

CLASS:XII

SUBJECT:PHYSICS

SESSION:2009-2010

<u>MONTH</u>	<u>DATE</u>	<u>NO. OF DAYS</u>	<u>TOPICS</u>
APRIL	1-4	3 3/04/2009- Holiday	<u>Unit I:- ELECTROSTATICS</u> Electric charges, Conservation of charges, Coulomb's Law: Force between two points charges, forces between multiple charges, Superposition Principle. Continuous charge distribution.
	6-9	3 7,10- Holiday 11-2 nd Saturday	Electric field, electric field due to a point charge electric field lines, electric dipole, electric field due to dipole; torque on a dipole in uniform electric field. Electric flux, statement of Gauss 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)
	13-18	6	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. Conductors and Insulators, free charges and bound charges inside a conductor, Dielectric and electric polarization ,Capacitors and Capacitance, combination of capacitances in series and parallel
	20-25	6	Capacitance of a parallel plate capacitor with or without dielectric medium between the plates energy stored in a capacitor, Van de Graff Generator. <u>UNIT II : CURRENT ELECTRICITY:-</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, V-I characteristics(linear and non-linear)
<u>May 1 – June</u> <u>30</u>	27-30	4	Electrical energy and power, Electrical resistivity and connectivity, 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. <i>SUMMER VACATION</i>

JULY	1-4	4	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.
	6-10	5 2nd saturday	<u>UNIT III :-MAGNETIC EFFECTS OF CURRENT AND MAGNETISM</u> Concept of magnetic field and 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.
	13-18	6	<u>Cyclotron :-</u> 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 a uniform magnetic field. Moving coil Galvanometer –its current sensitivity.
	20-25	6	Moving Coil Galvanometer- 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.
AUG	27-31 1	6	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.
	3-7	5	<u>UNIT IV ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENTS :</u> Electromagnetic induction ; Faraday's law induced emf and current ; Lenz's law , Eddy currents self and mutual inductance.
	10-13	4 14,15 Holidays	Need for displacement current Alternating currents , peak and rms value of altering current/voltage Reactance and Impedance. Lc oscillations (qualitative treatment only)
	17-22	6	LCR series circuit ; Resonance ; Power in AC circuits , wattless current. AC generator and transformer.

	24-29	6	<p><u>UNIT V : ELECTROMAGNETIC WAVES :-</u> Displacement current ,electromagnetic waves and their characteristics(qualitative ideas only) Transverse nature of electromagnetic waves.Electromagnetic spectrum(radio-waves,micro-waves,infrared,visible,ultraviolet,X-rays,gamma rays) including elementary facts about their uses.</p> <p><u>UNIT VI : OPTICS :-</u> Reflection of light,spherical mirrors,mirror formula.</p>
	31 SEP 1-5	1 4	<p>Refraction of light ,total internal reflection and its applications , optical fibres ,refraction through spherical surfaces ,lenses thin lens formula Lens makers formula.</p>
	4		I CCEP EXAM
	7-9		REVISION WORK
	10-18		I TERMINAL TEST
	19-28	8	AUTUMN BREAK
	29,30 OCT 1-3	4 2 Holiday	<p>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.</p> <p>Optical Instruments; Human eye, image formation and accommodation, correction of eye defects (myopia,hypermetropia,presbyopia and astigmatism) using lenses.</p> <p>Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.</p>
	5-10	5	<p>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 of light; Diffraction due to a single slit, width of central maximum.</p>
	12-17 17 Holiday	5	<p>Resolving power of microscopes and astronomical telescopes Plane polarized light, Brewster’s law, uses of plane polarized light and polaroids.</p> <p><u>DUAL NATURE OF MATTER AND RADIATION :-</u> Dual nature of radiation, Photoelectric effect Hertz and Lenard’s observations ;Einstein’s photoelectrical equation, Particle nature of light.</p>

			Matter waves-wave nature of particles, de-broglie relation Davisson Germer experiment.
	19-24	6	<u>UNIT VIII :ATOMS & NUCLEI :-</u> Alpha-particles 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.
	26-31	6	Mass energy relation, mass defect ; binding energy per nucleon and its variation with mass number nuclear fission and fusion.
	NOV 2-7	5 2,Holiday	<u>UNIT IX : ELECTRONIC DEVICES :-</u> Semiconductors Semi conductor diode-I-V characteristics in forward and reverse bias, diode as rectifier. I-V characteristics of LED, Photodiodes, solar cell and Zener diode as a voltage regulator, Junction transistor, transistor action, characteristics of a transistor.
	9-14	5 14, 2nd Saturday	Transistor as an amplifier (common emitter configuration) Oscillator Logic gates (OR,AND,NOT,NAND and NOR)
	16-21	6	Transistor as a switch <u>UNIT X : COMMUNICATION SYSTEMS :-</u> Elements of communication system (block diagram) only, Band width signals (speech ,TV and digital data) band width of transmission medium.
	23-30 28 Holiday	7	Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation, Need for modulation, production and detection of an amplitude modulated wave.
	DEC-FEB		REVISION WORK

PRACTICALS

Every student will perform 10 experiments (5 from each section) & 8 activities (4 from each section) during the academic year. Two demonstration experiments must be performed by the teacher with participation of students. The students will maintain a record of these demonstration experiments.

SECTION A

Experiments

1. To determine resistance per cm of a given wire by plotting a graph of potential difference versus current.
2. To find resistance of a given wire using metre bridge and hence determine the specific resistance of its material.
3. To verify the laws of combination (series/parallel) of resistances using a metre bridge.
4. To compare the emf of two given primary cells using potentiometer.

5. To determine the internal resistance of given primary cell using potentiometer.
6. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.
7. 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.
8. To find the frequency of the a.c. mains with a sonometer.

Activities

1. To measure the resistance and impedance of an inductor with or without iron core.
2. To measure resistance, voltage (AC/DC), current (AC) and check continuity of a given circuit using multimeter.
3. To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.
4. To assemble the components of a given electrical circuit.
5. To study the variation in potential drop with length of a wire for a steady current.
6. 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.

SECTION B

Experiments

1. To find the value of v for different values of u in case of a concave mirror and to find the focal length.
2. To find the focal length of a convex lens by plotting graphs between u and v or between $1/u$ and $1/v$.
3. To find the focal length of a convex mirror, using a convex lens.
4. To find the focal length of a concave lens, using a convex lens.
5. To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.
6. To determine refractive index of a glass slab using a travelling microscope.
7. To find refractive index of a liquid by using (i) concave mirror, (ii) convex lens and plane mirror.
8. To draw the I-V characteristic curve of a p-n junction in forward bias and reverse bias.
9. To draw the characteristic curve of a zener diode and to determine its reverse break down voltage.
10. To study the characteristics of a common - emitter npn or pnp transistor and to find out the values of current and voltage gains.

Activities

1. To study effect of intensity of light (by varying distance of the source) on an L.D.R.
2. To identify a diode, an LED, a transistor, and IC, a resistor and a capacitor from mixed collection of such items.
3. Use of multimeter to (i) identify base of transistor. (ii) distinguish between npn and pnp type transistors. (iii) see the unidirectional flow of current in case of a diode and an LED. (iv) check whether a given electronic component (e.g. diode, transistor or IC) is in working order.
4. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
5. To observe polarization of light using two Polaroids.
6. To observe diffraction of light due to a thin slit.
7. To study the nature and size of the image formed by (i) convex lens (ii) concave mirror, on a screen by using a candle and a screen (for different distances of the candle from the lens/mirror).
8. To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses.

B. Evaluation Scheme for Practical Examination:

• One experiment from any one section		8 Marks
• Two activities (one from each section)	(4+4)	8 Marks
• Practical record (experiments & activities)		6 Marks
• Record of demonstration experiments & Viva based on these experiments		3 Marks
• Viva on experiments & activities		5 Marks
Total		30 Marks

Recommended Textbooks.

1. Physics Part-I, Textbook for XII, Published by NCERT
2. Physics Part-II, Textbook for XII, Published by NCERT
