Annexure B

Section 2: Engineering Mathematics

Linear Algebra

Matrix Algebra, Systems of Linear Equations, Eigenvalues and Eigenvectors, Linear Vector, Spaces: Basis, Orthogonality, and Completeness, Matrices: Similarity Transformations and Diagonalization

Calculus and Vector Calculus

Mean Value Theorems, Theorems of Integral Calculus, Evaluation of Definite and Improper Integrals, Partial Derivatives, Maxima and Minima, Multiple Integrals, Fourier Series, Fourie Analysis, Vector Identities, Directional Derivatives Line, Surface, and Volume Integrals, Stokes's Theorem, Gauss's (Divergence) Theorem, Green's Theorem

Differential Equations

First-Order Equations (Linear and Nonlinear), Higher-Order Linear Differential Equations with Constant Coefficients, Method of Variation of Parameters, Cauchy's and Euler's Equations, Initial and Boundary Value Problems, Partial Differential Equations: Method of Separation of Variables, Second-Order Linear Differential Equations and Special Function Solutions

Complex Variables and Complex Analysis

Analytic Functions, Cauchy-Riemann Conditions, Cauchy's Integral Theorem and Formula, Taylor and Laurent Series, Residue Theorem and Applications, Singularities and Solution Integrals

Transforms and Tensors

Laplace Transforms, Elementary Concepts of Tensors: Covariant and Contravariant Tensors

Probability and Statistics

Sampling Theorems, Conditional Probability, Descriptive Statistics: Mean, Median, Mode, Standard Deviation, Random Variables: Discrete and Continuous Distributions, Common Distributions: Poisson, Normal, and Binomial, Correlation and Regression Analysis