Physics *Session: 2020-2021*

Month	Chapter	Topics	Sub Topics
April	I	Electrostatics	Electric charges and their conservation. Coulombs law - force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution.
			Electric field, electric field due to a point charge, electric field lines; electric dipole, electric field due to a dipole; torque on a dipole in a uniform electric field.
			Electric flux, statement of Gausss 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 of electric dipoles in an electrostatic field.
			Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarisation, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor,.
April	IX	Ray Optics	Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection and itsapplications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lens-makers formula. Magnification, power of a lens, combination of thin lenses in contact.
			Refraction and dispersion of light through a prism.Scattering of light-blue colour of the sky and reddish appearance of the sun at sunrise and sunset.
			Optical instruments:. Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.
May	**Unit Test 1**		
	II	Current Electricity	Electric current, flow of electric charges in a metallic conductor, drift velocity and mobility, and their relation with electric current; Ohms law, electrical resistance, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity. Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors; temperature dependence of resistance.
			Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel.
			Kirchhoff s laws and simple applications. Wheatstone bridge, metre bridge.Potentiometer - for comparing emf of two cells; measurement of internal resistance of a cell.

June	III	Magnetic Effects Of Current And Magnetism	Concept of magnetic field, Oersteds experiment.Biot - Savart law and its application to current carrying circular loop. Amperes law and its applications to infinitely long straight wire, straight and toroidal solenoids. Force on a moving charge in uniform magnetic and electric fields. Cyclotron.Force on a current-carrying conductor in a uniform magnetic field. Force between two parallel currentcarrying conductors-definition of ampere. Torque experienced by a current loop in a magnetic field; moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter.
			Current loop as a magnetic dipole and its magnetic dipole moment. Magnetic dipole moment of a revolving electron. Magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis. Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; Earths magnetic field and magnetic elements. Para-, dia- and ferro - magnetic substances, with examples. Electromagnets and factors affecting their strengths. Permanent magnets.
July	Unit Test 2		
	IV	Electromagnetic Induction And Alternating Currents	Electromagnetic induction; Faradays law, induced emf and current; Lenzs Law, Eddy currents. Self and mutual inductance.
			Need for displacement current.Alternating currents, peak and rms value of alternating current /voltage; reactance and impedance; LC oscillations (qualitative treatment only), LCR series circuit, resonance; power in AC circuits, wattless current.AC generator and transformer.
August	V	Electromagnetic Waves	Electromagnetic waves and their characteristics (qualitative ideas only). Transverse nature of electromagnetic waves. Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, x-rays, gamma rays) including elementary facts about their uses.
	X	Wave Optics	: Wavefront and Huygens principle, reflection and refraction of plane wave at a plane surface using wavefronts. Proof of laws of reflection and refraction using Huygens principle. Interference, Youngs 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. Resolving power of microscopes and astronomical telescopes. Polarisation, plane polarised light; Brewsters law, uses of plane polarised light and Polaroids
Block Test 1			

September	XI	Photoelectric Effect Dual Nature And Matter Waves	Photoelectric effect, Hertz and Lenards observations; Einsteins photoelectric equation - particle nature of light Matter waves - wave nature of particles, de Broglie relation. Davisson-Germer experiment..
October	XII & XIII	Atoms And Nuclei	Alpha - particle scattering experiment; Rutherfords model of atom; Bohr model, energy levels, hydrogen spectrumComposition and size of nucleus, atomic masses, isotopes, isobars; isotones. Radioactivity - alpha, beta and gamma particles/rays 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.
November	XIV	Electronic Devices	Semiconductors; semiconductor diode - I-V characteristics in forward and reverse bias, diode as a rectifier; I-V characteristics of LED, photodiode, solar cell, and Zener diode; Zener diode as a voltage regulator.
November	**Revision For Preboard Examination**		
December	**Preboard Examination**		

Syllabus for Preboard examination - as prescribed by CBSE