CLASS-XII : PHYSICS

Month	Name of Topic	Detailed syllabus	Period for class room teaching & Practical	Period for computer aided teaching	Total Period
April	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 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	20	5	40
	Current Electricity	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,	6	1	
	Practical	electrical potential energy of a system of two point charges and of electric dipole in an electrostatic field. Conductors and insulators, free charges and bound charges inside a conductor.	8		

		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. Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's 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. **Experiment 1A.** To determine resistance per cm of a given wire by plotting a graph of potential difference versus current **Experiment 2A.** To find resistance of a given wire using metre bridge and hence determine the specific resistance of its material .**Activity 1.**To assemble the components of a given electrical circuit. **Activity 2.** To draw the			

		diagram of a given open circuit comprising at least a battery, resistor/rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram. **Activity 3.** To study the variation in potential drop with length of a wire for a steady current.			
May-June	Current Electricity Magnetic Effects of Current and Magnetism Practical	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 - principle and its applications to measure potential difference and for comparing emf of two cells; measurement of internal resistance of a cell. 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	12 8 10	3 2	35

		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 and its magnetic dipole moment. Magnetic dipole moment of a revolving electron **Experiment 3A.**To verify the laws of combination (series/parallel) of resistances using a metre bridge. **Experiment 4A.** To compare the emf of two given primary cells using potentiometer. **Experiment 5A.**To determine the internal resistance of given primary cell using potentiometer. **Activity 4.** To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.			
July	Magnetic Effects of Current and Magnetism Electromagnetic Induction and Alternating	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.Para-, dia- and ferro - magnetic	10 15	5 5	41

	Currents Practical	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), LCR series circuit, resonance; power in AC circuits,wattless current.AC generator and transformer. **Experiment 6A**. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit. **Experiment 7A**. To convert the given galvanometer (of known resistance and figure of merit) into an ammeter and voltmeter of desired range and to verify the same.	6		
August	Electromagnetic waves Optics	Need for displacement current, 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	2 27	2 3	46

	Practical	facts about their uses. Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection and its applications, optical fibers, 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 dispersion of light through a prism. Scattering of light - blue colour of sky and reddish appearance of the sun at sunrise and sunset. **Optical instruments :** Human eye, image formation and accommodation correction of eye defects (myopia, hypermetropia) using lenses. 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 a plane surface using wave 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	12		

		of light. Diffraction due to a single slit, width of central maximum. Resolving power of microscopes and astronomical telescopes. Polarisation, plane polarized light Brewster's law, uses of plane polarised light and Polaroids. **Experiment 1B**. To find the value of v for different values of u in case of a concave mirror and to find the focal length. **Experiment 2B**. To find the focal length of a convex mirror, using a convex lens. **Experiment 3B**. To find the focal length of a convex lens by plotting graphs between u and v or between 1/u and 1/v. **Experiment 4B**. To find the focal length of a concave lens, using a convex lens. **Activity 5**.To observe polarization of light using two Polaroids. **Activity 6.** To observe diffraction of light due to a thin slit.			
Sep	Dual Nature of Matter and Radiation Atoms & Nuclei	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	6 14	2 4	36

		(experimental details should be omitted; only conclusion should be explained).			
	Practical	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 mass number; nuclear fission, nuclear fusion. **Experiment 5B**. To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation. **Experiment 6B**. To determine refractive index of a glass slab using a travelling microscope. **Activity 7.** To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab	10		
Oct	Electronic Devices	Energy bands in solids (Qualitative ideas only) conductors, insulator and semiconductors; semiconductor diode – I-V characteristics in forward	16	2	32

	Practical	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 (common emitter configuration) and oscillator. Logic gates (OR, AND, NOT, NAND and NOR).Transistor as a switch. **Experiment 7B**.To draw the I-V characteristic curve of a p-n junction in forward bias and reverse bias. **Experiment 8B**.To draw the characteristic curve of a zener diode and to determine its reverse break down voltage. **Experiment 9B**.To study the characteristic of a common - emitter npn or pnp transistor and to find out the values of current and voltage gains. **Activity 8.** To identify a diode, an LED, a transistor, and IC, a resistor and a capacitor from mixed collection of such items. **Activity 9.** To study effect of intensity of light (by varying distance of the source) on an L.D.R.	14		
Nov	Communicati on Systems	Elements of a communication system (block diagram only);	8	2	10

		bandwidth of signals (speech, TV and digital data); bandwidth of transmission medium. Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation. Need for modulation. Production and detection of an amplitude-modulated wave.			
Dec Jan		Revision			

COURSE STRUCTURE
Class XII (Theory)

Time: Three Hours **Max Marks: 70**

Unit	Name of the Unit	Weightage
1	Electrostatics	08
2	Current Electricity	07
3	Magnetic effect of current & Magnetism	08
4	Electromagnetic Induction and Alternating current	08
5	Electromagnetic Waves	03
6	Optics	14
7	Dual Nature of Matter and Radiation	04
8	Atoms and Nuclei	06
9	Electronic Devices	07
10	Communication Systems	05

Class XII (Practicals)

Every student will perform atleast 15 experiments (7 from section A and 8 from Section B) The activities mentioned here should only be for the purpose of demonstration. One Project of three marks is to be carried out by the students.

B. Evaluation Scheme for Practical Examination: ***Total Periods : 60***

Two experiments one from each section	**8+8 Marks**
Practical record (experiments & activities)	**6 Marks**
Project	**3 Marks**
Viva on experiments & project	**5 Marks**