Lesson Plan 2021-22 Even Semester

ne of the Assistant Professor: Sh.Vijay Kumar **Class: B.Sc. I**

iester: 2nd **Subject: Physics**

EK-3, RCH	Rotation of a rigid body, Concept of Moment of inertia
	K.E. of rotation & angular momentum
	Theorem of perpendicular & parallel axis,
	M.I. of solid bar
EK-4, RCH	M.I of solid sphere & Hollow sphere
	M.I of spherical shell
	M.I. of solid & hollow cylinder
	M.I. of fly wheel & torsional pendulum,
	M.I. of a ring
	Acceleration of a body rolling down an inclined plan
EK-1, ?IL	Conceptual and numerical problems
	Elasticity & Plasticity, stress and strain , Hook's law
	Torsion of cylinder and Poisson's ratio
	Elastic constants and their relations
	twisting couple,
EK-2 ?IL	
	Bending of beam, rigidity by Maxwell needle
	Cantilever and Centrally loaded beam
	Determination of Y and Elastic constants by Searle's method
EK-3, ?IL	Conceptual and numerical problems
	Revision and testing of the chapter
	Class Test
	Assumption of kinetic theory of gases, kinetic interpretation of Temperature
	Pressure of ideal gas, Ideal gas equation
	Degree of Freedom
	Vander Wall's equation
	Law of equipartition of energy & its application to specific gases of heat
?K 4, ~~MAY~~ April	
	Brownian motion(Qualitative) & real gases
	Conceptual and numerical problems
	Revision and testing of the chapter
	Class Test
?K-1, MAY	Maxwell's distribution of speed and velocities
	Experimental verification of Maxwell's law of speed distribution
	Most probable speed
	Average & r.m.s. speed
	Diffusion of gases
	Mean free path

-2 ay	transport of energy and momentum
	Conceptual and numerical problems
	Revision and testing of the chapter
	Class Test
	Energy bands in solids
	Semiconductor & type of semiconductor
	Carrier mobility and electrical resistivity of semiconductor
eek-3 nay	Hall effect
	p-n junction diode and its characteristics
	Zenor diode
	Zenor and avalanche breakdown
	Zenor diode as a voltage regulator
	Light emitting diodes(LED) & photo diode
	Photo conduction in semiconductors, Solar cell
	p-n junction as a rectifier, Half wave and full wave rectifier
ek-4+5 nay	Filter circuit (series inductor, shunt capacitance)
	L-Section or choke
	π and R.C. circuits
	Conceptual and numerical problems
eek-1 une-	Revision and testing of the chapter
	Junction transistors
	Working of NPN & PNP transistors
	Configuration of the transistors (C-B, C-E, C-C)
	D.C. load line
	Advantage and disadvantage of C-E configuration
eek-2 June	Transistors biasing and stabilization
	Revision and testing of the chapter
	Amplifiers and classification of amplifiers
	Common base and common emitter amplifiers
	Coupling of amplifiers & various method of coupling of amplifiers
eek-3 +4 June	RC coupled amplifier
	Feedback in amplifiers
	Advantage of negative feedback
	Emitter follower
	Distortion in amplifiers
	Conceptual and numerical problems
	Revision and testing of the chapter
	Oscillators and its principle

e 8 eek-5	Classification of oscillators
	Condition of self-sustained oscillation
	Barkhausen criterion for oscillation
	Tuned collectors common emitter oscillator
	Hartley oscillators
July eek-1	
	C.R.O. (Principle and Working)
	Conceptual and numerical problems
	Revision and testing of the chapter

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Sem - IV

n Plan Govt. College Bhattu Kalan (Fatehabad) Session 2021-22, B.Sc. Semester 4th, PH-04 : Statistical Mechanics & PH-04(B): Optics-II

Subject: Physics **Vijay Kumar (Assistant professor)**

Week-3, March	Polarization of light & its representations
	Polarization by reflection & scattering
	Law of Malus
	Phenomenon of double refraction
	Huygens's wave theory of double refraction
Week-4, March	Analysis of polarized light
	Nicol prism its Principle, working & physical significance
	Plane, Circularly & Elliptically polarized light
	Difference between positive and negative crystal
	Explanation negative (Calcite) crystal
	Quarter and half wave plates
Week-1, April	Optical activity
	Fresnel's theory of rotation
	Specific rotation
	Polarimeters (half shade and biquartz)
	Revision and testing of the chapter
	Class Test
	Fourier theorem and Fourier series
	Evaluation of fourier coefficients
Week-2, April	
	Importance and limitations of fourier theorem
	Even and odd function of fourier series
	Fourier function with different limits
	Fourier function from –L to +L
	Complex form of fourier series
	Applications of fourier series to solve complex function
	Solution of triangular and rectangular wave problems
Week-3, April	Half and full wave rectifier output.
	Parseval identity for fourier series
	Some fourier integrals
	Unit revision and problems
	Testing of the chapter
	Class test
Week-4, April	Fourier transform and its properties
	Application of fourier transform for evaluation of integrals
	Application to solution to ordinary differential equations
	Application to some special function

Week-1, May	
	Matrix method in paraxial optics
	Effect in translation and refraction
	Derivation of thin lens formula
	Derivation of thick lens formula
Week-2, May	Unit plane
	Nodal plane
	system of thin lenses
	Chromatic aberrations
	Spherical aberrations
	Coma aberrations
	Astigmatism aberrations
Week-3, May	Distortion aberrations and their remedies
	Fibre optics
	Critical angle of propagation
	Mode of propagation
	Acceptance angle
	Fractional refractive index
Week-4, May	Numerical aperture
	Type of optical fibre, Normalized frequency
	Pulse dispersion, Attenuation and its application
	Fibre optics communication and its disadvantage
	Revision and testing of the chapter
	Microscope and macro specific system, events dependent & independent
Week-1, June	
	Statistical probability, a priori probability and relations
	Probability and some considerations
	Combinations possessing minimum and maxi. probability
Week-2, June	Tossing of coin , permutation and combinations
	Micro & macro state, thermodynamically probability
	Entropy and probability , distribution of particles of different size
	Revision of chapter
	Statistical physics, phase space & its division in to cell
	Kind of statistics, MB statistics
Week-3, June	
	Speed and velocity distribution law
	Average and r.m.s. sped & velocity expression
	Most probable energy & mean energy for MB Distribution.
	Revision and testing of the chapter
	Quantum statistics & B.E. distribution law and its application

Week-4, June	F.D. statistics law & energy distribution and Comparison of three statistics
	Fermi energy and temperature, energy & degeneracy
	Zero point energy, F.D. Statistics distribution for electron gas
	Dulong and petit law & its derivation
	Einstein theory of specific heat
Week-1, July	
	Criticism of Einstein theory of specific heat
	Debye models of specific heat of solids & its shortcoming
	Comparison of Einstein & Debye models
	Sessional test

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Sem-VI

son Plan Govt. College Bhattu Kalan (Fatehabad) Session 2021-22, B.Sc. Semester 6th, PH-): Atomic & Molecular Spectroscopy PH-06(B):Solid State & Nano Physics.

Subject: Physics **Vijay Kumar (Assistant professor)**

Week-3, March Week-4, March Week-1, April	**Unit – I: Historical background of atomic spectroscopy.** Introduction of early observations, emission and absorption spectra, atomic spectra, wave number, spectrum of Hydrogen atom in Balmer series, Bohr atomic model(Bohr's postulates) , spectra of Hydrogen atom , explanation of spectral series in Hydrogen atom, un-quantized states and continuous spectra, spectral series in absorption spectra, effect of nuclear motion on line spectra (correction of finite nuclear mass), variation in Rydberg constant due to finite mass, short comings of Bohr's theory, Wilson sommerfeld quantization rule, de-Broglie interpretation of Bohr quantization law, Bohr's corresponding principle, Sommerfeld's extension of Bohr's model, Sommerfeld relativistic correction, Short comings of Bohr-Sommerfeld theory, Vector atom model; space quantization, electron spin, coupling of orbital and spin angular momentum, spectroscopic terms and their notation, quantum numbers associated with vector atom model, transition probability and selection rules.
Week-2, April Week-3, April	**Unit –II: Vector Atom Model (single valance electron)** Orbital magnetic dipole moment (Bohr megnaton), behavior of magnetic dipole in external magnetic field; Larmors' precession and theorem. Penetrating and Non-penetrating orbits, Penetrating orbits on the classical model; Quantum defect, spin orbit interaction energy of the single valance electron, spin orbit interaction for penetrating and non-penetrating orbits. quantum mechanical relativity correction, Hydrogen fine spectra, Main features of Alkali Spectra and their theoretical interpretation, term series and limits, Rydeburg-Ritze combination principle, Absorption spectra of Alkali atoms. Observed doublet fine structure in the spectra of alkali metals and its Interpretation, Intensity rules for doublets, comparison of Alkali spectra and Hydrogen spectrum.
Week-4, April Week-1, May	**UNIT-III: Vector Atom model (two valance electrons).** Essential features of spectra of Alkaline-earth elements, Vector model for two valance electron atom: application of spectra. Coupling Schemes;LS or Russell – Saunders Coupling Scheme and JJ coupling scheme, Interaction energy in L-S coupling (sp, pd configuration), Lande interval rule, Pauli principal and periodic classification of the elements. Interaction energy in JJ Coupling (sp, pd configuration), equivalent and non-equivalent electrons, Two valance electron system-spectral terms of non-equivalent and equivalent electrons, comparison of spectral terms in L-S And J-J coupling. Hyperfine structure of spectral lines and its origin; isotope effect, nuclear spin.
Week-2, May	**Unit –IV: Atom in External Field.** Zeeman Effect (normal and Anomalous),Experimental set-up for studying Zeeman effect, Explanation of normal Zeeman effect(classical and quantum mechanical), Explanation of anomalous Zeeman effect(Lande g-factor), Zeeman pattern of D1 and D2 lines of Naatom, Paschen-Back effect of a single valence electron system. Weak field Stark effect of Hydrogen atom. Molecular Physics General

Week-3, May	Considerations, Electronic States of Diatomic Molecules, Rotational Spectra (Far IR and Microwave Region), Vibrational Spectra (IR Region), Rotator Model of Diatomic Molecule, Raman Effect, Electronic Spectra.
Week-4, May Week-1, June	**Unit I: Crystal Structure I.** Crystalline and glassy forms, liquid crystals, crystal structure, periodicity, lattice and basis, crystal translational vectors and axes. Unit cell and Primitive Cell, Winger Seitz primitive Cell, symmetry operations for a two dimensional crystal, Bravais lattices in two and three dimensions. Crystal planes and Miller indices, Interplaner spacing, Crystal structures of Zinc Sulphide, Sodium Chloride and Diamond.
Week-2, June	**Unit II: Crystal Structure II.** X-ray diffraction, Bragg's Law and experimental X-ray diffraction methods. K-space and reciprocal lattice and its physical significance, reciprocal lattice vectors, reciprocal lattice to a simple cubic lattice, b.c.c. and f.c.c.
Week-3, June Week-4 & 5, June	**Unit III: Super conductivity.** Historical introduction, Survey of superconductivity, Super conducting systems, High Tc Super conductors, Isotopic Effect, Critical Magnetic Field, Meissner Effect, London Theory and Pippards' equation, Classification of Superconductors (type I and Type II), BCS Theory of Superconductivity, Flux quantization, Josephson Effect (AC and DC), Practical Applications of superconductivity and their limitations, power application of superconductors.
Week-1, July	**Unit IV: Introduction to Nano Physics.** Definition, Length scale, Importance of Nano-scale and technology, History of Nantechnology, Benefits and challenges in molecular manufacturing. Molecular assembler concept, Understanding advanced capabilities. Vision and objective of Nano-*technology, Nanotechnology in different field, Automobile, Electronics,* Nano-biotechnology, Materials, Medicine

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