XII-PHYSICS PART 2 2023-2024

Month	Name of the Unit / Chapter/Topic	Learning Outcomes	Suggested Activities/ Projects under Internal Assessment/PRACTICALS	Assignment	Assessment
APRIL + JUNE	Ray Optics and Optical Instruments Ray Optics: Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and 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, refraction of light through a prism. Optical instruments: Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.	Recalls all the technical terms defined for spherical mirrors and identifies the correct sign conventions for mirrors and lenses. Draws ray diagram to determine the position of the image of an object and derives all the equations related to spherical mirrors. Knows Snell's laws of refraction and obtains the relationship among relative refractive indices of different materials Explains various phenomena related to refraction and the phenomenon of total internal reflection Derives the relationship between object and image distances and derives lens maker's and thin lens formula. Derives various relationships for a light ray passing through a prism. Explains the magnification by a microscope. Derives the expression for the magnification by a telescope.	EXPERIMENTS EXP). To find the value of v for different values of u in case of a concave mirror and to find the focal length. EXP) To find the focal length of a convex lens by plotting graphs between u and v or between 1/u and1/v. EXP) To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation. ACT) To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab. ACT) ACT)To study the nature and size of the image formed by a (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).	WORK SHEET. CASE STUDY QUESTIONS. DIAGRAM BASED QUESTIONS.	
JULY	Wave front and Huygen's principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws	Compares wave theory with corpuscular theory and explains geometrical optics in terms of wave optics. States		WORK SHEET. CASE STUDY QUESTIONS. DIAGRAM BASED QUESTIONS.	PT1

	of reflection and refraction using Huygen’s principle. Interference, Young's double slit experiment and expression for fringe width (No derivation final expression only), coherent sources and sustained interference of light, diffraction due to a single slit, width of central maxima (qualitative treatment only).	Huygens principle, explains Snell's law of refraction, law of reflection and total internal reflection using the principle. States the Superposition principle of waves and derives the expressions for intensity of light for interference from coherent and incoherent light sources. Explains the Young's double slit experiment and derives the expression for fringe width in Young's experiment. .Explains what is diffraction of light waves and the pattern observed for diffraction from a single slit.		PROJECT.	
AUGUST	Semiconductor Electronics: Materials, Devices and Simple Circuits Energy bands in conductors, semiconductors and insulators (qualitative ideas only) Intrinsic and extrinsic semiconductors- p and n type, p-n junction Semiconductor diode - I-V characteristics in forward and reverse bias, application of	Takes initiative to understand the history of development of semiconductor electronics. Classifies solids as conductors, semiconductors and insulators on the basis of resistivities and energy bands. .Explains the lattice structure and behaviour of intrinsic semiconductors. 2.Explains how intrinsic semiconductors can be converted into extrinsic semiconductors. Defines and describes pn junction as the basic	EXP). To draw the I-V characteristic curve for a p-n junction in forward bias and reverse bias ACTIVITIES ACT)To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items	WORK SHEET. CASE STUDY QUESTIONS. DIAGRAM BASED QUESTIONS. PROJECT.	

	junction diode - diode as a rectifier.	building block of semiconductor devices. Extrapolates the understanding of pn junction to create a pn diode and describes its behaviour under the effect of forward and reverse external bias. Explains the working of pn junction diode as a rectifier in electronic circuits.			
SEPTEMBER	Dual Nature of Radiation and Matter Dual nature of radiation, Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light. Experimental study of photoelectric effect Matter waves-wave nature of particles, de-Broglie relation.	Describes the three significant historical experiments that lead to the discovery of electrons and recognises that valence electrons can be emitted from the metal surfaces under certain conditions. Describes how photoelectric effect was first observed historically and identify the factors that leads to photoelectric emission in metals. Explains the variation of photoelectric current as a function of intensity of incident radiation & potential difference and describes the variation of stopping potential with frequency of the incident radiation. Describes the basic features of Einstein's explanation for photoelectric effect.		WORK SHEET. CASE STUDY QUESTIONS. DIAGRAM BASED QUESTIONS. PROJECT.	TERM1

OCTOBER	Atoms Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity and energy of electron in his orbit, of hydrogen line spectra (qualitative treatment only).	Takes initiative to understand historical experiments related to the atomic model. 8.Explains the nature of electron orbits basis Rutherford model of atom. Explains the characteristics of atomic spectra of hydrogen atom. 0.Takes initiative to study the details of simplest atomic spectra of hydrogen atom. States and explains why Rutherford nuclear model failed and how Bohr model was a better model of atom. Identifies the energy levels of single electron in the hydrogen atom as per Bohr model. .Explains line spectra of hydrogen atom basis Bohr's postulate. Takes initiative to understand de-Broglie explanation of Bohr postulate of quantisation of angular momentum.		WORK SHEET. CASE STUDY QUESTIONS. DIAGRAM BASED QUESTIONS. PROJECT.	
NOVEMBER	Nuclei Composition and size of nucleus, nuclear force Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number;	Describes the important characteristics of nuclear force.Describes nuclear fission as breaking up of large nucleus into smaller nuclei.		WORK SHEET. CASE STUDY QUESTIONS. DIAGRAM BASED QUESTIONS. PROJECT.	

	nuclear fission, nuclear fusion. Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses	Describes the electromagnetic spectrum, the different em waves, the order of their distribution in the em spectrum, the frequency ranges and states the applications of each of the type of em wave			
DECEMBER	FULL SYLLABUS				TERM 2
JANUARY	FULL SYLLABUS				PRE BOARD