

Ch.1 – ORIGIN OF QUANTUM PHYSICS

- **Historical Note.**
- **Classical Physics.**
 - **Newtonian Mechanics.**
 - **Electromagnetic Theory.**
- **Inadequacy of Classical Theory.**
 - **Blackbody Radiation.**
 - **Photoelectric Effect.**
 - **Compton Effect.**
 - **Atomic Line Spectra.**
- **Wave Aspect of Particles.**
 - **De Broglie's Hypothesis: Matter Waves.**
- **Particles Versus Waves.**
 - **Classical View of Particles and Waves.**
 - **Quantum View of Particles and Waves.**
- **Heisenberg's Uncertainty Principle.**
- **Wave Packets.**

Ch. 2 OPERATORS AND WAVE FUNCTION

- **Definition.**
- **Properties of Linear Operators.**
- **Eigen Value Equation.**
- **Commutation Relations.**
- **Properties of Commutators.**
- **Wave Function.**
- **Physical Significance of Wave Function.**
- **Expectation Values.**
- **Hermitian Operator.**
- **Normalized, Orthogonal and Orthonormal Functions.**

Ch. 3 INTRODUCTION OF QUANTUM MECHANICS

- **Operations of Observation.**

- **Operators and Observations: Interpretive Postulates.**
- **Physical Postulates.**
 - **Correspondence Principle.**
 - **Complementarity Principle.**
- **Schrödinger Equation: Time-Dependent Form.**
- **The Schrödinger Equation: Time-Independent Form.**
- **Principle of Linear Superposition.**
- **Parity.**
- **Probability Current Density.**

Ch. 4 ONE-DIMENSIONAL MOTION

- **Free Particle.**
- **Particle in a box.**
- **Wave Functions of a Particle in a Box.**
- **The Potential Step.**
- **Potential barrier.**

Ch. 5 HARMONIC OSCILLATOR

- **Classical Theory.**
- **Quantum Theory.**
- **The raising and lowering ladder operator.**

Ch. 6 THREE DIMENSIONAL PROBLEMS

- **Schrodinger Equation in Three Dimensions.**
- **Particle in Three Dimensional Box.**

Ch. 7 QUANTUM THEORY OF HYDROGEN ATOM

- **Schrödinger's Equation for Hydrogen Atom.**
- **Angular Momentum.**
- **Separation of Variables.**
- **Magnetic Quantum Numbers.**
- **The Angular Equation (Zenith Equation).**
- **Orbital Quantum Number.**
- **Magnetic Quantum Number.**