PHYSICS SYLLABUS (10+2)

Theory Paper	Time : 3 Hours	Max. Marks: 70
Practical Paper	Time : 3 Hours	Max. Marks 30
		Total Marks : 100

THEORY

STRUCTURE OF QUESTION PAPER

1. There will be one Theory Paper comprising of 30 questions. All questions will be compulsory.
2. Q Nos. 1-10 will be of 1 mark, Q.Nos. 11-18 will be of 2 marks each Q. No. 19-26 will be of 3-marks each, Q-Nos. 27 to 30 will be of 5 marks each.
3. In questions No. 27-30 there will be internal choice in all the four questions
4. Distribution of marks over different of the paper will be as follows:

Learning Outcomes		Marks	Percentage of Marks
i)	Knowledge	20	29%
ii)	Understanding	30	42%
iii)	Application	20	29%

5. There will be no question of the type 'Write short note on' or objective type such as yes/no, tick, (x) cross', fill in the blanks, multiple choice, true/false etc.
6. Weightage to units in the question paper can vary by one mark.
7. Use of unprogrammable calculator is allowed. The log tables can also be used.
8. Numerical problems can be et many type of questions but the total weightage willbe in the range of 25% to 30%.

CLASS XII (THEORY)

One Paper **Time : 3 Hours** **70 marks**

Unit No.	Title	Weightage
Unit I	Electrostatics	08
Unit II	Current Electricity	07
Unit III	Magnetic effect of currem & Magnetism	08
Unit IV	Electromagnetic induction and Alternating current	08
Unit V	Electromagnetic Waves	03
Unit VI	Optics	14
Unit VII	Deal Nature of Matter	04
Unit VIII	Atoms and Nuclei	06
Unit IX	Electronic Devices	07
Unit X	Communication Systems	05
	Total :	**70**

Unit I: Electrostatics

Electric Charges; Conservation of charge, Coulomb's law-force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution.

Electrical field, electric field due to a point charge, electric field lines; electric dipole, electric field due to a dipole; torque on a dipolein uniform electric field.

Electric flux, statement of Gausss'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.

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 paralle, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor Van de Graaff generataor.

Unit II: Current Electricity

Electric current, flow of electric charges in a metillic conductor, drift velocity, mobility and their relation with electric current; Onm's law, electrical resistance. V-I characteristics (linear and non lineart), electrical energy and power, electrical resistivity and conductivity. Carbon resistors, colour code for carbon resistors; series and parallel combinations of reastors; 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.

Poentiometer - principle and its applications to measure potential difference and for comparing emf of two cells; measurement of internal reistance of a cell.

Unit III : Magnetic Effects of Current and Magnetism

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 ampere. Torque experienced by a current loop in uniform magnetic field; moving coil gal galvanometaits current sensitivity and conversion to ammeter and voltmeter.

Current loop as a magnetic dipole and its magnetic dipole moment. Magnetic depole 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.

Unit IV : Electromagnetic induction and Alternating Currents

Electromagnetic induction; Faraday's law, induced emf and current; Lenz's Law, Eddy currents. Self and mutual inductance.

Need for displacement current.

Alternating currents, peak and rms value of alternating current/voltage; reactance and impedances; LC oscillations (qualitative treatment only), LCR series circuit, resonance; power in AC circuits, wattless current.

AC generator and transformer.

Unit V : Electromagnetics waves

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 facts about their uses.

Unit VI: 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. 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.

Optical instruments: Human eye, image formation and accommodation, correction of eye defects (myopia, hypermetropia, presbyopia and astigmatism) using lenses. Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

Waves optics: wave front and Huygens' Principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflectionand refraction using Huygens' 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. Desolving power of microscopes and astronomical telescopes. Polarisation, plane polarised light; Brewster's law, uses of plane polarised light and pointed.

Unit VII: Dual nature of Matter and Radiation

Dual nature ratiation Photoelectric effect, Hertz and Lenard's observations'; Einstein's photoelectic equation-particle nature of light.

Matter waves-wave nature of particles, de Broglic relation. Davission-Germer experiment.

Unit VIII; Atoms & Nuclei

Alpha-particle seating 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 and fusion.

Unit IX: Electronic Devices

Semiconductors; semiconductor diode-I-V characteristics in forward and reverse bias, diode as a rectifier, I-V characteristics 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.

Unit X : 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. Need for modulation. Production and detection of an amplitude-modulated wave.

(PRACTICALS)

ONE PRACTICAL PAPER

Time : 3 Hours

30 marks

Notes : All experiments are compulsory. The question paper will contain 8 experiments in all, 4 from each section. The examinee will have to mark three experiments from each section and the examiner will allot one experiment from each section.

2. Records of experiments are to be maintained.

3. Records of activities are to be maintained.

Two experiments	14 marks (7marks each)
Record of activities	3 marks
Viva on activities	3 marks
Record of experiments	5 marks
Viva experimens	5 marks

PRACTICALS

Note: Every student will perform 10 experiments 15 from each section and 6 activities (3 from each section) during the academic year.

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 specifie 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 reistance 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 meno 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, as 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 theostar, 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 .....the local length.
2. To find the focal length of a convex lens by plotting graphs between u and v or between I/a and I/v.
3. To find the focal length of a convex mirror, using a convex lends.
4. To find the focal length of a concave lens, using a convex lens.
5. To determine angle of minimum deviationfor a given prism by plotting a graph between angle of incidence and angle of deviation.
6. To draw the I-V characteristic curve of a p-n junctionin forward bias and reverse bias.
7. To draw the characteristic curve of a zener diode and to determine its reverse breakdown voltage.
8. 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 and 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 laterial 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.