

(Aptitude Test for B.Tech. IInd Year) for B.Sc. Graduates

UNIT- 1

DIFFERENTIAL CALCULUS : Successive differentiation, n^{th} order derivate using Leibnitz theorem, Expansion of function for one variables and two variables by Maclaurin's and Taylor's theorem. Partial derivatives, maxima and minima, maxima and minima by Lagranges multiplier method.

INTEGRAL CALCULUS: Evaluation of definite integrals using standard formulae, Gamma and Beta functions, Dirichlet's integral, multiple integrals.

VECTOR CALCULUS : Gradient, divergence and curl, directional derivatives, line, surface and volume integrals, Gauss, Stoke's and Green's theorem.

UNIT-2

MATRIX THEORY : Matrix Algebra, Systems of linear equations, solution of linear system of homogeneous and non-homogeneous equations by matrix. Eigen values and eigen vectors. Cayley Hamilton theorem, complex matrices.

PROBABILITY AND STATISTICS : Sampling theorems, Conditional probability, Mean, median, mode and standard deviation, Random variables, Discrete and continuous distributions, Poisson, Normal and Binomial distribution, Correlation and regression analysis.

UNIT-3

DIFFERENTIAL EQUATIONS : First order equation (linear and nonlinear), Higher order linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's differential equations, Initial and boundary value problems, linear partial differential equations with constant coefficients of 2nd order and their classifications and variable separable method.

UNIT-4

COMPLEX VARIABLES : Analytic functions, Cauchy's integral theorem and integral formula, Taylor's and Laurent series, Residue theorem, contour integrals.

FOURIER SERIES : Periodic functions, Trigonometric series, Fourier series of period $2p$, Euler's formulae, functions having arbitrary period, Change of interval, Even and odd functions, Half range sine and cosine series.

UNIT-5

TRANSFORM THEORY : Laplace transform of derivatives and integrals, Inverse Laplace Transform, Laplace transform of periodic functions, Convolution theorem, Application to solve simple linear and simultaneous differential equations. Fourier integral, Fourier complex transform, Fourier sine and cosine transforms and applications to simple heat transfer equations. Z-transform and its application to solve difference equations.