

Paper XII: Trigonometry and Complex analysis

I. Trigonometry:

Expression of sine and cosines using De-Moiver's theorem. Series of sines and cosines. Hyperbolic functions. Logarithm of complex number (simple example), summation of trigonometric series (simple problems) **12 hrs**

II. Topological Spaces:

Definition of a topology and examples: Types of topologies: Discrete, indiscrete and co-finite topology (or finite complement topology). Open and closed sets. Simple examples, elementary concepts closure and closure properties, neighborhoods, limit points and derived sets, interior, exterior and boundary of a set. **Bases and sub bases:** Definition, base for a topology, properties of base for a topology. Characterization of a topological space in terms of base.

III. Relative topology:

Definition, Elementary properties and examples. Separation axioms, T_1 -Spaces and T_2 - Spaces (Definition and simple properties) **30 Hrs**

IV. Fuzzy Sets:

The vocabulary of Fuzzy logic- Boolean sets-operators-Fuzzy sets-Fuzzy Quantifiers-Fuzzy set operators-operations on Fuzzy sets-illustrations-Applications. **10 Hrs**

Note: Internal Marks-30

References:

1. Churchill R V : Introduction to complex variables and applications (Mcgraw Hill)
 2. Murry R Spiegel : Complex Variables (Schaum's Outline series)
 3. Choudhary B: The elements of complex analysis (New Age International Pvt Ltd).
 4. L.V. Ahlfors : **Complex Analysis:** An Introduction to The Theory of Analytic Functions of One Complex Variable (Mcgraw Hill)
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5. E. Sampath Kumar and K.S. Amur: Introduction to Modern Algebra and Topology.
 6. General Topology by Seymour Lipschutz (Schum's Outline series).
 7. Klir and Yaan: Introduction to fuzzy set theory (PHI Publication).