Lesson Plan

Semester I , Paper I- PHY 101 : Mechanics

Teacher Name : MR Chatterpal\Dr Priyanka Dhawan

Session: 2020-21

Week 1

Lecture 1: Unit-I : Mechanics of single and system of particles.
Lecture 2: Conservation of laws of linear momentum.
Lecture 3: Angular momentum and Mechanical energy.

Week 2

Lecture 4: ,Centre of mass and equation of motion
Lecture 5 : Constrained motion
Lecture 6: Degrees of freedom

Week 3

Lecture 7: Numerical Problems related to Unit 1
Lecture 8: Numerical Problems related to Unit 1
Lecture 9: Students Problems related to Unit 1

Week 4

Lecture 10: Generalised coordinates, displacement, velocity
Lecture 11 Generalised acceleration, momentum.
Lecture 12: Generalised force and potential.

Week 5

Lecture 13: Unit-1 (Internal Assesment- Test)
Lecture 14: Hamilton's variational principle
Lecture 15 : Lagrange's equation of motion from Hamilton's Principle.

Week 6

Lecture 16: Linear Harmonic oscillator, simple pendulum,
Lecture 17 Atwood's machine.
Lecture 18. Numerical Problems from Unit-2

Week 7

Lecture 19. Numerical Problems from Unit -2
Lecture 20: Students problems related to Unit-2
Lecture 21: Rotation of Rigid body

Week 8

Lecture 22: Moment of inertia.
Lecture 23: Torque, angular momentum
Lecture 24: Kinetic energy of rotation.

Week 9

Lecture 25:. Unit-2 (Internal Assesment- Test)
Lecture 26: Theorems of perpendicular and parallel axes with proof
Lecture 27 : Moment of inertia of solid sphere

Week 10

Lecture 28: Moment of inertia of Hollow sphere and Spherical shell.
Lecture 29: Moment of inertia of solid cylinder, hollow cylinder
Lecture 30: Moment of Inertia solid bar of rectangular cross-section.

Week 11

Lecture 31: Acceleration of a body rolling down on an inclined plane.
Lecture 32: Numerical Problem Unit-3
Lecture 33: Numerical Problem Unit-3

Week 12

Lecture 34: Students doubts from Unit-1,2,3.
Lecture 35: Students doubts from Unit-1,2,3.
Lecture 36: Unit-1,2,3 (Final Assesment- Test)

References

1. Classical Mechanics by V.K.Jain (Ane 2009)
2. Classical Mechanics by H. Goldstein (2nd Edition)
3. Berkeley Physics Course, Vol. I, Mechanics by E.M. Purchell

Lesson Plan

Paper II- PHY 102 : ELECTRICITY AND MAGNETISM

Teacher Name : Mrs Innu Yadav/Dr Priyanka Dhawan

Session: 2020-21

Week 1

Lecture 1: Unit-I : **Mathematical Background :** Scalars and Vectors, dot and cross product,
Lecture 2: Triple vectorproduct, Scalar and Vector fields,
Lecture 3: Differentiation of a vector, Gradient of a scalar and itsphysical significance,

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Week 2

Lecture 4: Integration of a vector (line, surface and volume integral and theirphysical significance),
Lecture 5: Gauss's divergence theorem
Lecture 6: and Stocks theorem.

Week 3

Lecture 7: Electrostatic Field : Derivation of field E from potential as gradient,
Lecture 8: derivation of Laplace and Poisson equations. Electric flux,
Lecture 9: Gauss's Law and its application to spherical shell,

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Week 4

Lecture 10: uniformly charged infinite plane and uniformity charged straight wire, mechanical force of charged surface,
Lecture 11: Energy per unit volume.
Lecture 12: Test

Week 4

Lecture 12: Unit II: **Magnetostatistics :** Magnetic Induction, magetic flux,
Lecture 13: Unit solenoidal nature of Vector field of induction.

Lecture 14: Properties of B

Week 5

Lecture 15: Electronic theory of dia andpara magnetism (Langevin's theory).

Lecture 16: Domain theory of ferromagnetism.

Week 6

Lecture 17: Cycle of Magnetisation - Hysteresis (Energy dissipation, Hysteresis loss and importance of Hysteresis curve).

Lecture 18: Contt.. Cycle of Magnetisation - Hysteresis (Energy dissipation, Hysteresis loss and importance of Hysteresis curve).

Lecture 19 : Discussion on previous years question from unit II

Week 7

Lecture 20: Test

Lecture 21: Unit III **Electromagnetic Theory : Introduction**

Lecture 22: Maxwell equation and their derivations,

Week 8

Lecture 23: Contt.. Maxwell equation and their derivations,

Lecture 24:Contt.. Maxwell equation and their derivations,

Lecture 25:Test

Week 9

Lecture 26: Displacement Current.

Lecture 27: Vector and scalar potentials,

Lecture 28 : Contt. Vector and scalar potentials,

Week 10

Lecture 29: boundary conditions at interface between twodifferent media,

Lecture 30 : contt boundary conditions at interface between twodifferent media,
Lecture 31: Contt. boundary conditions at interface between twodifferent media,

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Week 11

Lecture 32: Contt boundary conditions at interface between twodifferent media,
Lecture 33: Propagation of electromagnetic wave (Basic idea, no derivation).

Week 12

Lecture 34 : Poynting vector and Poynting theorem.
Lecture 35: Revision
Lecture 36: Test

References :

1. Electricity and Magnetism by Reitz and Milford (Prentice Hall of India)
2. Electricity and Magnetism by A.S. Mahajan and A.A. Rangwala (Tata McGraw Hill).

Lesson Plan

Semester III , Paper I- PHY 301 : Computer Programming, Thermodynamics

Teacher Name : Mrs Pooja/Dr Anu Chauhan

Session: 2020-21

Week 1

Lecture 1: Unit-I : Computer Programming: Computer organization, Binary representation
Lecture 2: Algorithm development,
Lecture 3: flow charts and their interpretation.

Week 2

Lecture 4: Flowchart and algorithm-based problems
Lecture 5 :Fortran Preliminaries: Integer and floating point arithmetic expression,
Lecture 6: built in functions executable and non-executable statements, input and output statements,

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Week 3

Lecture 7: Formats,
Lecture 8: I.F.and GO TO statements,
Lecture 9: Do statement

Week 4

Lecture 10: Dimension, arrays statement
Lecture 11: Function and function subprogram.
Lecture 12: Test

Week 5

Lecture 13: Unit-II Thermodynamics-I : Second law of thermodynamics,
Lecture 14: Carnot theorem, Absolute scale of temperature,
Lecture 15 : test

Week 6

Lecture 16: Absolute Zero,
Lecture 17: Entropy, show that dQ/T=O, T-S diagram Nernst heat law,
Lecture 18: Joule's free expansion, Joule Thomson (Porous plug) experiment. Joule - Thomson effect.

Week 7

Lecture 19: Liquefication of gases.
Lecture 20: Liquification of gases Contt.
Lecture 21: Test

Week 8

Lecture 22: Air pollution due to internal combustion Engine.
Lecture 23 :Unit III- Thermodynamics-II : Derivation of Clausius – Claperyron Equation latent heat equation
Lecture 24 :test

Week 9

Lecture 25:. Phase diagram
Lecture 26: triple point of a substance.
Lecture 27 : test

Week 10

Lecture 28: Development of Maxwell thermodynamical relations.
Lecture 29: contt. Development of Maxwell thermodynamical relations.
Lecture 30: Application of Maxwell relations in the derivation of relations between entropy, specific heats and thermodynamic variables.

Week 11

Lecture 31: Test
Lecture 32: Thermodynamic functions : Internal energy (U), Helmholtz function (F),

Lecture 33 Enthalpy(H), Gibbs function (G) and the relations between them.

Week 12

Lecture 34: Test
Lecture 35: Revision lecture
Lecture 36: Test

References :

1. Rajaraman, Fortran Programming.
2. Schaum Series, Fortran 77.
3. Ram Kumar, Programming with Fortran - 77.
4. S. Lokanathan and R.S., Gambir, Statistical and Thermal Physics (An Introduction), Prentice Hall of India, Pvt., Ltd. (1991, New Delhi).
5. J.K. Sharma and K.K. Sarkar, Thermodynamics and statistical Physics, Himalaya Publishing House (1991, Bombay.)
6. M.W. Zemansky and R. Dittman, Heat and Thermodynamics, McGraw Hill, New York (1981).

Lesson plan Paper-II PHY 302
Optics – I

Teacher Name : Mrs Pooja/Dr Anu Chauhan
Session: 2020-21

Week 1

Lecture 1: Unit-I: Fourier Analysis and Fourier Transforms : Speed of transverse waves on a uniform string.
Lecture 2: Speed of longitudinal waves in a fluid
Lecture 3: superposition of waves (physical idea)

Week 2

Lecture 4: Fourier Analysis of complex waves
Lecture 5: Fourier Analysis application for the solution of triangular
Lecture 6: : Fourier Analysis rectangular waves,

Week 3

Lecture 7: Application of Fourier analysis to half wave rectifier output
Lecture 8 : **Application of Fourier analysis to** full wave rectifier out puts.
Lecture 9: Test

Week 4

Lecture 10: Fourier transforms and its properties.
Lecture 11: Application of fourier transform to following function.
(I) $f(x) = e^{-x2/2}$

Lecture 12: Application of fourier transform to following function.

$$f(x) = \begin{cases} I & [x] < a \\ 0 & [x] > a \end{cases}$$

Week 5

Lecture 13: Unit II Geometrical optics : Introduction to Geometrical Optics :
Lecture 14: Matrix methods in paraxial optics,
Lecture 15: effects of translation and refraction,

Week 6

Lecture 16: Test
Lecture 17 : derivation of thin lens and thick lens formulae using matrix method,
Lecture 18: unit plane, nodal planes, system of thin lenses,

Week 7

Lecture 19: Chromatic,
Lecture 20: spherical
Lecture 21: coma,

Week 8

Lecture 22: astigmatism and
Lecture 23:distortion aberrations and their remedies.
Lecture 24: Test

Week 9

Lecture 25: Unit Interference : Introduction to Interference
Lecture 26: Interference by Division of Wavefront : Young's Double slit Experiment
Lecture 27: Fringe width in Young's Double slit experiment

Week 10

Lecture 28: Interference of white light vs monochromatic light and law of conservation of energy in interference
Lecture 29 : Fresnel's Biprism
Lecture 30: Applications of Fresnel's Biprism in determination of wavelength of sodium light

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Week 11

Lecture 31: Application of Frenel's Bi-prism in determination of thickness of mica sheet,
Lecture 32: Lioyd's mirror,
Lecture 33: phase change on reflection.

Week 12

Lecture 34: Difference Between interference by Liyod mirror and Frsenel's Bi-prism
Lecture 35: Revision
Lecture 36: Test

References

1. Mathematical Physics by B.S. Rajput and Yog Prakash Pragati Prakashan.
2. Theory and Problems of Laplace Transforms by Murrari R. spiegel, McGraw Hill Book Company.
3. Optics by Ajay Ghatak, Tata McGraw Hill 1977.
4. Introduction of Optics by Frank L. Pedrotti and Leno S. Pedrotti, Prentice Hall 1987.
7.

LESSON PLAN
DRONACHARYA GOVT. COLLEGE, GURUGRAM
DEPARTMENT OF PHYSICS

SUBJECT: QUANTUM MECHANICS SUBJECT CODE: PHY 502 SEMESTER: V
CLASS: B.Sc 3RD year
SESSION: 2020-2021
FACULTY: Dr Parminder/Dr Monika Malik

WEEK 1
LECTURE 1: UNIT-1: Failure of (Classical) E.M. Theory, quantum theory of radiation (old quantum theory)
LECTURE 2: Photon, photoelectric effect and Einstein's photoelectric equation
LECTURE 3: Compton Effect (theory and result)
WEEK 2
LECTURE 4: Inadequancy of old quantum theory, de-Broglie hypothesis
LECTURE 5: Davisson and Germer experiment, G.P. Thomson experiment
LECTURE 6: Phase velocity group velocity
WEEK 3
LECTURE 7: Heisenberg's uncertainty principle
LECTURE 8: Time-energy and angular momentum
LECTURE 9: position uncertainty, Uncertainty principle
WEEK 4
LECTURE 10: de-Broglie wave, (wave-particle duality).Gamma Ray Microscope
LECTURE 11: Electron diffraction from a slit
LECTURE 12: TEST
WEEK 5
LECTURE 13: Derivation of time dependent Schrodinger wave equation
LECTURE 14: Derivation of time- independent Schrodinger wave equation
LECTURE 15: Discussion of Schrodinger wave equation

WEEK 6
LECTURE 16: Eigen values, Eigen functions, wave functions and its significance.
LECTURE 17: Normalization of wave function
LECTURE 18: concept of observable and operator
WEEK 7
LECTURE 19: Solution of Schrodinger equation
LECTURE 20: equation for harmonic oscillator excited states
LECTURE 21: equation for harmonic oscillator ground states
WEEK 8
LECTURE 22: Application of Schrodinger equation in the solution of the following one-dimensional problems
LECTURE 23: Schrodinger equation in the solution of the following 2-dimensional problems
LECTURE 24: Discussion of Schrodinger equation in the solution of the following 2-dimensional problems
WEEK 9
LECTURE 25: Free particle in one dimensional box
LECTURE 26: Free particle in two dimensional box
LECTURE 27: Free particle in three dimensional box
WEEK 10
LECTURE 28: Problem class
LECTURE 29: solution of Schrödinger wave equation, Eigen function, Eigen values
LECTURE 30: solution of Schrödinger wave equation quantization of energy and momentum
WEEK 11
LECTURE 31: solution of Schrödinger wave equation nodes and antinodes, zero point energy
LECTURE 32: One-dimensional potential barrier $E>V_0$ (Reflection and Transmission coefficient.
LECTURE 33: One-dimensional potential barrier, $E>V_0$ (Reflection Coefficient, penetration of leakage coefficient, penetration depth).

WEEK 12

LECTURE 34: Revision
LECTURE 35: Test
LECTURE 36: Test

References:

1. Quantum Mechanics by L.I.Schiff, McGraw Hill Book Company, Inc.
2. Quantum Mechanics by B. Crasem and J. D.Powel (Addison Wesley.
3. Quantum Mechanics by A.P. Messiah

LESSON PLAN
DRONACHARYA GOVT. COLLEGE, GURUGRAM
DEPARTMENT OF PHYSICS

SUBJECT: SOLID STATE PHYSICS SUBJECT CODE: PHY 501 SEMESTER: V
CLASS: B.Sc 3RD year
SESSION: 2020-2021 SECTION: - A
FACULTY: Mr Vivek/Dr Monika Malik

WEEK 1
- **LECTURE 1: UNIT-1:** Crystalline and glassy forms, liquid crystals
- **LECTURE 2:** Crystal structure, periodicity, lattice, and basis
- **LECTURE 3:** Crystal translational vectors

WEEK 2
- **LECTURE 4:** Crystal translational axes
- **LECTURE 5:** Unit cell and primitive cell
- **LECTURE 6:** Winger Seitz primitive Cell

WEEK 3
- **LECTURE 7:** Symmetry operations for a two-dimensional crystal
- **LECTURE 8:** Bravais lattices in two dimensions
- **LECTURE 9:** Bravais lattices in three dimensions

WEEK 4
- **LECTURE 10: TEST**
- **LECTURE 11:** Crystal planes
- **LECTURE 12:** Detail Information of Miller indices

WEEK 5
- **LECTURE 13:** Formation of Interplanar spacing
- **LECTURE 14:** Crystal structures of Zinc sulphide
- **LECTURE 15:** Crystal structures of Sodium Chloride

WEEK 6
- **LECTURE 16: :** Crystal structures of Diamonds.
- **LECTURE 17:** X-ray diffraction
- **LECTURE 18:** Bragg's Law

WEEK 7
- **LECTURE 19:** Experimental x-ray diffraction methods
- **LECTURE 20**: K-space
- **LECTURE 21: TEST**

WEEK 8
- **LECTURE 22:** Reciprocal lattice and its physical significance
- **LECTURE 23:** Reciprocal lattice vectors
- **LECTURE 24:** Reciprocal lattice to a simple cubic lattice

WEEK 9
- **LECTURE 25:** Reciprocal lattice to B C C
- **LECTURE 26:** Reciprocal lattice to F C C
- **LECTURE 27:** Relation between three lattices

WEEK 10
- **LECTURE 28:** Introduction to specific heat of solids

- **LECTURE 29:** Dulong and Pettit's law of specific heat of solids and its drawbacks
- **LECTURE 30:** Einstein's theory of specific heat

WEEK 11

- **LECTURE 31:** Drawbacks of Einstein theory of specific heat
- **LECTURE 32:** Debye model of specific heat of solids.
- **LECTURE 33:** Comparison of three theories of specific heats of solids.

WEEK 12

- **LECTURE 34: Test**
- **LECTURE 35: Revision**
- **LECTURE 36: Test**

References:

4. Introduction to solid state Physics (5th Ed.) by kittel, Wiley eastern Limited.

Lesson Plan

Semester II ,

Paper I- PHY 201 : Properties of Matter, Kinetic theory and Relativity

Teacher Name : Mrs Innu Yadav/Dr Priyanka Dhawan

Session: 2020-21

Week 1

Lecture 1: Unit-I : **:** Elasticity, Hooke's law
Lecture 2: Elastic constants and their relations
Lecture 3: Poisson's ratio, torsion of cylinder and twisting couple

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Week 2

Lecture 4: ,Topic continued from Lecture 3
Lecture 5 : Bending of beam (bending moment and its magnitude) cantilevers
Lecture 6: Centrally loaded beam.

Week 3

Lecture 7: Numerical Problems related to Unit 1
Lecture 8: Numerical Problems related to Unit 1
Lecture 9: Students Problems related to Unit 1

Week 4

Lecture 10:: **Unit-2 :** Assumptions of Kinetic Theory of gases, Law of equipartition of energy and its applications for specific heats of gases.
Lecture 11 Topic continued.
Lecture 12: Maxwell distribution of speeds and velocities (derivation required).

Week 5

Lecture 13: Unit-1 (Internal Assessment- Test)
Lecture 14: Experimental verification of Maxwell's Law of speed distribution
Lecture 15 : Most probable speed, Average and r.m.s. speed

Week 6

Lecture 16: Mean free path. Transport of energy and momentum,
Lecture 17 Diffusion of gases. Brownian motion (qualitative)
Lecture 18. Real gases, Van der Waal's equation.

Week 7

Lecture 19. Numerical Problems from Unit -2
Lecture 20: Student's problems related to Unit-2
Lecture 21: Reference systems, inertial frames.

Week 8

Lecture 22: Unit 3: Galilean invariance and Conservation laws
Lecture 23: Newtonian relativity principle
Lecture 24: Michelson - Morley experiment: Search for ether.

Week 9

Lecture 25:. Unit-2 (Internal Assessment- Test)
Lecture 26: Topic continued from Lecture 24
Lecture 27 : Lorentz transformations

Week 10

Lecture 28: Length contraction.
Lecture 29: Time dilation.
Lecture 30: Velocity addition theorem, variation of mass with velocity and mass energy equivalence.

Week 11

Lecture 31: Topic continued.
Lecture 32: Numerical Problem Unit-3
Lecture 33: Numerical Problem Unit-3

Week 12

Lecture 34: Students doubts from Unit-1,2,3.
Lecture 35: Students doubts from Unit-1,2,3.
Lecture 36: Unit-1,2,3 (Final Assesment- Test)

References

1. Properties of Matter by D.S. Mathur.
2. Heat and Thermodynamics (Vth Edition) by Mark W. Zemansky.
3. Berkeley Physics Course, Vol.-I Mechanics by E.M. Purchell.

Lesson Plan

Semester II, Paper II- PHY-202 : ELECTRO MAGNETIC INDUCTION AND ELECTRONICDEVICES

Teacher Name: Dr Kartar singh/Dr Priyanka Dhawan
Session: 2020-21

Week 1

Lecture 1: Growth and decay of current in a circuit with (a) Capacitanceand resistance (b) resistance and inductance

Lecture 2: (c) Capacitance and inductance (d) Capacitance resistance and inductance.

Lecture 3: AC circuit analysis using complex variables with (a) capacitance and resistance,

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Week 2

Lecture 4: (b) resistance and inductance (c) capacitance and inductance (d) capacitance, inductance

Lecture 5 : and resistance Seriesand parallel resonant circuit.

Lecture 6: Quality factor (Sharpness of resonance).

Week 3

Lecture 7: Energy bands in solids.

Lecture 8: Intrinsic and extrinsic semiconductor, Hall effect,

Lecture 9: P-N junction diode and their V-I characteristics.

Week 4

Lecture 10: Zener and avalanche breakdown. Resistance of a diode,

Lecture 11: Light Emitting diodes (LED). Photo conduction in semiconductors,photodiode, Solar Cell

Lecture 12: P-N junction half wave and full wave rectifier.

Week 5

Lecture 13: Types of filter circuits (Land - with theory).

Lecture 14: Zener diode as voltage regulator, simple regulated power supply.

Lecture 15 : Transistors : Junction Transistors, Bipolar transistors,

Week 6

Lecture 16: working of NPN and PNP transistors,
Lecture 17: Transistor connections (C-B, C-E, C-C mode
Lecture 18:), constants of transistor. Transistor characteristic curves (excluding h parameter analysis),

Week 7

Lecture 19: advantage of C-B configuration. C.R. O. (Principle, construction and working in detail).
Lecture 20: Test
Lecture 21: Transistor Amplifiers : Transistor biasing

Week 8

Lecture 22: , methods of Transistor biasing and stabilization. D.C. load line
Lecture 23 : . Common-base and common-emitter transistor biasing.
Lecture 24 : Common-base, common- emitter amplifiers.

Week 9

Lecture 25:. Classification of amplifiers.
Lecture 26: Resistance-capacitance (R-C) coupled amplifier two stage
Lecture 27 : ; concept of band width, no derivation).

Week 10

Lecture 28:. Feed-back in amplifiers,
.**Lecture 29:** advantage of negativefeedback Emitter follower.
Lecture 30: Oscillators: Oscillators, Principle of Oscillation,

Week 11

Lecture 31: Classification of Oscillator.

Lecture 32: Condition for self-sustained oscillation
Lecture 33: : Barkhousen Criterion for oscillations.

Week 12

Lecture 34: Tuned collector common emitter oscillator. Hartley oscillator. Colpitt's oscillator
Lecture 35: Doubt class & Numerical problems discussion
Lecture 36: Test

References:

1. Electricity and Magnetism by Reitz and Milford (Prentice Hall of India)
2. Electricity and Magnetism by A.S. Mahajan and A.A. Rangwala (Tata McGraw Hill).
3. Basic Electronics and Linear circuits by N.N. Bhargava, D.C. Kulshreshtha and S.C. Gupta (TITI, CHD).
4. Soild State Electronics by J.P. Agarwal, Amit Agarwal (Pragati Prakashan, Meerut).
5. Electronic Fundamentals and Applications by J.D. Ryder (Prentice Hall India)

LESSON PLAN

Semester IV, PAPER PH 401 : STATISTICAL MECHANICS
Teacher's Name :Dr Anu Chauhan/Mrs Pooja
Session: 2020-21

WEEK 1

Lecture 1 : Unit-I Introduction: Probability, some probability considerations
Lecture 2 : Combinations possessing maximum probability, combinations possessing
minimum probability
Lecture 3 : Distribution of molecules in two boxes.

WEEK 2

Lecture 4 : Case with weightage (general).
Lecture 5 : Phase space, microstates and macrostates
Lecture 6 : statistical fluctuations

WEEK 3

Lecture 7 : constraints and accessible States
Lecture 8 : Thermodynamical probability
Lecture 9 : Numerical of unit-II will be discussed

WEEK 4

Lecture 10 : Revision of unit-I
Lecture 11 : Test of unit-I
Lecture 12: Postulates of Statistical Physics, Division of Phase space into cells

WEEK 5

Lecture 13 : Condition ofequilibrium between two system in thermal contact. b-Parameter
Lecture 14 : Entropy and Probability
Lecture 15 : Boltzmann's distribution law. Evaluation of A and b

WEEK 6

Lecture 16 : Bose-Einstein statistics
Lecture 17 : Application of B.E. Statistics to Planck's radiation law
Lecture 18 : B.E. gas.

WEEK 7

Lecture 19 : Numerical of unit 2
Lecture 20 : Test of unit 2
Lecture 21 : Fermi-Dirac statistics

WEEK 8

Lecture 22 : M.B. Law as limiting case of B.E. statistics
Lecture 23 : Degeneracy
Lecture 24 : B.E. Condensation

WEEK 9

Lecture 25 : Fermi- Dirac Gas
Lecture 26 : Electron gas in metals
Lecture 27 : Zero point energy

WEEK 10

Lecture 28 : Specific heatof metals and its solution
Lecture 29 : Numerical of unit 3
Lecture 30 : Revision of unit-3

WEEK 11

Lecture 31 : Revision of unit-I
Lecture 32 : Revision of unit-II
Lecture 33 : Revision of unit-III

WEEK 12

Lecture 34: Quiz of unit I
Lecture 35: Quiz of unit II
Lecture 36: Quiz of unit III

References:

1. B.B. Laud, “Introduction to Statistical Mechanics” (Macmillan 1981).
2. F. Reif, “Statistical Physics’ (McGraw Hill 1988).
3. K. Huang, “Statistical Physics” (Wiley Easter 1988).

Lesson Plan

Semester IV , Paper II- PHY 402 : Optics-2
Teacher Name : Mrs Pooja/Dr Anu Chauhan

Session: 2020-21

Week 1

Lecture 1: Unit-I : Introduction
Lecture 2: Interference by Division of Amplitude :Color of thin, films, wedge shaped film
Lecture 3: Interference by Division of Amplitude :Color of thin, films, wedge shaped film(contd.)

Week 2

Lecture 4: Newton's rings
Lecture 5 : Interferometers: Michelson's interferometer and
Lecture 6: its application to
(I) Standardization of a meter (II) determination of wave length

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Week 3

Lecture 7:its application to
(I) Standardization of a meter (II) determination of wave length(contd.)
Lecture 8: Fresnel's Diffraction (introduction)
Lecture 9: Fresnel's half period zones

Week 4

Lecture 10: zone plate, diffraction at a straight edge

Lecture 11: rectangular slit and circular aperture.
Lecture 12: Unit test

Week 5

Lecture 13: Unit-2, Fraunhofer diffraction(introduction)
Lecture 14: One slit diffraction
Lecture 15 : Two slit diffraction

Week 6

Lecture 16: N-slit diffraction,
Lecture 17: Plane transmission granting spectrum
Lecture 18: Dispersive power of a grating

Week 7

Lecture 19: Limit of resolution
Lecture 20: Rayleigh's criterion
Lecture 21: resolving power of telescope and a grating

Week 8

Lecture 22: Revision and Doubt class
Lecture 23: Revision and Doubt class
Lecture 24 :test

Week 9

Lecture 25: Introduction to wave nature of light
Lecture 26: Polarisation and Double Refraction
Lecture 27: Polarisation by reflection

Week 10

Lecture 28: Polarisation by scattering
Lecture 29: Malus law, Phenomenon of double refraction

Lecture 30: Huygen's wave theory of double refraction (Normal and oblique incidence)

Week 11

Lecture 31: Analysis of Palorised light : Nicol prism
Lecture 32: Quarter wave plate and half wave plate
Lecture 33: production and detection of (i) Plane polarized light (ii) Circularly polarized light and (iii)Elliptically polarized light,

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Week 12

Lecture 34: Optical activity, Fresnel's theory of rotation
Lecture 35: Specific rotation, Polarimeters (half shade and Bi-quartz).
Lecture 36: Test

References :

1. Optics by Ajay Ghatak, Tata McGraw Hill 1977.
2. Introduction of Optics by Frank L. Pedrotti and Leno S. Pedrotti, PrenticeHall 1987.

LESSON PLAN
DRONACHARYA GOVT. COLLEGE, GURUGRAM
DEPARTMENT OF PHYSICS

SUBJECT: ATOMIC MOLECULAR AND LASER PHYSICS **SUBJECT CODE: PHY 601**
SEMESTER: VI
CLASS: B.Sc 3RD year
SESSION: 2020-2021 **SECTION: - A**
FACULTY: Mr Vivek

WEEK 1
- **LECTURE 1: UNIT-1:** Vector atom model
- **LECTURE 2:** Quantum numbers associated with vector atom model
- **LECTURE 3:** Penetrating orbits (qualitiative description)

WEEK 2
- **LECTURE 4:** Non- penetrating orbits (qualitiative description)
- **LECTURE 5:** Spectral lines in different series of ailkali spectra
- **LECTURE 6:** Continue (Spectral lines in different series of ailkali spectra)

WEEK 3
- **LECTURE 7:** Spin orbit interaction and doublet term separation
- **LECTURE 8:** LS or Russel-Saunder Coupling (expressions for interaction energies)
- **LECTURE 9: :** JJ Coupling (expressions for interaction energies)

WEEK 4
- **LECTURE 10: Test**
- **LECTURE 11:** Zeeman effect (normal and Anormalous)
- **LECTURE 12:** Zeeman pattern of D 1 and D2 lines of Na-atom

WEEK 5
- **LECTURE 13:** Paschen, Back effect of a single valence electron system
- **LECTURE 14:** Weak field Strak effect of Hydrogen atom
- **LECTURE 15:** Diseete set of electronic energies of molecules

WEEK 6
- **LECTURE 16:** Quantisation of Vibrational energies
- **LECTURE 17:** Quantisation of ratiational energies
- **LECTURE 18:** Raman effect (Quantitative description)

WEEK 7
- **LECTURE 19:** Stoke's lines
- **LECTURE 20**: Anti Stoke's lines
- **LECTURE 21: Test**

WEEK 8
- **LECTURE 22:** Main features of a laser : Directionality, high intensity
- **LECTURE 23:** High degree of coherence
- **LECTURE 24:** Spatial and temporal coherence

WEEK 9
- **LECTURE 25:** Einstein's coefficients
- **LECTURE 26:** Possibility of amplification
- **LECTURE 27:** Momentum transfer, life time of a level

WEEK 10

- **LECTURE 28:** Kinetics of optical obsorption
- **LECTURE 29:** Threshold condition for laser emission
- **LECTURE 30:** Laser pumping

WEEK 11

- **LECTURE 31:** He-Ne laser (Principle, Construction and Working).
- **LECTURE 32:** RUBY laser (Principle, Construction and Working).
- **LECTURE 33:** Applications of laser in the field of medicine and industry.

WEEK 12

- **LECTURE 34: Revision**
- **LECTURE 35: Doubt clearing session**
- **LECTURE 36: Test**

References:

5. Introduction to Atomic and Molecular Spectroscopy by V.K.Jain, Narosa (2007)
6. Introduction to Atomic Spectra by H.B. White.
7. Atomic spectra by G. Herzberg.
8. Molecular Spectra and Molecular Structure by G. Herzberg.
9. Fundamentals of molecular spectroscopy by Colin N. Banwell and Elaine M.Mc-Cash.
10. Lassers, Theory and Application (2nd Ed.) by Thagrajan and Ajay Ghatak.
11. Laser and Nonlinear Optics by B.B. Laud (2nd Ed.)
12. Introduction to Optics by Frank L. Pedrotti and Lens S. Pedrotti, Prentice Hall, 1987.

LESSON PLAN
DRONACHARYA GOVT. COLLEGE, GURUGRAM
DEPARTMENT OF PHYSICS

SUBJECT: NUCLEAR PHYSICS SUBJECT CODE: PHY 602 SEMESTER: VI
CLASS: B.Sc 3RD year
SESSION: 2020-2021
FACULTY: Dr Parminder

WEEK 1
- **LECTURE 1: UNIT-1:** Nuclear mass and binding energy
- **LECTURE 2:** Systematics nuclear binding energy
- **LECTURE 3:** Nuclear stability

WEEK 2
- **LECTURE 4:** Detail discussion of Nuclear size
- **LECTURE 5:** Nuclear spin, parity
- **LECTURE 6:** Statistics magnetic dipole moment, quadrupole moment (shape concept)

WEEK 3
- **LECTURE 7:** Determination of mass by Bain-Bridge
- **LECTURE 8:** Bain-Bride and Jordan mass spectrograph
- **LECTURE 9:** Determination of charge by Mosley law

WEEK 4
- **LECTURE 10:** Determination of size of nuclei by Rutherford Back Scattering
- **LECTURE 11: Test**
- **LECTURE 12:** Interaction of heavy charged particles (Alpha particles)

WEEK 5
- **LECTURE 13:** Alpha disintegration and its theory Energy loss of heavy charged particle (idea of Bethe formula)
- **LECTURE 14:** Energetics of alpha-decay, Range and straggling of alpha particles
- **LECTURE 15:** Geiger-Nuttal law

WEEK 6
- **LECTURE 16:** Introduction of Beta-particle, Origin of continuous beta-spectrum (neutrino hypothesis).
- **LECTURE 17:** Types of beta decay and energetics of beta decay
- **LECTURE 18:** Energy loss of beta- particles (ionization), Range of electrons, absorption of beta-particles

WEEK 7
- **LECTURE 19:** Interaction of Gamma Ray, Nature of gamma rays
- **LECTURE 20**: Energetics of gamma rays, passage of Gamma radiations through matter by photoelectric effect.
- **LECTURE 21:** Energetics of gamma rays, passage of Gamma radiations through matter by compton effect

WEEK 8
- **LECTURE 22:** Energetics of gamma rays, passage of Gamma radiations through matter by pair production effect
- **LECTURE 23:** Asborption of Gamma rays (Mass attenuation coefficient) and its application

- **LECTURE 24:** Nuclear reactions, Elastic scattering

WEEK 9

- **LECTURE 25:** Inelastic scatting, Nuclear disintegration
- **LECTURE 26:** Photoneuclear reaction, Radiative capture
- **LECTURE 27:** Direct reaction, heavy ion reactions and spallation Reactions

WEEK 10

- **LECTURE 28:** Conservation laws. Q-value and reaction threshold
- **LECTURE 29:** Nuclear Reactors General aspects of Reactor design
- **LECTURE 30:** Nuclear fission and fusion reactors (Principles, construction, working and use)

WEEK 11

- **LECTURE 31:** Linear accelerator, Tendem accelerator, Cyclotron and Betatron accelerators
- **LECTURE 32:** Ionization chamber, proportional counter.
- **LECTURE 33:** G.M. counter detailed study.

WEEK 12

- **LECTURE 34:** Scintillation counter and semiconductor detector.
- **LECTURE 35: Doubt clearing session**
- **LECTURE 36: Test**

References:

13. Atomic and nuclear Physics, Vol. II by S.N. Ghashal.
14. Nuclear Physics by D.C. Tayal, Umesh Prakashan, 125, Goblind Dev Khurja (UP).
15. Concept of Modern physics by arther Besier, Tata McGraw Hill Publications.
16. Nuclear Physics by W.E. Burcham.
17. Nuclear Radiation Detectors by S.S. Kapoor
18. Experimental Nuclear Physics by M. Singru.