

2005-2006

SSP-S. 116 P103 : Introductory Quantum Mechanics

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| 1. The Conceptual aspect (Thankappan Sec 1.1) | 5 Hrs. |
| Wave particle duality, Bohr's complementarity principle; Wave function and its interpretation; Principle of superposition; Wave packets – phase velocity and group velocity Uncertainty relation | |
| 2. Postulates of Quantum Mechanics | 12 Hrs. |
| Schrödinger wave equation; Conservation of probability; Operators and their properties; Equation of Motion for operators; Hermitian operators and their Eigenvalues and eigen functions; Stationary states, Bohr's correspondence principle; Coordinate and Momentum representation; Ehrenfest's theorem; Commutator Algebra. | |
| 3. Dirac Delta function, definition and properties | 3 Hrs |
| Dirac Delta Normalization | |
| 4. One dimensional problems | 10 Hrs |
| Free Particle; Potential step; Rectangular Potential Barrier; Potential Well; Linear Harmonic Oscillator | |
| 5. Angular Momentum | 10 Hrs. |
| Angular Momentum in spherical polar coordinates; Eigenvalues and eigen functions of L^2 , L_z , L_x and L_y operators; Commutation relations; Rigid Rotator; Hydrogen atom. | |
| 6. Time-independent perturbation theory for | 10 Hrs. |
| (i) non-degenerate systems and (ii) degenerate systems; Application to linear Stark effect in Hydrogen; Variation method and its application to Helium atom; Electron spin, spin-orbit interaction, fine structure, Landé's interval rule. | |
| Textbooks : | |
| 1. Quantum Mechanics by E. MERZBACHER | |
| 2. Quantum Mechanics by R.D. RATNA RAJU | |
| Reference Books : | |
| 1. Quantum Mechanics by Thankappan | |
| 2. Quantum Mechanics by Aruldas. | |