Govt. College, Safidon (Jind)-126112

Session: 2023-24 (Odd Semester)

Lesson Plan of B.Sc. 3rd year

Name of the Teacher: Ms Reenu Devi Subject: Quantum and laser Physics and nuclear physics

Sr. No.		Month	Topic
		July	Overview, scale of quantum physics, boundary between classical and quanOverview, scale of quantum phys
		August	boundary between classical and quantum phenomena, Photon, Photoelectric effect,Comptoneffect(theoryandresult), FrankHertz experiment , de-Broglie hypothesis. Davisson and Germe experiment, ·G.P.Thomson . Phase velocity, group velocity and their relation. Heisenberg's uncertainty princi Time energy and angular momentum, position uncertainty. Uncertainty principle from de Broglie wave. (Wav particle duality). Gamma Ray Microscope, Electron diffraction from a slit. Derivation of 1-D time-dependent Schrodinger wave equation (subject to force, free particle). Time-independent Schrodinger wave equation, e values, eigen functions, wave functions and its significance. Orthogonality and Normalization of function, co of observer and operator. Expectation values of dynamical quantities, probability current density
			Free particle in one-dimensional box (solution of Schrodinger wave equation, eigen functions, eigen values, quantization of energy and momentum, nodes and anti nodes, zero point energy). (ii) One dimensional step potential E > Vo (Reflection and Transmission coefficient)
		September	One dimensional step potential E < Vo (penetration depth calculation). (iv) One dimensional potential barrier Vo (Reflection and Transmission coefficient) (v) One-dimensional potential barrier, E < Vo (penetration or tunneling coefficient). (vi) Solution of Schrodinger equation for harmonic oscillator (quantization of energy, point energy, wave equation for ground state and excited states).
			Nuclear composition (p-e and p-n hypotheses), Nuclear properties; Nuclear size, spin, parity, statistics, magn dipole moment, quadruple moment (shape concept). Determination of mass by Bain-Bridge, Bain-Bridge and Jordan mass spectrograph. Determination of charge by Mosley Law. Determination of size of nuclei by Ruth Back Scattering. mass and binding energy, systematic of nuclear binding energy, nuclear stability,give assig test

		October	Alpha-disintegration and its theory. Energetics of alpha-decay, Origin of continuous beta spectrum (neutrino hypothesis), types of beta-decay and energetics of beta-decay. Nature of gamma rays, Energetics of gamma
			Absorption and emission of radiation, Main features of a laser: Directionality, high intensity, high degree of coherence, spatial and temporal coherence, Einstein's coefficients and possibility of amplification, momentu transfer, life time of a level, kinetics of optical absorption (two and three level rate equation, Fuchbauer land formula).population inversion: A necessary condition for light amplification, resonance cavity, laser pumping Threshold condition for laser emission, line broadening mechanism, homogeneous and inhomogeneous line broadening (natural, collision and Doppler broadening).
			He-Ne laser and RUBY laser (Principle, Construction and working), Optical properties of semiconductor, Semiconductor laser (Principle, Construction and working), Applications of lasers in the field of medicine an industry
		November	Linear accelerator, Tendem accelerator, Cyclotron and Betatron accelerators. Nuclear Radiation Detectors. G filled counters; Ionization chamber, proportional counter, G.M. Counter (detailed study), Scintillation counter semiconductor detector.
			Nuclear reactions, Elastic scattering, Inelastic scattering, Nuclear disintegration, Photonuclear reaction, Rad capture, Direct reaction, Heavy ion reactions and spallation Reactions. Conservation laws, Q-value and react threshold. Nuclear Reactors. Nuclear Reactors, General aspects of Reactor Design. Nuclear fission and fusi reactors, (Principle, construction, working and use).
		December	Revision and unit test

Name -Reenu Devi

Dept. -Physics

GIOVT COLLEGIE, SAFIDON

2023-24

LESSON PLAN - B.Sc Ist SEM.

SUBJECT - PHYSICS

PAPER - MECHANICS

TEACHER: AJAY PARKASH

Months	Week	Topics
July	5th	Rigid body, Moment of Inertia, Radius of Gyration.
August	1st	Theorems of perpendicular and parallel axis (with proof.), Moment of Inertia of ring, Moment of Inertia of Disc.
	2nd	Moment of Inertia of Angular Disc, Moment of Inertia of Solid cylinder, Moment of Inertia of Solid Sphere.
	3rd	Moment of Inertia of Hollow Sphere, Moment of Inertia of Rectangular plate, Moment of Inertia of Square plate.
	4th	Moment of Inertia of Solid Cone, Moment of Inertia of triangular plate, Torque.
	5th	Rotational Kinetic Energy, Angular momentum, Law of Conservation of angular momentum.
September	1st	Rolling motion, Condition for pure rolling, Acceleration of body rolling down an Inclined plane.
	2nd	Fly wheel, Moment of Inertia of an Irregular body, Deforming force.

Month	Week	Topic
September	3rd	Elastic Limit, Stress, Strain and their types, Hooks Law.
	4th	Module of Elasticity, Relation between shear angle and angle of twist, Elastic Energy Stored / volume in an elastic body
	5th	Elongation produced in heavy rod due to its own weight and elastic potential Energy Stored in it, Poisson's ratio and its limiting value, Relation between young modulus, Bulk modulus and Poisson ratio
October	1st	Derive the Relation between Young's modulus, Bulk Modulus and Modulus of rigidity; Torque required for twisting cylinder; Bending of beam, bending moment and its magnitude.
	2nd	Bending of cantilever (loaded by a weight W at its free end), weight of cantilever uniformly distributed over its entire length, Dispersion of a centrally loaded beam supported at its ends.
	3rd	determination of elastic constants for material of wire by Searle's method, Michelson's Morley experiments and its outcome, postulate of special theory of relativity.

Month	Week	Topic
October	4th	Lorentz, Transformation, Simultancity and order of events, Lorentz Contraction.
	5th	Time dilation, Relativistic transform-ation of velocity.
November	Ist	Relavistic addition of velocities, variation of mass-energy equivalence, relativistic Doppler effect.
	2nd	Law of gravitation, Potential and field due to spherical shell and solid sphere; Motion of a particle under central force filled.
	3rd	Two body problem and its reduction to one body problem and its solution, determination of g by means of bar pendulum.
	4th	Normal coordinates and normal modes, Normal modes of vibration for given spring mass system.
	5th	Possible angular frequencies of oscillation of two identical simple pendulums of length (l) and small bob of mass (m) joined together with spring of spring constant (K).

LESSON PLAN – 2023-2024
Govt. COLLEGE, SAFIDON

CLASS – B.Sc. III SEMESTER
SUBJECT – PHYSICS
TEACHER – AJAY PARKASH
PAPAR – COMPUTER PROGRAMMING AND THERMODYNAMICS

Month	Week	Topics
August	Ist Week	Computer Organization, Binary representation, Algorithm development, Flow charts and their interpretation.
	2nd Week	FORTRAN Preliminaries: Integer and floating point arithmetic expression, built in functions.
	3rd Week	executable and non-executable statements, Input and output statements, Formats.
	4th Week	IF, DO and GO TO statements, Dimension arrays, Statements function and function Subprogram.
	5th Week	Algorithm, Flow chart and programming for print out of natural numbers, Range of set of given numbers.
September	Ist Week	Ascending and descending order, Mean and Standard deviation, Least Square fitting of Curve.
	2nd Week	Roots of quadratic equation, Product of Two matrices, Numerical integration (Trapezoidal rule and Simpson 1/3 rule)

Month	Week	Topics
September	3rd Week	Thermodynamic System and Zeroth law of thermodynamics. First law of Thermodynamics and its limitations.
	4th Week	Reversible and irreversible process. Second law of thermodynamics and its Significance, Carnot theorem.
	5th Week	Absolute Scale of temperature, Absolute Zero and magnitude of each division on Wark Scale and perfect scale, Joule's free expansion.
October	1st Week	Joule Thomson effect, Joule - Thomson (Porous plug) experiment, calculations and explanation
	2nd Week	Analytical treatment of Joule Thomson effect, Entropy, Calculations of entropy of reversible and irreversible process, T-S diagram
	3rd Week	Entropy of a perfect gas, Nernst heat law (third law of thermodynamics), Liquefaction of gases, (oxygen, air, hydrogen and helium), Solidification of He below 4K
	4th Week	Cooling by adiabatic demagnetization, Derivation of clausius - clapeyron and clausius latent heat equation and their significance, Specific heat of Saturated vapours.

Month	Week	Topics
	5th Week	Phase diagrame and triple point of a Substance, development of Maxwell thermodynamical relations.
November	Ist Week	Thermodynamical Functions : Internal energy(U), Helmholtz function (F), Enthalpy (H), Gibbs function and the relations between them.
	2nd Week	Derivation of Maxwell thermodynamical relations from thermodynamical function.
	3rd Week	Application of Maxwell relations: relation between two specific heats of gas, Derivation of clausiw - clapeyron and Clausiw equation,
	4th Week	Vasciation of intrinsic energy with volume for (i) perfect gas (ii) Vander Wall gas (iii) Solids and liquids.
	5th Week	Derivation of stefans law, adiabatic Compression and expantion of gas and deduction of theory of Joule Thomson effect.

Govt. College, Safidon

Lesson Plan 2023-24

2023-2024

Subject- Physics

Class- Bsc III Semester

Teacher- Ajay Parkash

Paper :- Wave and optics

Month	Week	Topics
August	Ist Week	Interference by division of Wave front: Young's double slit experiment, Coherence
	2nd Week	Conditions of interference,
	3rd Week	Fresnel's biprism and its applications to determination of Wavelength of Sodium light and thickness of a mica sheet
	4th Week	Lloyd's mirror, phase change on reflection.
	5th Week	Difference between Bi-prism and Lloyd mirror fringes.
September	Ist Week	Interference by division of Amplitude: Thin film,
	2nd Week	Parallel film, Wedge shaped film

Month	Week	Topics
September	3rd Week	Interference due to transmitted light
	4th Week	Newton's rings.
	5th Week	Interferometers: Michelson's interferometer and its applications to (i) standardization of a meter.
October	Ist Week	Determination of wavelength.
	2nd Week	Huygens-Fresnel's theory, Fresnel's assumptions.
	3rd Week	Rectilinear propagation of light, Fresnel's half period zones
	4th Week	Zone plate, diffraction at a straight edge.
	5th Week	Rectangular slit and diffraction at a circular aperature.
November	Ist Week	Diffraction due to a narrow slit, diffraction due to a narrow wire.
	2nd Week	Fraunhoffer diffraction: one slit diffraction.
	3rd Week	Two slit diffraction, N-slit diffraction

Month	Week	Topics
November	4th Week	Plane transmission granting spectrum dispersive power of grating.
	5th Week	Limit of resolution, Rayleigh's Criterion, resolving power of telescope and grating.