

M-Phy)

Mathematics, Paper-I

1. Metric Spaces : Open and closed sets,
Interior of X a set, Limit points, Boundary closure of a set.
Continuous functions : Homeomorphic, Isometry.
Cauchy Sentences, Complete metric spaces.
Completeness of the real line R .
Contraction principle, Baire's Category Theorem.
2. Topological Spaces: Bases, Subbases, order topology,
Product topology, subspace topology, closed sets, Limit point,
Hausdroff space, Continuity, metric topology, quotical topology,
Connected spaces : Limit point compactness, Local compactness.
Countability axioms, separation axioms.
Completely Regular Spaces.
Stone-cech compactification.

Prescribed Books:-

- Topology & Moder Analysis : G.F.Simmons.
Topology : J.R.Munkres.

Paper- II. Algebra.

1. Groups: Subgroups, Cyclic groups, Permutation groups.
Homomorphism & Isomorphism of groups.
Lagrange's Theorem, Cauchy Theorem, Normal Subgroups,
Finite abelian groups, i.g. abelian groups.
2. Rings: Rings of contiguous functions, matrix rings, Polynomial
rings, power series rings, Laurent rings, Boolean rings,
some spacial rings. Direct Products, Opposite rings,
Characteristic of rings.
Ideals- Basic properties of ideals, Algebre of Ideals, Maximal
and Prime ideals, Quotient rings, Ideals in quotient rings,
Local rings.
Homomorphism of rings :- Basic properties, Fundamental Theorems,
Endomorphism rings, Field of Fractions.
Divisibility in an I.D.- Euclidean domains, Principal Ideal
domains, Factorization domains, Unique ~~factoris~~ factorization
domains, Irreducible Polynomials, Irreducible Polynomials,
Eisenstien's criterion.
3. Linear Algebra : Vector Spaces: Subspaces, linearly dependent
and Independent sets of vectors, Direct sums, Quotient spaces,
Homomorphism. Bases Dimension of a vector space. Dual spaces,
Rank & Nullity, Algebra of Linear transformations. Characteristic
roots, Characteristic vectors, Algebra of Matrices- Celey -
Hamilton T.

Prescribed Books:-

- ings & Modules : C.Musili
cs in Algebra : I.N.Herstein.

Paper-III Functional Analysis.

- 1) Normed Linear Spaces.
- 2) Banach Spaces, Chapter-9 Simmons.
- 3) Hilbert Spaces Chapter-10 Simmons.
- 4) Finite Dimensional Spectral Theory : The Spectral Theorem.

Prescribed Book :-

Introduction to Topology

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Modern Analysis : G.F.Simmons.

Al Khan