

5.3 JEST PHYSICS SYLLABUS

Mathematical Methods : Vector Algebra and Vector Calculus, Tensors, Curvilinear Coordinate Systems, Linear Algebra, Linear Differential Equations, Elements of Sturm–Liouville Theory, Special Functions, Complex Analysis, Fourier Series And Fourier Transforms, Laplace Transforms, Elementary Properties of Discrete Groups, Elements of Probability Theory and Error Analysis.

Classical Mechanics: Newton's Laws, Conservation Of Energy and Momentum, Collisions, Generalised Coordinates, Principle of Least Action, Lagrangian and Hamiltonian Formulations of Mechanics, Symmetry and Conservation Laws, Central Force Problem, Kepler Problem, Small Oscillations and Normal Modes and Special Relativity in Classical Mechanics.

Electromagnetism & Optics : Electrostatics and Magneto statics, Boundary Value Problems, Multipole Expansion, Fields in Conducting, Dielectric, Diamagnetic and Paramagnetic Media, Faraday's Law and Time-Varying Fields, Displacement Current, Maxwell's Equations, Energy and Momentum of Electromagnetic Fields, Propagation of Plane Electromagnetic Waves, Reflection, Refraction, Electromagnetic Waves in Dispersive And Conducting Media, Diffraction, Interference and Polarisation.

Quantum Mechanics: Uncertainty Principle, Schrodinger Equation, Central Potentials, Hydrogen Atom, Orbital and Spin Angular Momenta, Addition of Angular Momenta, Matrix Formulation of Quantum Theory, Unitary Transformations Hermitian Operators, Variational Principle, Time Independent Perturbation Theory and Time-Dependent Perturbation Theory.

Thermodynamics & Statistical Physics: Laws of Thermodynamics, Work and Heat Thermodynamic Potentials, Elements of Kinetic Theory, Maxwell's Relations, Statistical Ensembles, Partition Function, Classical Ideal Gas, Harmonic Oscillators, Classical and Quantum Statistics, Fermi and Bose Gases, Black Body Radiation and Statistics of Paramagnetism.

Electronics: Basics of Semiconductor, p-n Junctions, Diodes, Transistors, LCR Circuits Rectifiers, Amplifiers Active Filters and Oscillators, Basics of OPAMPS and their Applications and Basics of Digital Electronics