

5.6 GRE PHYSICS SYLLABUS

Classical Mechanics (20%): Kinematics, non inertial reference frames, energy and work, rotational motion about a fixed axis, of particles, celestial mechanics and central forces, oscillatory motion, dynamics of systems Newton's laws, Hamiltonian and Lagrangian formalism, three-dimensional particle dynamics, elementary topics in fluid dynamics.

Electromagnetism (18%) : Electrostatics, Electromagnetic waves, induction, magnetic fields in free space, AC circuits, currents and DC circuits, Maxwell's equations and their applications, Lorentz force, magnetic and electric fields in matter.

Optics and Wave Phenomena (9%): Wave properties, interference, geometrical optics, superposition, polarization, diffraction, Doppler effect.

Thermodynamics and Statistical Physics (10%) : Laws of thermodynamics, ideal gases, equations of state, ensembles, thermodynamic processes, kinetic theory, statistical concepts and calculation of thermodynamic quantities, thermal expansion of heat transfer.

Special Relativity (6%): Introductory concepts, length contraction, energy and momentum, simultaneity, time dilation, four-vectors and Lorentz transformation, velocity addition.

Laboratory Methods (6%) : Data and error analysis, radiation detection, interaction of charged particles with matter, electronics, dimensional analysis, optical interferometers and lasers, instrumentation, counting statistics, fundamental applications of probability and statistics.

Specialized Topics (9%): Nuclear and Particle physics, radioactive decay, fission and fusion reactions, fundamental properties of elementary particles), Condensed Matter (such as crystal structure, X-ray diffraction, thermal properties, electron theory of metals, semiconductors, superconductors), Miscellaneous mathematical methods, astrophysics. computer applications

