

**MONTHLY SYLLABUS**

**SESSION-2016-17**

**CLASS XII**

**SUBJECT : PHYSICS**

<b>MONTH</b>	<b>CONTENTS</b>
01.04.2016 to 08.04.2016	Orientation, and recapitulation Discussion on importance of physics, scope of physics and other topic of interest.
11.04.2016 to 30.04.2016	<p><b>UNIT-I: ELECTROSTATICS:</b></p> <p>Electric Charges. Conservation of charges, coulomb’s law, three between two point charges</p> <p>Force between multiple charges. superposition principle, continuous charge distribution, 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</p> <p><b>One activity related to topics discussed in the week</b></p> <p>Applications of Gauss theorem to find field due to infinitely long straight wire; uniformly charges infinite plane sheet and uniformly charged thin spherical shell (field inside and outside)</p> <p>Electric Potential, potential difference. electric potential due to point charge, a dipole and system of charges equipotential surface: electric potential energy of a system of two point charges and of electric dipole in an electrostatic field, PSA practice</p> <p><b>One experiment related to topics discussed in the week</b></p> <p>Conductors and insulators, free charges and bound charge inside a conductor. Dielectric and electric polarization. Capacitors and capacitance in series and parallel, capacitance of a parallel plate capacitor with or without dielectric medium between the plates,</p>

	<p>energy stored in a capacitor.</p> <p><b>NCERT exercise and value based questions</b></p>
02.05.2016 to 10.05.2016	<p><b>UNIT-II CURRENT ELECTRICITY</b></p> <p>Electric current flow of electric charges in a metallic conductor, drift velocity, mobility &amp; their relation with electric current.</p> <p><b>One experiment related to topics discussed in the week</b></p> <p>Ohm 's law, electric Resistance. V-I Characteristics (Linear and Nonlinear), electrical energy &amp; power, electrical resistivity and conductivity. Carbon resistors colour code for carbon resistors, combination of resistors - series and parallel, temperature dependence of resistance, potential difference, emf and Internal resistance of a cell, combination of cells in series and in parallel, Kirchhoffs Law and simple applications.</p> <p><b>PSA practice</b></p> <p><b>One experiment related to topics discussed in the week</b></p> <p>Wheatstone Bridge, metre Bridge, potentiometer - principle &amp; its applications to measure potential difference and for comparing emf of two cells, measurement of internal resistance of a cell.</p> <p><b>NCERT exercise and value based questions, PSA practice</b></p> <p><b>One experiment related to topics discussed in the week</b></p>
11.05.2015 to 30.06.2015	<p><b>SUMMER VACATIONS</b></p>
01.07.2016 to 30.07.2016	<p><b>UNIT-III: MAGNETIC EFFECT OF CURRENT AND MAGNETISM:</b></p> <p>Concept of magnetic field and Oersted 's experiment. Biot-Savart law and its application to current carrying circular loop. Ampere 's Law &amp; its application to infinitely long straight wire, straight and toroidal solenoids, force on a moving charge in</p>

	<p>uniform magnetic and electric fields</p> <p><b>One activity related to topics discussed in the week</b></p> <p>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 a uniform magnetic field, moving coil galvanometer and its sensitivity and conversion to ammeter and voltmeter.</p> <p><b>PSA practice</b></p> <p><b>One experiment related to topics discussed in the week.</b></p> <p>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.</p> <p><b>One experiment related to topics discussed in the week.</b></p> <p><b>YUVA Session 12.8, Chak Dc Burger!</b></p> <p>Earth's Magnetic field and magnetic elements. Para-, dia-, and ferromagnetic substances with examples, Electromagnets and factors affecting their strength. Permanent magnets.</p> <p><b>NCERT exercise and value based questions.</b></p> <p><b>UNIT-IV: ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT</b></p> <p>Electromagnetic Induction: Faraday's laws, Induced emf and current, Lenz's law.</p> <p><b>PSA practice</b></p> <p><b>One activity related to topics discussed in the week</b></p>
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<p>01.08.2016 to 31.08.2016</p>	<p>Eddy Currents, self and mutual inductance, Alternating currents. Peak and RMS value of alternating current voltage, reactance and impedance, LC-Oscillations (Qualitative Treatment only): LCR-series circuit, resonance.</p> <p><b>One experiment related to topics discussed in the week</b></p> <p>Power in ac-circuits, wattless current, AC generator, Transformers</p> <p><b>NCERT-Exercise and Value Based Questions.</b></p> <p><b>PSA practice</b></p> <p><b>One activity related to topics discussed in the week</b></p> <p><b>UNIT -V: ELECTROMAGNETIC WAVES</b></p> <p>Need for displacement current: Electromagnetic waves and their characteristics (qualitative ideas only), transverse nature of E.M. waves, Electromagnetic spectrum (radio wave, microwave. infrared, visible, ultraviolet, X-rays. gamma rays.) including elementary facts about their uses.</p> <p><b>NCERT exercise and value based questions.</b></p> <p><b>UNIT-VI: OPTICS</b></p> <p>Reflection of light, spherical mirrors, mirror formula.</p> <p><b>One experiment related to topics discussed in the week</b></p> <p>Refraction of light, total internal reflection and its applications. optical fibers, refraction through 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</p> <p><b>PSA practice</b></p>

	<p><b>One experiment related to topics discussed in the week</b></p> <p>Scattering of light - blue colour of the sky and reddish appearance of the sun at sunrise and sunset.</p> <p><b>Optical Instruments :</b> Microscope and astronomical telescopes (reflecting and refracting )and their magnifying powers.</p> <p><b>NCERT exercise and value based questions:</b></p> <p><b>One experiment related to topics discussed in the week.</b></p>
<p><b>01.09.2016 to 30.09.2016</b></p>	<p><b>Wave optics:</b> Wave front and Huygens’s Principle, reflection and refraction of plane waves 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.</p> <p><b>PSA practice</b></p> <p><b>One experiment related to topics discussed in the week.</b></p> <p>Diffraction due to a single slit, width of central maxima. Resolving power of microscopes and astronomical telescope. Polarization, plane polarized light. Brewster s Law, uses of plane polarized light and Polaroid ‘s.</p> <p><b>NCERT exercise and value based questions One experiment related to topics discussed in the week</b></p> <p><b>REVISION FOR SA-I (EXAM).</b></p>
<p>01.10.2016 to 31.10.2016</p>	<p style="text-align: center;"><b>SA-I (EXAM)</b></p> <p>DISCUSSION OF SA-I QUESTION PARER</p> <p><b>UNIT -VII : DUAL, NATURE OF MATTER:</b></p> <p>Dual Nature of Radiation: Photoelectric effect, Hertz and Lenard’s observations, Einstein s photoelectric equation. particles nature of light. Matter waves- wave nature of particle,</p>

	<p>de Broglie relation, Davisson- Germer experiment (experimental details should be omitted, only conclusion should be explained)</p> <p><b>NCERT exercise and value based questions.</b></p> <p><b>AUTUMN BREAK</b></p> <p><b>UNIT –VIII ATOM AND NUCLEI</b></p> <p>Alpha particles scattering experiment; Rutherford ‘s model of atom. Bohr model, Energy levels. hydrogen spectrum. Composition and size of nucleus</p> <p><b>NCERT exercise and value based questions</b></p> <p><b>PSA practice</b></p>
<p>01.11.2016 to 30.11.2016</p>	<p>Radioactivity, Alpha Beta &amp; 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 nuclear fusion.</p> <p><b>NCERT exercise and value based questions</b></p> <p><b>One activity related to topics discussed in the week</b></p> <p><b>UNIT-IX : ELECTRONIC DEVICES</b></p> <p>Energy band and solids (Qualitative Idea only) Conductors. insulator &amp; Semiconductor. Semiconductor diode. I-V characteristics in forward biasing and reverse biasing. Diode as rectifier, I-V Characteristics of LED. Photodiodes. Solar cell and Zener diode, Zener diode as voltage regulator</p> <p><b>PSA practice</b></p> <p><b>One experiment related to topics discussed in the week</b></p> <p>Junction transistor. Transistor action, characteristics of a transistor, Transistor as an amplifier (CE configuration), logic gates (OR, AND, NOT. NAND, NOR)</p> <p><b>NCERT exercise and value based questions</b></p>

	<p><b>UNIT-X : COMMUNICATION SYSTEMS</b></p> <p>Elements of communication systems (Block diagram only): Bandwidth signals (Speech. TV and Digital data): Bandwidth of transmission medium</p> <p><b>One experiment related to topics discussed in the week</b></p> <p>Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation, satellite communication. Need for modulation, amplitude modulation and frequency modulation, advantages of frequency modulation over amplitude modulation. Basic ideas about internet, mobile telephony and global positioning system (GPS)</p> <p><b>NCERT Exercise : Value based questions</b></p> <p><b>YUVA Session 3.2 : Choice not chance determines destiny!</b></p>
01.12.2016 to 31.12.2016	<ul style="list-style-type: none"> <li>• REVISION FROM SUPPORT Material - Unit - 1,2</li> <li>• REVISION FROM SUPPORT MATERIAL - Unit - 3,4</li> <li>• REVISION FROM SUPPORT MATERIAL -Unit - 6,7</li> <li>• REVISION FROM SUPPORT MATERIAL - Unit - 8,9</li> <li>• REVISION FROM SUPPORT MATERIAL - Unit- 5,10</li> </ul>
02.01.2016 to 31.01.2016	<p><b>WINTER BREA</b></p> <p><b>PRE-BOARD EXAM</b></p>
01.02.2016 to 28.02.2016	<p>Discussion of pre-board question papers, practice from CBSE-sample papers, value based questions.</p> <p><b>BOARD PRACTICAL EXAM</b></p>
	<p><b>REVISION/BOARD PRACTICAL EXAM</b></p> <p><b>REVISION- HOTS QUESTIONS</b></p> <p><b>REVISION/BOARD EXAM</b></p>

## LIST OF PRACTICALS

The record, to be submitted by the students, at the time of their annual examination, has to include:

- Record of at least 15 Experiments (with a minimum of 6 from section A and 6 from section B) to be performed by the students.
- Record of at least 5 Activities (with a minimum of 2 each from section A and section B), to be demonstrated by the teachers.
- Report of the project to be carried out by the students

### SECTION-A

#### Experiments:

1. To determine resistance per cm of a given wire by plotting a graph of potential difference vs. 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- (For the purpose of demonstration only)

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 or 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 a battery. Resistor/rheostat, key, ammeter and volt meter. 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 focal (f) 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 characteristics curve of a p-n junction in Forward bias and reverse bias.
9. To draw the characteristics curve of a Zener diode and to determine its reverse breakdown 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 (For the purpose of demonstration only)**

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 a 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 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.

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