

MONTHWISE SYLLABUS PHYSICS
CLASS-XII

April	<u>NIT I ELECTROSTATISTICS (THEORY)</u> Electric charges; Conservation of charge, Coulomb's law-force between two point charges, force between multiple charges, Superposition principle and continuous charge distribution. Experiment. 1. To determine resistance per unit length of a given wire by plotting a graph of potential difference versus current. <u>UNIT I ELECTROSTATISTICS (THEORY)</u> Electric field, electric field due to a point charge, electric field lines; electric dipole, electric field due to a torque on a dipole in uniform electric field. Electric flux, statement of gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside) Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges, Equipotential surfaces, electrical potential energy of a system of two point charges and to electric dipole in an electrostatic field. Capacitor and dielectrics. Experiment: 1. To determine the angle of minimum deviation for a given glass prism by plotting a graph between the angle of incidence and the angle of deviation.
May	<u>UNIT II CURRENT ELECTRICITY (THEORY)</u> Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current, Ohm's law, electrical Resistance-I characteristics (linear and nonlinear), electrical energy and power, electrical resistivity and conductivity. Series and parallel combinations of resistance, temperature depends on resistance. Emf and potential difference of a cell, internal resistance of a cell, combination of cells in series and parallel. Kirchhoff's law and simple applications. Wheatstone bridge, meter bridge. Applications of meter bridge i) To find resistance of a given wire. ii) To verify laws of series and parallel combinations of two resistors. Experiments: 1. To determine the resistance of a given wire using a metre bridge and hence determine the resistivity of the material of the wire . 2. To verify the laws of combination of resistances (series and parallel) using a metre bridge.
July	

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UNIT III MAGNETIC EFFECTS OF CURRENT AND
MAGNETISM(THEORY)

Concept of magnetic field, Oersted's experiment.

Biot-Savart law and its applications to current carrying circular loop. Ampere's law and its applications to infinitely long straight wire, straight and toroidal solenoids.

Force on a moving charge in uniform magnetic and electric field. Cyclotron.

Force on a current carrying conductor in a uniform magnetic field. force between two parallel current carrying conductors. Definition of ampere. Torque experienced by a current loop in uniform magnetic field . moving coil galvanometer- its current sensitivity and conversion to ammeter and voltmeter.

Current loop as a magnetic dipole moment. magnetic dipole moment of revolving electron. Magnetic field intensity due to a magnetic dipole along its axis and perpendicular to its axis. torque on a magnetic dipole in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; earth's magnetic field and magnetic elements. Para dia and ferra magnetic substances with examples. Electromagnets and factors affecting their strength. permanent magnets.

Experiments:

1-To compare the emf of two given primary cells using a potentiometer.

UNIT IV
ELECTRO MAGNETIC INDUCTION AND
ALTERNATING CURRENTS (THEORY)

Electromagnetic induction; Faraday's law induced emf and current, Lenz's law, Eddy current. Self and mutual inductions. Need for displacement current.

Alternating current, peak and r.m.s value of alternating current. Reactance and impedances, L C oscillations , LCR series circuit ,resonance; power in ac circuits wattless current. Ac generator and transformer.

UNIT V ELECTROMAGNETIC WAVES

Electromagnetic waves and its characteristics. transverse nature of electromagnetic waves.

Electromagnetic spectrum including elementary facts about their uses

Experiments:

1-To determine the resistance of a galvanometer by half-deflection method and to find its figure of merit.

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	2-To find the value of “v” for different values of “u” in case of concave mirror and to find the focal length.
August	UNIT VI <u>RAY OPTICS</u> Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection and its applications, optical fiber, refraction at spherical surfaces, lenses thin lens formula, Len’s makers formula. magnification; power of a lens; combination of thin lenses in contact. Refraction and dispersion of light through a prism. Optical Instruments- Microscopes and astronomical telescopes and their magnifying powers. WAVE OPTICS Wave front and Huygen’s principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygen’s principle. Interference, Youngs’s double slit experiment and expression for fringe width, coherent sources and sustained interference of light. Diffraction due to a single slit, width of central maximum. Experiments: 1. To find the focal length of a convex lens by plotting graphs between “u” or “v” between 1/u and 1/v.
September	UNIT VII DUAL NATURE OF MATTER AND RADIATION Dual nature of radiation. Photoelectric effect, Hertz and Lenard’s observation; Einstein’s photo electric equation –particle nature of light. Matter waves- wave nature of particles, de Broglie relation. UNIT VIII <u>ATOMS AND NUCLEI (THEORY)</u> Alpha-particle scattering experiment; Rutherford’s model of atom; Bohr model, energy levels, hydrogen spectrum. Composition and size of nucleus, atomic masses, isotopes, isobars; isotones. Radioactivity-alpha, beta and gamma particles and their properties; radioactive decay law. Mass energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission and fusion. Experiments: 1. To determine refractive index of a glass slab using a travelling microscope. 2. To determine the refractive index of a liquid (water) using a concave mirror.
October	

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	UNIT IX <u>ELECTRONIC DEVICES (THEORY)</u> Semiconductors; semiconductor, Energy bands P-N junction, biasing of P-N junction diode, I-V characteristics in forward and reverse bias; diode as a rectifier; I-V characteristics of LED , photo diode ; solar cell and zener diode; zener diode as a voltage regulator. Experiments: To draw I-V characteristic curve of a P-N junction in forward bias and determine reverse bias.
November	REVISION
December	PRE-BOARD EXAMINATION