

Lesson Plan (2023-24)

Name:- Vijay kumar


Class:- B.Sc. 1<sup>st</sup>

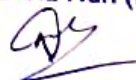
Subject:- Physics

Semester:-2<sup>nd</sup>

Month	Topics
January (2024)	<p>Elasticity hookes law, elastic constants and their relations, poisson, s ratio, torsion of cylinder and twisting couple. Bending of beam cantilevers, centrally loaded beam.assumption of kinetic theory of gases, law of equipartition of energy and its application for specific heat of gases.maxwell distribution of speed and velocities.Experimental verification of Maxwell law of speed distribution: most probable speed, average and r.m.s. speed mean free path.</p> <p>Transport of energy and momentum, diffusion of gases.brownion motion real gas vandewalls equation. Reference systems, inertial frames, gallilean invariance ad conservation laws, newtonion relativity principle, and michleson –Morley expermint: search for ether.lorentz transformation length contraction, time dilation, velocity addition theorem, variation of mass with velocity and mass energy equivalence.</p>
February	<p>Growth and decay of in a circuit with (a) Capacitance and resistance(b)resistance and inductance(d)capacitance resistance and inductance. AC circuit analysis using complex variable with ) Capacitance and resistance(b) resistance and inductance(d)capacitance resistance and inductance. Series and parallel resonance circuit. quality factor. energy bands in solids, intrinsic and extrinsic semiconductors ,hall effect-N junction diode and their V-I characteristics.zener and avalanche breakdown. Resistance of a diode LED. photo conduction in semiconductors, photodiode, Solar Cell, Diode Rectifiers : P-N junction half wave and full wave rectifier. Types of filter circuits (L and - with theory). Zener diode as voltage regulator, simple regulated power supply. Transistors : Junction Transistors, Bipolar transistors, working of NPN and PNP transistors, Transistor connections (C-B, C-E, C-C mode), constants of transistor. Transistor characteristic curves (excluding h parameter analysis), advantage of C-B configuration. C.R. O. (Principle, construction and working in detail.</p>
March & April	<p>Transistor Amplifiers : Transistor biasing, methods of Transistor biasing and stabilization. D.C. load line. Common-base and common-emitter transistor biasing. Common-base, common- emitteer amplifiers. Classification of amplifiers. Resistance-capacitance (R-C) coupled amplifer (two stage; concept of band width, no derivation). Feed-back in amplifiers, advantage of negative feedback Emitter follower. Oscillators : Oscillators, Principle of Oscillation, Classification of Oscillator. Condition for self sustained oscillation : Barkhousen Criterion for oscillations. Tuned collector common emitter oscillator. Hartley oscillator</p>

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Lesson Plan (2023-24)

Class:- B.Sc. 2<sup>nd</sup>

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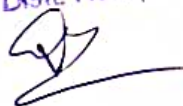
Semester:-4<sup>th</sup>

Subject:- Physics

Month	Topics
January (2024)	Probability, some probability considerations, combinations possessing maximum probability, combinations possessing minimum probability, distribution of molecules in two boxes. Case with weightage (general). Phase space, microstates and macrostates, statistical fluctuations constraints and accessible States Thermodynamical probability. Postulates of Statistical Physics. Division of Phase space into cells, Condition of equilibrium between two system in thermal contact. b-Parameter. Entropy and Probability, Boltzman's distribution law. Evaluation of A and b. Bose-Einstein statistics, Application of B.E. Statistics to Planck's radiation law, B.E. gas.
February	Fermi-Dirac statistics, M.B. Law as limiting case of B.E. Degeneracy and B.E., Condensation. F.D. Gas, electron gas in metals. Zero point energy. Specific heat of metals and its solution. Interference by Division of Amplitude : Colour of thin, films, wedge shaped film, Newton's rings. Interferometers: Michelson's interferometer and its application to (I) Standardisation of a meter (II) determination of wave length. Fresnel's Diffraction : Fresnel's half period zones, zone plate, diffraction at a straight edge, rectangular slit and circular aperture Fraimhoffer diffraction : One slit diffraction, Two slit diffraction N-slit diffraction, Plane transmission grating spectrum, Dispersive power of a grating , Limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating.
March & April	Polarization : Polarisation and Double Refraction : Polarisation by reflection, Polarisation by scattering, Malus law, Phenomenon of double refraction, Huytgen's wave theory of double refraction (Normal and oblique incidence), Analysis of Polarised light : Nicol prism, Quarter wave plate and half wave plate, production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii) Elliptically polarized light, Optical activity, Fresnel's theory of rotation, Specific rotation, Polarimeters (half shade and Biquartz).

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Lesson Plan (2023-24)

Name:- Vijay kumar

Class:- B.Sc. 3<sup>rd</sup>

Subject:- Physics

Semester:-6<sup>th</sup>

Month	Topics
January (2024)	<p>Vector atom model, quantum numbers associated with vector atom model, penetrating and nonpenetrating orbits (qualitative description), spectral lines in different series of alkali spectra, spin orbit interaction and doublet term separation LS or Russell-Saunders Coupling jj coupling (expressions for interaction energies for LS and jj coupling required).</p> <p>Zeeman effect (normal and anomalous) Zeeman pattern of D 1 and D2 lines of Na-atom, Paschen, Back effect of a single valence electron system. Weak field Stark effect of Hydrogen atom.</p> <p>Discrete set of electronic energies of molecules. Quantisation of vibrational and rotational energies Raman effect (Quantitative description) Stokes and anti Stokes lines.</p>
February	<p>Main features of a laser: Directionality, high intensity, high degree of coherence, spatial and temporal coherence, Einstein's coefficients and possibility of amplification, momentum transfer, life time of a level, kinetics of optical absorption. Threshold condition for laser emission, Laser pumping, He-Ne laser and RUBY laser (Principle, Construction and Working). Applications of laser in the field of medicine and industry</p> <p>Nuclear mass and binding energy, systematics nuclear binding energy, nuclear stability, Nuclear size, spin, parity, statistics magnetic dipole moment, quadrupole moment (shape concept), Determination of mass by Bain-Bridge, Bain-Bride and Jordan mass spectrograph, Determination of charge by Mosley law Determination of size of nuclei by Rutherford Back Scattering.</p>
March & April	<p>Interaction of heavy charged particles (Alpha particles), alpha disintegration and its theory Energy loss of heavy charged particle (idea of Bethe formula, no derivation), Energetics of alpha-decay, Range and straggling of alpha particles. Geiger-Nuttall law.</p> <p>Introduction of light charged particle (Beta-particle), Origin of continuous beta-spectrum (neutrino hypothesis) types of beta decay and energetics of beta decay, Energy loss of beta particles (ionization), Range of electrons, absorption of beta-particles</p> <p>Interaction of Gamma Ray, Nature of gamma rays, Energetics of gamma rays, passage of Gamma radiations through matter (photoelectric, Compton and pair production effect) electron positron annihilation. Absorption of Gamma rays (Mass attenuation coefficient) and its application.</p> <p>Nuclear reactions, Elastic scattering, Inelastic scattering, Nuclear disintegration, photoneuclear reaction, Radiative capture, Direct reaction, heavy ion reactions and spallation Reactions, conservation laws. Q-value and reaction threshold.</p> <p>Nuclear Reactors General aspects of Reactor design. Nuclear fission and fusion reactors (Principles, construction, working and use)</p>

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