Maharashtra State Board of Secondary & Higher Secondary School, Pune

Department of Physics

Subject: Physics
Standard: Eleven
Faculty: Science

Syllabus

XI Physics (Theory & Practical)

Theory Index

Practical Index

Sr. No.	Practical's Name
1	Use of Vernier Callipers.
2	Use of Micrometre screw gauge.
3	Use of Spherometer.
4	Parallelogram law of vectors.
5	Coefficient of Static friction.
6	Travelling microscope.
7	Focal length of convex lens by displacement method.
8	Refractive index of liquid by concave mirror.
9	Refractive index of Prism.
10	Determination of magnetic moment of short bar magnet. (dipole) using a deflection magnetometer.
11	Thermistor.
12	Diode characteristics.
	LIST OF ACTIVITIES
1	Refractive index of convex lens. (using spherometer and auto collimation method)
2	Law of moments.
3	Rolling friction.
4	Coefficient of restitution.
5	'J' by electric method.
6	Refractive index of glass by total internal reflection.
7	Study of resistor using colour code.
8	Study of potential divider circuit.

Syllabus

Sr.No.	Name of the Topic	Scope of Syllabus
1	Units and Measurement	Introduction, System of Units, Fundamental Quantities and Units, Derived Quantities and Units, Conventions for the use of SI Units, Measurement of length, Measurement of Large Distance (Parallax Method), Measurement of Distance to Stars, Measurement of the Size of a Planet or a Star, Measurement of Very Small Distances, Measurement of Mass, Measurement of Time, Dimensions and Dimensional Analysis, Uses of Dimensional Analysis, Accuracy, Precision and Uncertainty in Measurement, Errors in Measurement, Estimation of Error, Combination of error, Significant Figures.
2	Mathematical Methods	Introduction, Vector Analysis, Scalars, Vectors, Types of Vector, Vector Operations, Multiplication of a Vector by a Scalar, Addition and Subtraction of Vectors, Triangle Law for Vector Addition, Law of Parallelogram of Vectors, Resolution of Vectors, Multiplication of Vectors, Scalar Product (Dot Product), Vector Product (Cross Product), Introduction to Calculus, Differential Calculus, Integral Calculus.

3	Motion in a Plane	Introduction, Rectilinear Motion, Motion in Two Dimensions-Motion in a Plane, Average and Instantaneous Velocities, Average and Instantaneous Acceleration, Equations of Motion for an Object travelling a Plane with Uniform Acceleration, Relative Velocity, Projectile Motion, Uniform Circular Motion, Period, Radius Vector and Angular Speed, Expression for Centripetal Acceleration, Conical Pendulum.
4	Law of Motion	Introduction, Aristotle's Fallacy, Newton's Law of Motion, Importance of Newton's First Law of Motion, Importance of Newton's Second Law of Motion, Importance of Newton's Third Law of Motion, Inertial and Non-Inertial Frames of Reference, Types of Forces, Fundamental Forces in Nature, Contact and Non-Contact Forces, Real and Pseudo Forces, Conservative and Non-Conservative Forces and Concept of Potential Energy, Work Done by a Variable Force, Work Energy Theorem, Principal of Conservation of Linear Momentum, Collision, Elastic and Inelastic Collision, Perfectly Inelastic Collision, Coefficient of Restitution, Expressions for final velocities after a head-on, elastic collision, Loss in the kinetic energy during a perfectly inelastic head-on collision, Collision in two dimensions, i.e. a non-head on collision, Impulse of a force, Necessity of defining impulse, Rotational analogue of a force – Moment of a force or Torque, Couple and its torque, Mechanical equilibrium Stable, Unstable and neutral equilibrium, Centre of Mass, Velocity of Centre of Mass, Acceleration of the Centre of Mass, Centre of Gravity.

5	Gravitation	Introduction, Kepler's Laws, Law of Orbit, Law of Areas, Law of Period, Universal Law of Gravitation, Measurement of the Gravitational Constant, Acceleration due to Gravity, Variation in the Acceleration due to Gravity with Altitude, Depth, Latitude and Shape, Gravitational Potential and Potential Energy, Earth Satellites
6	Mechanical Properties of Solids	Introduction, Elastic Behaviour of Solids, Stress and Strain, Hook's Law, Elastic Modulus, Young's Modulus (Y), Bulk Modulus (K), Modulus of Rigidity (n), Poisson ratio, Stress-Strain Curve, Strain Energy, Hardness, Friction in Solids, Types of Friction.
7	Thermal Properties of Matter	Introduction, Temperature and Heat, Measurement of Temperature, Absolute Temperature and Ideal Gas Equation, Absolute zero and absolute temperature, Ideal Gas Equation, Thermal Expansion, Linear Expansion, Areal Expansion, Volume Expansion, Relation between Coefficient of Expansion, Specific Heat Capacity, Specific Heat Capacity of Solids and Liquids, Specific Heat Capacity of Gas, Heat Equation, Heat Capacity (Thermal Capacity), Calorimetry, Change of State, Sublimation, Phase Diagram, Gas and Vapour, Latent Heat, Heat Transfer, Conduction, Convection, Radiation.
8	Sound	Introduction, Types of Waves, Common Properties of all Waves, Transverse Wave and Longitudinal Waves, Mathematical Expression of a Wave, The Speed of Travelling Waves, The Speed of Transverse Waves, The Speed of Longitudinal Waves, Newton's formula for velocity of sound, Laplace's Correction, Factors affecting speed of sound, Principle of Superposition of

		Waves, Echo, Reverberation and Acoustics, Qualities of Sound, Doppler Effect.
9	Optics	Introduction, Nature of Light, Ray Optics OR Geometrical Optics, Reflection, Refraction, Total Internal Reflection, Refraction at a spherical surface and lenses, Dispersion of light and prisms, Some natural phenomena due to Sunlight, Defects of lenses, Optical Instruments.
10	Electrostatics	Introduction, Electric Charges, Basic Properties of Electric Charge, Additive Nature of Charge, Quantization of charge, Conservation of charge, Forces between Charges, Coulomb's Law, Scalar form of Coulomb's Law, Relative Permittivity OR Dielectric Constant, One Coulomb, Coulomb's Law in Vector Form, Principle of Superposition, Electric Field, Electric Flux, Gauss Law, Electric Dipole, Continuous Charge Distribution.
11	Electric Current Through Conductor	Introduction, Electric Current, Flow of Current Through a Current , Drift Speed, Ohm's Law, Limitation of the Ohm's Law, Electrical Energy and Power, Resistors, Rheostat, Specific Resistance, Variation of Resistance with Temperature, Electromotive Force, Cells in Series, Cells in Parallel, Type of Cells
12	Magnetism	Introduction, Magnetic Lines of Force and Magnetic Field, The Bar Magnet, Gauss law of Magnetism, Earth's Magnetism.

13	Electromagnetic Waves and Communication System	Introduction, EM Waves, Sources of EM Waves, Characteristics of EM Waves, Electromagnetic Spectrum, Radio Waves, Microwaves, Infra-red waves, Visible Light, Ultraviolet Rays, X-rays, Gamma Rays, Propagation of EM Waves, Ground wave, Space wave, Sky wave propagation, Introduction to Communication System, Elements of Communication System, Commonly used terms in electronic Communication System, Modulation.
14	Semiconductor	Introduction, Electrical Conductor in Solids, Band Theory of solids, a brief introduction, Intrinsic Semiconductor, Extrinsic Semiconductor, p-n junction, p-n junction diode, Semiconductor devices, Application of semiconductors and p-n junction diode, Thermistor.