Lesson Plan

2020-21
Even Sem

Name: **Dr. Mukesh Chander (Ext. Lecturer Physics)**

Class and Section: **B.Sc.-1st (2nd Sem.)**

Subject: **Physics**

Paper 2

May 2021	Unit I: Semiconductors	Energy bands in solids, Intrinsic and extrinsic semiconductors, carrier mobility and electrical resistivity of semiconductors, Hall effect, p-n junction diode and their characteristics, Zener and Avalanche breakdown, Zener diode, Zener diode as a voltage regulator. Light emitting diodes (LED), Photoconduction in semiconductors, Photodiode, Solar Cell, p-n junction as a rectifier, half wave and full wave rectifiers (with derivation) filters (series inductor, shunt capacitance L-section or choke, π and R.C. filter circuits).
May 2021	Unit 2: Transistors	Junction transistors, Working of NPN and PNP transistors, Three configurations of transistor (C-B, C-E, C-C modes),Common base, common emitter and common collector characteristics of transistor, Constants of a transistor and their relation, Advantages and disadvantages of C-E configuration. D.C. load line Transistor biasing; various methods of transistor biasing and stabilization.
May 2021	Unit 3: Transistor Amplifiers	introduction Amplifiers, Classification of amplifiers common base and common emitter amplifiers, coupling of amplifiers various methods of coupling, Resistance- Capacitance (RC) coupled amplifier (two stage concept of band width, no derivation), Feedback in amplifiers advantages of negative feedback, emitter follower, distortion in amplifiers.
June 2021	Unit 4: Oscillators	introduction Oscillators, Principle of oscillation classification of oscillators Condition for self sustained oscillation: Barkhausen criterion for oscillation Tuned collector common emitter oscillator Hartley oscillator C.R.O. Principle and working

Paper 1

June 2021	Unit I:	Moment of inertia Rotation of rigid body, Moment of inertial, Torque, angular momentum, Kinetic Energy of rotation Theorem of perpendicular and parallel axes (with proof), Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross–section, Fly wheel, Moment of inertia of an irregular body, Acceleration of a body rolling down on an inclined plane.
June 2021	Unit 2:	Elasticity, Stress and Strain, Hook's law, Elastic constant and their relations, Poisson's ratio, Torsion of cylinder and twisting couple, Determination of coefficient of modulus of rigidity for the material of wire by Maxwell's needle, Bending of beam (Bending moment and its magnitude), Cantilever and Centrally loaded beam, Determination of Young's modulus for the material of the beam and Elastic constants for the material of the wire by Searle's method.
July 2021	Unit 3:	Assumption of Kinetic theory of gases, pressure of an ideal gas (with derivation) Kinetic interpretation of Temperature, Ideal Gas equation, Degree of freedom Law of equipartition of energy and its application for specific heat of gas Real gases, Vander wall's equation, Brownian motion(Qualitative)
July2021	Unit 4:	Introduction Maxwell's distribution of speed and velocities (derivation required) Experimental verification of Maxwell's law of speed distribution: most probable speed Average and r.m.s. speed, Mean free path Transport of energy and momentum, Diffusion of gases.

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Name: **Dr. Mukesh Chander (Ext. Lecturer Physics)**
Class and Section: **B.Sc.-2nd (4th Sem.)**
Subject: **Physics**

2020-21
Even Sem

Paper 2

May2021	Unit 1	Polarization by reflection, refraction and scattering, Malus law, double refraction, hygen wave theory of double refraction, Analysis of polarized light, Nicol Prism, quarter and half wave plate, production and detection of PPL, CPL and EPL, optical activity, Fresnel theory of optical rotation, specific rotation, polerimeters
May2021	Unit 2	Fourier theorem and Fourier series, evaluation of Fourier coefficient, importance and limitations of Fourier theorem, even and odd functions, Fourier series of functions f(x) between (i) 0 to 2pi, (ii) -pi to pi, (iii) 0 to pi, (iv) -L to L, complex form of Fourier series, Application of Fourier theorem for analysis of complex waves: solution of triangular and rectangular waves, half wave rectifier full wave rectifier outputs, Parseval identity for Fourier Series, Fourier integrals.
May2021	Unit 3	Fourier transforms Fourier transforms and its properties, Application of Fourier transform (i) for evaluation of integrals, (ii) for solution of ordinary differential equations, (iii) to the following functions: 1. f(x)= e- x2/2 i |X|<a ii . f(x) = 0 |X |>a Geometrical Optics I Matrix methods in paraxial optics, effects of translation and refraction, derivation of thin lens and thick lens formulae, unit plane, nodal planes, system of thin lenses.
June 2021	Unit 4	Geometrical Optics II Chromatic, spherical, coma, astigmatism and distortion aberrations and their remedies. Fiber Optics Optical fiber, Critical angle of propagation, Mode of Propagation, Acceptance angle, Fractional refractive index change, Numerical aperture, Types of optics fiber, Normalized frequency, Pulse dispersion, Attenuation, Applications, Fiber optic Communication, Advantages.

Paper 1

June 2021	Unit –I	Microscopic and Macroscopic systems, events-mutually exclusive, dependent and independent, Probability, statistical probability, A- priori Probability and relation between them, probability theorems, some probability considerations, combinations possessing maximum probability, combination possessing minimum probability, Tossing of 2,3 and any number of Coins, Permutations and combinations, distributions of N (for N= 2,3,4) distinguishable and indistinguishable particles in two boxes of equal size, Micro and Macro states, Thermodynamical probability, Constraints and Accessible states, Statistical fluctuations, general distribution of distinguishable particles in compartments of different sizes, Condition of equilibrium between two systems in thermal contact-- β parameter, Entropy and Probability (Boltzman's relation).
June 2021	Unit –II	Postulates of statistical physics, Phase space, Division of Phase space into cells, three kinds of statistics, basic approach in three statistics. M. B. statistics applied to an ideal gas in equilibrium-energy distribution law (including evaluation of α and β) speed distribution law & velocity distribution law. Expression for average speed, r.m.s. speed, average velocity, r. m. s. velocity, most probable energy & mean energy for Maxwellian distribution.
July 2021	Unit-III:	Quantum Statistics Need for Quantum Statistics, Bose-Einstein energy distribution law, Application of B.E. statistics to Planck's radiation law B.E. gas, Degeneracy and B.E. Condensation, Fermi-Dirac energy distribution law, F.D. gas and Degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law, Fermi Dirac gas and degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law for electron gas in metals, Zero point energy, Zero point pressure and average speed (at 0 K) of electron gas, Specific heat anomaly of metals and its solution. M.B. distribution as a limiting case of B.E. and F.D. distributions, Comparison of three statistics.
July 2021	Unit-IV	Theory of Specific Heat of Solids Dulong and Petit law. Derivation of Dulong and Petit law from classical physics Specific heat at low temperature, Einstein theory of specific heat, Criticism of Einstein theory, Debye model of specific heat of solids, success and shortcomings of Debye theory, comparison of Einstein and Debye theories.

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Lesson Plan

2020-21
Even Sem

Name : **Dr. Mukesh Chander (Ext. Lecturer Physics)**
Class and Section: **B.Sc.-3rd (6th Sem.)**
Subject: **Physics**

Paper 1

May 2021	Unit 1st	Crystal Structure Introduction Crystalline and glassy forms, liquid crystal crystal structure, periodicity translation vector and axes unit cell, primitive cell Wienger sietz primitive cell symmetry operation for a two dimensional crystal Bravis lattice for two and three dimension crystal plane and miller indices inter planar spacing and numerical crystal structures
May 2021	Unit 2nd	Introduction X-Ray and Braggs Diffraction K –spacing and reciprocal lattice and its physical significance reciprocal lattice vectors reciprocal lattice to a simple cubic lattice,b.c.c and f.c.c.
May 2021	Unit 3rd	Introduction survey of superconductivity, high and tc superconductor isotopic effect,critical magenetic field, miessner effect London and peppards equation classfication of superconductor BCS Theory and flux quantisation Josephon effect , application and limitation of superconductivity
June 2021	UNIT 4th	Introduction to Nano Physics, definition, length scale ,importance of Nano scale and technology history, benefits and challenge in molecular manufacturing molecular assembler concept,vision and objective of nano technology application of nano techonology in different fields

Paper 2

June 2021	Unit 1	-introduction , emission and absorption spectra Bohr Atomic Model spectra of hydrogen atom complete explanation of spectra, Rydberg constant mass shortcoming of Bohr model wilson sommerfieid quantization rule Bohr corresponding model, shortcoming of this model vector atom model various quantum no. associated with vector model and selection rule
June 2021	Unit 2nd	-introduction orbital ,magnetic dipole moment larmor precession and theorem penetrating and non penetrating model quantum defect and spin orbit interaction energy hydrogen fine spectra main feature of alkali spectra and theoretical interpretation absorption spectra of alkali atom intensity rule for doublets comparison of alkali and hydrogen spectra
July 2021	unit 3rd	vector atom model for two valence electron LS Coupling and jj coupling hyperfine structure of spectral line and its origin ,nuclear spin
July 2021	Unit 4th	atoms in external field Zeeman effect,types and lande –g factor Paschen –Back effect of a single valence electron system rotation spectra,vibration spectra and rotator model of diatomic model

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