

PHYSICS FOR CHEMICAL ENGINEERING (CHS-122)

Lasers: Concepts of maser and laser, spontaneous and stimulated emission, elementary idea about lasers, basic principles involved in laser, three and four level laser system, coherence, characteristics of laser light; ruby, He-Ne, CO₂ and semiconductor lasers, application of lasers.

Fibers Optics: Optical Fiber, physical structure and basic theory, modes in optical fibers, step index and graded index fibers, losses in optical fibers, sources and sensors for optical fibers, applications of optical fibers in communication.

Electrostatics and Electrodynamics: Gauss's Law in dielectric medium, Equation of continuity, displacement current, Maxwell's equations, wave equation for electromagnetic radiation, electromagnetic wave propagation in free space and isotropic dielectric medium, Poynting theorem & Poynting vector.

Mechanics and Theory of Relativity: Displacement, Velocity and acceleration in polar and spherical coordinate systems, inertial and non-inertial frames, Michelson and Morley experiment, postulates of special theory of relativity, Lorentz's space-time transformations and their consequences, mass variation with velocity, mass energy equivalence, momentum and energy transformation.

Quantum Mechanics: Need of quantum mechanics, Compton effect, Born's concept of wave function, eigen function and eigen values, operators in quantum mechanics, expectation values, time independent and time dependent Schrodinger's wave equations and its applications viz., particle in one dimensional potential well.

Superconductivity: Introduction and discovery of superconductivity, superconducting materials, Meissner effect, critical magnetic field and critical current, type-1 and type-2 superconductors, isotope effect, theory of superconductivity, flux quantization, SQUIDS, applications of superconductivity.

Books Recommended:

1. A text book of engineering Physics; M.N. Avadhanulu and P.G. Kashirsagar, S. Chand & Co. Ltd.
2. Engineering Physics; Satya Prakash and Vibhav Saluja, Pragati Prakashan, Meerut.
3. Modern Engineering Physics; A.S. Vasudeva, S. Chand & Co. Ltd.
4. Optical Electronics; AK Ghatak and Thyagarajan, Foundation books, New Delhi