## Lesson Plan (2023-24)

**Name:- Vijay kumar** **Class:- B.Sc. 1st**

**Subject:- Physics** **Semester:-2nd**

| Month | Topics |
|---|---|
| January (2024) | 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 equipartion 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.<br><br>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. |
| February | 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. |
| March & April | Transistor Amplifers : Transistor biasing, methods of Transistor biasing and stabilization. D.C. load line. Common-base and common-emitter transistor biasing. Common-base, common- emitteer amplifers. Classification of amplifers. Resistance-capacitance (R-C) coupled amplifer (two stage; concept of band width, no derivation). Feed-back in amplifers, 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 |

Vijay Kumar
Extension Lect.
Dept- Physics.

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Principal
H.L.G. Govt. College,
Tauru, Distt. Nuh (HR)

## Lesson Plan (2023-24)

**Name:- Vijay kumar** **Class:- B.Sc. 2nd**

**Subject:- Physics** **Semester:-4th**

| Month | Topics |
|---|---|
| January (2024) | Probability, some probability considerations, combinations possessing maximum probability, combinations possessing minimum probability, distribution of molecules in two boxs. Case with weightage (general). Phase space, microstates and macrostates, statistical fluctuations constraints and accessibleStates Thermodynamical probability.<br>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-Einsteinstatistics, Application of B.E. Statistics to Plancks'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 heatof metals and its solution.<br>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. Fresuel's Diffraction : Fresnel's half period zones, zone plate, diffraction at a straight edge, rectangular slit and circular aperture<br>Fraimhoffer diffraction : One slit diffraction, Two slit diffraction N-slit diffraction, Plane transmission granting 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 Palorised 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,<br><br>Specific rotation, Polarimeters (half shade and Biquartz). |

Vijay Kumar
Extension Lect.
Deptt- Physics.

Principal
H.L.G. Govt. College
Tohana, Distt. Fatehabad (HR)

## Lesson Plan (2023-24)

**Name:- Vijay kumar** **Class:- B.Sc. 3rd**

**Subject:- Physics** **Semester:-6th**

| Month | Topics |
|---|---|
| January<br><br>(2024) | Vector atom model, quantum numbers associated with vector atom model, penetrating and nonpenetratingorbits (qualitiative description ), spectral lines in different series of ailkali spectra,spin orbit interaction and doublet term seperation LS or Russel-Saunder Coupling jj coupling<br>(expressions for inteaction energies for LS and jj coupling required).<br><br>Zeeman effect (normal and Anormalous) Zeeman pattern of D 1 and D2 lines of Na-atom, Paschen, Back effect of a single valence electron system. Weak field Strak effect of Hydrogenatom.<br>Diseete set of electronic energies of molecules. quantisation of Vibrational and ratiationalenergies Raman effect (Quantitative description) Stoke's and anti Stoke's lines. |
| February | 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 obsorption. Threshold condition for laser emission, Laserpumping, He-Ne laser and RUBY laser (Principle, Construction and Working). Applications oflaser in the field of medicine and industry<br>Nuclear mass and binding energy, systematics nuclear binding energy, nuclear stability, Nuclear<br>size, spin, parity, statistics magnetic dipole moment, quadrupole moment (shape concept), Determination of mass by Bain-Bridge, Bain-Bride and Jordan mass spectrograph, Determination<br>of charge by Mosley law Determination of size of nuclei by Rutherford Back Scattering. |
| March & April | 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-Nuttal law.<br>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 betaparticles(ionization), Range of electrons, absorption of beta-particles<br>Interaction of Gamma Ray, Nature of gamma rays, Energetics of gamma rays, passage of Gamma<br>radiations through matter (photoelectric, compton and pair production effect) electron position anhilation. Asborption of Gamma rays (Mass attenuation coefficient) and its application.<br><br>Nuclear reactions, Elastic scattering, Inelastic scatting, Nuclear disintegration, photoneclear reaction, Radiative capture, Direct reaction, heavy ion reactions and spallation Reactions, conservation laws. Q-value and reaction threshold.<br>Nuclear Reactors General aspects of Reactor design. Nuclear fission and fusion reactors (Principles, construction, working and use) |

Vijay Kumar
Extension Lect.
Deptt. Physics.

Principal
M.L.G. Govt. College,
Distt. Kuh (HR)