

Government College, Chhachhrauli

Summary of Lesson Plan

Name of Teacher : Dr. Shruti Bhardwaj

Academic Session : 2023-24

Class : B.Sc I

Semester : 1st

Subject : Physics(PH 101)

Unit	Topic/Chapters to be covered	Duration	Assignment and Tests
2	Elasticity Elasticity, Stress and Strain, Hook's law, Elastic constant and their relations, Poisson's ratio, Torsion of cylinder and twisting couple.	01 Aug to 15 Aug	
2	Determination of coefficient of modulus of rigidity for the material of wire by Maxwell's needle, Bending of beam (Bending moment and its magnitude),	16 Aug to 31 Aug	
2	Cantilever and Centrally loaded beam, Determination of Young's modulus for the material of the beam and Elastic constants for the material of the wire by Searle's method.	01 Sep to 15 Sep	
3	Special Theory of Relativity: Michelson's Morley experiments and its outcome, Postulate of special theory of relativity.	16 Sep to 30 Sep	Assignment1 till 30/09/2023
3	Lorentz Transformation, Simultaneity and order of events, Lorentz contraction Time dilation, Relativistic transformation of velocity, relativistic addition of velocities, variation of mass-energy equivalence, relativistic Doppler effect, relativistic kinematics, transformation of energy and momentum, transformation of force, Four vectors, Problems of relativistic dynamics; Acceleration of charge particle by constant electric field, transverse electric field.	01 Oct to 15 Oct	Class test in 1 st week

4	<p>Gravitation and central force motion: Law of gravitation, Potential and field due to spherical shell and solid sphere. Motion of a particle under central force field, Two body problem and its reduction to one body problem and its solution, compound pendulum or physical pendulum in form of elliptical lamina and expression of time period, determination of g by means of bar pendulum, Normal coordinates and normal modes.</p>	16 Oct to 31 Oct	
4	<p>Normal modes of vibration for given spring mass system, possible angular frequencies of oscillation of two identical simple pendulums of length and small bob of mass (m_0) joined together with spring of spring constant (k)</p> <p>Revision</p>	01 Nov to 15 Nov	Test

Government College, Chhachhrauli

Summary of Lesson Plan

Name of Teacher : Dr. Shruti Bhardwaj

Academic Session : 2023-24

Class : B.Sc I

Semester : 3rd

Subject : Physics(PH 302)

Unit	Topic/Chapters to be covered	Duration	Assignment and Tests
1	Interference by Division of wavefront, Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet.	01 Aug to 15 Aug	
1	Lloyd's mirror, Difference between Bi-prism and Lloyd mirror fringes, phase change on reflection.	16 Aug to 31 Aug	
1/2	Interference by Division of Amplitude: Plane parallel thin film, production of colors in thin films, classification of fringes in films, Interference due to transmitted light and reflected light, wedge shaped film.	01 Sep to 15 Sep	
3	Newton's rings, Interferometer: Michelson's interferometer and its applications to (i) Standardization of a meter (ii) determination of wavelength.	16 Sep to 30 Sep	Assignment1 till 30/09/2023
4	Diffraction I Fresnel's diffraction: Fresnel's assumptions and half period zones, rectilinear propagation of light, zone plate, diffraction at a straight edge, rectangular slit and circular aperture, diffraction due to a narrow slit and wire.	01 Oct to 15 Oct	Class test in 1 st week

4	Fraunhofer diffraction: single-slit diffraction, double-slit diffraction, N-slit diffraction, plane transmission grating spectrum, dispersive power of grating, limit of resolution, Rayleigh's criterion, resolving power of telescope and a grating. Differences between prism and grating spectra. Including Revision and Tests	16 Oct to 31 Oct	
	Revision	01 Nov to 24 Nov	Test

Government College, Chhachhrauli

Summary of Lesson Plan

Name of Teacher : Dr. Shruti Bhardwaj

Academic Session : 2023-24

Class : B.Sc III Semester : 5th

Subject : Physics(PH 501)

Unit	Topic/Chapters to be covered	Duration	Assignment and Tests
1	Origin quantum physics (Experimental basis) Overview, scale of quantum physics, boundary between classical and quantum phenomena, Photon, Photoelectric effect, Compton effect (theory and result), FrankHertz experiment, de-Broglie hypothesis. Davisson and Germer experiment.	01 Aug to 15 Aug	
1	G.P. Thomson experiment. Phase velocity, group velocity and their relation. Heisenberg's uncertainty principle. Time energy and angular momentum, position uncertainty. Uncertainty principle from de Broglie wave. (Wave-particle duality). Gamma Ray Microscope, Electron diffraction from a slit. Derivation of 1-D time-dependent Schrodinger wave equation (subject to force, free particle).	16 Aug to 31 Aug	
1& 2	Time-independent Schrodinger wave equation, eigen values, eigen functions, wave functions and its significance. Orthogonality and Normalization of function, concept of observer and operator. Expectation values of dynamical quantities, probability current density. Application of Schrodinger wave equation: (i) 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).	01 Sep to 15 Sep	
2	(ii) One dimensional step potential $E > V_0$ (Reflection and Transmission coefficient) (iii) One dimensional step potential $E < V_0$ (penetration depth calculation). (iv) One dimensional potential barrier, $E > V_0$ (Reflection and Transmission coefficient) (v) One-dimensional potential barrier, $E < V_0$ (penetration or tunneling coefficient). (vi) Solution of Schrodinger equation for harmonic oscillator (quantization of energy, Zero-point energy, wave equation for ground state and excited states).	16 Sep to 30 Sep	Assignment1 till 30/09/2023

3	Laser Physics –I 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, momentum transfer, life time of a level, kinetics of optical absorption ((two and three level rate equation.	01 Oct to 15 Oct	Class test in 1 st week
3	Fuchbauer landerburg 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).	16 Oct to 31 Oct	
4	Laser Physics – II 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 and industry. Revision	01 Nov to 24 Nov	Test

Note:-

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Students can ask any query on my E-Mail ID also

> E-Mail:

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Summary of Lesson Plan

Name of Teacher : Dr. Sandeep Kumar Academic Session : 2023-24

Class : B.Sc I Semester : 1st Subject : Physics(PH 101)

Unit	Topic/Chapters to be covered	Duration	Assignment and Tests
1	Moment of inertia Rotation of rigid body, Moment of inertial, Torque, angular momentum, Kinetic Energy of rotation.	01/08/2023 to 31/08/2023	
1	Theorem of perpendicular and parallel axes (with proof), Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section, Fly wheel.	01/09/2023 to 30/09/2023	Assignment1 on Moment of Inertia till 30/09/2023
1	Moment of inertia of an irregular body, Acceleration of a body rolling down on an inclined plane.	01/10/2023 to 31/10/2023	Class test in 3 rd week
1	Revision	01/11/2023 to 24/11/2023	Test

Government College, Chhachhrauli

Summary of Lesson Plan

Name of Teacher : Dr. Sandeep Kumar Academic Session : 2023-24

Class : B.Sc II Semester : 3rd Subject : Physics(PH 301)

Unit	Topic/Chapters to be covered	Duration	Assignment and Tests
1	Computer Programming Computer organization, Binary representation, Algorithm development, Flow charts and their interpretation.	01 Aug to 15 Aug	
1	FORTRAN Preliminaries: Integer and floating point arithmetic expression, built in functions, executable and non-executable statements, input and output statements, Formats, IF, DO and GO TO statements, Dimension arrays, statement function and function subprogram	16 Aug to 31 Aug	Assignment1 on Fortran till 30/09/2023
2	Applications of FORTRAN programming Algorithm, Flow Chart and Programming for Print out of natural numbers, Range of the set of given numbers, Ascending and descending order, Mean and standard deviation.	01 Sep to 15 Sep	Class test in 3 rd week
2	Least square fitting of curve, Roots of quadratic equation, Product of two matrices, Numerical integration (Trapezoidal rule and Simpson 1/3 rule) .		Test
3	Thermodynamics-I Thermodynamic system and Zeroth law of thermodynamics. First law of thermodynamics and its limitations,	16 Sep to 30 Sep	

3	Reversible and irreversible process. Second law of thermodynamics and its significance, Carnot theorem, Absolute scale of temperature, Absolute Zero and magnitude of each division on work scale and perfect gas scale, Joule's free expansion, Joule Thomson effect.	01 Oct to 15 Oct	
3	Joule-Thomson (Porous plug) experiment, conclusions and explanation, analytical treatment of Joule Thomson effect. Entropy, calculations of entropy of reversible and irreversible process. T-S diagram, 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, Cooling by adiabatic demagnetization.	16 Oct to 31 Oct	
4	Derivation of Maxwell thermodynamical relations from thermodynamical functions		
4	Application of Maxwell relations: relations between two specific heats of gas, Derivation of Clausius-Clapeyron and Clausius equation, variation of intrinsic energy with volume for (i) perfect gas (ii) Vanderwall gas (iii) solids and liquids, derivation of Stefans law, adiabatic compression and expansion of gas & deduction of theory of Joule Thomson effect. Revision	01 Nov to 24 Nov	Test

Government College, Chhachhrauli

Summary of Lesson Plan

Name of Teacher : Dr. Sandeep Kumar Academic Session : 2023-24

Class : B.Sc III Semester : 5th Subject : Physics(PH-502)

Unit	Topic/Chapters to be covered	Duration	Assignment and Tests
1	Nuclear Structure and Properties of Nuclei Nuclear composition (p-e and p-n hypotheses), Nuclear properties; Nuclear size, spin, parity, statistics, magnetic dipole moment, quadruple moment (shape concept).	01 Aug to 15 Aug	
1	Determination of mass by Bain-Bridge, Bain-Bridge and Jordan mass spectrograph. Determination of charge by Mosley Law.	16 Aug to 31 Aug	
3	Determination of size of nuclei by Rutherford Back Scattering. mass and binding energy, systematic of nuclear binding energy, nuclear stability. Nuclear Accelerators Linear accelerator.	01 Sep to 15 Sep	Class test in 3 rd week
3	Tendem accelerator, Cyclotron and Betatron accelerators. Nuclear Radiation Detectors. Gas filled counters; Ionization chamber, proportional counter, G.M. Counter (detailed study), Scintillation counter and semiconductor detector.	16 Sep to 30 Sep	Assignment1 till 30/09/2023

2	Nuclear Radiation decay Processes 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 rays. Radiation interaction Interaction of heavy charged particles (Alpha particles); Energy loss of heavy charged particle (idea of Bethe formula, no derivation).	01 Oct to 15 Oct	Test
2 4	Range and straggling of alpha particles. Geiger-Nuttal law. Interaction of light charged particle (Beta-particle), Energy loss of beta-particles (ionization), Range of electrons, absorption of beta-particles. Interaction of Gamma Ray; 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 Nuclear reactions. Nuclear reactions, Elastic scattering, Inelastic scattering, Nuclear disintegration, Photonuclear reaction, Radiative capture, Direct reaction, Heavy ion reactions and spallation Reactions. Conservation laws, Q-value and reaction threshold.	16 Oct to 31 Oct	
4	Nuclear Reactors. Nuclear Reactors, General aspects of Reactor Design. Nuclear fission and fusion reactors, (Principle, construction, working and use). Revision	01 Nov to 24 Nov	Test

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