

Lesson Plan
Session 2020 – 2021

Name: Dr. Kavita

Subject: Physics

Class and Section: B.Sc.-III (C.S.)

Papers: Elements of Modern Physics & Nuclear Physics

September – October

Introduction to Quantization: Properties of Thermal Radiation, Spectral Distribution of Blackbody Radiation, Kirchhoff's Law, Stefan – Boltzmann Law and Wien's Distribution and Displacement Law, Rayleigh – Jeans Law, Ultraviolet Catastrophe, Plank's Quantum Postulates, Plank's Law of Blackbody Radiation : Experimental Verification.

Photo – electric effect and Compton Scattering, Pair production and annihilation, Bremsstrahlung effect, Cherenkov radiation, Production of X – rays.

October - November

Bohr Model: Drawbacks of Rutherford model, Bohr atomic model; Bohr's quantization rule and atomic stability, Calculation of energy levels for hydrogen like atoms and their spectra, Effect of nuclear mass on spectra, Correspondence principle.

Fundamentals of Wave Mechanics: De Broglie Wavelength and matter waves; Wave particle duality; Frank – Hertz, Davison and Germer experiment, phase velocity, group velocity and their relations.

Basic Properties of Nuclei: Nuclear composition (p – e and p – n hypothesis), Nuclear properties; Nuclear mass, size, spin, parity, magnetic dipole moment, quadrupole moment (shape concept) and binding energy, nuclear binding energy curve.

November – December

Radioactivity: Law of Radioactive Decay, Half – life, Radioactive Series, alpha - decay: Range of alpha particles, Geiger – Nuttal law and alpha particle Spectra, Beta decay, Energy Spectra and Neutrino Hypothesis, gamma decay: origin of gamma rays.

Nuclear Models and Nuclear Forces: Similarity between nuclear matter and liquid drop, Liquid Drop Model, Semi – classical Mass formula, Limitations of liquid drop model, Magic number, Experimental signature of shell structure in nuclei, Nuclear Shell Model (qualitative only) and its application, Meson Theory of Nuclear Forces.

Radiation Interaction: Interaction of heavy charged particles (proton, Alpha particles etc.); Energy loss of heavy charged particle (Discussion of Bethe formula), Range of alpha particles. Interaction of light charged particle (Beta particle)

Kavita

December – January

Test 1 and Assignment 1

Radiation Interaction: Interaction of Gamma Ray; Passage of Gamma radiations through matter (Photoelectric, Compton and pair production effect), Absorption of Gamma rays (Mass attenuation coefficient).

Nuclear Reactions: Types of nuclear reactions, Concept of reaction cross – section, Concept of Compound and Direct reactions.

Heisenberg Uncertainty Principle: Estimating minimum energy of a confined particle using uncertainty principle; Energy – time uncertainty principle, Properties of wave – function, Physical Interpretation of wave – function.

Schrodinger Equation: Momentum and energy operators, Stationary states, Physical interpretation of a wave function, probabilities and normalization, Schrodinger Equation, Particle on 1 – dimension infinite potential well.

January – February

Test 2 and Assignment 2

Laser: Absorbption and emission of radiation (qualitative only); Basic features of LASER, Population inversion; Resonance cavity; Laser pumping; threshold condition for laser emission; Einstein's Co – efficient, 3 level and 4 level system, Basic principle and working of He – Ne LASER and Ruby LASER, Application of LASER.

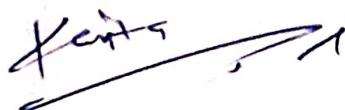
Nuclear Radiation Detectors: Gas filled counters; Ionization chamber, proportional counter, G. M. Counter (detailed study), Basic principle of scintillation counter and semiconductor detectors.

Nuclear Reactors: General aspects of reactor design, Nuclear fission reactor (Principle, Construction, Working and Use)

Particle Accelerators: Particle Accelerator facilities in India, Linear Accelerator, Cyclotron, Synchrotron.

February – March

Revision of Syllabus



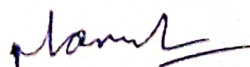
LESSON PLAN (2020-2021)

Name – Manisha Kumari

Subject- Paper 1st(Mechanics) and Paper 2 (Electrostatics and Magnetism)

Class- B.SC. I(N.M. and C.S.)

16 Nov 2020-30 Nov 2020	Paper 1 (scalar and vector field, Gradient, Divergence, Curl and its physical significance, Stoke and Guass Divergence Theorem)
1 Dec 2020-31 Dec 2020	Concept of Cartesian Polar and Spherical Coordinates, Motion in Plane Polar coordinates, Dynamics using Polar Coordinates , Conservation Theorem of momentum and energy, C.M. , Rocket motion, Elastic and inelastic collision. Coriolis forces ,Moment of inertia of different bodies, Torque, 1st Test and assignment.
1 Jan 2021-31 Jan 2021	PAPER 2 (Electric field , Flux and Potential, energy stored in electric field per unit volume, Application of electrostatics.
1 Feb 2021- 28 Feb 2021	Guass theorem in dielectrics ,parallel plate capacitor ,Susceptibility and permittivity, Magnetism, Biot-Savart's law and its application, ampere's circuital law and its application.
1 March 2021- 31 March 2021	Bound currents and its physical interpretation , Magnetic properties of materials ,B-H Curve, Currie point, Two Body Problem and concept of Reduced Mass, Kepler's law , Elasticity, 2nd Test and assignment Revision .



Lesson plan (2020-2021)

Name of Extension lecturer: Dr. Monika Dhariwal

Subject: CPL-301 (Semiconductor devices), CPL-302 (Heat and thermodynamics)

Class: B. Sc. II (Non medical with computer science)

Month	CPL-301	CPL-302
September 2020	P and n type semiconductor and their types, Forward and reverse biasing, PN junction diode, Half and full wave rectifier	Thermodynamic variable and equilibrium, Zeroth law, concept of heat, work and temperature
October 2020	Zener diode and its applications, Solar cell, light emitting diode and photo cell	First law of thermodynamics and application, Work done during isothermal and adiabatic process Reversible and irreversible process, Carnot cycle and theorem
November 2020	Pnp and npn transistor, Biasing of transistor in active, saturation and cut off mode	Concept of entropy and related terms, Clausius theorem and inequality, Second law of thermodynamics, entropy of perfect gas and universe
December 2020	Circuit configuration CE CB and CC mode, Current gain of different transistor and their relation	Entropy of reversible and irreversible process, Thermodynamic potential, Derivation of Maxwell equation, Application of Maxwell equation
January 2021	DC load line and Q- point, Amplifier explanation, Types of feedback in amplifier Hartley oscillator, Colpitts oscillator, Differential amplifier	Energy equation and change of temperature during adiabatic process, Behaviour of real gases, virial equation, Van der Waal's equation
February 2021	Operational amplifier, Open loop and closed loop gain, Differentiator, Integrator Revision	Law of corresponding state Pv diagrams, comparison of experimental curves. Joules's expansion, Adiabatic expansion of perfect gas, Revision

Monika

Lessons Plan
Session (2020-2021)

Name : Sushil Kumar

Subject: Physics

Class and section : B.sc-III(Non-Medical)

Paper: Element of Modern Physics & Nuclear physics

September- October

Introduction of Nuclear physics:- Basic properties of nuclei
Nuclear composition (p- e and p- n hypothesis), Nuclear properties:- Nuclear mass, spin, parity, magnetic dipole moment, quadrupole moment and binding energy, Nuclear binding energy curve
Radioactivity:- law of radioactivity decay, half life, radioactivity series, alpha decay :- range of alpha- particle, Geiger- nuttal law and alpha particle spectra, beta decay, energy spectra and neutrino hypothesis, gamma decay, origin of gamma rays

October- November

Similarities b/w nuclear matter and liquid drop, liquid drop model, semiclassical mass formula, limitation of liquid drop model, magic number experimental signature of shell structure in nuclei, Nuclear shell model and its application, meson theory of Nuclear forces, interaction of heavy charge particle, range of alpha particle, interaction of light charge particle, interaction of gamma ray :- passage of gamma radiation through matter, absorption of gamma rays nuclear reactions:- type of Nuclear reactions, concept of reactions cross section, concept of compound and direct reactions, gas filled counter, G.M counter, basic principles of scintillation counter and semiconductor detector
General aspects of reactor design, nuclear fission reactor, particle accelerator in India, linear accelerator, cyclotron, synchrotron, properties of thermal radiation, spectral distribution of black body radiation, Kirchhoff's law, Stefan Boltzmann law, Wien's distribution and displacement law, Rayleigh Jeans law, ultraviolet catastrophe, Planck quantum postulate, Planck law of black body experiment verification

November- December

Photoelectric effect and Compton scattering, pair production and annihilation bremsstrahlung effect, Cherenkov radiation, production of X-rays, drawbacks of Rutherford model, Bohr atomic model, Bohr quantization rule and atomic stability, calculations of energy levels for hydrogen like atom and their spectra effect of Nuclear mass on spectra, correspondence principle, de Broglie wavelength and matter waves,

December- January

Wave particle duality, Frank-Hertz, Davisson and Germer experiment, phase velocity, group velocity and their relations, estimating minimum energy of confined particle using uncertainty principles, energy-time uncertainty principles, properties of wave function, physical interpretations of wave function, Schrödinger equations, momentum and energy operators, stationary states, physical interpretation of wave function probabilities and normalisation

January- February

1 test and 1 assignment

Schrödinger equations, particle in 1-dimensions

Infinite potential well, absorption and emissions of radiation, basic features of laser, populations, inversions, resonance cavity, laser pumping, threshold condition for laser emissions, Einstein coefficient, 3-level and 4-level systems, basic principles and working of He-Ne laser, and ruby laser, application of laser.

February- March

2 Test and 2 assignments.

Revision of syllabus

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Lesson plan (2020-2021)

Name of Extension lecturer: KOMAL RANI

Subject: CPL-301 (Semiconductor devices), CPL-302 (Heat and thermodynamics)

Class: B. Sc. II (Non medical with computer science)

Month	CPL-301	CPL-302
September 2020	P and n type semiconductor and their types, Forward and reverse biasing, PN junction diode, Half and full wave rectifier	Thermodynamic variable and equilibrium, Zeroth law, concept of heat, work and temperature
October 2020	Zener diode and its applications, Solar cell, light emitting diode and photo cell	First law of thermodynamics and application, Work done during isothermal and adiabatic process Reversible and irreversible process, Carnot cycle and theorem
November 2020	Pnp and npn transistor, Biasing of transistor in active, saturation and cut off mode	Concept of entropy and related terms, Clausius theorem and inequality, Second law of thermodynamics, entropy of perfect gas and universe
December 2020	Circuit configuration CE CB and CC mode, Current gain of different transistor and their relation	Entropy of reversible and irreversible process, Thermodynamic potential, Derivation of Maxwell equation, Application of Maxwell equation
January 2021	DC load line and Q- point, Amplifier explanation, Types of feedback in amplifier Hartley oscillator, Colpitts oscillator, Differential amplifier	Energy equation and change of temperature during adiabatic process, Behaviour of real gases, virial equation, Van der Waal's equation
February 2021	Operational amplifier, Open loop and closed loop gain, Differentiator, Integrator Revision	Law of corresponding state P _v diagrams, comparison of experimental curves, Joules's expansion, Adiabatic expansion of perfect gas, Revision

Komal