

BEM-C102

ENGINEERING MATHEMATICS -I

MM: 100

Sessional: 30

Time: 3 hrs

ESE: 70

L T P

Credits 4

3 1 0

NOTE: The question paper shall consist of three sections (Sec.-A, Sec.-B and Sec.-C). Sec.-A shall contain 10 objective type questions of one mark each and student shall be required to attempt all questions. Sec.-B shall contain 10 short answer type questions of four marks each and student shall be required to attempt any five questions. Sec.-C shall contain 8 descriptive type questions of ten marks each and student shall be required to attempt any four questions. Questions shall be uniformly distributed from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT I

Differential Calculus I: Successive differentiation, Leibnitz theorem, Taylor's & Maclaurin's Expansion, Indeterminate forms, Radius of curvature, Asymptotes, Double points and their classification, Tracing of curves.

UNIT II

Differential Calculus II: Partial Differentiation of functions, Normal to surfaces and tangent plane, Change of variables, Jacobian, Taylor's series of two variables, Truncation errors, Extrema of function of two and more variables, Method of Lagrange's multipliers.

UNIT III

Multiple Integrals: Fundamental Theorem of integral calculus, Differentiation under the integral sign, Double and triple integrals, change of order of integration, change of variables. Application to arc length, area, volume, centroid and moment of inertia. Gamma and Beta functions, Dirichlet's integral.

UNIT IV

Vector Calculus: Differentiation of a vector, Scalar and vector fields, Gradient, Divergence, Curl and their physical meanings, Differential operator and identities, Line, Surface and Volume integrals, green's theorem in plane. Gauss and Stoke's theorems (without proof). Simple applications.

UNIT V

Matrices: Elementary row/ column operations, Rank of a matrix and its applications, Eigen-values and Eigen vectors, Cayley-Hamilton theorem, Diagonalization of Matrices, Linear dependence and independence, Normal matrices, Complex matrices and unitary matrices.

Text Books / References

1. Prasad C., A first course in mathematics for Engineers, Prasad Mudranalaya
2. Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999
3. Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
4. Srivastava R.S.L., Engineering Mathematics Vol.I

