Joint Entrance Screening Test

JEST EXAM PATTERN-PHYSICS

Section	Number of Questions
Part A	15 questions
Part B	10 questions
Part C	25 questions

Marking Scheme in JEST

Parts	Marking Scheme	Negative Marking
Part A	+3	-1
Part B	+3	No Negative Marking
Part C	+1	-1/3

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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.
