Suggested Material for the Comprehensive Exam

Real Analysis

1- Sequences and Series
2- Continuity
3- Differentiation
4- Taylor’s Theorem
5- Riemann Integrals (in one and in several variables)
6- Sequences and Series of Functions
7- Line Integrals and Green’s Theorem

Complex Analysis

1- Analytic Functions
2- Elementary Functions
3- Contour Integrals
4- Cauchy Integral Formula
5- Maximum Modulus Principle
6- Identity Theorem
7- Residue Theorem

Linear Algebra

1- Systems of Linear Equations
2- Matrices
3- Vector Spaces
4- Linear Transformations
5- Eigenvalues and Eigenvectors
6- Inner Product Spaces

Abstract Algebra

1- Groups
2- Cyclic, Symmetric and Alternating Groups
3- Cosets, Normal Subgroups and Quotient Groups
4- Rings and Fields
5- Prime and Maximal Ideals
6- Integral Domains
7- Quotient Rings
8- Homomorphisms, Fundamental Homomorphism Theorems

Suggested References

1- Berkley Problems in Mathematics.
2- Schaum's Outline: Complex Variables.
3- Schaum's Outline of Advanced Calculus.
4- Schaum's Outline of Linear Algebra.
5- Schaum's Outline of Abstract Algebra.