## Syllabus for PhD/M.Tech/MS written test

A candidate is required to attempt only Mathematics

## Mathematics (compulsory for all)

Linear Algebra: Matrix algebra, Systems of linear equations, Eigen values and eigen vectors.

**Calculus:** Functions of single variable, Limit, continuity and differentiability, Mean value theorems, Evaluation of definite and improper integrals, Partial derivatives, Total derivative, Maxima and minima, Gradient, Divergence and Curl, Vector identities, Directional derivatives, Line, Surface and Volume integrals, Stokes, Gauss and Green's theorems.

**Differential equations:** First order equations (linear and nonlinear), Higher order linear differential equations with constant coefficients, Cauchy's and Euler's equations, Initial and boundary value problems, Laplace transforms, Solutions of one dimensional heat and wave equations and Laplace equation.

**Numerical Methods**: Numerical solutions of linear and non-linear algebraic equations Integration by trapezoidal and Simpson's rule, single and multistep methods for differential equations