

SUBJECT: PHYSICS (PHYS)**CLASS XII
SEMESTER III****THEORY****FULL MARKS –30****(MCQ Type Question)**

UNIT	Topic	No of periods assigned	Marks
I	Electrostatics	15	08
II	Current Electricity	11	04
III	Magnetic effect of current & magnetism	14	08
IV	Electromagnetic induction & alternating current	12	07
V	Electromagnetic waves	08	03
	Total	60	30

DETAIL SYLLABUS

UNIT	Topic / Sub Topic	No of periods assigned
I	Electric charge; conservation of charge, Coulomb's Law – force between two point charges; principle of superposition – force due to multiple charges. Electric field - electric field due to a point charge, electric field lines; electric dipole – field due to a dipole, torque on a dipole placed in uniform electric field. Electric flux – Gauss' theorem and its applications to find field due to uniformly charge infinite plane sheet and uniformly charged thin spherical shell [field inside and outside]. Electric potential, potential difference, relation between intensity of electric field and potential, potential due to a point charge, equipotential surface. Potential energy of two point charges. Conductors and insulators, free charge and bound charge inside a conductor. Dielectrics and electric polarization. Capacitor and capacitance, combination of capacitors in series and in parallel. Parallel plate capacitor, energy stored in a capacitor, Van De Graff generator	15
II	Electric current, flow of electrons in a metallic conductor, drift velocity, and its relation with electric current, volume density of current; Ohm's law, electrical resistance. V-I characteristics [linear and non-linear] electrical energy and power, units of power, electrical resistivity and conductivity. Carbon resistors, colour code for carbon resistors, series and parallel combination of resistors; temperature dependence of resistors. Potential difference and e.m.f. of cells, internal resistance of a cell, series and parallel combination of cells, secondary cell. Kirchhoff's	11

	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. Household wiring, three pin plug point, miniature circuit breaker [MCB]	
III	Concept of magnetic field, Oersted's experiment. Biot Savart Law and its application to current carrying circular loop at the centre, magnetic moment due to a current carrying circular loop. Ampere's circuital law and its applications to infinitely long straight wire, straight and toroidal solenoids. Force on a moving charge in uniform magnetic and electric fields. Force on a current carrying conductor in a uniform magnetic field. Force between two parallel current carrying conductors (no deduction) – definition of ampere. Torque on a current carrying loop in uniform magnetic field; moving coil galvanometer and its conversion to ammeter and voltmeter. Earth's magnetic field and magnetic elements. Dia, para- and ferro-magnetic substances. Electromagnet and permanent magnet	14
IV	Electromagnetic induction; Faraday's laws, induced e.m.f. and current; Lenz's law; eddy currents, self and mutual inductance. Alternating current, peak and rms values of alternating current and voltage; reactance and impedance; series LCR circuit, resonance, power in AC circuits, Wattless Current. AC generator and transformers, its different types; power station-thermal and hydel; transmission and distribution of power, renewable energy (basic principle only)	12
V	Need for displacement current; Electromagnetic waves and their characteristics; Transverse nature of electromagnetic waves. Electromagnetic spectrum.	8
	Total	60

PHYSICS (PHYS)
CLASS XII
SEMESTER IV
THEORY

FULL MARKS –40

(SAQ AND LAQ Type Question)

UNIT	Topic	No of periods assigned	Marks
VI	Optics	22	13
VII	Dual nature of matter & Radiation	12	6
VIII	Atoms and nuclei	14	6
IX	Electronic devices	22	11
X	Communication systems	14	4
	Total	84	40

DETAIL SYLLABUS

UNIT	Topic / Sub Topic	No of periods assigned
VI	Reflection of light, spherical mirror, mirror formula, refraction of light, total internal reflection and its application, optical fibres. Refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula, combination of thin lenses in contact. Refraction and dispersion of light through a prism, dispersive power of prism. Scattering of light – blue colour of the sky and reddish appearance of the sun at sun rise and sun set. Optical instruments: Microscopes and astronomical telescopes [reflecting and refracting] and their magnifying powers (no deduction), human eye – image formation and accommodation, correction of eye defects using lenses. Wave optics: wave front and Huygens' principle. 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 maxima (no deduction). Polarization: plane polarized light, Brewster's law, uses of plane polarized light and polaroids.	22
VII	Dual nature of radiation, photoelectric effect, Einstein's photoelectric equation, particle nature of light. Matter waves – wave nature of particles, de Broglie relation.	12
VIII	Bohr's model, energy level, hydrogen spectrum. Continuous and characteristic x rays spectra. 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	14

	fusion.	
IX	Energy bands in solids – conductors, insulators and semiconductors; p-n junction diodes – I-V characteristics in forward and reverse bias; diodes as rectifier – half wave, full wave and bridge rectifier; filter. I-V characteristics of LED, Zener diode, voltage regulator, three-pin voltage regulator. Junction transistor, transistor action, transistor configurations, input and output characteristics of a transistor in common emitter [CE] configuration. Transistor as an amplifier in CE configuration – diac, triac, SCR, LDR, Photodiode, Phototransistor, solar cell. Logic gates – OR, AND, NOT, NAND and NOR gates. NAND & NOR gate as universal gate. Transistor as a switch.	22
X	Elements of a communication system [block diagram only], band width of signal [audio, video and digital]; bandwidth of a transmission medium, transmission media. Noise, Signal to noise [S/N] ratio. Propagation of electromagnetic waves – ground, sky and space waves. Need for modulation – production and detection of amplitude modulated wave, satellite communication.	14
	Total	84

**PROJECT / PRACTICAL
CLASS XII**

FULL MARKS – 30

NO OF PERIODS ASSIGNED – 72

DETAIL SYLLABUS

Practical / Project:

Every student has to perform at least 10 (Ten) experiments out of the list of following experiments and to carry

out one project under the guidance of teacher.

List of Experiments :

- 1) To measure resistance of a given wire using metre bridge and hence to find the specific resistance of its material.
- 2) To compare the emf of two given primary cells using potentiometer.
- 3) To verify the laws of series and parallel combination of resistance using post office box.
- 4) To determine resistance of a galvanometer by half deflection method and to find its figure of merit.

- 5) 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.
- 6) To find the focal length of a convex lens by plotting $1/u$ against $1/v$.
- 7) To determine refractive index of a glass slab using a travelling microscope.
- 8) To construct a full wave rectifier using pn junction diodes with capacitor filter and to draw load current – load voltage graph and hence to find percentage regulation using bread board.
- 9) To draw the I-V characteristics of a Zener Diodes in the reverse bias and to find the break down voltage.
- 10) To draw the output characteristics of a pnp/npn transistor in the common –emitter configuration and to find the current gain.
- 11) To verify the truth table of NAND / NOR gate and to show that they are universal gate [using bread board]
- 12) To study the variation of resistance of a LDR with intensity of light from LED as a source [using bread board]
- 13) Use of solar cell as generator of energy.
- 14) To fabricate and test a circuit consisting of two lines, one with two bulbs and a fan and the other with a high current plug point using a MCB and feed by AC mains