Government College for Women Ateli (Mahendergarh)

Lesson Plan (MECHANICS)

BSc. 1st sem.(odd sem.) wef 22 July 2024

Week	Topic Covered
1st Week	Fundamentals of Dynamics: Rigid body, Moment of Inertia, Radius of Gyration, Theorems of perpendicular and parallel axis (with proof),
2nd Week	Moment of Inertia of rod, ring, Disc, Angular Disc, Solid cylinder, Solid sphere, Hollow sphere, Rectangular plate, Square plate, Solid cone, Triangular plate,,
3rd Week	Torque, Rotational Kinetic Energy, Angular momentum, Law of conservation of angular momentum, Rolling motion, condition for pure rolling,
4th Week	Acceleration of body rolling down an inclined plane, Fly wheel, Moment of Inertia of an irregular body. & **UNIT TEST-1**
5th Week	**Introduction,** Deforming force, Elastic limit, stress, strain and their types, Hooke‟s law, Modulus of rigidity, Relation between shear angle and angle of twist, elastic energy stored/volume in an elastic body
6th Week	Elongation produced in heavy rod due to its own weight and elastic potential energy stored in it, Tension in rotating rod, Poisson‟s ratio and its limiting value,
7th Week	Bending of beam, bending moment and its magnitude, Flexural rigidity, Geometrical moment of inertia for beam of rectangular cross-section and circular cross-section.
8th Week	Bending of cantilever (loaded by a weight W at its free end), weight of cantilever uniformly distributed over its entire length..
9th class	Dispersion of a centrally loaded beam supported at its ends, determination of elastic constants for material of wire by Searle‟s method & UNIT TEST - 2
10th Week	Michelson‟s Morley experiment and its outcomes, Postulates of special theory of relativity, Lorentz Transformations,
11th Week	Simultaneity and order of events, Lorentz

	contraction, Time dilation, Relativistic transformation of velocity, relativistic addition of velocities,
12th Week	Variation of mass-energy equivalence, relativistic Doppler effect, relativistic kinematics
13th week	Transformation of energy and momentum, transformation of force, Problems of relativistic dynamics.
14th Week	Law of gravitation, Potential and field due to spherical shell and solid sphere. Motion of a particle under central force field,,
15th Week	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,
16th Week	Determination of g by means of bar pendulum, Normal coordinates and normal modes, Normal modes of vibration for given spring mass system,
17th Week	Possible angular frequencies of oscillation of two identical simple pendulums of length (l) and small bob of mass m0 joined together with spring of spring constant (k). & **UNIT TEST-4**
18th Week	**Revision of important question of unit-1**
19th Week	**Revision of important question of unit-2**
20th Week	**Revision of important question of unit-3**
21th Week	**Revision of important question of unit-4**

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Lesson Plan

(Physics-Optics-I)

B.Sc. 3rd sem.(Odd sem.) w.e.f 22 July 2024

Week	Topic Covered
1st Week	Transverse wave in a string, Speed of transverse wave in string, Speed of longitudinal waves in a fluid
2nd Week	Superposition of waves, Fourier's Theorem , Dirichlet's condition , evaluation of Fourier coefficients
3rd Week	Cosine series for even function and Sine series for odd function, Fourier series for the interval $(0,2\pi)$
4th Week	Complex for of a Fourier series, application of Fourier series for rectangular square wave, Triangular wave
5th Week	Analysis of output of half wave rectifier and full wave rectifier, analysis of saw tooth waves, Fourier series in interval (-L,L)
6th Week	Numerical Practice on application of Fourier series an Fourier integrals , Fourier integral for even and odd function an complex form of Fourier integral
7th Week	Fourier Transforms, Fourier Sine Transforms, Fourier Cosine Transforms Properties of Fourier Transforms
8th Week	Application of Fourier Transforms: Fourier Transform of Gaussian Function and Single step Function
9th class	Basic of Matrices and Use of Matrices in Paraxial Optics, sign conventions
10th Week	Coordinates of paraxial ray, Effect of Translation and Translational Matrices, Effect of Refraction and Refraction Matrices
11th Week	Position of an image plane and magnification of an optical system, System Matrix for thick lens and derivation of le s maker formula for thin lens
12th Week	Concept of Unit Plane and derivation of Lens' Maker formula for a thick lens, Nodal plane and show that anodal plane coincide with unit plane
13th week	Aberrations and their types, Chromatic Aberration in a Lens, Achromatic Combination of two thin lens in contact
14th Week	Achromatic Combination of two coaxial lens held apart, Spherical aberration in a lens, Longitudinal aberration in thin Lens and method for their reduction
15th Week	Coma and Method of removal of Coma, Astigmatism and Curvature of Field and their Removal
16th Week	Distortion and removal of distortion and Practices of Numerical problems
17th Week	Interference of waves, Types of interference, Coherent sources, condition for sustained interference, Analytical treatment of Young double slit interference
18th Week	Expression for fringe width, Fresnel's Biprism and determination of wavelength of Sodium light
19th Week	Determination of thickness of transparent sheet using Fresnel's biprism, Lloyd's mirror Comparison b/n Fresnel's biprism an Lloyd's mirror interference pattern s
20th Week	Stoke's Treatment and Achromatic fringe with white light
21th Week	Revision of important question of unit-1
22th Week	Revision of important question of unit-2
23th Week	Revision of important question of unit-3

Government College for Women Ateli (Mahendergarh)

Lesson Plan

(Physics-Quantum Mechanics)

B.Sc. 5th sem. (Odd Sem.) wef 22 July 2024

Week	Topic Covered
1st Week	Failure of classical E.M. Theory, Planck's Quantum Theory of Radiation, Characteristics of Photons
2nd Week	Photoelectric Effect and failure of classical E.M. Theory to explain to Explain Photo Electric Effect, Einstein's Equation of Photoelectric Effect
3rd Week	Compton Effect & theory of Compton Scattering, Experimental Study of Compton Effect, Relation B/n angle of scattering Photon and Recoiling electron
4th Week	Energy of recoiling electron, K.E of recoiling electron in term of angle of scattering, Energy of scattered photon, Compton effect with visible and UV light, Limitation of old Quantum Theory
5th Week	De-Broglie Hypothesis and matter wave, alternative method, de –Broglie wavelength of accelerated electrons experimental verification of wave particle dualism
6th Week	Wave Packet and Wave function , Group and phase velocity of a wave packet and their relation
7th Week	Heisenberg Uncertainty Principle, Examples of position momentum uncertainty, application of uncertainty Principle
8th Week	Derivation of 1-D time dependent Schrodinger Wave Equation and its extension to 3-Dand Effect of external Force
9th class	Derivation of time independent Schrodinger wave equation, Eigen values and Eigen functions, Physical significance of Eigen function and its Normalization
10th Week	Operators and Observables, expectation values of dynamic quantities, Probability current density
11th Week	Hands on Practice of numerical Problems of unit-1
12th Week	Application of Quantum mechanics: A particle in one dimensional box, Derivation of Eigen function Eigen values and position of Nodes and Antinodes
13th week	One dimensional potential step: wave function Probability current density for transmitted and reflected waves
14th Week	One dimensional potential barrier: Derivation for Transmission coefficients and reflection coefficients and quantum Mechanical tunneling
15th Week	One dimensional linear harmonic oscillators: Derivation for energy Eigen values, Eigen function, Zero point energy and their graphical representation
16th Week	Hands on practice of Numerical Problems
17th Week	Revision of important question of unit-1
18th Week	Revision of important question of unit-2
19th Week	Revision of important question of unit-3
20th Week	Preparation for House