

| Date       | Lecture No | Teachers Name    | Paper | Chapter                             | Topic                                          |
|------------|------------|------------------|-------|-------------------------------------|------------------------------------------------|
| 16/07/2019 | 1          | Dr S.K.Thakur    | I     | Introduction                        | List of books                                  |
| 17/07/2019 | 1          | Dr S.K.Thakur    | II    | Introduction                        | List of books                                  |
| 18/07/2019 | 1          | Dr S.K.Thakur    | IV    | Introduction                        | List of books                                  |
| 17/07/2019 | 2          | Maneeta Singh    | III   | Statistical basis of Thermodynamics | Ensemble, Ergodic Surface                      |
| 19/07/2019 |            | Dr S.K.Thakur    |       | CLASS TEACHING                      |                                                |
| 18/07/2019 | 1          | Maneeta Singh    | III   | Statistical basis of Thermodynamics | Phase space $\mu$ and $\Gamma$ -space          |
| 20/07/2019 | 2          | Dr S.K.Thakur    | I     | Classical mechanics                 | Conservation theorem                           |
| 21/07/2019 | 3          | Dr S.K.Thakur    | I     | System of particle                  | Constraints and generalized coordinates        |
| 22/07/2019 | 2          | Dr S.K.Thakur    | II    | Schrodinger equation                | Time-dependent equation                        |
| 23/07/2019 | 3          | Dr S.K.Thakur    | II    | Schrodinger equation                | Time-depedent equation                         |
| 24/07/2019 | 1          | A.V              | III   | Statistical basis of Thermodynamics | Ensemble Average, Density of states            |
| 24/07/2019 | 2          | Dr S.K.Thakur    | IV    | Atomic spectra of two systems       | Coupling scheme                                |
| 25/07/2019 |            | Dr S.K.Thakur    |       | CLASS TEACHING                      |                                                |
| 26/07/2019 | 4          | Dr S.K.Thakur    | I     | System of particle                  | D-alembert principle                           |
| 27/07/2019 | 5          | Dr S.K.Thakur    | I     | System of particle                  | Langrange's equation                           |
| 29/07/2019 | 4          | Dr S.K.Thakur    | II    | Schrodinger equation                | Postulate of Q.M. superposition principle      |
| 25/07/2019 | 2          | A.V              | III   | Statistical basis of Thermodynamics | Liouville's theorem                            |
| 30/07/2019 | 5          | Dr S.K.Thakur    | II    | Schrodinger equation                | Physical Interpretation of wave function       |
| 31/07/2019 | 3          | Dr S.K.Thakur    | IV    | Atomic spectra of two systems       | Spin orbit Interaction Energy                  |
| 01/08/2019 |            | Dr S.K.Thakur    |       | CLASS TEACHING                      |                                                |
| 02/08/2019 | 6          | Dr S.K.Thakur    | I     | System of particle                  | Generalised Momenta                            |
| 03/08/2019 | 7          | Dr S.K.Thakur    | I     | System of particle                  | Principle of least action                      |
| 06/08/2019 | 8          | Dr. S. K. Thakur | II    | Schrodinger equation                | Schrodinger equation                           |
| 07/08/2019 | 3          | A.V              | III   | Statistical basis of Thermodynamics | Liouville's theorem : 2 <sup>nd</sup> part     |
| 07/08/2019 | 6          | Dr S.K.Thakur    | II    | Schrodinger equation                | Schrodinger equation                           |
| 08/08/2019 | 7          | Dr S.K.Thakur    | II    | Schrodinger equation                | Expectation Value                              |
| 08/08/2019 | 3          | Maneeta Singh    | III   | Thermodynamic equilibrium           | Statistical equilibrium, Probability & entropy |
| 09/08/2019 | 4          | Dr S.K.Thakur    | IV    | Atomic spectra of two systems       | Zeeman effect                                  |
| 10/08/2019 |            | Dr S.K.Thakur    |       | CLASS TEACHING                      |                                                |
| 10/08/2019 | 8          | Dr S.K.Thakur    | I     | System of particle                  | Langrangian for a free particle                |
| 13/08/2019 | 9          | Dr S.K.Thakur    | I     | System of particle                  | Remaining portion & discussion                 |
| 14/08/2019 | 4          | A.V              | III   | Thermodynamic equilibrium           | Boltzman Entropy Relation                      |
| 14/08/2019 | 8          | Dr S.K.Thakur    | II    | Schrodinger equation                | Ehrenfest's theorem                            |
| 16/08/2019 | 9          | Dr S.K.Thakur    | II    | Schrodinger equation                | Ehrenfest's theorem                            |
| 17/08/2019 | 5          | Dr S.K.Thakur    | IV    | Two valance system                  | Paschen back effect                            |
| 19/08/2019 |            | Dr S.K.Thakur    |       | CLASS TEACHING                      |                                                |

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|------------|----|---------------|-----|--------------------------------------|---------------------------------------------|
| 21/08/2019 | 5  | Maneeta Singh | III | Thermodynamic equilibrium            | M.B. distribution                           |
| 20/08/2019 | 10 | Dr S.K.Thakur | I   | Two body problem                     | Reduction to one body problem               |
| 21/08/2019 | 11 | Dr S.K.Thakur | I   | Two body problem                     | Centre of Mass, kepler's Law                |
| 22/08/2019 | 4  | Maneeta Singh | III | Thermodynamic equilibrium            | 2nd Law of thermodynamics                   |
| 22/08/2019 | 10 | Dr S.K.Thakur | II  | Schrodinger equation                 | Degeneracy & parity                         |
| 19/08/2019 |    | A.V           | III | Thermodynamic equilibrium            | M.B. distribution of speed in an ideal gas  |
| 24/08/2019 | 11 | Dr S.K.Thakur | II  | Operator                             | Linear operator, production of two operator |
| 26/08/2019 | 6  | Dr S.K.Thakur | IV  | Two valance system                   | Atomic spectra of alkali metals             |
| 27/08/2019 |    | Dr S.K.Thakur |     | MONTHLY EVALUATION                   |                                             |
| 28/08/2019 | 12 | Dr S.K.Thakur | I   | Two body problem                     | Kepler's problem                            |
| 25/08/2019 |    | A.V           | III | Quantum statistics                   | M. B. distribution                          |
| 26/08/2019 |    | AV            |     | Quantum statistics                   | M. B. distribution                          |
| 29/08/2019 | 13 | Dr S.K.Thakur | I   | Canonical formulation                | Hamilton's equation                         |
| 30/08/2019 | 12 | Dr S.K.Thakur | II  | Operator                             | Simultaneous eign function                  |
| 02/09/2019 | 13 | Dr S.K.Thakur | II  | Operator                             | Simultaneous egin function                  |
| 03/09/2019 | 7  | Dr S.K.Thakur | IV  | Atomic spectra of one Valence system | Atomic spectra of alkali metals             |
| 04/09/2019 |    | Dr S.K.Thakur |     | CLASS TEACHING                       |                                             |
| 03/09/2019 |    | A.V           | III | Quantum statistics                   | Planck's Law                                |
| 04/09/2019 |    | A.V           | III | Quantum statistics                   | Planck's Law                                |
| 05/09/2019 | 14 | Dr S.K.Thakur | I   | Canonical formulation                | Hamilton's equation                         |
| 06/09/2019 | 15 | Dr S.K.Thakur | I   | Canonical formulation                | Canonical transformation                    |
| 07/09/2019 | 14 | Dr S.K.Thakur | II  | Operator                             | Angular momentum operator                   |
| 09/09/2019 | 15 | Dr S.K.Thakur | II  | Simple one-D problem                 | Particle in a box                           |
| 11/09/2019 | 8  | Dr S.K.Thakur | IV  | Atomic spectra of one Valence system | Zeeman effect                               |
| 13/09/2019 |    |               |     | CLASS TEACHING                       |                                             |
| 21/09/2019 |    | A.V           | III | Laser & Maser                        | Eienstein coefficient,                      |
| 14/09/2019 | 16 | Dr S.K.Thakur | I   |                                      |                                             |
| 22/09/2019 | 6  | Maneeta Singh | III | Laser & Maser                        | Eienstein coefficient Population inversion  |
| 16/09/2019 |    | Dr S.K.Thakur | I   | Canonical formulation                | Poisson's bracket , angular momentum        |
| 17/09/2019 | 16 | Dr S.K.Thakur | II  | Simple one-D problem                 | Step potential                              |
| 19/09/2019 | 17 | Dr S.K.Thakur | II  | Simple one-D problem                 | Rectangular barrier                         |
| 20/09/2019 | 9  | Dr S.K.Thakur | IV  | Atomic spectra of one Valence system | Paschen Back effect                         |
| 28/09/2019 | 7  | Maneeta Singh | III | Quantum statistics                   | R-D equation                                |
| 28/09/2019 |    |               |     | EVALUATION                           |                                             |
| 29/09/2019 | 8  | Maneeta Singh | III | Laser & Maser                        | Three level laser, Ruby Laser               |
| 23/09/2019 | 17 | Dr S.K.Thakur | I   | Canonical formulation                | Harmonic oscillator problem                 |
| 24/09/2019 | 18 | Dr S.K.Thakur | I   | Canonical formulation                | Harmonic oscillator problem                 |
| 25/09/2019 | 18 | Dr S.K.Thakur | II  | Simple one-D problem                 | Rectangular barrier                         |

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| 26/09/2019 | 19 | Dr S.K.Thakur | II  | Simple one-D problem                 | Finite Potential well                             |
| 27/09/2019 | 10 | Dr S.K.Thakur | IV  | Atomic spectra of one Valence system | Paschen Back effect                               |
| 30/09/2019 |    | Dr S.K.Thakur |     | CLASS TEACHING                       |                                                   |
| 02/10/2019 | 19 | Dr S.K.Thakur | I   | Motion of rigid bodies               | Angular momentum                                  |
| 03/10/2019 | 20 | Dr S.K.Thakur | I   | Motion of rigid bodies               | Torque free motion of a rigid body                |
| 04/10/2019 |    | A.V           | III | Laser & Maser                        | Ruby Laser                                        |
| 04/10/2019 | 20 | Dr S.K.Thakur | II  | One D-Harmonic Oscillator            | Linear Harmonic Oscillator                        |
| 05/10/2019 | 9  | Maneeta Singh | III | Laser & Maser                        | He-Ne Laser, Maser                                |
| 05/10/2019 | 21 | Dr S.K.Thakur | II  | One D-Harmonic Oscillator            | Linear Harmonic Oscillator                        |
| 06/10/2019 |    |               | III | One D-Harmonic Oscillator            | Linear Harmonic Oscillator                        |
| 07/10/2019 | 11 | Dr S.K.Thakur | IV  | Atomic spectra of one Valence system | Spin orbital Interaction                          |
| 09/10/2019 |    |               |     | CLASS TEACHING                       |                                                   |
| 11/10/2019 | 10 | Maneeta Singh | III | Nuclear instruments                  | Cyclotron                                         |
| 11/10/2019 | 21 | Dr S.K.Thakur | I   | Motion of rigid bodies               | Symmetrical top precession                        |
| 13/10/2019 | 22 | Dr S.K.Thakur | I   | Curvi linear coordinates             | Tangent basis vectors, scale factor               |
| 14/10/2019 | 22 | Dr S.K.Thakur | II  | One D-Harmonic Oscillator            | Ground & excited states, zero point energy        |
| 16/10/2019 | 23 | Dr S.K.Thakur | II  | Matter and radiation                 | Photoelectric effect                              |
| 17/10/2019 | 12 | Dr S.K.Thakur | IV  | Atomic spectra of one Valence system | Stark's effect                                    |
| 19/10/2019 |    | Dr S.K.Thakur |     | EVALUATION                           |                                                   |
| 20/10/2019 | 23 | Dr S.K.Thakur | I   | Curvilinear coordinates              | Spherical coordinate system                       |
| 21/10/2019 | 24 | Dr S.K.Thakur | I   | Curvilinear coordinates              | Polar & Cylindrical Coordinate System             |
| 19/10/2019 | 11 | Maneeta Singh | III | Nuclear instruments                  | Synchrotron                                       |
| 25/10/2019 | 12 | Maneeta Singh | III | Nuclear instruments                  | Betatron                                          |
| 23/10/2019 | 24 | Dr S.K.Thakur | II  | Matter and radiation                 | Photoelectric effect                              |
| 24/10/2019 | 25 | Dr S.K.Thakur | II  | Matter and radiation                 | Compton Effect                                    |
| 25/10/2019 | 13 | Dr S.K.Thakur | IV  | Atomic spectra of one Valence system | Electron Spin & fine structure                    |
| 26/10/2019 |    |               |     | CLASS TEACHING                       |                                                   |
| 27/10/2019 | 25 | Dr S.K.Thakur | I   | Curvilinear coordinates              | Gradient of Scale, Curl divergent                 |
| 26/10/2019 |    | A.V           | III | Nuclear instruments                  | G.. M. Counter                                    |
| 03/11/2019 | 13 | Maneeta Singh | III | Nuclear instruments                  | G.. M. Counter                                    |
| 30/10/2019 | 26 | Dr S.K.Thakur | I   | Curvilinear coordinate               | Laplace equation in spherical polar & cylindrical |
| 01/11/2019 | 26 | Dr S.K.Thakur | II  | Matter and radiation                 | De- Broglie's Hypothesis                          |
| 03/11/2019 | 27 | Dr S.K.Thakur | II  | Matter and radiation                 | Davison-germer Experiment                         |
| 04/11/2019 | 14 | Dr S.K.Thakur | IV  | Atomic Model                         | Sommer fields Model                               |
| 05/11/2019 |    |               |     | CLASS TEACHING                       |                                                   |
| 12/11/2019 | 27 | Dr S.K.Thakur | I   | Special functions                    | Legendra generationy Function                     |
| 14/11/2019 | 28 | Dr S.K.Thakur | I   | Special functions                    | Legendra differential equation                    |

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|------------|----|---------------|-----|----------------------------|-------------------------------------------------------|
| 15/11/2019 | 28 | Dr S.K.Thakur | II  | Matter & Radiation         | Uncertainty & Complementary Principle                 |
| 04/11/2019 | 14 | Maneeta Singh | III | Elementary Particle        | Classification                                        |
| 16/11/2019 | 15 | Maneeta Singh | III | Elementary Particle        | Elementary ideas of Electromagnetism                  |
| 16/11/2019 | 29 | Dr S.K.Thakur | II  | Matter & Radiation         | Bohr Magnetron, Angular Momentum                      |
| 17/11/2019 | 15 | Dr S.K.Thakur | IV  | Atomic Model               | Vector Atom Model                                     |
| 18/11/2019 |    | Dr S.K.Thakur |     | CLASS TEACHING             |                                                       |
| 21/11/2019 | 29 | Dr S.K.Thakur | I   | Special functions          | Recurrence relations                                  |
| 17/11/2019 |    | A.V           | III | Elementary Particle        | Quark Model                                           |
| 22/11/2019 | 30 | Dr S.K.Thakur | I   | Special functions          | Rodrigue's formula & orthogonality                    |
| 23/11/2019 |    | A.V           | III | Elementary Particle        | Quark Model                                           |
| 23/11/2019 | 30 | Dr S.K.Thakur | II  | H-atom                     | Rigid Rotator, H-atom                                 |
| 30/11/2019 | 31 | Dr S.K.Thakur | II  | H-atom                     | H-atom, Value of $L_2$ & $L_2$                        |
| 31/11/2019 | 16 | Dr S.K.Thakur | IV  | Atomic Model               | Pauli's Exclusion Principle                           |
| 01/12/2019 |    |               |     | EVALUATION                 |                                                       |
| 04/12/2019 | 31 | Dr S.K.Thakur | I   | Special functions          | Legendre Polynomial & Generating function of Laguerre |
| 30/11/2019 |    | A.V           | III | Nuclear and nuclear Model  | Rutherford Scattering                                 |
| 05/12/2019 | 32 | Dr S.K.Thakur | I   | Special functions          | Recurrence relation for Laguerre                      |
| 06/12/2019 |    | A.V           | III | Nuclear and nuclear Model  | Liquid drop Model                                     |
| 06/12/2019 | 32 | Dr S.K.Thakur | II  | H-atom                     | Remaining portion                                     |
| 07/12/2019 | 33 | Dr S.K.Thakur | II  | QUESTION ANSWER            |                                                       |
| 07/12/2019 | 17 | Dr S.K.Thakur | IV  | Atomic Model               | Fine Structure of He Line                             |
| 07/12/2019 |    | A.V           | III | Nuclear and nuclear Model  | Static Properties of Nucleus                          |
| 11/12/2019 |    | Dr S.K.Thakur |     | CLASS TEACHING             |                                                       |
| 13/12/2019 |    | Dr S.K.Thakur | I   | Special functions          | orthogonality of laguerre                             |
| 14/12/2019 | 33 | Dr S.K.Thakur | I   | Special functions          | Rodrigues formula for laguerre                        |
| 15/12/2019 | 34 | Dr S.K.Thakur | II  | QUESTION ANSWER            |                                                       |
| 16/12/2019 | 35 | Dr S.K.Thakur | II  | QUESTION ANSWER            |                                                       |
| 13/12/2019 | 16 | Maneeta Singh | III | Nuclear and nuclear Model  | Bohr- Wheeler Theory                                  |
| 14/12/2019 |    | A.V           | III | Nuclear and nuclear Model  | Semi-empirical Mass formula                           |
| 18/12/2019 | 18 | Dr S.K.Thakur | IV  | Atomic Model               | Electronic Configuration of Atom                      |
| 19/12/2019 |    |               |     | CLASS TEACHING             |                                                       |
| 20/12/2019 | 34 | Dr S.K.Thakur | I   | Special functions          | Laguerre's Associated Polynomial                      |
| 21/12/2019 | 35 | Dr S.K.Thakur | I   | Special functions          | Hermite differential equation $H_n(x)$                |
| 22/12/2019 | 19 | Dr S.K.Thakur | IV  | M.S. of diatomic molecules | Near & Far Infrared Spectra                           |
| 23/12/2019 | 20 | Dr S.K.Thakur | IV  | M.S. of diatomic molecules | Rotation-Vibration Spectra                            |
| 20/12/2019 | 17 | Maneeta Singh | III | Nuclear and nuclear Model  | Beethe's Theory and Nuclear Fusion                    |

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| 25/12/2019 | 21 | Dr S.K.Thakur | IV  | M.S. of diatomic molecules | P, Q, R- branches                                          |
| 21/12/2019 | 18 | Maneeta Singh | III | Nuclear and nuclear Model  | Shell Model and Magic Number                               |
| 26/12/2019 |    | Dr S.K.Thakur |     | EVALUATION                 |                                                            |
| 27/12/2019 | 36 | Dr S.K.Thakur | I   | Special functions          | Rearrence relation for $H_n(x)$ Orthogonality for $H_n(x)$ |
| 28/12/2019 | 37 | Dr S.K.Thakur | I   | Special functions          | Remaining Portion of Special function                      |
| 29/12/2019 | 22 | Dr S.K.Thakur | IV  | M.S. of diatomic molecules | Coupling of rotation                                       |
| 27/12/2019 | 19 | Maneeta Singh | III | Magnetism                  | Diamagnetism, Para magnetism                               |
| 30/12/2019 | 23 | Dr S.K.Thakur | IV  | M.S. of diatomic molecules | Electronic band system                                     |
| 28/12/2019 | 20 | Maneeta Singh | III | Magnetism                  | Curie's Law                                                |
| 02/01/2020 | 24 | Dr S.K.Thakur | IV  | M.S. of diatomic molecules | Symmetric properties of electronic eigen function          |
| 03/12/2020 |    |               |     | CLASS TEACHING             |                                                            |
| 07/01/2020 | 38 | Dr S.K.Thakur | I   | Proper & improper rotation | Proper & improper rotation                                 |
| 09/01/2020 | 39 | Dr S.K.Thakur | I   | Euler's angle              | Euler's angles, Notation of goldstein                      |
| 11/01/2020 | 25 | Dr S.K.Thakur | IV  | M.S. of diatomic molecules | Franck-condon principle                                    |
| 11/01/2020 |    | A.V           | III | Magnetism                  | Curie's Law                                                |
| 12/01/2020 | 26 | Dr S.K.Thakur | IV  | M.S. of diatomic molecules | Sequences & Progression                                    |
| 13/01/2020 | 27 | Dr S.K.Thakur | IV  | M.S. of diatomic molecules | Fluorescence                                               |
| 14/01/2020 | 28 | Dr S.K.Thakur | IV  | Fluresence & raman spectra | Raman Spectra                                              |
| 12/12/2020 | 21 | Maneeta Singh | III | Magnetism                  | Curie's Law                                                |
| 16/01/2020 |    |               |     | CLASS TEACHING             |                                                            |
| 17/01/2020 | 40 | Dr S.K.Thakur | I   | Orthogonal Transformation  | Transformation of Matrix                                   |
| 18/01/2020 | 41 | Dr S.K.Thakur | I   | Hydrogen Atom              | Radial Solution                                            |
| 19/01/2020 | 29 | Dr S.K.Thakur | IV  | Hydrogen Atom              | Spherical Harmonic                                         |
| 20/01/2020 | 30 | Dr S.K.Thakur | IV  | Hydrogen Atom              | Discussion of Solution of Hydrogen Atom Wave Equation      |
| 21/01/2020 | 31 | Dr S.K.Thakur | IV  | Rigid Body Dynamics        | EULER Equation of Motion                                   |
| 18/01/2020 | 22 | Maneeta Singh | III | Magnetism                  | FerroMagnetism, domain                                     |
| 23/01/2020 |    | Dr S.K.Thakur |     | CLASS TEACHING             |                                                            |
| 19/01/2020 | 23 | Maneeta Singh | III | Magnetism                  | Hysteresis Loop                                            |
| 24/01/2020 | 32 | Dr S.K.Thakur | IV  | Angular Momentum           | Commutation Operator Algebra                               |
| 26/01/2020 | 33 | Dr S.K.Thakur | IV  | Fluresence & raman spectra | Revision                                                   |
| 27/01/2020 | 42 | Dr S.K.Thakur | I   | Orthogonal Transformation  | Revision                                                   |
| 28/01/2020 | 43 | Dr S.K.Thakur | I   | Orthogonal Transformation  | Revision                                                   |
| 26/01/2020 | 24 | Maneeta Singh | III | Magnetism                  | Revision                                                   |

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