

**ALGEBRA & THEORY OF NUMBERS**

**UNIT I**

Relation between roots & coefficients of Polynomial Equations–Symmetric functions – Sum of the  $r^{\text{th}}$  powers of the Roots – Two methods

**UNIT II**

Transformations of Equations – Diminishing, Increasing & multiplying the roots by a constant- Forming equations with the given roots.-Reciprocal equations – all types- Descarte’s rule of Signs(statement only) –simple problems.

**UNIT III**

Inequalities-elementary principles- Geometric & Arithmetic means -Weirstrass inequalities - Cauchy inequality- Applications to Maxima & minima

**UNIT IV**

Rank of a Matrix – Consistency - Eigen values, Eigen vectors – Cayley Hamilton’s Theorem (statement only) – Symmetric, skew Symmetric, Orthogonal, Hermitian, skew Hermitian, & Unitary Matrices –Simple problems only.

**UNIT V**

Theory of Numbers – Prime & Composite numbers – divisors of a given number  $N$  - Euler’s function  $\phi(N)$  and its value – The highest power of a prime  $P$  contained in  $N!$  – Congruences – Fermat’s, Wilson’s & Lagrange’s Theorems

**TEXT BOOK(S)**

- [1] T.K.Manickavasagom Pillai & others Algebra Volume I, S.V Publications -1985 Revised Edition
- [2] T.K.Manickavasagom Pillai & others Algebra Volume II, S.V Publications -1985 Revised edition
- [3] S.Arumugam & A.Thangapandi Issac, Modern Algebra, New Gamma Publishing House, 2000

- UNIT – I - Chapter 6 Sections 11 to 14 of [1]
- UNIT – II - Chapter 6 Sections 15 to 21 & 24 of [1]
- UNIT – III - Chapter 4 of [2]
- UNIT – IV - Chapter 6 Sections 6.1 to 6.3 of [3]
- UNIT – V - Chapter 5 of [2]

**REFERENCES(S)**

- [1] H.S.Hall and S.R. Knight, Higher Algebra, Prentice Hall of India, New Delhi,
- [2] H.S.Hall and S.R. Knight, Higher Algebra, McMillan and Co., London, 1948