Lesson Plan

Name of the Assistant/ Associate Professor……Ritu…….

Class and Section:……B.Sc 2nd Year …… ……..

Subject:……Organic Chemistry ……..

Session:……2022-2023 ……..

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	
	2	
	3	
	4	Monohydric alcohols nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters.
September	1	Hydrogen bonding. Acidic nature. Reactions of alcohols,.
	2	Dihydric alcohols nomenclature, Methods of formation, chemical reactions of vicinal glycols,
	3	Oxidative cleavage [Pb(OAc), and HIO] and pinacol-pinacolone rearrangement.
	4	Phenols:Nomenclature, structure and bonding.
October	1	Preparation of phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols.
	2	Reactions of phenols electrophilic aromatic substitution. Mechanisms of Fries rearrangement. ions.
	3	Claisen rearrangement, Reimer-Tiemann reaction, Kolbe's reaction and Schotten and Baumann react
	4	Epoxides: Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening,
November	1	Absorption laws (Beer-Lambert law), molar absorptivity.
	2	Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts.
	3	UV spectra of conjugated. enes and enones,Applications of UV Spectrosc organic compounds.
	4	Carboxylic Acids & Acid Derivatives.
December	1	Nomenclature of Carboxylic acids, structure and bonding, physical
	2	Properties, acidity of carboxylic acids, effects of substituents on
	3	
	4	

January	1	
	2	
	3	
	4	
February	1	
	2	
	3	Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands.
	4	Applications of IR spectroscopy in structure elucidation of simple organic compounds
March	1	Amines: physical properties. Separation of a mixture of primary, secondary and tertiary amines.
	2	Reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds.
	3	Name reactions
	4	Diazonium Salts: Mechanism of diazotisation, structure of benzene diazonium chloride.
April	1	Aldehydes and Ketones:Nomenclature andSynthesis of aldehydes and ketones .
	2	Properties, Comparison of reactivities of aldehydes and ketones. Mechanism of nucleophilic additions reactions.
	3	Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction. Oxidation of aldehydes, Baeyer- Villiger oxidation of ketones,
	4	Name reactions.
May	1	
	2	
	3	
	4	

Signature

Lesson Plan

Name of the Assistant/ Associate Professor.....Renu Mor.....

Class and Section:.....B.Sc 2nd year..... .....

Subject:.....Inorganic chemistry .....

Session:.....2022-2023 .....

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	
	2	
	3	D-block element: position, general characteristics, comparison of properties of 3d, 4d and 5d.
	4	Stabilities of oxidation state, structure and properties of transitionelement compounds.
September	1	Co-ordination compounds introduction.
	2	isomerism
	3	VBT and it's limitations.
	4	colour, magnetic property and shape
October	1	IUPAC nomenclature.
	2	CFT
	3	non - aqueous solvents introduction
	4	physical property and types.
November	1	general characteristics
	2	Non- aqueous solvents with reference to NH3 and liquid SO2.
	3	
	4	
December	1	
	2	
	3	
	4	
January	1	
	2	
	3	
	4	
February	1	
	2	
	3	F block elements: lanthanides
	4	Separation of lanthanide, lanthanide compounds
March	1	actanide

	2	Acid based radicals, I identification of acid radicals and base radicals.
	3	Common ion effect and solutions product.
	4	Precipitation reactions and it's type.
April	1	Purification of precipitates.
	2	Test for presece of acid radicals.
	3	Test for presence basic radicals
	4	miscellaneous test.
May	1	
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Signature

Lesson Plan

Name of the Assistant/ Associate Professor……Yashika Garg…….……

Class and Section:……B.sc 3rd Year…….…… ……..……..……..

Subject:…… Inorganic Chemistry ……..

Session:……2022-2023 ……..

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	
	2	
	3	
	4	Metal- Ligand Bonding in Transition Metal complexes Limitations of VBT.
September	1	CFT in octahedral, Tetrahedral and Square planer.
	2	Thermodynamics and Kinetic Aspects of metal complexes
	3	Thermodynamic stability of metal complexes and factors affecting the stability,
	4	Irving William Series, Substitution reactions of square planer compounds Trans effect.
October	1	Magnetic properties of Transition metal complexes
	2	Magnetic susceptibility, Method of determining magnetic susceptibility,
	3	Orbital contribution to magnetic moments,
	4	Correlation of μ, and eff values, Orbital contribution to magnetic moments.
November	1	Application of magnetic moment data for 3d metal complexes.
	2	Selection rules for d-d transition, Spectroscopic ground states, Spectrochemical series
	3	Electronic spectra of Transition metal complexes, d-d transition.
	4	Orgel energy level diagram for d' and d states.
December	1	Spin Only formula and L-S coupling.
	2	Discussion of electronic ion.spectrum of [Ti(H2O)6]complex
	3	
	4	
January	1	
	2	
	3	
	4	
February	1	
	2	

	3	Acids and Bases:Arrhenius, Bronsted-lowry, Lux-flood, Solvent system
	4	Lewis concept of acids and bases, relative strength of acids and bases,
March	1	Levelling solvents, Hard and soft acids and bases(HSAB), Applications of HSAB principle.
	2	Classification and nomenclature of organometallic compounds, preparation,
	3	Properties and bonding of alkyls of Li, Al, Hg and Sn, Concept of hapticity of organic ligand,
	4	Structure and bonding in metal-ethylenic complexes, Ferrocene
April	1	metal carbonyls, Preparation, properties and bonding.
	2	Bio inorganic chemistry: haemoglobin and myoglobin. Biological role of Na, K, Ca, Mg, Fe+ ions, Cooperative effect, Bohr effect.
	3	Silicones and Phosphazenes Nomenclature, classification, prepration and uses of silicones,
	4	Elastomers, polysiloxane copolymers, poly phosphazenes and bonding in triphosphazene
May	1	
	2	
	3	
	4	

Signature

Lesson Plan

Name of the Assistant/ Associate Professor……Renu Mor…….

Class and Section:……B.Sc 3rd year…… ……..

Subject:……Organic Chemistry ……..

Session:…… 2022-2023 ……..

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	
	2	
	3	
	4	Organic Synthesis via Enolates
September	1	Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism.
	2	Molecular orbital picture and aromatic characteristics. of pyrrole, furan, thiophene and pyridine. ,
	3	Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution.
	4	Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole
October	1	Five and six-membered heterocycles. Prepration and reactions of indole,
	2	Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline.
	3	Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis.
	4	Structure and nomenclature of peptides and proteins. Classification. of proteins.
November	1	Peptide structure determination, end group analysis, selective hydrolysis of peptides
	2	Classical peptide synthesis, solid- phase peptide synthesis. Structures of peptides and proteins.
	3	Synthetic polymer introduction
	4	Free radical vinyl polymerization, ionic vinyl polymerization and vinyl polymers. polymerization, Ziegler-Natta
December	1	Addition or chain-growth polymerization. Condensation or step growth polymerization.
	2	Polyesters, polyamides, phenol formaldehyde resins. Natural and synthetic rubbers.
	3	

	4	
January	1	
	2	
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	4	
February	1	
	2	
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	4	
March	1	
	2	
	3	NMR Spectroscopy Principle of nuclear magnetic spectrum,number of signals,
	4	Peak resonance, the PMR areas, equivalent and nonequivalent protons positions of signals and chemical shift,
April	1	Shielding and deshielding of protons, proton counting,splitting of signals and coupling constants,
	2	Magnetic equivalence of protons. Discussion of PMR spectra of the molecules: ethyl bromide, n-propyl bromide etc.
	3	PMR spectroscopy for structure determination of organic compounds.
	4	Carbohydrates: Classification and nomenclature, osazone formation, conversions.
May	1	Configuration of monosaccharides. Erythro and threo diastereomers.
	2	Disaccharides (maltose, sucrose and lactose) and polysaccharides (starch and cellulose).
	3	Organomagnesium compounds: the Grignard reagents-formation, structure and chemical reactions.
	4	

Signature

Lesson Plan

Name of the Assistant/ Associate Professor……Ritu…….

Class and Section:……B.sc 3rd year …… ……..

Subject:……Physical Chemistry ……..

Session:……2022-2023 ……..

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	
	2	
	3	
	4	Black-body radiation. Plank's radiation law, photoelectric effect. Postulates.
September	1	Quantum mechanical operators, commutation relations, Hamiltonian operator,
	2	Hermitian operator, average value of square of Hermitian as a positive quantity, Role of operators
	3	To show quantum mechanically that position and momentum cannot be predicated simultaneously.
	4	Determination of wave function & energy of a particle in one dimensional box.
October	1	Optical activity, polarization, dipoles in an electric field,
	2	Dipole moment, induced dipole moment, measurement of dipole.
	3	Refractivity method, dipole moment and structure of molecules,
	4	Magnetic permeability, magnetic susceptibility and its determination.
November	1	Application of magnetic susceptibility, magnetic properties Paramagnetism, diamagnetism and ferromagnetism.
	2	Electromagnetic radiation, regions of spectrum, statement approximation, Degrees of freedom.. of Born-oppenheimer
	3	Rigid rotator , rotational spectra of diatomic molecules, spectral intensity distribution.
	4	Maxwell-Boltzmann distribution determination of bond length and isotopic effect.
December	1	Harmonic oscillator, pure vibrational spectrum of diatomic molecules.
	2	Determination of force constant , idea of vibrational frequencies of different functional groups.
	3	Raman Spectrum
	4	
January	1	
	2	

	3	
	4	
February	1	
	2	
	3	Statistical thermodynamics, thermodynamic probability, Maxwell Boltzmann distribution.
	4	Born oppenheimer approximation, partition function Factorization of partition function.
March	1	Photochemistry: thermal and photochemical processes.
	2	Laws of photochemistry: Grotthus-Drapper law, Stark- Einstein,Jablonski diagram
	3	Qualitative description of fluorescence, phosphorescence, non-radiative processes
	4	Quantum yield, photosensitized reactions-energy transfer processes.
April	1	Ideal and non-ideal solutions, methods of expressing concentrations of solutions, Dilute solutions, Raoult's law.
	2	Colligative properties
	3	Thermodynamic derivation of relation between amount of solute and elevation in boiling point and depression in freezing point.
	4	Applications in calculating molar masses of normal, dissociated and associated solutes in solution.
May	1	Phase, component and degree of freedom, thermodynamic derivation of Gibbs phase rule,
	2	Phase equilibria of one component system-Example water system
	3	Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilverisation of lead.
	4	

Signature

Lesson Plan

Name of the Assistant/ Associate Professor…… Yashika Garg……

Class and Section:……B.Sc 2nd year …… ……

Subject:……Physical Chemistry ……

Session:…… 2022-2023 ……

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	
	2	
	3	
	4	Thermodynamics introduction
September	1	Thermodynamics process and Thermodynamics equilibrium
	2	Concept of heat and work. First law of Thermodynamics
	3	Various types of heat capacity and relation between them.
	4	Reversible and irreversible reactions.
October	1	Adiabatic and isotherm reversible reaction, Joule Thomson experiment.
	2	Equilibrium constant and free energy, Concept of chemical. Potential,
	3	Thermodynamic derivation of law of chemical equilibrium.
	4	Temperature dependence of equilibrium constant. Clausius-Clapeyron equation and its applications
November	1	Nernst distribution law its thermodynamic derivation.
	2	Applications of distribution law: Determination of degree of hydrolysisand hydrolysis constant of aniline hydrochloride.
	3	Others applications of distribution law.
	4	Etermination of equilibrium constant of potassium tri-iodide complex and
December	1	Determination of Process of extraction. More stress on numerical problems.
	2	
	3	
	4	
January	1	
	2	
	3	
	4	
February	1	
	2	
	3	
	4	Second law of thermodynamics, Carnot's cycles Carnot's theorm,
March	1	Thermodynamicsscaleoftemperature, Entropy .
	2	Entropychangeinphysicalchange,entropyasacriteriaofspontaneityandequilibrium.

	3	Third law of thermodynamics
	4	Residual entropy,Gibbs function, Helmholtz function.
April	1	Electrolytic and Galvanic cells. reversible & irreversible cells.
	2	Type of electrodes, Electrode reactions, Nernst equations.
	3	Hydrogenelectrode,referenceelectrodes,standardelectrodepotential,
	4	Concentrationcellswithandwithouttransference,liquidjunctionpotentialandits measurement
May	1	ApplicationsofEMFmeasurementinsolubilityproductandpotentiometrictitratio nsusingglass electrode.
	2	Transport number.
	3	
	4	

Signature

Lesson Plan

Name of the Assistant/ Associate Professor : Mahak

Class and Section: B.Sc 1st (Non Medical)

Subject: Physics (Paper 2) (1). Classical Mechanics.
(2). Mechanics and Kinetic Theory of gases.

Session: 2022 - 2023

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	
	2	**Semester - 1st**
	3	
	4	Unit 1: Basic concepts of Classical mechanics :- Introduction, Mechanics of single and system of particles
September	1	Conversion law of linear momentum, Angular momentum and mechanical energy for a particle and a system of particles,
	2	Centre of Mass and equation of motion, Constrained Motion.
	3	Numerical problem Unit2: Generalized Notations:- Introduction
	4	Degrees of freedom and Generalized coordinates, Transformation equations,
October	1	Generalized Displacement, Velocity, Acceleration, Momentum Force and Potential,
	2	Hamilton's variational principle, Lagrange's equation of motion from Hamilton's principle,
	3	Linear Harmonic oscillator, Simple pendulum, Atwood's machine.
	4	Unit 3: Theory of relativity :- Introduction Frame of reference, limitation of Newton's law of motion, Inertial frame of reference,
November	1	Galilean transformation, Frame of reference with linear acceleration, Classical relativity- Galilean invariance,
	2	Transformation equation for a frame of reference- inclined to an inertial frame and Rotating frame of reference, Non-inertial frames-The accelerated frame of reference and rotating frame of reference.
	3	Effect of centrifugal and coriolis forces due to Earth's rotation, Fundamental frame of reference, Michelson-Morley's experiment.

	4	concept of Einstein's relativity. Unit 4: Applications of theory of relativity :- Introduction ,Special theory of relativity, Lorentz co-ordinate and physical significance of Lorentz invariance,
December	1	Length Contraction, Time Dilation, Twin Paradox, Velocity addition theorem, Variation of mass with velocity, Mass energy equivalence,
	2	Physical significance of Lorentz invariance, Length Contraction, Time Dilation, Twin Paradox, Velocity addition theorem, Variation of mass with velocity, Mass energy equivalence.
	3	
	4	
January	1	
	2	
	3	
	4	
February	1	**Semester - 2nd**
	2	
	3	Unit I: Moment of inertia:- Rotation of rigid body, Moment of inertial, Torque, angular momentum, Kinetic Energy of rotation. Theorem of perpendicular and parallel axes (with proof).
	4	Moment of inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and solid bar of rectangular cross-section.
March	1	Fly wheel, Moment of inertia of an irregular body, Acceleration of a body rolling down on an inclined plane.
	2	Unit 2: Elasticity :-Elasticity, Stress and Strain, Hook's law, Elastic constant and their relations, Poisson's ratio, Torsion of cylinder and twisting couple.
	3	Determination of coefficient of modulus of rigidity for the material of wire by Maxwell's needle, Bending of beam (Bending moment and its magnitude).
	4	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.
April	1	Unit 3: Kinetic theory of gases-I:- Assumption of Kinetic theory of gases, pressure of an ideal gas (with derivation), Kinetic interpretation of Temperature, Ideal Gas equation.
	2	Degree of freedom, Law of equipartition of energy and its application for specific heat of gases, Real gases.

	3	Vander wall's equation, Brownian motion(Qualitative) . V Unit 4: Kinetic theory of gases-II:-Maxwell's distribution of speed and velocities (derivation required).
	4	Experimental verification of Maxwell's law of speed distribution: most probable speed, average and r.m.s.
May	1	Mean free path, Transport of energy and momentum, Diffusion of gases.
	2	
	3	
	4	

Lesson Plan

Name of the Assistant/ Associate Professor:- Nisha

Class and Section:- B.sc 1st year (Non Medical) (1st and 2nd Semester)

Subject:- Physics (Paper 2). (1) Electricity, Magnetism and Electromagnetic theory……
(2) Semiconductor Devices

Session: 2022-2023

Month	Week	Topics
July	1	
	2	
	3	
	4	**Semester-1st**
August	1	
	2	
	3	
	4	Unit 1: Vector background and Electric field :-Gradient of a scalar and its physical significance, Line, Surface and Volume integrals of a vector and their physical significance.
September	1	Flux of a vector field, Divergence and curl of a vector and their physical significance, Gauss's divergence theorem, Stoke's theorem .
	2	Derivation of electric field E from potential as gradient, Derivation of Laplace and Poisson equations, Electric flux.
	3	Derivation of electric field E from potential as gradient, Derivation of Laplace and Poisson equations, Electric flux, Numerical problem .
	4	Numerical problem Unit 2: Magnetism:-Magnetic induction, Magnetic flux, Solenoidal nature of vector field of induction, properties of B.
October	1	Electronic theory of dia and paramagnetism, Domain theory of ferromagnetism (Langevin's theory).
	2	Cycle of magnetization- hystresis loop (Energy dissipation, Hystresis loss and importance of Hystresis Curve .
	3	Numerical problem ,Unit 3: Electromagnetism:-Maxwell equations and their derivations
	4	Displacement current, Vector and Scalar potentials, Boundary conditions at interface between two different media
November	1	Numerical Problem ,Unit 4: A. C. Analysis:-A.C. circuit analysis using complex variable with (a) Capacitance
	2	A.C. circuit analysis using complex variable with (b) Resistance and Inductance (LR) (c) Capacitance and Inductance (LC).
	3	Numerical problem .
	4	A.C. circuit analysis using complex variable with (d) Capacitance, Inductance anSeries and parallel resonance circuit,
December	1	Quality factor (sharpness of resonance). Numerical Problem.

	2	
	3	
	4	
January	1	
	2	
	3	**Semester-2nd**
	4	
February	1	
	2	
	3	Unit 1: Semiconductors:-Energy bands in solids, Intrinsic and extrinsicsemiconductors, carrier mobility and electrical resistivity ofsemiconductors, Hall effect .
	4	p-n junction diode and their characteristics, Zener and Avalanche breakdown, Zener diode and their characteristics.
March	1	Zener and Avalanche breakdown, Zener diode, Zener diode as a voltage regulator Light emitting diodes (LED).
	2	Photoconduction in semiconductors, Photodiode, Solar Cell, p-n junction as a rectifier, half wave and full wave rectifiers (with derivation).
	3	Filters (series inductor, shunt capacitance, L-section or choke, n and R.C. filter circuits).Unit 2: Transistors :- Junction transistors, Working of NPN and PNP transistors.
	4	Three configurations of transistor (C-B, C-E, C-C modes), Common base, common emitter and common collector characteristics of transistor .
April	1	Constants of a transistor and their relation, Advantages and disadvantages of C-E configuration. D.C. load line Transistor biasing. various methods of transistor biasing and stabilization.
	2	Unit 3: Transistor Amplifiers :-Amplifiers, Classification of amplifiers, common base and common emitter amplifiers, coupling of amplifiers.
	3	Variious methods of coupling, Resistance- Capacitance (RC) coupled amplifier (two stage, concept of band width, no derivation), Feedback in amplifiers.
	4	Unit 4: Oscillators:-Oscillators, Principle of oscillation, classification of oscillators, Condition for self sustained oscillation.
May	1	Tuned collector common emitter oscillator, Hartley oscillator, C.R.O. (Principle and Working).
	2	Numerical Problem.
	3	
	4	

Lesson Plan

Name of the Assistant/ Associate Professor : Mange Ram

Class and Section: B.Sc 2nd (Non Medical)

Subject: Physics (Paper 2). (1). Wave and Optics

Sessions: 2022 - 2023

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	
	2	**Semester - 3rd**
	3	
	4	Unit-1: Interference 1:-Interference by Division of Wave front. Young's double slit experiment, Coherence, Conditions of interference.
September	1	Fresnel's biprism and its applications to determine the wavelength of sodium light and thickness of a mica sheet .
	2	Lloyd's mirror, Difference between Bi-prism and Llyod mirror fringes.
	3	Phase change on reflection.Numerical Problem . Unit 2: Interference II :-Interference by Division of Amplitude:
	4	Plane parallel thin film, production of colors in thin films, classification of fringes in films, Interference due to transmitted light and reflected light.
October	1	Wedge shaped film, Newton's rings, Michelson's interferometer and its applications to (i) Standardization of a meter.
	2	Michelson's interferometer and its applications to (i) Standardization of a meter (ii) determination of wavelength.
	3	Unit-3: Diffraction I :-Fresnel's diffraction: Fresnel's assumptions and half period zones.
	4	Diffraction at a straight edge, rectangular slit and circular aperture.
November	1	Diffraction due to a narrow slit and wire. Numerical Problem Chapter 2 and Chapter 3.
	2	Unit -4: Diffraction II:- Fraunhoffer diffraction: single-slit diffraction, double -slit diffraction.
	3	N-slit diffraction, plane transmission granting spectrum, dispersive power of grating, limit of resolution.
	4	Rayleigh's criterion, resolving power of telescope and a grating Differences between.
December	1	Prism and grating spectra ,Numerical Problem.
	2	
	3	
	4	

January	1	
	2	
	3	
	4	
February	1	**Semester - 4th**
	2	
	3	Unit-1: Polarization :-Polarization: Polarisation by reflection, refraction and scattering,Malus Law .
	4	Phenomenon of double refraction, Huygen's wave theory of double refraction (Normal and oblique incidence), Analysis of polarized Light.
March	1	Polarized Light. Nicol prism,Quarter wave plate and half wave plate, production and detection of (1) Plane polarized light.
	2	Production and detection of (1) Plane polarized light (ii) Circularly polarized light and (iii) Elliptically polarized light. Optical activity, Fresnel's theory of optical rotation.
	3	Fresnel's theory of optical rotation, Specific rotation, Polarimeters (half shade and Biquartz) .
	4	Unit-II: Fourier analysis:-Fourier theorem and Fourier series, evaluation of Fourier coefficient, importance and limitations of Fourier theorem, even and odd functions.
April	1	Fourier series of functions f(x) between (i) 0 to 2pi, (ii) pi to pi, (iii) 0 to pi, (iv) -L to L, complex form of Fourier series, Application of Fourier theorem for analysis of complex waves: solution of triangular and rectangular waves.
	2	Half and full wave rectifier outputs, Parseval identity for Fourier Series, Fourier integrals.Unit III: Fourier transforms:-Fourier transforms and its properties.
	3	Application of Fourier transform (1) for evaluation of integrals, (ii) for solution of ordinary differential equations, (iii) to the following functions.1. f(x)=e-x2/2. 2. f(x) =0
	4	Geometrical Optics I:- Matrix methods in paraxial optics, effects of translation and refraction, derivation of thin lens and thick lens formulae, unit plane, nodal planes, system of thin lenses.
May	1	Unit-IV: Geometrical Optics II :-Chromatic, spherical, coma, astigmatism and distortion aberrations and their remedies. Fiber Optics :-Optical fiber, Critical angle of propagation, Mode
	2	Fractional refractive index change, Numerical aperture, Types of opties fiber, Normalize frequency, Pulse dispersion, Attenuation, Applications, Fiber optie Communication Advantages.
	3	
	4	

Lesson Plan

Name of the Assistant/ Associate Professor: Mange Ram

Class and Section: B.sc 2nd year (Non Medical)(3 and 4 Semester)

Subject: Physics (paper 1) (1) Computer Programming, Thermodynamics and
(2) Statistical Physics

Session: 2022 -2023

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	**Semester - 3rd**
	2	
	3	
	4	Introduction of Computer organisation, Binary Representation, Algorithm Development, Flow charts theter interpretation .
September	1	Fortran Preliminaries,Integer & Floating Point Arithmetic Expressions , Built in functions, Executable & Non Executable Statements .
	2	Input ,Output and Format Statements, Doubt's Related to Fortran Preliminaries IF, Do and GOTO Statements .
	3	Dimension & Arrays, Statements functicent Function Subprogram
	4	Applications of fortran programming - To Print all natural numbers between given limit, Range of set of given numbers, Ascending & Desending order .
October	1	Mean and Standard deviation, Least Square fitting of curve,Product of two matrices .
	2	Roots of quadratic Equationsl, Trapezoidal Rule, Simpson's 1/3 Rule.
	3	Introduction of Thermodynamics Laws & their significance Carnot Engine & Carnot Theorem, Absolute Scale of Temperature and Absolute zero.
	4	Joule's free Expansion , Joule Thomson Effect and Joule Thomson Experiment, Analytical treatment of joule - Thomson effect.
November	1	Problems Related to Joule- Thomson effect, Introduction of Entrop , Entropy of Revessible and Irreversible Process .
	2	Entropy of perfect Gas, Nernest Heat law, Liquefaction of gases, solidification of helium 4K, Cooling adiabatic demagnetization.
	3	Derivation of clausius Clapeyron latent heat equation and their significance, specific heat of saturated vapours, phase diagram and triple point of a substance.
	4	Development of Maxwell thermodynamical relations, thermodynamical function: internal energy, Helmholtz function, Enthalpy,Gibbs function and relation between them.

December	1	Derivation of Maxwell thermodynamical relation from thermodynamical functions, derivation of Clausius -Clapeyron and Clausius equation ,variation of instrinsic energy with volume for (1)perfect gas (2)vanderwall gas (3) solid and liquid
	2	Derivation of Stefan's law, adiabatic compressions and expension of gas and deduction of theory of Joule- Thomson effect .
	3	
	4	
January	1	**Semester - 4th**
	2	
	3	
	4	
February	1	
	2	
	3	Unit -I: Statistical Physics I :-Microscopic and Macroscopic systems, events-mutually exclusive, dependent and independent. Probability, statistical probability.
	4	A priori Probability and relation between them, probability theorems, some probability considerations, combinations possessing maximum probability, combination possessing minimum probability.
March	1	Thermodynamical probability, Constraints and Accessible states, Statistical fluctuations, general distribution of distinguishable particles in compartments of different sizes, Condition of equilibrium between two systems in thermal contact- B parameter.
	2	Unit-II: Statistical Physics II :- Postulates of statistical physics, Phase space, Division of Phase space into cells, three kinds of statistics, basic approach in three statistics.
	3	M. B. statistics applied to an ideal gas in equilibrium- energy distribution law (including evaluation of o and ß), speed distribution law & velocity distribution law. Expression for average speed,
	4	R.m.s. speed, average velocity, r. m. s. velocity, most probable energy and mean energy for Maxwellian distribution. Unit-III (Quantum Statistics) :-Need for Quantum Statistics: Bose-Einstein energy distribution law .
April	1	Application of B.E. statistics to Planck's radiation law B.E. gas, Degeneracy and B.E. Condensation, Fermi- Dirac energy distribution law, F.D. gas and Degeneracy, Fermi energy and Fermi temperature, Fermi Dirac energy distribution law for electron gas in matel.
	2	Zero point energy, Zero point pressure and average speed (at 0 K) of electron gas, Specific heat anomaly of metals and its solution. M.B. distribution as a limiting case of B.E. and F.D. distributions, Comparison of three statistics.

	3	Unit-IV: (Theory of Specific Heat of Solids):-Dulong and Petit law. Derivation of Dulong and Petit law from classical physics. Specific heat at low temperature
	4	Einstein theory of specific heat, Criticism of Einstein theory, Debye model of specific heat of solids,
May	1	Success and shortcomings of debate theory , Tossing of 2,3 and any number of Coins, Permutations and combinations, distributions of N (for N 2,3,4) distinguishable and indistinguishable particles in two boxes of equal size.
	2	Micro and Macro states, Numerical problem.
	3	
	4	

Lesson Plan

Name of the Assistant/ Associate Professor: Mahak

Class and Section: B.Sc 3rd (Non Medical)

Subject: Physics (Paper 1) 1. Quantum Mechanics and Laser
2. Solid State and Nanotechnology

Session: 2022 -2023

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	**Semester - 5th**
	2	
	3	
	4	Boundary between Classical and Quantum , Photoelectric effect , Compton effect .
September	1	Frank Hertz experiment, De broglie Hypothesis , Davisson Germer experiment ,G.P Thomson experiment .
	2	Phase velocity, Group velocity, Heisenberg 's uncertainty Principle, Gamma Ray Microscope, Electron diffraction from slit .
	3	Derivation of Schrodinger Wave equation , Eigen value, Eigen function and significance , Orthogonality of function .
	4	Normalisation of function, Concept of observable and operator , Exceptation value of Dynamical Quantities .
October	1	Probability current Density , Numerical Problems .
	2	Free Particle in one Dimensional box, Nodes and Antinodes, Zero point energy, One dimensional step potential E >Vo.
	3	ONE Dimensional Step Potential E<Vo, Tunneling effect, Linear Harmonic oscillator .
	4	Quantization of energy for oscillator, Zero point Energy, wave equation of Harmonic oscillator .
November	1	Property of Laser (Intensity, Directionality) Property of Laser (Conernce, Monochromaticity) .
	2	Einstein's coefficients and possibility of amplification , Momentum transfer , Life time of a level.
	3	Kinetic of optical absorption, population invesion, resonance cavity .
	4	Laser pumping , threshold condition for laser action, line broadening mechanism, Homogeneous line broadening
December	1	Inhomogeneous , line broadening, working of He- Ne and Ruby laser.
	2	Construction and working of semiconductor laser , application of laser .
	3	
	4	
January	1	

	2	
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February	1	**Semester - 6th**
	2	
	3	Unit I: Crystal Structure I :- Crystalline and glassy forms, liquid crystals , crystals structure, periodicity , lattice and basic crystal translational vectors and axes .
	4	Unit cell and primitive cell, winger seitz primitive cell .Unit cell and Primitive Cell, Winger Seitz primitive Cell, symmetry operations for a two dimensional crystal, Bravais lattices in two and three dimensions.
March	1	Crystal planes and Miller indices, Interplaner spacing, Crystal structures of Zinc Sulphide, Sodium Chloride and Diamond. Unit II: Crystal Structure II :- X-ray diffraction.
	2	X-ray diffraction, Bragg's Law and experimental X-ray diffraction methods. K-space and Reciprocal lattice and its physical significance, Reciprocal lattice vectors.
	3	Reciprocal lattice to a simple cubic lattice, b.c.c. and f.c.c. Unit III: Super conductivity Historical introduction, Survey of superconductivity,
	4	Super conducting systems, High Tc Super conductors, Isotopic Effect, Critical Magnetic Field, Meissner Effect, London Theory and Pippards' equation, Classification of Superconductors (type I and Type II), BCS Theory of Superconductivity,
April	1	Flux quantization, Josephson Effect (AC and DC), Practical Applications of superconductivity and their limitations, power application of superconductors.
	2	Numerical Problem ,Their limitations, Power application of superconductors.
	3	Unit IV: Introduction to Nano Physics Definition, Length scale, Importance of Nano-scale and technology.
	4	History of Nan- technology, Benefits and challenges in molecular manufacturing. Molecular assembler concept, Understanding advanced capabilities.
May	1	Vision and objective of Nano-technology, Nanotechnology in different field, Automobile, Electronics.
	2	Nano-biotechnology, Materials, Medicine , Numerical Problem.
	3	
	4	

Lesson Plan

Name of the Assistant/ Associate Professor: Nisha

Class and Section:B.Sc Final (Non Medical)

Subject:(Physics Paper -2). 1 Nuclear PhysicsAtomic
2 Atomic and Molecular spectroscopy

Session: 2022-2023

Month	Week	Topics
July	1	
	2	
	3	
	4	
August	1	**Semester - 5th**
	2	
	3	
	4	Unit I: Nuclear Structure and Properties of Nuclei:- Nuclear composition (p-e and p-n hypotheses), Nuclear properties, Nuclear size, spin, parity, statistics, magnetic dipole moment.
September	1	Quadruple moment (shape concept),Determination of mass by Bain-Bridge, Bain-Bridge and Jordan mass spectrograph. Determination of charge by Mosley Law.
	2	Determination of size of nuclei by Rutherford Back Scattering, mass and binding energy, Numerical Problem.
	3	Systematic of nuclear binding energy, nuclear stability, Unit II: Nuclear Radiation decay Processes:-Alpha-disintegration and its theory. Energetics of alpha-decay.
	4	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 of heavy charged particles (Alpha particles).
October	1	Energy loss of heavy charged particle (idea of Bethe formula, no derivation), 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.
	2	Absorption of beta-particles. Interaction of Gamma Ray, Passage of Gamma radiations through matter (Photoelectric, Compton and pair production effect) electron-positron annihilation.
	3	Absorption of Gamma rays (Mass attenuation coefficient) and its application.Unit III: Nuclear Accelerators:-Linear accelerators.
	4	Tendem accelerator, Cyclotron and Betatron accelerators.
November	1	Nuclear Radiation Detectors,Gas filled counters, Ionization chamber, proportional counter, G.M. Counter (detailed study), Scintillation counter and semiconductor detector

	2	Unit IV: Nuclear reactions.:-Nuclear reactions, Elastic scattering, Inelastic scattering.
	3	Nuclear disintegration Photonuclear reaction, Radiative capture, Direct reaction, Heavy ion reactions ar spallation Reactions.
	4	Conservation laws, Q-value and reaction threshold,Nuclear Reactors, Nuclear Reactors, General aspects of Reactor Design.
December	1	Nuclear fission and fusion reactors, (Principle, construction, working and use),Numerical Problem.
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	4	
January	1	
	2	
	3	
	4	**Semester - 6th**
February	1	
	2	
	3	Unit-1: Historical background of atomic spectroscopy:-Introduction of early observations, emission and absorption spectra, atomic spectra, wave number, spectrum of Hydrogen atom in Balmer series, Bohr atomic model (Bohr's postulates). spectra of Hydrogen atom.
	4	Un-quantized states and continuous spectra, spectral series in absorption spectra, effect of nuclear motion on line spectra (correction of finite nuclear mass), variation in Rydberg constant due to finite mass, short comings of Bohr's theory, Wilson sommerfeld quantization rule.
March	1	De-Broglie interpretation of Bohr quantization law, Bohr's corresponding principle, Sommerfeld's extension of Bohr's model, Sommerfeld relativistic correction, Short comings of Bohr-Sommerfeld theory, Vector atom model; space quantization, electron spin.
	2	Coupling of orbital and spin angular momentum, spectroscopic terms and their notation, quantum numbers associated with vector atom model, transition probability and selection rules. Unit-II: Vector Atom Model (single valance electron) Orbital magnetic dipole moment (Bohr megnaton), behavior of magnetic dipole in external magnetic filed .
	3	Penetrating and Non-penetrating orbits, Penetrating orbits on the classical model; Quantum defect, spin orbit interaction energy of the single valance electron, spin orbit interaction for penetrating and non-penetrating orbits quantum mechanical relativity correction, Hydrogen fine spectra.
	4	Main features of Alkali Spectra and their theoretical interpretation, term series and limits, Rydeburg-Ritze combination principle, Absorption spectra of Alkali atoms, observed doublet fine structure in the spectra of alkali metals and its Interpretation, Intensity rules for doublets

April	1	Orbital magnetic dipole moment (Bohr megnaton), behavior of magnetic dipole in external magnetic filed; Larmors precession and theorem,comparison of Alkali spectra and Hydrogen spectrum.
	2	UNIT-III: Vector Atom model (two valance electrons)Essential features of spectra of Alkaline-earth elements, Vector model for two valance electron atom: application of spectra Coupling Schemes LS or Russell - Saunders Coupling Scheme and JJ coupling scheme, Interaction energy in L-S coupling (sp. pd configuration),
	3	Lande interval rule, Pauli principal and periodic classification of the elements. Interaction energy in JJ Coupling (sp. pd configuration), equivalent and non-equivalent electrons.
	4	Two valance electron system-spectral terms of non-equivalent and equivalent electrons, comparison of spectral terms in L-S And J-J coupling Hyperfine structure of spectral lines and its origin, isotope effect, nuclear spin.
May	1	Zeeman Effect, Experimental set-up for studying Zeeman effect, Explanation of anomalous Zeeman effect, Zeeman pattern of DI and D2 lines of Na- atom, Paschen-Back effect of a single valence electron system. Weak field Stark effect of Hydrogen atom.
	2	Molecular Physics:General Considerations, Electronic States of Diatomic Molecules, Rotational Spectra, Vibrational Spectra, Rotator Model of Diatomic Molecule, Raman Effect, Electronic Spectra
	3	
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