

Topics Included In Final Exam

Chapter 1: The Birth of Modern Physics

Chapter 2: The Theory of Special Relativity: 1-The Lorentz Transformation

Classical relativity (Newtonian relativity; Galilean transformation)

Einstein's Postulates

The Lorentz Transformation

Time Dilation and Length Contraction

Addition of Velocities

Twin Paradox

Spacetime

Doppler Effect

Relativistic Momentum

Relativistic Energy

Chapter 3: The Experimental Basis of Quantum

Physics

Discovery of the X Ray and the Electron

Quantization

Blackbody Radiation

Photoelectric Effect

X-Ray Production

Compton Effect

Pair Production and Annihilation

Chapter 4: Structure of the Atom

The Atomic Models of Thomson and Rutherford

Rutherford Scattering

The Classical Atomic Model

The Bohr Model of the Hydrogen Atom

Characteristic X-Ray Spectra and Atomic Number.

Chapter 5: Wave Properties of Matter

and Quantum Mechanics I

De Broglie Waves

Wave Motion

Waves or Particles?

Uncertainty Principle

Probability, Wave Functions

Particle in a Box

Chapter 6: Quantum Mechanics II

The Schrödinger Wave Equation

Expectation Values

Infinite Square-Well Potential

Simple Harmonic Oscillator

Chapter 7: The Hydrogen Atom

Application of the Schrödinger Equation to the Hydrogen Atom

Solution of the Schrödinger Equation for Hydrogen

Quantum Numbers

Magnetic Effects on Atomic Spectra