DEPARTMENT OF PHYSICS

LESSION PLAN

SUSHIL KUMAR

CLASS:- B.Sc 1ST PHYSICAL SCIENCE

PAPER NAME:- ELECTRICITY AND MAGNETISM (DSC)

FEBRUARY

Unit-I

Vector Background and Electric Field: Gradient of a scalar and its physical significance, Line, Surface and Volume integrals of a vector and their physical significance, Flux of a vector field, Divergence and curl of a vector and their physical significance, Gauss's divergence theorem, Stoke's theorem. Conservative nature of Electrostatic Field, Electrostatic Potential, Potential as line integral of field, potential difference Derivation of electric field E from potential as gradient. Derivation of Laplace and Poisson equations. Electric flux, Gauss's Law, Differential form of Gauss's law and applications of Gauss's law.

MARCH

TEST

Unit-II

Magnetic Field: Biot-Savart law and its applications: straight wire and circular loop, Current Loop as a Magnetic Dipole and its Dipole Moment, Ampere's Circuital Law, and its applications to (1) Solenoid and (2) Toroid,
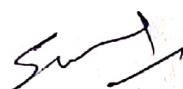
Magnetic Properties of Matter: Force on a dipole in an external field, Electric currents in Atoms, Electron spin and Magnetic moment, types of magnetic materials, Magnetization vector (M), Magnetic Intensity (H), Magnetic Susceptibility and permeability, Relation between B, H and M, Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory), B-H curve and hysteresis loop, importance of Hysteresis loop.

APRIL

Unit-III

Time varying electromagnetic fields: Electromagnetic induction, Faraday's laws of induction and Lenz's Law, Self-inductance, Mutual inductance, Energy stored in a Magnetic field, Derivation of Maxwell's equations, Displacement current, Maxwell's equations in differential and integral form and their physical significance.

Electromagnetic Waves: Electromagnetic waves, Transverse nature of electromagnetic wave, energy transported by electromagnetic waves, Poynting vector, Poynting's theorem. Propagation of Plane electromagnetic waves in free space & Dielectrics.

Unit-IV

DC current Circuits: Electric current and current density, Electrical conductivity, and Ohm's law, Kirchhoff's laws for D.C. networks, Network theorems: Thevenin's theorem, Norton theorem, Superposition theorem.

Alternating Current Circuits: A resonance circuit, Phasor, Complex Reactance and Impedance, Analysis for RL, RC and LC Circuits, Series LCR Circuit: (1) Resonance, (2) Power Dissipation (3) Quality Factor and (4) Band Width, Parallel LCR Circuit.

REVISION OF PAPERS

DEPARTMENT OF PHYSICS

LESSION PLAN

SUSHIL KUMAR

CLASS:- B.A 1ST ARTS

PAPER NAME:- Fundamental of Physics-II (SemesterII) MDC

FEBRUARY

Unit-I

Light and Optics-Nature and properties of light, its speed, frequency, and wavelength; Reflection of light- types of reflection and their importance in daily life, laws of reflection, multiple reflection by mirrors and their applications.

MARCH
TEST

Refraction of light- laws of refraction, refractive index, refraction of light through prism (dispersion of light), formationRainbow,twinklingofstars,advanceSunrise,anddelayedSunset;Scatteringoflightandbluecolourofthe sky; apparent depth, total internal reflection, and its important applications.
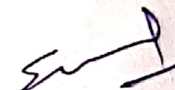
APRIL

Unit-II

Electricity- electric charge, types of charges, unit of charge, frictional electricity, electricity by conduction and electric current, unitsofelectric current, measurement ofcurrent, conductorsand insulators;resistance, resistivity and Ohm's law, electric potential and potential difference, emf; Electric circuit- resistor, capacitor, battery, ammeter and voltmeter.

MAY

Series and parallel combinations of resistors, electrical wiring in houses and electrical safety (fuse, hot wire, neutral, ground and short circuit), electric power and electric power transmission; Heating effect of current and its practical applications.

REVISION OF PAPERS

DEPARTMENT OF PHYSICS

LESSION PLAN

SUSHIL KUMAR

CLASS:- B.Sc 1ST PHYSICAL SCIENCE (VAC)

PAPER NAME:- Electronic Components And Measuring Instruments (sem 2nd)

FEBRUARY

Unit-I

Electronic Components: Passive Components: Resistors, Capacitors, Inductors, Transformers, Fuses (their types &applications). Junction Diodes: Rectifying diode, Forward and reverse bias characteristics.

MARCH

TEST

Varactor Diode, Light Emitting Diode, Photo diode and Photo transistors (qualitative only)
Rectifiers:Halfwave,Fullwave,Bridge,Clipping and Clamping circuits. Zener diode: Zener diode as voltage regulator.

Measuring Instruments: Multimeter, CRO,Signal Generator,Frequency Counter, LCRmeter.

APRIL

Unit-II

Thermo couples or IR Thermometer, Digital Storage Oscilloscope (DSO), DC power supply, Impedance analyzer, Hall Effect Meter, Telecommunications test set, Thermocouple and temperature Sensors, RFpower supply, Network analyzer, Spectrum Analyzer

MAY

REVISION OF PAPERS

Lesson Plan

Even Semester (2024 – 2025)

Name: Dr. Kavita

Class: B.Sc. IInd

Papers: Waves and Optics, Statistical Mechanics, and Electrical Circuits and Network Skills

January 2025

Wave motion: wave equation, solution of wave equation, particle and wave velocities, intensity of wave, superposition principle, group velocity, phase velocity.

Transverse waves: the string as a first oscillator, velocity of transverse vibrations of stretched strings, reflections and transmissions of waves on a string at a boundary, transversewave on a string, travelling and standing waves on a string, normal modes of a string, reflections and transmission of energy

Longitudinal wave: velocity of longitudinal waves in a fluid in a pipe, Newton's formula forvelocity of sound, Laplace's correction (qualitative), reflections and transmission of sound waves at a boundary, energy distribution in sound waves.

Statistical basis of thermodynamics: statistical basis, probability and frequency, permutations and combinations, distribution of an distinguishable and indistinguishable particles in two boxes, Macrostate and microstate, thermodynamics probability, fluctutations and their dependence on n: (narrowing of probability distribution with increasing n), constraints on a system, static and dynamic system, most probable state, concept of cell in compartment, concept of ensembles and type of ensembles (qualitative idea only).

Universal law in statics: fundamental postulates of statistical mechanics, density of quantumstates of energy of a particle, entropy and thermodynamics probability, statistical interpretation of 2nd law of thermodynamics, partition function and relation with thermodynamics quantities

February 2025

Digital Circuit: Difference between analog and digital circuits, binary numbers, Decimal to binary and binary to decimal conversion, AND, OR and NOT gates, realization of AND,ORand NOT gates using diodes, resistance and transistor, NAND and NOR gates as universal gate, realization of AND, OR and NOT gates using NAND gates only and NOR gates only, XOR gates, XNOR gates, Demorgan's theorem, Boolean laws.
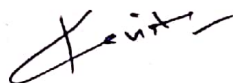
Interference: division of amplitude and division of wave front, Young's double slit experiment, Lloyd's mirror and Fresnel's Biprism, phase change on reflection : Stokes' measurement of wave length and refractive index.

Kinetic theory of gases: Maxwell- Boltzmann law of distribution of particle speed in anideal gas and its experimental verification, mean, RMS and most probable speeds.

Molecular collisions: Mean free path, Collision probability, estimates of mean free path, transport phenomenon in ideal gases: (1) viscosity, (2) thermal conductivity, (3) diffusion browning motion and its significance.

Equipartition law: degrees of freedom, law of equipartition of energy (no proof required) and its applications to the specific heat of monoatomic and diatomic gases and its limitations.

Test I & Assignment I

Basic Electrical Components : electronic components, passive components, resistors and their types, color coding of resistors, troubles in resistor, capacitors and their types, trobles in capacitors, inductors and their types, troubles in inductors, internal resistance and impedance, types of electrical, " single – pole single –throw(SPST)switch , "single –pole double throw"(SPDT) switch, ' double- pole double-throw"(DPDT)switch, application of SPST,SPDT,DPDT switches.

March 2025

Electrical Protection and Electrical Wiring : Relays , fuses and disconnect switches, circuit breaker,overload devices ground –fault protection, grounding and isolating , construction and working of MCB and MCCB and their uses ,dffierent types of conductors and cables, basic of wiring – star and delta connection, voltage drop and losses across cables and conductor, insulation, solid and stranded cable. preparation of extention board .

Test & Project of Electrical circuit and network skill

Diffraction: Fresnel diffraction: Fresnel's assumptions, Fresnel's half- period zones for plane wave, rectilinear propagation of light, theory of a zone plate and its applications, multiple foci of a zone plate, qualitative description for Fresnel diffraction pattern of a straight edge, a slit and a wire.

Fraunhofer diffraction: single slit , double slit multiple slits and 'n' multiple slits, diffraction grating and it's resolving power, ray light criteria of the limit of resolution andresolving power of a telescope.

Test 2 & Assignment 2

Classical statics: phase space and application to one dimension harmonic oscillator and free particle, division of phase space into cells, basis approach in three statics, Maxwell – Boltzmann distribution law, thermodynamics functions of finite numbers of energy levels, negative temperature, thermodynamics functions of an ideal gas, classical entropy expression.Gibbs paradox.

April 2025

Polarization: plane polarized light – production and analysis , circular and elliptical polarization, optical activity, specific rotation.

Fibre optics: optical Fibre – construction and working, critical angle of propagation, modes of propagation, acceptance angle, attenuation. Advantages and applications of optical fibre.

Bose- Einstein statistics: B.E. distribution law, thermodynamics functions of a completely degenerate Bose gas, Bose- Einstein condensation, properties of liquid He (quantative description), radiations as photon gas, Bose's derivation of plank's law.
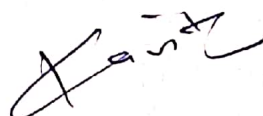
Fermi- dirac statistics: Fermi- dirac distribution law, thermodynamic functions of an ideal completely degenerate, Fermi gas, Fermi energy, electron gas in a metal, specific heat of metals, comparision of three statistics M-B, B-E and F-D.

Test & Assignment

Electrical Energy Sources and Measurements: Real(practical) and ideal voltage sources, Real (practical) current sources, conversion of voltage source into current source or vice –versa maximum power transfer theorem ,thevenin theorem and Norton 's theorem.familiarization with multimeter ,voltmeter and ammeter . AC source- single phase and three phase alternating current sources . measurement of energy consumption in AC circuit .

May 2025

Revision of Syllabus

LESSON PLAN
6TH SEMESTER (2024-25)
SOLID STATE PHYSICS (CPL-601)
TEACHER NAME : MS. POONAM DEVI

Jan, 2025

Crystal structure: Crystalline and glassy forms, liquid crystal, crystal structure, periodicity, lattice and basis, crystal translations vector and axis. Unit cell and primitive cell, wingers Seitz primitive cell, symmetry operations for two dimensional crystal, Bravais lattice in two and three dimensional. Crystal planes and millers indices, interplaner spacing, crystal structure of zinc sulphide, silicon, sodium chloride and diamond.

Feb, 2025

Crystal structure: X ray diffraction, Bragg law and experiment Xray diffraction methods. K-space and reciprocal lattice and its physical significance, reciprocal lattice vector, reciprocal lattice to simple cubic lattice and bcc,and fcc. Lattice vibrations: phonon concept, vibrations of monoatomic and diatomic, Acoustical and optical modes, dispersion relations for phonon, dulong and petits law, Einstein and debye theories of specific heat of solid, debye T3 law

Test and assignments 1

Mar, 2025

Band theory: free electron gas model, nearly free electron model, bloch function, kronig penny model, velocity and effective mass of electron, distinction between metal, semiconductor and insulator , hall effects. Magnetic properties of matter: Dia, Para, ferromagnetic material, classical Langevin theory of Dia and paramagnetic domains, curie law .

April, 2025

Super conductivity: Historical introduction, survey of superconductivity, Super conducting systems, high Tc superconductors, isotopic effects, critical magnetic fields, messiner effects, London theory and penetration depth , classification of superconductors, BCS theory of superconductivity, Flux quantization, limitations. Josephson effects Ac and DC, practical applications of superconductors and their limitations.

Test and assignments 2

May, 2025

Revision and class tests.

Lesson Plan (2024-2025) Even Sem.

Name of Teacher : Dr. Monika Dhariwal

Class : BSc 3rd Non Medical and Computer science

Paper : Quantum Mechanics CPL -602

January

Wave function and its physical significance, time dependent and independent Schrödinger wave function, Hermitian Operator, Probability current density and its relation to wave function, Expectation values and particle in 1- dimensional box

February

Application of Schrödinger Wave Equation, Free Particle and concept of group velocity, Tunneling through finite potential barrier, uncertainty principles for position – momentum and energy

March

Larmor Precession, Bohr Magneton, Coupling scheme : LS and JJ coupling scheme, Hyperfine structure of spectral lines and its origin, Atom in external magnetic field; Normal Zeeman effect,

Class test

April

Rotational spectra of diatomic molecules as rigid rotator, Rotational spectra of diatomic molecules as non rigid rotator, Raman spectra , Molecules as Harmonic oscillator problem

May

Revision of syllabus