Purohit   : Elements of Abstract Algebra