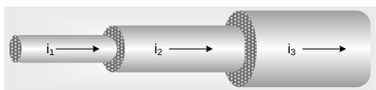
CHOITHRAM SCHOOL, MANIK BAGH, INDORE
ANNUAL CURRICULUM PLAN SESSION 2018– 2019

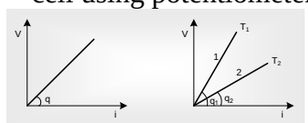
CLASS: -XII **SUBJECT: -PHYSICS**

Month & Working Days	Theme/ Sub-theme	Learning Objectives		Activities &Resources	Expected Learning Outcomes	Assessment
		Subject Specific (Content Based)	Behavioural (Application based)			
March ,12	**Electrostatics** Electric Charges; Conservation of charge, Coulomb's 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 uniform electric fleld.	Student will be able to • Understand the concept of charge • Understand concept of electrostatic force and field. • State the Coulomb's law of electrostatic force. • Understand the concept potential. • Understand the concept of capacitor. • Understand the electric dipole and electric field due to an electric dipole. • Understand the electric potential and potential gradient. • Understand the potential energy and torque due to an electric dipole.	Students will be able to.. • Apply the concept of static electricity in selection of cloths as per the weather conditions • By using the concept of electrostatics students can protect themselves from lightning. • Distinguish between parallel plate and cylindrical capacitors and their uses . • Apply the concept and principle of capacitor in forming home made capacitor. • Apply the concept of charging to charge any conductor at home.	**Teacher will start the topic by asking the following questions related to the previous knowledge** 1. **When we take off our synthetic shirts or nylon sweaters a spark is produced. Why?** 2. By rubbing palms we experience a different feeling. Why? 3. Why does the mustard seeds adhere to the walls of the polythene bag 4. If an electrically charged rod is brought near normal flow of water from a tap, the flow gets slightly diverted towards the rod. Why? Now according to the response of the students the explaination of the topic will be started ,through lecture method the concept of force and electric field will be explained. By demonstrating the activity of charging	Students have learned • The concept electrostatic force and field. The application of torque in rotating a dipole • Energy of a capacitor and uses of capacitor in different appliances. • The applications of Gauss's theorem • Drawing the electric field lines and presence of electric field.	**Conceptual type questions , numerical and unit test.**

	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 of electric dipole in an electrostatic field.			polythene and glass rod by rubbing to each other the types of charges and property of attraction of two unlike charges will be explained. By lecture method concept of potential and electric field will be explained. Using regulators of a fan the construction ang working of capacitors will be discussed. Assignment questions… 1. Plotting of graph showing the variation of Coulom force versus distane between two similar and two dissimilar charges. 2. How you can charge a metal sphere negatively without touching ? 3. Drawing of electric field lines around the charges. 4. Applications of Gauss's theorem. 5. Numerical questions on capacitors.		

	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. Van de Graaff generator.					
April,12+8	**Current electricity** Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and	Student will be able to ● Understand the concept of electric current and potential difference . ● Understand the difference between	● Apply the concept of current and potential difference on measuring the resistance of conductor /electrical appliances at home. ● Apply the concept	**i)**First of all teacher will ask the questions based on their previous knowledge. The teacher will explain the electric current its uses and he electrical appliances which draw more or less current in accordance with their resistance. ***Ampere:*** of current means the flow of		**Conceptual type questions , numerical and unit test**

June,16	their relation with electric current; Ohm's law, electrical resistance, Current Electricity (Cont.) 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	drift velocity and mobility of electrons in a conductor. ● State the Ohm's law and understand the Ohmic conductor. ● Understand the concept of electric power, electrical resistivity and conductivity. . ● Understand the difference between resistance and resistivity . ● Understand the colour coding in carbon resistor and the dependence of internal resistance of a cell on its temperature. ● Understand the concept of combination of resistances ● Know the difference between emf and potential difference.	mobility of electrons in calculating the drift velocity in different conductors and alloy. ● Student will be able to plot the graph between the V and I and then they will calculate the resistance of conductor by the slope of same graph. ● Apply the concept for electrical power and energy to calculate the electricity bill of their home, factory or offices. Apply the concept of series and parallel combination of resistances if desired	6.25×10^{18} electrons/sec through any cross-section of the conductor. The conventional direction of current is taken to be the direction of flow of positive charge, i.e. field and is opposite to the direction of flow of negative charge as shown below. The net charge in a current carrying conductor is zero. For a given conductor current does not change with change in cross-sectional area. In the following figure $i_1 = i_2 = i_3$  ii)The teacher will explain the graph between V and I ,and will explain them the calculation of R by the slope of graph. Ohm's law is not a universal law, the substances, which obey ohm's law are known as ohmic substance. Graph between V and i for a metallic conductor is a straight line as shown. At different temperatures V-i curves are different. **Class room Activites :**		

	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 - principle and its applications to measure potential difference and for comparing emf of two cells; measurement of internal resistance of a cell.	• State the Kirchhoff's vltage and current law. • Understand principle of wheatstone bridge and potentiometer.		i) Teacherwill demonstrate the emf of a cell purchased from market. ii) Teacher will demonstrate the how student will calculate the total no. Of electrons in 1 kg water.. iii) Teacher will show the electrolyte used in different cell which is being used in laboratory. **Lab activities :** i) Measurement of unknown resistance by wheat stone bridge. ii) Measurement of specific resistance by wheat stone bridge. iii) Comparison of emfx of two primary cell using potentiometer. Measurement of internal resistance of cell using potentiometer. 		
July ,24	**Magnetic effect of current and Magnetism** **Electromagnetic**	Student will be able to • Understand the concept of magnetic field and Oerested	• Apply the concept of Biot savart's law in calculating the magnetic field due to current	**Class room Activites :** iv) Teacher will demonstrate the presence of magnetic field due to current carrying conductor.	• The concept of magnetic field and Oerested experiment .	**Conceptual type questions , numerical and unit test.**

	Induction Concept of magnetic field, Oersted's experiment. Biot - Savart law and its application 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 fields. Cyclotron. Force on a current-carrying conductor in a uniform magnetic field. Force between two parallel current-carrying conductors-definition of	experiment . ● State the Biot savart's law. ● State the Ampere's law. ● Understand the force on a moving charge in uniform magnetic and electric fields. ● Understand the principle of cyclotron and its working. ● Understand the force on a current-carrying conductor in a uniform magnetic field. ● Understand force between two parallel current-carrying conductors-definition of ampere. ● Understand the torque experienced by a current loop in uniform magnetic field .	carrying circular loop and straight conductor. ● Apply the Ampere's law to calculate the magnetic field due to infinitely long straight wire, straight and toroidal solenoids's ● Student will be able to plot the graph between the B and r . ● Apply the concept Cyclotron in solving the numerical. ● Apply the concept of force on a current carrying conductor in d.c motor . ● Apply the concept of torque experienced by a current loop in uniform magnetic field on moving type galvanometer. ● Student will be able to calculate the current and voltage sensitivity of moving coil galvanometer. ● Students will be able to calculate the torque on a magnet placed in uniform magnetic field. ● Students will be able to differentiate between	v) Teacher will demonstrate the force experience by current carrying conductor placed in uniform magnetic field. **vi)** Teacher will demonstrate the model of galvanometer in the class. vii) The teacher will demonstrate the magnetic lines of force due to a bar magnet in the class . viii) The teacher will demonstrate the magnetic lines of force due to a bar magnet in the class. ix) The teacher will demonstrate the solenoid and its magnetic poles in the class . **Lab activities or Project** v) Measurement of magnetic moment of bar magnet . vi) Reduction factor of tangent galvanometer. vii) Magnetic field intensity of n number of turns of the coil used in T.G.	● Statement the Biot savart's law. ● Statement the Ampere's law. ● Statement of the force on a moving charge in uniform magnetic and electric fields. ● Statement of the principle of cyclotron and its working. ● The force on a current-carrying conductor in a uniform magnetic field. ● The force between two parallel current-carrying conductors-definition of ampere. ● The torque experienced by	

	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 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 andperpendicular to its axis. Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid,	• Understand the moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter . • Know the Current loop as a magnetic dipole and its magnetic dipole moment. Magnetic dipole moment of a revolving electron. • Understand the 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; Earth's magnetic field and magnetic elements.	permanent magnet and temperory magnet by observing area of Hysteresis curve.		a current loop in uniform magnetic field . • The moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter . • The Current loop as a magnetic dipole and its magnetic dipole moment. Magnetic dipole moment of a revolving electron. • The magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular	

	magnetic field lines; Earth's magnetic field and magnetic elements. Para-, dia- and ferro - magnetic substances, with examples. Electromagnets and factors affecting their strengths. Permanent magnets. Electromagnetic induction; Faraday's laws, induced emf and current; Lenz's Law, Eddy currents. Self and mutual induction. Alternating currents, peak and rms value of alternating current/voltage; reactance and impedance; LC oscillations (qualitative treatment only),	• Para-, dia- and ferro - magnetic substances, with examples. Electromagnets and factors affecting their strengths. Permanent magnets.			to its axis . • The Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field and magnetic elements. • The Para-, dia- and ferro - magnetic substances, with examples. Electromagnets and factors affecting their strengths. Permanent magnets.	

	LCR series circuit, resonance; power in AC circuits, wattless current. AC generator and transformer.					

August,22	**Ray optics** **Wave optics** Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection and its applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lens-maker's formula. Magnification, power of a lens, combination of thin lenses in contact, combination of a lens and a mirror. Refraction and	• Understand the concept of reflection of light, spherical mirrors, mirror formula. • Understand the Refraction of light, total internal reflection. • State the laws of reflection and refraction.. • Understand the refraction at spherical surfaces, lenses, thin lens formula, lens-maker's formula. • Understand the magnification , power of a lens, combination of thin lenses in contact, combination of a	• Apply the concept of refraction in finding the refractive index of a glass slab with the help of possible . • Application the concept of TIR in cables used in computers and transmission of Data. • Student will be able to apply the refraction of light in sound. • Student will be able to apply the concept of focal length to calculate the focal length of combination of lenses. - • Students can construct the astronomical telescope of desired magnification using the concept of angular magnification.. • Students can applying the scattering of light	**Lab Activities:** i)Focal length of convex lens. ii) Focal length of concave mirror. iii)Focal length of convex mirror using convex lens. iv) Focal length of concave lens using convex lens	• The concept of reflection of light, spherical mirrors, mirror formula. • Statement of Refraction of light, total internal reflection. • the the refraction at spherical surfaces, lenses, thin lens formula, lens-maker's formula. • magnification , power of a lens, combination of thin lenses in contact,	**Conceptual type questions , numerical and unit test.**

	dispersion of light through a prism. Scattering of light - blue colour of sky and reddish apprearance of the sun at sunrise and sunset. Optical instruments: Human eye, image formation and accommodation, correction of eye defects (myopia, hypermetropia) using lenses. fronts. Proof of laws of reflection and refraction using Huygen's principle. Interference, Young's double slit experiment and expression for fringe width, coherent sources and sustained interference of light. Diffraction due to a single	lens and a mirror. ● Understand the Refraction and dispersion of light through a prism. ● Understand the Scattering of light - blue colour of sky and reddish apprearance of the sun at sunrise and sunset . ● Understand the Human eye, image formation and accommodation, correction of eye defects (myopia, hypermetropia) using lenses. ● Understand the microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.	concept in day to day life conditions .		combination of a lens and a mirror. ● the microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers. ● Students will be able to calculate the focal length of their father's convex lens.	

	slit, width of central maximum. Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers. Wave optics: Wave front and Huygen's principle, reflection and refraction of plane wave at aplane surface using wave					
September,22	Optics(cont.) Resolving power of microscopes and					

	astronomical telescope. Polarisation, plane polarised light, Brewster's law, uses of plane polarised light and Polaroids.					
	Dual nature of matter and EM Waves. Dual nature of radiation. Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light. Matter waves-wave nature of particles, de Broglie relation. Davisson-Germer experiment (experimental details should be omitted; only conclusion	• Understand the concept of photoelectric effect. • Understand the threshold frequency. • State the laws of photoelectric effect. • Understand the Einsyein's photoelectric equation. • Understand the Davisson and Germer Experiment.	• Apply the concept of dual nature in day to day life			

	should be explained). **Atom and Nuclei**					
October ,7	**Atom and Nuclei(Cont.)** 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/rays and their properties; radioactive decay law. Mass-energy relation, mass defect; binding energy per nucleon and its variation with	• Understand the Rutherford experiment • Understand the Bohr model, energy levels, hydrogen spectrum. • State the laws of photoelectric effect. • Understand the Einsyein's photoelectric equation. • Understand the Davisson and Germer Experiment.				

November,23	mass number; nuclear fission, nuclear fusion. **Electronic devices** Energy bands in solids (Qualitative ideas only) conductor, insulator and semiconductor; semiconductor diode – I-V characteristics in forward and reverse bias, diode as a rectifier; I-Vcharacteristics of LED, photodiode, solar cell, and Zener diode; Zener diode as a voltage regulator. Junction transistor, transistor action, characteristics of a transistor, transistor as an amplifier	• Understand the n type and p type semiconductor • Understand the diode • Understand the transistor and its characteristics. • Understand the energy band gaps in conductor,semiconductor and insulator				

	(common emitter configuration) and oscillator.					
	Electronic Devices (Cont.) **Communication System and EM Waves**	Elements of a communication system (block diagram only); bandwidth of signals (speech, TV and digital data); bandwidth of transmission medium. Propagation of electromagnetic waves inthe atmosphere, sky and space wave propagation. Need		**Lab Activities** • Characteristic of PN junction diode. • Characteristics of Zener diode. • Transistor characteristics.		

		for modulation. Production and detection of an amplitude-modulated wave.				
December	Revision					