



Physics by fiziks

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JEST Physics

Syllabus

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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, error analysis.

Classical Mechanics

Newton's laws, conservation of energy and momentum, collisions; generalized 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; special relativity in classical mechanics.

Electromagnetism & Optics

Electrostatics and magnetostatics, 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, polarization.

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, 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; 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; basics of digital electronics.



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JEST Physics Exam Instructions

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TIME: 3 HOURS**MAXIMUM MARKS: 300****Mode of Exam: Online****INSTRUCTIONS FOR ALL CANDIDATES APPEARING FOR THE
PHYSICS PH.D. OR INTEGRATED Ph.D. TEST**

- This test consists of Three sections.
- **SECTION A** comprises 10 questions (MCQ Type).
- **SECTION B** comprises 20 questions (MCQ Type).
- **SECTION C** comprises 10 questions (NAT Type).
- The **grading scheme** will be as follows:

Section A: **+1** marks if correct; **-1/3** mark if incorrect; **0** marks if not attempted.

Section B: **+3** marks if correct; **-1** marks if incorrect; **0** marks if not attempted.

Section C: **+3** marks if correct; **0** marks if incorrect; **0** marks if not attempted.