

Govt. College Dujana (Lesson Plan) Subject: Physics (Even Semesters)

Name of the Asst. Professor: Dr. Monica

Class -- B.Sc. (Pass Course) 2nd Sem

Subject – Properties of Matter, Kinetic Theory and Relativity PHY 201

Jan.

Week 1; Week 2 Exams and Practical exams
Week 3 Practical exams
Week 4 Elasticity, Hooke's law, Elastic constants and their relations
Week 5 Poisson's ratio, torsion of cylinder and twisting couple.

Feb.

Week 1 Bending of beam (bending moment and its magnitude) Cantilevers Numerical Problems.
Week 2 Centrally loaded beam Queries; Assignment
Week 3 Test Unit 1 ; Assumption of kinetic theory of gases
Week 4 Law of equipartition of energy and its application for specific heats of gases

March

Week 1 Maxwell distribution of speeds and velocities; Queries.
Week 2 Holi Break
Week 3 Experimental verification of Maxwell's law of speed distribution: most probable speed average and r.m.s speed
Week 4 Mean free path, transport energy and momentum
Week 5 Diffusion of gases, Brownian motion, real gases, vander waal's equation

April

Week 1 Numerical Problems; Assignments and Test Unit II
Week 2 Reference system, Inertial frames, Galilean invariance and conservation laws. Newtonian relativity principle
Week 3 Michelson- Morley experiment, search for ether, Lorentz transformations length contraction, time dilation
Week 4 Velocity addition theorem, variation of mass with velocity.

May

Week 1 Mass energy equivalence Assignment, Numerical Problems; Test Unit 3
Week 2 REVISION

Name of the Asst. Professor: Dr. Monica

Class -- B.Sc. (Pass Course) 2nd Sem

Subject – Electronic Devices PHY 202

Jan.

Week 1; Week 2 Exams and Practical exams

Week 3 Practical exams

Week 4 Basics of Semiconductors

Week 5 Energy Band in Solids, Intrinsic and Extrinsic

Feb.

Week 1 Hall Effect, P-N Junction diode, V-I characteristics

Week 2 Zener and Avalanche breakdown, Resistance of diode, LED

Week 3 Photoconduction, photodiode, Solar cell

Week 4 Rectifiers, Basics of Transistor, Test

March

Week 1 Transistor Biasing Methods, DC load line, Amplifiers configuration

Week 2 Holi Break

Week 3 Classification of amplifier, RC coupled amplifier Queries.

Week 4 Feedback in amplifier

Week 5 Numerical Problems; Assignments and Test

April

Week 1 Basics of Oscillator, Hartley and Colpitt Oscillator

Week 2 Growth and decay of current in a RC, RL, LC circuit

Week 3 Growth and decay of current in RLC circuit and Ac analysis of RC, RL, LC circuit

Week 4 RLC circuit Ac analysis Series Resonance

May

Week 1 Parallel resonance and Quality factor. Test and queries

Week 2 REVISION

Name of the Asst. Professor: Dr. Monica

Class -- B.Sc. (Pass Course) 4th Sem

Subject – Statistical Mechanics PHY 401

Jan.

Week 1; Week 2 Exams and Practical exams

Week 3 Practical exams

Week 4 Combinations possessing maximum probability, combinations possessing minimum probability, distribution of molecules in two boxes.

Week 5 Case with weightage (general). Phase space, microstates and macrostates,

Feb.

Week 1 Statistical fluctuations constraints and accessible States Thermodynamical probability. Numerical Problems.

Week 2 Queries; Test Unit 1; Postulates of Statistical Physics. Division of Phase space into cells

Week 3 Condition of equilibrium between two system in thermal contact. b Parameter. Entropy and Probability,

Week 4 Boltzman's distribution law. Evaluation of A and b. Bose-Einstein statistics

March

Week 1 Application of B.E. Statistics to Plancks's radiation law B.E. gas. Queries.

Week 2 Holi Break

Week 3 Numerical Problems; Assignments and Test Unit II

Week 4 Fermi-Dirac statistics,

Week 5 M.B. Law as limiting case of B.E. Degeneracy

April

Week 1 B.E. Condensation. F.D. Gas

Week 2 Electron gas in metals. Zero point energy.

Week 3 Specific heat of metals and its solution. Queries

Week 4 Assignment, Numerical Problems; Test Unit 3

May

Week 1 Test Unit 1,2,3

Week 2 REVISION

Name of the Asst. Professor: Dr. Monica

Class and Semester: B. Sc. II (Pass Course), Semester : 4

Name of Subject: Optics - II PHY - 402

Jan.

Week 1; Week 2 Exams and Practical exams

Week 3 Practical exams

Week 4 Introduction Interference

Week 5 Interference by Division of Amplitude Colour of thin, films wedge shaped film

Feb.

Week 1 Newton's rings

Week 2 Interferometers: Michelson's interferometer

Week 3 Michelson's interferometer application to (I) Standardisation of a meter (II) determination

of wavelength

Week 4 Fresnel's Diffraction : Fresnel's half period zones; Zone plate

March

Week 1 Diffraction at a straight edge, rectangular slit and circular aperture. Assignment

Week 2 Holi Break

Week 3 Fraunhofer diffraction : One slit diffraction, Two slit diffraction N-slit diffraction, Plane transmission grating spectrum

Week 4 Dispersive power of a grating , Limit of resolution, Rayleigh's criterion, resolving power of

telescope and a grating.

Week 5 Numerical Problems; Assignments and Test

April

Week 1 Polarization :Polarization and Double Refraction : Polarization by reflection, Polarisation by scattering

Week 2 Malus law, Phenomenon of double refraction, Huygen's wave theory of double refraction

Week 3 Huygen's wave theory of double refraction cont. Analysis of Polarised light : Nicol prism

Week 4 Quarter wave plate and half wave plate, production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii) Elliptically polarized light

May

Week 1 Optical activity, Fresnel's theory of rotation, Specific rotation, Polarimeters

Week 2 REVISION; Test and queries

Name of the Asst. Professor: Dr. Monica

Class and Semester: B. Sc. III (Pass Course), Semester : 6th

Name of Subject: Atomic, Molecular and Laser Physics PHY - 601

Jan.

Week 1; Week 2 Exams and Practical exams
Week 3 Practical exams
Week 4 Introduction Vector atom model
Week 5 Quantum numbers associated with vector atom model, penetrating and non-penetrating orbits.

Feb.

Week 1 Spectral lines in different series of alkali spectra, spin orbit interaction and doublet term separation LS or Russel-Saunders Coupling.
Week 2 jj coupling (expressions for interaction energies for LS and jj coupling required). Numerical problems of 1st unit.
Week 3 Zeeman effect (normal and Anomalous) Zeeman pattern of D₁ and D₂ lines of Na-atom
Week 4 Paschen Back effect of a single valence electron system. Weak field Stark effect of Hydrogen atom.

March

Week 1 Numerical problems and conceptual questions on atoms in the external field. Assignment
Week 2 Holi Break
Week 3 Discrete set of electronic energies of molecules. quantisation of Vibrational and rotational energies.
Week 4 Raman effect (Quantitative description) Stoke's and anti Stoke's lines.
Week 5 Classical and Quantum theory of Raman spectra and selection rules.

April

Week 1 Numerical Problems; Assignments and Test
Week 2 Main features of a laser : Directionality, high intensity, high degree of coherence, spatial and temporal coherence, Einstein's coefficients.
Week 3 Possibility of amplification, momentum transfer, life time of a level, kinetics of optical absorption.
Week 4 Threshold condition for laser emission, Laser pumping. Numericals

May

Week 1 He-Ne laser and RUBY laser (Principle, Construction and Working). Applications of laser in the field of medicine and industry.
Week 2 REVISION; Tests and queries

Name of the Asst. Professor: Dr. Monica

Class -- B.Sc. (Pass Course) 6th Sem

Subject – Nuclear Physics PHY- 602

Jan.

Week 1; Week 2 Exams and Practical exams

Week 3 Practical exams

Week 4 Introduction Unit I: Nuclear mass and binding energy, nuclear binding energy, nuclear stability, Nuclear size, spin, parity, statistics magnetic dipole moment, quadrupole moment

Week 5 Determination of mass by Bain-Bridge, Bain-Bride and Jordan mass spectrograph Determination of charge by Mosley law; Determination of size of nuclei by Rutherford Back Scattering.

Feb.

Week1 Test Unit I;Unit II: Interaction of heavy charged particles (Alpha particles), alpha disintegration and its theory

Week2 Energy loss of heavy charged particle (idea of Bethe formula); Energetics of alpha-decay, Range and straggling of alpha particles.

Week 3 Geiger-Nuttal law. Introduction of light charged particle (Beta particle), Origin of continuous beta-spectrum (neutrino hypothesis) types of beta decay

Week 4 Energetics of beta decay, Energy loss of betaparticles (ionization), Range of electrons, absorption of beta-particles. Interaction of Gamma Ray, Nature of gamma rays

March

Week 1 Energetics of gamma rays, Passage of Gamma radiations through matter (photoelectric, Compton effect)

Week 2 Holi Break

Week 3 Pair production effect; electron positron annihilation.

Week 4 Absorption of Gamma rays (Mass attenuation coefficient) and its application.

Week 5 Unit II Test; Nuclear reactions, Elastic scattering, Inelastic scattering, Nuclear disintegration

April

Week 1 Photonuclear reaction, Radiative capture, Direct reaction, heavy ion reactions and spallation Reactions, conservation laws. Q-value and

reaction threshold.

Week2 Nuclear Reactors General aspects of Reactor design.

Week3 Nuclear fission and fusion reactors

Week4 Linear accelerator, Tandem accelerator, Cyclotron and Betatron accelerators.
Ionization chamber

May

Week 1 Proportional counter, G.M. counter detailed study, scintillation counter and
semiconductor detector.

Week2 Test Unit III and REVISION