Name of Teacher – Mr. Sahil **Subject – Organic Chemistry**
Paper –
Class – B.Sc. 1st

Weeks With Months	Contents
OCT 23	
OCT 26-31	,
NOV 2-7	
NOV 9-14	
NOV 16-21	Localized and delocalized chemical bond,Van der Waal's interactions, resonance: conditions resonance effect and its applications Concept of isomerism. Types of isomerism. Optical isomerism – elements of symmetry
NOV 23-28	Molecular chirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers
NOV 30- DEC 5	Chiral and achiral molecules with two stereogenic centres , Diastereomers, threo and erythro diastereomers, meso compounds resolution of enantiomers, inversion, retention and racemization
DEC 7-12	Relative and absolute configuration, sequence rules, R & S systems of nomenclature Geometric isomerism – determination of configuration of geometric isomers. E & Z system of nomenclature
DEC 14-19	Conformational isomerism – conformational analysis of ethane and n-butane, conformations of cyclohexane, axial and equatorial bonds Newman projection and Sawhorse formulae, Difference between configuration and conformation
DEC 21-26	Curved arrow notation, drawing electron movements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking Types of reagents – electrophiles and nucleophiles
DEC 28- JAN 2	Types of organic reactions Reactive intermediates – carbocations, carbanions, free radicals, carbenes, (formation, structure & stability).
JAN 4-9	IUPAC nomenclature of branched and unbranched alkanes Classification of carbon atoms in alkanes. Isomerism in alkanes, sources, methods of formation: Wurtz reaction, Kolbe reaction,
JAN 11-16	Corey-House reaction and decarboxylation of carboxylic acids Physical properties.: Mechanism of free radical halogenation of alkanes
JAN 18-23	Reactivity and selectivity Cycloalkanes – nomenclature, synthesis of cycloalkanes and their derivatives Photochemical (2+2) cycloaddition reactions,

JAN 25-30	Dehalogenation of α,ω-dihalides, , pyrolysis of calcium or barium salts of dicarboxylic acids, Baeyer's strain theory and its limitations., theory of strainless rings.

Name of Teacher – Mr. Sahil **Subject – Inorganic Chemistry**
Paper –
Class – B.Sc. 1st

Weeks With Months	Contents
OCT 23	
OCT 26-31	,
NOV 2-7	
NOV 9-14	
NOV 16-21	Idea of de Broglie matter waves, Heinsenberg's uncertainty principle, atomic orbitals, quantum numbers, radial and angular wave functions, normal and orthogonal wave functions.
NOV 23-28	significance of Ψ and Ψ2 , probability distribution curves, shapes of s, p, d, f orbitals, Aufbau and Pauli exclusion principles, Hund's multiplicity rules, Electronic configuration of elements.
NOV 30- DEC 5	effective nuclear charge, Slater's rules, Classification of periodic table into s, p, d, f blocks.
DEC 7-12	atomic and ionic radii, ionisation energy, electron affinity and electronegativity definition methods of determination or evaluation, trend in periodic table (in s and p-block elements).
DEC 14-19	methods of determination or evaluation, trend in periodic table (in s and p-block elements).
DEC 21-26	Valence bond theory (Heitler-London and Pauling approach) and its limitation, directional characteristics of covalent bond, various type of hybridisation and shapes of simple inorganic molecules and ions (BeF2, BF3, CH4).
DEC 28- JAN 2	various type of hybridisation and shapes of simple inorganic molecules and ions (PF5, SF6, IF7, SO4 -2 , ClO4 -1 , NO3 -1) valence shell electron pair repulsion (VSEPR) theory to NH3, H3O + , SF4, ClF3, H2O, SnCl2, ClO3 -1 and ICl2-.
JAN 4-9	Molecular orbital theory of homonuclear (N2, O2) heteronuclear (CO and NO) diatomic molecules and ions, bond energy, bond angle, bond length and dipole moments, percentage ionic character from dipole moment and electronegativity difference.

JAN 11-16	Ionic structures (NaCl, CsCl, ZnS (Zinc blende), CaF2) size effects, radius ratio rule and its limitations, Madelung constant.
JAN 18-23	Stoichiometric and Non stoichiometric defects in crystals, Lattice energy (mathematical derivation excluded) and Born Haber cycle. **Test**
JAN 25-30	Solvation energy and its relation with solubility of Ionic solids, Polarizing power and Polarisability of ions, Fajan's rule. **Test**

Name of Teacher – Mr. Sahil **Subject – Inorganic Chemistry**
Paper –
Class – B.Sc. 2nd

Weeks With Months	**Contents**
OCT 23	Definition of transition elements, position in the periodic table, General characteristic properties of d-Block elements.
OCT 26-31	General characteristic properties of d-Block elements, Comparison of properties of 3d elements with 4d and 5d elements with reference only to ionic radii.
NOV 2-7	Oxidation state, magnetic and spectral properties and stereochemistry.
NOV 9-14	Stability of various oxidation states and e.m.f (Latimer diagrams).
NOV 16-21	Stability of various oxidation states and e.m.f (Frost diagrams).
NOV 23-28	Structure and properties of some compounds of transition elements- TiO2, VOCl2.
NOV 30- DEC 5	Structure and properties of some compounds of transition elements- FeCl3, CuCl2 and Ni(CO)4.
DEC 7-12	Werner's theory of coordination compounds, effective atomic number.
DEC 14-19	Chelates, nomenclature of coordination compounds
DEC 21-26	Isomerism in coordination compounds, valence bond theory of transition metal complexes
DEC 28- JAN 2	Physical properties of solvents, types of solvents
JAN 4-9	General characteristics, reactions in non aqueous solvents with reference to liquid NH3

JAN 11-16	General characteristics, reactions in non aqueous solvents with reference to liquid SO2
JAN 18-23	**Revision** **Test**
JAN 25-30	**Revision** **Test**

Name of Teacher – Mr. Sahil **Subject – Physical Chemistry**
Paper –
Class – B.Sc. 2nd

Weeks With Months	**Contents**
OCT 23	Definition of thermodynamic terms: system, surrounding etc.
OCT 26-31	Types of systems, intensive and extensive properties. State and path functions and their differentials.
NOV 2-7	Thermodynamic process. Thermodynamic equilibrium, Concept of heat and work.
NOV 9-14	First law of thermodynamics: statement, concepts of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship.
NOV 16-21	Joule–Thomson coefficient for ideal gas and real gas and inversion temperature
NOV 23-28	Calculation of w,q, dU & dH for the expansion of ideal gases under isothermal conditions for reversible process.
NOV 30- DEC 5	Calculation of w,q, dU & dH for the expansion of ideal gases under adiabatic conditions for reversible process
DEC 7-12	Equilibrium constant and free energy, concept of chemical potential,
DEC 14-19	Thermodynamic derivation of law of chemical equilibrium. Temperature dependence of equilibrium constant
DEC 21-26	Clausius–Clapeyron equation and its applications.
DEC 28- JAN 2	Nernst distribution law – its thermodynamic derivation,
JAN 4-9	Applications of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride

JAN 11-16	Applications of distribution law: (ii) Determination of equilibrium constant of potassium tri-iodide complex
JAN 18-23	Applications of distribution law: (iii) Process of extraction. More stress on numerical problems.
JAN 25-30	**Test**

Name of Teacher – Mr. Sahil **Subject – Inorganic Chemistry**
Paper –
Class – B.Sc. 3rd

Weeks With Months	**Contents**
OCT 23	Limitations of valence bond theory
OCT 26-31	an elementary idea of crystal field theory, crystal field splitting in octahedral
NOV 2-7	crystal field splitting in octahedral, tetrahedral and square planer complexes.
NOV 9-14	factors affecting the crystal field parameters Revision
NOV 16-21	A brief outline of thermodynamic stability of metal complexes
NOV 23-28	d factors affecting the stability, Irving William Series.
NOV 30- DEC 5	Substitution reactions of square planer complexes of Pt[II], Trans effect. Revision
DEC 7-12	Types of magnetic materials, magnetic susceptibility.
DEC 14-19	method of determining magnetic susceptibility
DEC 21-26	spin only formula, L-S coupling, correlation of μs and μeff values
DEC 28- JAN 2	Orbital contribution to magnetic moments, application of magnetic moment data for 3d metal complexes.
JAN 4-9	Selection rules for d-d transition, spectroscopic ground states

JAN 11-16	spectrochemical series, orgel energy level diagram for d1 and d9 states
JAN 18-23	discussion of electronic spectrum of [Ti(H2O)6] +3 complex ion
JAN 25-30	**Revision** **Test**

Name of Teacher – Mr. Sahil **Subject – Physical Chemistry**
Paper –
Class – B.Sc. 3rd

Weeks With Months	**Contents**
OCT 23	Black-body radiation
OCT 26-31	Plank's radiation law, photoelectric effect,
NOV 2-7	postulates of quantum mechanics, quantum mechanical operators
NOV 9-14	commutation relations, Hamiltonian operator, Hermitian operator, average value of square of Hermitian as a positive quantity, Role of operators in quantum mechanics
NOV 16-21	To show quantum mechanically that position and momentum cannot be predicated simultaneously, Determination of wave function & energy of a particle in one dimensional box.
NOV 23-28	Optical activity, polarization – (Clausius – Mossotti equation - derivation excluded). Orientation of dipoles in an electric field
NOV 30- DEC 5	dipole moment, induced dipole moment, measurement of dipole moment-temperature method and refractivity method
DEC 7-12	dipole moment and structure of molecules, Magnetic permeability, magnetic susceptibility and its determination.
DEC 14-19	Application of magnetic susceptibility, magnetic properties – paramagnetic, diamagnetism and ferromagnetism. **Spectroscopy** : Introduction: Electromagnetic radiation
DEC 21-26	Regions of spectrum, basic features of spectroscopy, statement of Born-oppenheimer approximation, Degrees of freedom.
DEC 28- JAN 2	**Rotational Spectrum** : Selection rules, Energy levels of rigid rotator (semi-classical principles), rotational spectra of diatomic molecules , spectral intensity distribution

	using population distribution (Maxwell-Boltzmann distribution)
JAN 4-9	determination of bond length and isotopic effect . **Vibrational spectrum** : Selection rules, Energy levels of simple harmonic oscillator, pure vibrational spectrum of diatomic molecules
JAN 11-16	determination of force constant and qualitative relation of force constant and bond energy, idea of vibrational frequencies of different functional groups.
JAN 18-23	**Raman Spectrum** : Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules, Quantum theory of Raman spectra.
JAN 25-30	**Test**