INDIRA GANDHI GOVT. COLLEGE PANDARIA
DIST. - KABIRDHAM(C.G.)

Website - igcollegepandaria.ac.in **Email**- pandariacollege@gmail.com

Department of Physics

B.Sc. (Physics Group): Three Year Graduation Program

Course Outcome(CO)

Class	Paper name and paper code	Course outcome number	Course Outcome
B.Sc. First year	MECHANICS, OSCILLATIONS AND PROPERTIES OF MATTER PAPER CODE -0793	CO1	Student are understand the concept of Cartesian, Cylindrical and Spherical coordinate system, Intertial and non-inertial frames of reference, uniformly rotating frame, Coriolis force and its aaplications. Motion under a central force, Kepler's laws.
		CO2	Student are understand the concept of Rigid body motion, rotational motion, moments of inertia and their products, principal moments & axes, introductory idea of Euler's equation. Potential well and Periodic Oscillations.
		CO3	Student are understand the concept of Bifilar oscillations, Helmholtz resonator, LC circuit, vibrations of a magnet, oscillations of two masses connected by a spring. Superposition of two simple harmonics motions off the same frequencies. Power dissipation, Lissajous figures.
		CO4	Student are understand the concept of E as an accelerating field, electron gun, eletron gun, case of discharge tube, linear accelerator, E as deflecting field- CRO sensitivity, Transverse B field, 180° deflection, mass spectrograpgh curvature tracks for energy determination, principle of a cyclotron.
		CO5	Student are understand the concept of Elasticiy: Strain and stress elastic limit, Hooke's law, Modulus of rigidity, Poisson's ratio, Bulk modulus, Euler's equation, Bernaulli's theorem.
		CO1	Student are understand the concept of Repeated integrals of a function of more than one variable, definition of a double and triple integral. Gradient of a scalar field and its geomectrical interpretation, divergence and curl of a vector field, and their geomerical interpretation, krichiff law, thevenin theorem, Norton theorem.
		CO2	Coulomb's law in vaccum expressed in - Vector forms, calculations of E for simple distributions of charges at rest, dipole and quadrupole fields, gauss law and its application: E due to (1) an Infinite Line of Charge, (2) a Charged Cylindrical Conductor, (3) an Infinite sheet of Charge and Two Parallel Charged Sheets, capacitors.

PRINCIPAL
INDIRA GANDHI GOVT. COLLEGE
PANDARIA, DISTT. KABIRDHAM (C.G.)

B.Sc. First year	ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY PAPER CODE -0794	CO3	Student are understand the concept of Dielectric constant, Polar and Non Polar dielectrics, Dielectrics and Gauss's Law, Dielectric Polarization, Electric Polarization vectors P, Electric displacement vector D Ferroelectric and Paraelectric dielectrics, Steady current, current density J, non-steady current and continuity equation, rise and decay of current in LR, CR and LCR circuits.
		CO4	Student are understand the concept of Magnetization Current and magnetization vector M, Three magnetic vectors and their relationship, Magnetic permeability and susceptibility, Diamagnetic, paramagnetic and ferromagnetic substances, B.H. Curve, Biot-Savart law's Law and its applications: B due to (1) a Straight Current Carrying Conductor and (2) Current Loop, Current Loop as a Magnetic Dipole and its Dipole Moment (Analogy with Electric Dipole), Ampere's Circuital law (Integral and Differential Forms).
		CO5	Student are understand the concept of Electromagnet induciton, Faraday's law, electromotive force, integral and differential forms fo Faraday's law Mutual and self inductance, Transformers, energy in a static magnetic field, Maxwell's displacement current, Maxwell equations.

PRINCIPAL
INDIRA GANDHI GOVT. COLLEGE
PANDARIA, DISTT. KABIRDHAM (C.G.)

INDIRA GANDHI GOVT. COLLEGE PANDARIA
DIST. - KABIRDHAM(C.G.)

Website - igcollegepandaria.ac.in **Email**- pandariacollege@gmail.com

Department of Physics

B.Sc. (Physics Group): Three Year Graduation Program

Course Outcome(CO)

Class	Paper name and paper code	Course outcome number	Course Outcome
B.Sc. Second year	THERMODYNAMICS,KINETIC THEORY AND STATICAL PHYSICS PAPER CODE -	CO1	Student are understand the concept of The laws of thermodynamis : The Zeroth law, first law of thermodynamics, internal energy as a state function, reversible and irreversible change, Carnot's cycle, carnot theorem, second law of thermodynamics. Claussius theorem inequality, S-T diagram, principle of increase of entropy.
		CO2	Student are understand the concept of Thermodynamic function, Internal energy, Enthalpy, Helmholtz function and Gibb's free energy. Maxwell's thermodynamical equations and their applications, TDS equations, Block body spetcrum, Stefan-Boltzmann law.
		CO3	Student are understand the concept of Maxwellian distribution of speeds in an ideal gas: Distribution of speeds and velocities, experimental verification, distnction between mean, rms and most probable speed values. Doppler broadening of spectral lines. Transport phenomena in gases: Molecular collisions mean free path and collision cross sections.
		CO4	Student are understand the concept of The statical basis of thermodynamics: probability and thermodynamic probability, principle of equal a priori probabilities, statical postulates. Concpt of Gibb's ensemble, γ phase space and μ phase space, Boltzmann entropy relation.
		CO5	Student are understand the concept of Indistinguishability of particles and its conseuences, Bose-Einstein & Fermi-Dirac conditions, Concept of partition function, Derivation of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics, Limits of B-E and F-D statics to M-B statistics.
		CO1	Student are understand the concept of Waves in media: Speed of transverse on uniform string, speed of longitudinal waves in a fluid, energy density and energy transmission in waves. Waves over liuid surface: gravity waves and ripples. Group velocity and phase and relationship between them. Production and detection of ultrasonic and infrasonic waves and applications. Reflection, refraction and diffraction of sound: Acoustic impediance of a medium, percentage reflection & refraction at a boundry.

B.Sc. Second year	WAVES, ACOUSTICS AND OPTICS PAPER CODE -	CO2	Student are understand the concept of Fermat's principle of extremum path, the aplanatic points of a sphere and other applications. Cardinal points of an optical system, thick lens and lens combinaitons. Lagrange equation of magnification, telescopic combinations, telephoto lenses.
		CO3	Student are understand the concept of Interferene of light: The principle of superpositions, two slit interferece, coherence requirement for the sources, optical path retardations, Conditions for sustained interference, Theory of interference, Thin films Newton's rings and Michelson interferometer and their appliations, Fabry-Perot interferometer, Rayleigh refractometer.
		CO4	Student are understand the concept of Diffraction, Types of Diffraction, Fresnel's diffration half-period zones, phasor diagram and integral calculus methods, the intensity distribution, Zone plates, diffraction due to straight edge.
		CO5	Student are understand the concept of Laser system: Basis properties of Laser, coherence length and cohernce time, spatial coherence of a source, Einsten's A and B coffifients, Spontaneous and induced emissions, conditions for laser action, population inversion, Types of Laser: Ruby and He-Ne laser.

PRINCIPAL
INDIRA GANDHI GOVT. COLLEGE
PANDARIA, DISTT. KABIRDHAM (C.G.)

INDIRA GANDHI GOVT. COLLEGE PANDARIA

DIST. - KABIRDHAM(C.G.)

Website - igcollegepandaria.ac.in Email- pandariacollege@gmail.com

Department of Physics

B.Sc. (Physics Group): Three Year Graduation Program

Course Outcome(CO)

Class	Paper name and paper code	Course outcome number	Course Outcome
B.Sc. Third year	RELATIVITY, QUANTUM MECHANICS, ATOMIC MOLECULAR AND NUCLEAR PHYSICS PAPER CODE -	CO1	Student are understand the concept of Reference systems, inertial frames, Galilean invariance propagation of light, Michelson- Morley experiment, search for ether. Postulates for the special theory of relativity, Lorentz transformations, length contraction, time dilation, velocity addition, variation of mass with velocity, mass energy equivalence, particle with zero rest mass.
		CO2	Student are understand the concept of Origin of the quantum theory : Failure of classical physics to explain the phenomena such as black-body spectrum, photoelectric effect, Compton effect, Wave-particle duality, uncertainty principle, de Broglie's hypothesis for matter waves, the concept of Phase and group velocities, experimental demonstration of mater waves. Davisson and Germer's experiment. Consequence of de Broglie's concepts, Bohr's complementary Principle, Bohr's correspondence principle, Bohr's atomic model, energies of a particle in a box, wave packets. Consequence of the uncertainty relation, gamma ray microscope, diffraction at a slit.
		CO3	Student are understand the concept of Quantum Mechanics: Schrodinger's equation, Statistical interpretation of wave function, Orthogonality and normalization of wave function, Probability current density, Postulatory basis of quantum mechanics, operators, expectation values, Ehrenfest's theorem, transition probabilities, applications to particle in a one and three dimensional boxes, harmonic oscillator in one dimension, reflection at a step potential, transmission across a potential barrier.
		CO4	Spectra of hydrogen, deuteron and alkali atoms spectral terms, doublet fine structure, screening constants for alkali spectra for s, p, d and f states, selection rules. Discrete set of electronic energies of moleculers, quantisation of vibrational and rotational energies, determination of inter-nuclear distance, pure rotational and rotation vibration spectra. Dissociation limit for the ground and other electronic states, transition rules for pure vibration and electronic vibration spectra. Raman effect, Stokes and anti-Stokes lines, complimentary character of Raman and infrared spectra, experimental arrangements for Raman spectroscopy.
		CO5	Student are understand the concept of Structure of nuclei:- Basic Properties of Nuclei: (1) Mass, (2) Radii, (3) Charge, (4) Angular Momentum, (5) Spin, (6) Magnetic Moment (μ), (7) Stability and (8) Binding Energy, Nuclear Models:- Liquid Drop Model, Mass formula, Shell Model, Types of Nuclear reactions, laws of conservation, Q-value of reactions, Interaction of Energetic particles with matter, Ionization chamber, GM Counter, Cloud Chambers, Fundamental Interactions, Classification of Elementary Particles, Particles and Antiparticles, Baryons, Hyperons, Leptons, and Mesons, Elementary Particle Quantum Numbers: Baryon Number, Lepton Number, Strangeness, Electric Charge, Hypercharge and Isospin, introductory idea of discovery of Higg's Boson.
B.Sc. Third year	SOLID STATE PHYSICS, SOLID STATE DEVICES AND ELECTRONICS	CO1	Student are understand the concept of Amorphous and crystalline solids, Elements of symmetry, seven crystal system, Cubic lattices, Crystal planes, Miller Indices, Laue's equation for X-ray diffraction, Bragg's Law, Bonding in solids, classification. Cohesive energy of solid, Madelung constant, evaluation of Parameters, Specific heat of solids, classical theory (Dulong-Petit's law), Einstein and Debye theories, Vibrational modes of one dimensional monoatomic lattice, Dispersion relation, Brillouin Zone.
		CO2	Student are understand the concept of Free electron model of a metal, Solution of one dimensional Schrödinger equation in a constant potential, Density of states, Fermi Energy, Energy bands in a solid (Kronig-Penny model without mathematical details), Difference between Metals, Insulator and Semiconductors, Hall effect, Dia, Para and Ferromagnetism, Langevin's theory of dia and para-magnetism, Curie- Weiss's Law, Qualitative description of Ferromagnetism (Magnetic domains), B-H curve and Hysteresis loss.
		CO3	Student are understand the concept of Intrinsic and extrinsic semiconductors, Concept of Fermi level, Generation and recombination of electron hole pairs in semiconductors, Mobility of electrons and holes, drift and diffusion currents, p-n junction diode, depletion width and potential barrier, Junction capacitance, I-V characteristics, Tunnel diode, Zener diode, Light emitting diode, solar cell, Bipolar transistors, pnp and npn transistors, characteristics of transistors, different configurations, current amplification factor, FET and MOSFET Characteristics.
		CO4	Student are understand the concept of Half and full wave rectifier, rectifier efficiency ripple factor, Bridge rectifier, Filters, Inductor filter, L and π section filters, Zener diode, regulated power supply using zener diode, Applications of transistors, Bipolar Transistor as amplifier, h-parameter, h-parameter equivalent circuit, Transistor as power amplifier, Transistor as oscillator, principle of an oscillator and Bark Hausen's condition, requirements of an oscillator, Wein-Bridge oscillator and Hartley oscillator.
		CO5	Student are understand the concept of Digital Circuits: Difference between Analog and Digital Circuits, Binary Numbers, Decimal to Binary and Binary to Decimal Conversion, AND, OR and NOT Gates (Realization using Diodes and Transistor), NAND and NOR Gates as Universal Gates, XOR and XNOR Gate, De Morgan's Theorems, Boolean Laws, Simplification of Logic Circuit using Boolean Algebra, Digital to Analog Converter, Analog to Digital Converter.

PRINCIPAL
INDIRA GANDHI GOVT. COLL...
PANDARIA, DISTT. KABIRDH...