MONTHLY SYLLABUS
SESSION-2017-18
CLASS-XII
SUBJECT : PHYSICS

MONTH	CONTENTS
First Term	**April 2017 to September 2017**
April 2017	**Unit-I: Electrostatics** **Chapter-1: Electric Charges and Fields** Electric Charges; Conversation 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 charged thin spherical shell (field inside and outside) **Chapter-2: Electrostatic Potential and Capacitance** 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, 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. • Exercise questions from NCERT and value based questions • Experiment related to topic • PSA Practice • Activity related to topic	
May 2017	**Unit-II: Current Electricity** **Chapter-3: Current Electricity** 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. 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. • Exercise questions from NCERT and value based questions • Experiment related to topic • Activity related to topic • PSA Practice	
SUMMER BREAK		

July 2017	**Unit-III: Magnetic Effects of Current and Magnetism**
	Chapter-4: Moving Charges and Magnetism
	Concept of magnetic field, Oersted's experiment.
	Blot – 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 (only qualitative treatment); 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 ampere, torque experienced by a current loop in uniform magnetic field; moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter.
	Chapter-5: Magnetism and Matter
	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; earth's magnetic field and magnetic elements.
	Para, dia- and ferro – magnetic substances, with examples. Electromagnets and factors affecting their strengths; permanent magnets.
	• Exercise questions from NCERT and value based questions • Experiment related to topic • Activity related to topic

	- PSA Practice - YUVA session 12.8, Chak De Burger!
August 2017	**Unit-IV: Electromagnetic Induction and Alternating Currents** **Chapter-6: Electromagnetic Induction** Electromagnetic induction; Faraday's laws, induced EMF and current; Lenz's Law, Eddy currents Self and mutual induction. **Chapter-7: Alternative Current** Alternating current, peak and RMS value of alternating current/voltage; reactance and impedance; LC oscillations (qualitative treatment only); LCR series circuit' resonance, power in AC circuits, power factor; wattles current. AC generator and transformer. **Unit-V: Electromagnetic Waves** **Chapter-8: Electromagnetic Waves** Basic idea of displacement current, Electromagnetic waves, their characteristics, their Transverse nature (qualitative ideas only). Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays gamma rays) including elementary facts about their uses. **Unit-VI: Optics** **Chapter-9: Ray Optics and Optical Instruments** **Ray Optics**: Reflection of light; spherical mirrors formula; refraction of light; total internal reflection and its application; optical; fibres; refraction at spherical surfaces; lenses; thin lens formula; Lensmaker's formula; magnification, power of a lens; combination of thin lenses in contact; refraction and dispersion of light through a prism.

	• Exercise questions from NCERT and value based questions • Experiment related to topic • Activity related to topic • PSA Practice
September 2017	Scattering of light-blue colour of sky and reddish appearance of the sun at sunrise and sunset. Optical instruments: Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers. **Revision For First Term Exam** • Exercise questions from NCERT and value based questions • Experiment related to topic • Activity related to topic • PSA Practice
SUMMATIVE ASSESMENT SA-I **FIRST TERM EXAMINATION 2017-18**
SECOND TERM **OCTOBER 2017 TO MARCH 2018**
October 2017	**Discussion of question paper of SA-I** **Chapter-10: Wave Optics** 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; resolving power of microscope and

	astronomical telescope, polarization; plane polarized light; Brewster's law; uses of plane polarized light and Polaroids.
	Unit-VII: Dual Nature of Radiation and Matter
	Chapter-11: Dual Nature of Radiation and Matter
	Dual nature of radiation; Photoelectric effect; Hertz and Lenard's observations; Elinstein'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 should be explained.
	Unit-VIII: Atoms and Nuclei
	Chapter-12: Atoms
	Alpha-particle scattering experiment; Rutherford's model of atoms; Bohr model, energy levels, hydrogen spectrum.
	• Exercise questions from NCERT and value based questions
	• Experiment related to topic
	• Activity related to topic
	• PSA Practice
November 2017	**Chapter-13: Nuclei**
	Composition and size of nucleus; 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.
	Unit IX: Electronic Devices
	Chapter-14: Semiconductor Electronics: Materials, Devices

	and Simple Circuits Energy bands in conductors; semiconductors and insulators (qualitative ideas only) Semiconductor diode - I-V characteristics in forward and reverse bias; diode as a rectifier; Special purpose p-n junction diodes: LED, photodiode, solar cell and Zener diode and their characteristics; zener diode as a voltage regulator. Junction transistor; transistor action; characteristics of a transistor and transistor as an amplifier (common emitter configuration); basic idea of analog and digital; signals Logic gates (OR, AND, NOT, NAND and NOR). **Unit X: Communication Systems** **Chapter-15: Communication Systems** Elements of a communication system (block diagram only); bandwidth of signals (speech, TV and digital data); bandwidth of transmission medium. Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation, satellite communication. Need for modulation, amplitude modulation. - Exercise questions from NCERT and value based questions - Experiment related to topic - Activity related to topic - PSA Practice - YUVA session 3.2 choice not chance determines destiny
December 2017	**Revision of units From I to X** **Practice from support material and sample papers**

	Mock Test
	Mock Test Question Paper Discussion Practice from Sample Papers
	Remedial Classes During Winter Break
January 2018	**Common Pre-Board School Examination**
February 2018	**Revision and Board Practical Examination**
March 2018	**Board Examination 2017-18**
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 each section], to be performed by the students. • Record of at least 5 Activities [with a minimum of 2 each from section A and section 13], to be demonstrated by the teachers. • The Report of the project to be carried out by the students. **Evaluation Scheme** **Time Allowed: Three hours** **Max. Marks: 30** | Two experiments one from each section	8+8 Marks
Practical record [experiments and activities]	6 Marks
Investigatory Project	3 Marks
Viva on experiments, activities and projects	5 Marks
Total	30 Marks	

SECTION-A

Experiments

1. To determine resistance per cm of a given wire by plotting a graph for potential difference versus current.

2. To find resistance of a given wire using metre bridge and hence determine the resistivity (specific resistance) of its material.

3. To verify the laws of combination (series) of resistances using a metre bridge.

4. To verify the laws of combination (parallel) of resistances using a metre bridge.

5. To compare the EMF of two given primary cells using potentiometer.

6. To determine the internal resistance of given primary cell using potentiometer.

7. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.

8. To convert the given galvanometer (of known resistance and figure of merit) Into a voltmeter of desired range and to verify the same.

9. To convert the given galvanometer (of known resistance and figure of merit) into an ammeter of desired range and to verify the same.

10. To find the frequency of. AC 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 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 mirror, using a convex lens. 3. To find the focal length of a convex lens by plotting graphs between u and v or between 1/u and 1/v. 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 convex lens and plane mirror., 8. To draw the I-V characteristic curve for 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 characteristic 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 identify a diode, an LED, a transistor, an IC, a resistor and a capacitor from a mixed collection of such items.

2. 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.

3. To study effect of intensity of light (by varying distance of the source) on an LDR.

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 a (i) convex lens, (ii) concave mirror, on a screen by using 4 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.