

Waves & Fluid Mechanics (only one DVD)	
Fluid Mechanics	<p>Introduction, Density, Pressure in a fluid, Pressure, Depth, and Pascal's Law, Absolute pressure, Gauge pressure and pressure gauges, Self Efforts.</p> <p>Buoyancy, Archimedes's principle states, Self Efforts.</p> <p>Fluid Flow, The Continuity Equation, Bernoulli's Equation, Turbulence, Self Efforts.</p> <p>Surface Tension, Pressure inside a bubble, Capillarity, Viscosity, Self Efforts.</p>
Waves	<p>Introduction, Types of Mechanical Waves, Periodic Waves, Wave Function for a sinusoidal wave, Self Efforts.</p> <p>Speed of a Longitudinal wave, Sound Waves in Gases, Normal Modes of a String, Self Efforts.</p> <p>Boundary Conditions and Superposition, The Principle of Superposition, Standing Waves on a String, Organ pipes and wind instruments, Self Efforts.</p> <p>The Doppler Effect, Moving Listener, Moving Source and Moving Listener, Self Efforts.</p>
Simple Harmonic Motion	<p>Introduction, Simple Harmonic Motion, Equations of simple harmonic motion, The Simple Pendulum, Self Efforts.</p> <p>Displacement, Velocity and Acceleration in SHM, Energy in Simple Harmonic Motion, Applications of Simple Harmonic Motion, Vertical SHM, Angular SHM, Self Efforts.</p> <p>Advance level Include objective, and Passage. Assertion Reason type questions with self effort.</p>
Gravitation and Satellite	<p>Newton's Law of Gravitation, Determine the value of G, Gravitational Potential Energy, Apparent Weight, Self Efforts.</p> <p>The Motion of Satellites, The Motion of Planets, Kepler's first Law, Kepler's second Law, Kepler's second Law, Self Efforts.</p>

Thermal Physics (only one DVD)	
Thermometry	<p>Concept of Temperature, Scale of Temperature, Temperature and Thermal Equilibrium, Absolute Temperature or Kelvin Scale, Types of Thermometer, Constant-Volume Air Thermometer Description, Standard Constant Volume Gas (Hydrogen) Thermometer, Platinum Resistance Thermometer, Thermo-Couple Thermometer Principle, Total Radiation Pyrometer, Optical Pyrometer Principle. Calorimetry and Phase Changes, Heat Calculations.</p> <p>Thermal Expansion, Linear Expansion, Thermal Stress.</p> <p>Area Expansion or Superficial Expansion, Volume Expansion or Cubical Expansion, Relation Between α, β, γ, Volume Expansion in Liquids, Apparent Expansion of Liquid, Relation Between γ_r and γ_a, Case-1 Liquid Overflow, Case-2 Liquid Level Remains Unchanged, Case-3 Liquid Level seems to be Compressed.</p>
Thermodynamics	<p>Thermodynamic Systems, Signs For Heat and Work in Thermodynamics, Work Done During Volume Changes, Internal Energy and the First Law of Thermodynamics,</p> <p>Kinds of Thermodynamic Processes, Adiabatic Process, Isochoric Process, Isothermal Process, Internal Energy of an Ideal Gas, Heat capacities of an Ideal Gas, Molar Heat capacities of Gases at Low Pressure, Types of Thermodynamics Process, Isobaric P, Ist Law of Thermodynamics, Isochoric Process, Isothermal Process, Adiabatic Process Ist Law, Polytrophic Process,</p>
Mechanisms of Heat Transfer	<p>Mechanism of Heat Transfer, Conduction, Thermal Conductivities, Convection, Radiation,</p>
School Level	<p>Directions of Thermodynamic Processes, Heat Engines, Internal-Combustion Engines, The Otto Cycle, The second Law of Thermodynamics, The Carnot Cycle, The Carnot Cycle, Entropy, Entropy and Disorder</p>

Electromagnetism (only one DVD)	
Moving Charge in Magnetic Field	<p>Introduction, Magnetic Field, Magnetic Field Lines and Magnetic Flux Caution.</p> <p>Motion of Charged Particles in a Magnetic Field, When θ is other than 0°, 180° or 90°, Thomson's e/m Experiment.</p> <p>Following points are worth noting in case of a helical path, Deviation of a charged particle in magnetic field.</p> <p>Path of a charged particle in both electric and magnetic field, Case 1, When $\vec{E} \uparrow \vec{B}$ and particle velocity is perpendicular to both of these fields, Case 2, When $\vec{E} \perp \vec{B}$ and the particle is released at rest from origin.</p>
Magnetic field of Current Element	<p>Introduction, Magnetic Field of a Straight Current- Carrying Conductor, Magnetic Field of a Circular Current Loop.</p> <p>Ampere's Law, Field inside a long cylindrical conductor, Identify and set up, Execute, Evaluate, Field of a solenoid, Identify and Set up, Execute, Evaluate,</p> <p>Magnetic Force on a Current – Carrying Conductor, Force between Parallel Conductors.</p> <p>Force and Torque on a Current Loop.</p>
Magnetic Flux and Gauss's law of Magnetism	<p>Introduction, Caution, Induction Experiments, Faraday's Law, Faraday's law of induction states, Direction of Induced EMF, Lenz's Law, Finding the Direction of induced current, Motion Electromotive Force.</p> <p>Inductance, Mutual inductance, Caution, Self – inductance and inductors, Caution.</p> <p>Magnetic – field energy, Caution, The R – L circuit, Current Growth in an R – L circuit, Current decay in an R – L circuit.</p>
School Level	Para magnetism, Diamagnetism, Ferromagnetism.

Optics & Wave Optics (only one DVD)	
Geometrical Optics (Reflection)	<p>Plane Surfaces, Reflection at Smooth Surfaces, Image formed by a Plane Mirror, Some Important Points:- In Case of Plane Mirror, Number of Images formed by Combination of two Plane Mirror.</p> <p>Spherical Surfaces, Motion of object and Mirrors, Spherical Mirrors, Focus, Image Tracing, Relation between u, v, and R for Spherical Mirror, Relation between the Focal Length and the Radius of curvature, Linear Magnification, Linear Magnification by Spherical Mirrors, Magnification Formula, Other Formulae for Magnification.</p>
Geometrical Optics (Refraction)	<p>Refraction, Refraction at Plane Surfaces, Refraction of Light, Cause of Refraction, Reversibility of Light, Refraction through Parallel Multiple Media, Image due to Refraction at a Plane Surface, Some Important Points.</p> <p>Refraction at Convex Spherical Surface, Refraction at Concave Spherical Surface, Refraction of Light through a Thin Lens:- Lens Maker's Formula, Dependence upon Refractive Index, Object at Infinity, Object at a distance beyond $2f$, Object at a distance $2f$, Object at a distance between f and $2f$, Object at Focus, Object between Optical Centre and Focus, Concave Lens, Linear Magnification by Spherical Lenses, Other Formula for Magnification, Combined Focal Length of two Thin Lenses in Contact, (ii) One Lens is Convex and the other is Concave, Combined Power of two Lenses placed in Contact, Magnification by Combination of Lenses, Simple Microscope, Magnifying Power, Compound Microscope, Magnifying Power, The final image is formed at the least distance D of distinct vision, When the final image is formed at infinity, Resolving Power of Optical Instruments.</p> <p>Critical Angle and Total Internal Reflection, Critical Angle, Total Internal Reflection, Relation between Refractive Index and Critical Angle, Totally Reflecting Prisms, As Simple Reflecting Prism, As a Reversing Prism, As an Erecting Prism, Advantages of Totally Reflecting Prisms, Calculation of the Angle of Deviation: Minimum Deviation, Formula for the Refractive Index of the Prism, Deviation produced by a Thin Prism.</p>
Wave Optics	<p>Principle of Superposition, Interference of Light Waves, Young's Double Slit Experiment, Conditions for Constructive and Destructive Interference (Maxima and Minima), Constructive Interference, Destructive Interference, Position of Maxima and Minima in Interference Pattern: Fringe-width: Determination of Wavelength of Light, Positions of Bright Fringes, Positions of Dark Fringes, Fringe – Width, Angular Fringe-Width.</p>

Mechanics	
Unit and Dimension (DVD -1)	Unit and Dimension
Kinematics (DVD -1)	<p>Distance and Displacement, Some Conceptual Points, Average speed and Average velocity, Some Important Points, Instantaneous Velocity, Some Important Points.</p> <p>Average Acceleration and Instantaneous Acceleration, Some Important Point, Problem Solving Strategy, Motion in two or Three Dimension, Discussion, Motion Under Gravity, Discussion.</p> <p>Graphs.</p> <p>Velocity of Approach.</p> <p>Projectile Motion.</p> <p>Motion in vertical direction, co-ordinates and velocity components of projectile.</p> <p>Projectile Motion In Inclined Plane, Up the plane, Time of Flight, Range, Down The Plane.</p> <p>Relative Motion, (a) Minimum Distance Between Two Bodies In Motion, (b) River-Boat Problems, (i) Condition When The Boatman Crosses The River In Shortest Interval Of Time, (ii) Condition when the boatman wants to reach point B, i.e., at a point just opposite from where he Started, (c) Aircraft Wind Problems, (d) Rain problems.</p> <p>Aircraft Wind Problems, Rain Problems.</p>
Dynamics (DVD -1)	<p>Review of Concepts, Concept of Force and Net Force, Newton's Second Law, Application Methods Using Newton's Second Law Of Motion, Alternative Method, Statement Of Newton's Third Law, Different types of forces in Nature, (a) Gravitational force, (b) Weight of body (mg), (c) Normal reaction force, Normal Reaction Forces In Different Situations, (d) Spring force, Combination of Springs, (i) Springs in series, (ii) springs in parallel, String, String, (a) Massless String, (b) Massive String, Some Important Points, Discussions, Some Important Points.</p>
Circular Motion (DVD -2)	<p>Angular Variables, Condition of Toppling of a Vehicle on Circular Tracks.</p> <p>12. Centripetal force, 13. Centrifugal force.</p>
Centre of Mass and Work Energy (DVD -2)	<p>Centre of Mass of a Uniform Rod.</p> <p>The centre of Mass of Some Rigid Bodies.</p> <p>The linear momentum of a body. External force acting on a system, elastic collision.</p> <p>Linear Momentum and its Conservation Principle, Collision, Elastic Collision in one Dimension, 1. Elastic Collision Between A Heavy Body and A Light Body, 2. Elastic Collision of Two Bodies of Equal Mass, Perfectly inelastic Collision in one Dimension, Final velocity, Loss in Kinetic Energy, Coefficient of Restitution, Elastic Collision in two Dimensions.</p> <p>Calculation of Work Done, Constant Force, Spring Force, Kinetic Energy.</p>
Rotation (DVD -2)	<p>Mass Moment of Inertia of Common Geometrical Shapes.</p> <p>Rolling Motion on an Inclined Plane.</p>

Modern Physics	
Atomic Physics (DVD -1)	<p>The Nuclear Atom, The Bohr Model, Rutherford Scattering, Observation, Impact Parameter (b), Number of particles scattered per unit area, Bohr' Model, Assumptions, Radius of n^{th} Bohr's orbit, Velocity of electron in n^{th} Bohr's orbit, Kinetic energy of electron in n^{th} Bohr's orbit, Potential energy of electron in n^{th} Bohr's orbit, Total energy of electron in n^{th} Bohr's orbit, Ionisation Energy.</p> <p>Line Spectra, De Broglie Waves, Atomic Line Spectra and Energy Levels, Spectrum, Emission Spectra, Absorption Spectra, The Hydrogen Spectrum, Energy Levels, Spectral Series for H – Atom, 1. Lyman Series, 2. Balmer Series, 3. Paschen Series, 4. Bracket Series, 5. Pfund Series, 6. Humphery Series, Conclusions of Bohr's Theory.</p> <p>X –Ray Production and Scattering, X – Ray Photons, X- Ray Spectra, Dual nature of electromagnetic waves, De – Broglie wavelength of matter wave, Electromagnetic Spectrum, X – Rays, Production of X-rays, 1. Continuous X-rays, Duane – Hunt rule, 2. Characteristic X-rays, Moseley's Law for Characteristic Spectrum, Important Points Regarding X-rays, Absorption of X-rays. Emission of electrons, 1. Thermionic emission, 2. Field emission, 3. Secondary emission, 4. Photo electric emission, The Photoelectric Effect, Work Functions of Several Elements, Work Function, Photo electric effect, Photo electric Current, Graph.</p>
Nuclear Physics (DVD -1)	<p>Radioactivity, α – decay, Radioactive Series, Nuclear Stability and Radioactivity, Alpha Decay, Beta Decay, Gamma Decay, Natural Radioactivity, Activities and Half-Lives, β – decay, γ – decay, Decay Law, Decayed nuclei, Probability for survival, Half life, Mean life, Successive disintegration, Radioactive Dating.</p> <p>Equivalence of mass and energy , Binding energy and nuclear stability, Nuclear fission (Divide and Conquer), Nuclear Fusion, Q – value of a nuclear reaction, Nuclear Fission, Fission Reactions for Conservation of Nucleon Number and Charge, Chain Reaction, Nuclear Fusion.</p>
Electronics (DVD -2)	<p>Solids and Semiconductor, Crystalline, Amorphous, Band Theory of a Crystalline Sold, Energy Bands, Insulators and Semiconductors, Semiconductors, Holes, Impurities, Holes, Classification of solids on the basis of band theory, Conductors, Insulators, Semiconductors, Extrinsic or doped semiconductors, Electrical properties of semiconductor, Resistivity.</p> <p>Semiconductor Devices, The p-n Junction, p – n Junction Diode, Depletion region, p – n Junction diode as a rectifier, p – n junction diode as half – wave rectifier, p – n junction diode as full – wave rectifier, Transistor, Working of p – n – p Transistor, Working of p – n – p Transistor, α and β–parameters,.</p> <p>Logic Gates, Truth Table, Boolean Expression, Binary System, Type of Gate, Diode and Triode, Thermionic emission, Diode value, Working of Diode, Diode Characteristics, Dynamic Plate Resistance, Half Wave Rectifier, Full Wave Rectifier, Triode value, Characteristic Constant, Amplification Factor (μ), Internal Resistance (r_p), Mutual Conductance (g_m), Relation between three constant.</p>
Alternating Current	<p>Phasors and Alternating Currents, Resistance and Reactance, Inductor in an Ac circuit, Capacitor in an AC circuit, Alternating Current and Voltage, Circuit Elements in ac</p>

(DVD -2)	Circuits, A Resistor in an ac Circuit, An Inductor in an ac Circuit, A Capacitor in an ac Circuit. Terminology and Analysis of Series ac Circuits, AC Applied to L-R Circuit, AC Applied to C-R Circuit, AC Applied to L-C Circuit, Resonance in Series L-C-R Circuit, Power in ac Circuit and Choke Coil.
School level (DVD -2)	Davisson Germer Experiment, Electron Diffraction, Nuclear Reactors, Communications, Basic Components of a Communication System, Modulation, Modulation Factor, Fax, Television Signals Propagations, Height of transmitting antenna, C.R.O Tube, Wilson Cloud Chamber,

Electrostate & Current Electricity (only one DVD)	
Electrostate	<p>Electric Charge, Electric Charge, Electric Charge and the Structure of Matter, Electric Charge, Charged Body, Amount of Charge, Units of charge, Conversion, Ways to Charging a body, Properties of Charges, Induced Charges, Coulomb 's L aw, Superposition of Forces.</p> <p>Electric Field and Electric Forces, Electric Field Lines, Electric Field, Electric field intensity, Electric Lines of Force, Concepts of Electric Lines of force, Some Basic Terms. Gauss's Law, Introduction, Charge and Electric Flux, Calculating Electric Flux, Gauss's Law, Charge on Conductors, Field at the surface of a conductor, Gauss's Law, Electric Flux, Application of Gauss's Law, Electric Potential Energy of More Than Two Charges, Electric Potential, Potential of a Charged Conducting Sphere, An infinite line charge or charged conducting cylinder, Potential Gradient, Motion of a Charged Particle in an Electric Field.</p> <p>Electric Dipoles, Force and Torque on an Electric Dipole, Electric Dipole, Dipole Moment, Direction, Maximum Torque, Minimum Torque, In nonuniform electric field, Potential Energy of a Dipole, Particular Cases, Electric Field Due to a Dipole.</p> <p>Electric Potential Energy, Electric Potential Energy in a Uniform Field, Electric Potential Energy of Two Point Charges, Electric Potential Energy.</p>
Capacitor	<p>Capacitor, Objectives of Capacitors, Units Capacitance, Capacitors and Capacitance, Actual Capacitor, Types of Capacitors, Dielectrics, Advantages of Dielectrics, Capacitor Partially Filled With Dielectric, Electric-Field Energy, Dielectrics, Induced Charge and Polarization, Dielectric Breakdown.</p> <p>Capacitors in Series and Parallel, Energy Storage in Capacitors and Electric-Field Energy, Combinations of Capacitors, Mixed Combinations, Dielectric between plates of capacitors, Energy Stored in a Capacitor, Redistribution of charge, Initially, Finally, Energy loss.</p>
Current Electricity	<p>Current Resistance and Electromotive Force, Introduction, Current, Current, Drift Velocity and current Density, Resistivity, Resistance, Electromotive Force and Circuits, Electromotive Force, Internal Resistance, Symbols for circuit Diagrams, Energy and Power in Electric Circuits, Pure Resistance, Types of Electric Current, Electric Current Vector or Scalar, Ohm's Law.</p> <p>Colour Table, Fourth Band, Electromotive Force (EMF), Kirchhoff's Junction Law (KJL), Kirchhoff's Voltage Law (KVL), Loop, Combination of Resistors, Resistors in series and Parallel, Resistors in Series, Resistors in Parallel.</p> <p>Grouping of Cells, Series Grouping, Parallel Grouping, Mixed Group, Thermal Effect of Electric Current, Power delivered, Kirchhoff's Rules, Kirchhoff's junction rule, Kirchhoff's loop rule:, Electric Measuring Instruments, Ammeters, Voltmeters, Ammeters and Voltmeter in combination, Ohmmeters, The Potentiometer, Power Distribution System.</p>