

## Physics

### Subject Test

The Physics subject test assesses the background in three fundamental areas of physics, namely Quantum Mechanics, Classical Mechanics, and Electricity Magnetism at the undergraduate level. It's a two hours written exam where the applicants are required to solve problems in the space provided on the answer sheets. There will not be any multiple choice question. The questions in each section may cover various ideas or they may cover a single idea at various levels of difficulty. In preparing for the test, a thorough review of calculus, ordinary differential equations and the analysis of functions will be very helpful.

Following is the syllabus covered by the exam and the suggested reading material,

### Classical Mechanics

Kinematics. Newton's laws. Work and Energy. Oscillatory motion. Rotational motion about a fixed axis. Central forces and celestial mechanics.

Suggested reading

**Physics**, by Halliday, Resnick and Krane.

**Physics for Engineers and Scientists**, by Hans C. Ohanian and John T. Markart

### Quantum Mechanics

Fundamental concepts like eigenvalues and expectation values of operators. The interpretation of the wavefunction and its general properties. The basic linear algebra in Dirac ket-bra language. The matrix representation of states and operators. The solutions of the schrödinger equation for the rectangular potentials. The angular momentum algebra and the Spin.

Suggested reading

**Introduction to Quantum Mechanics**, by Griffiths

**Introductory Quantum Mechanics**, by Richard L. Liboff

### Electromagnetism

Electrostatics, Coulomb's and Gauss's laws, discrete and continuous charge distribution, currents and DC circuits, scalar electric potential, static magnetic fields in free space, current loops, Lorentz force, induction, vector magnetic potential, Maxwell's equations in differential form, plane waves.

Suggested reading

**Physics**, by Halliday, Resnick and Krane.

**Physics for Engineers and Scientists**, by Hans C. Ohanian and John T. Markart

**Introduction to electrodynamics**, by Griffiths