

Applied Mathematics
S.E. Sem. III [PROD]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	25

SYLLABUS

1. Laplace Transform

Definition and formulae (without proof) for the L. T. of standard functions; Properties (without proof). Problems using the above formulae and properties.

2. Inverse Laplace Transform

Formulae and properties and simple problems using direct applications of the above, NO PROOF
More Problems using Inverse L.T., Partial Fractions Method, Convolution Theorem (without proof) applications to find inverse LT. (NO THEORY TO BE ASKED IN EXAM) Solutions of ordinary differential equations (using boundary and initial conditions) (No unit step function, No periodic function).

3. Matrices

Types of Matrices : Orthogonal, Symmetric, Skew symmetric, Unitary, Hermition, Skew Hermition. Definitions. Results and Theorems, (problems based on the above).

Adjoint of Matrix

Formula for inverse in terms of adjoint inversion Method to solve a system of non homogeneous equations. (Explanation of the methods and problems). Properties of adjoint (only statement) and problems based on the properties (No theory to be asked) Elementary Operations and applications. Reducing a matrix to Normal form. Echelon form and hence find the rank of the given matrix. Solutions of Homogeneous and Non–Homogeneous equations (stating the conditions in terms of rank and problems) (No partition of matrices)

4. Eigen values and Eigen Vectors

Definitions, properties (only statement). Problems to find Eigen values. Eigen vectors. Cayley Hamilton Theorem (statement and application). To find the inverse of a matrix and to reduce a given polynomial and find its value.

5. Definitions and results

Complex–valued function, Analytic function, singular points, Regular function, Necessary and sufficient condition for analytic functions (only statement), Cauchy Riemann equations in Cartesian and Polar form (ONLY STATEMENT AND PROBLEM)

Problems: To find the analytic function, given (i) u (ii) v (iii) $u.v$ (iv) $u-v$ (using Milne Thompson Method) and other problems.

Definitions and Problems of the following: Harmonic function, Orthogonal Trajectories (ONLY PROBLEMS AND THEOREMS WITHOUT PROOF)

Bilinear Transformation: Definition of bilinear transformation critical points, fixed points, cross ratio and problems (ONLY STATEMENT OF THERMOS ON CROSS RATIO AND FIXED POINTS)

GIVEN the following transformations to find the of given curve or its pre-image.

Complex Integration: Only Line Integrals (direct evaluation) Independent only statement of path condition) No CAUCHY'S OR RESIDUES THEROMS AND INTEG. Formulae)

6. Introduction of Fourier series

Fourier series of periodic functions with period 2π and $2l$ even and odd functions, half range Sine and Cosine series. And Parseval's identity (only statement and problems) no derivations (Complex form of Fourier series and Fourier transform not to be included).

References :

1. Elements of Applied Mathematics (*P.N. Wartikar*) – Vol. III and IV
2. Engineering Mathematics (*Kumbhojkar*) – Vol. III
3. Matrices (*Vasistha*)
4. Complex Variable (*M.L.Khanna*)
5. Matrices (*Shanti Narayan*)
6. Theory of Function of Complex Variable (*Shanti Narayan*)
7. Complex Variables (*Schaum's Series*)
8. Laplace Transforms (*Schaum's Outline Series*)
9. Engineering Mathematics (*Bali, Saxena, Iyengar*)

