GUJRANWALA GURU NANAK KHALSA COLLEGE, CIVIL LINES, LUDHIANA AFFILIATED TO PANJAB UNIVERSITY, CHANDIGARH

Academic Calendar for the session 2018-19 with Under Graduate & Post Graduate Chemistry Course having Semester System of examination:-

<u>SummerVacation</u>	02-06-18	То	08-07-18	(39 days)
	Saturday		Sunday	
<u>Academic Calendar</u>				
Colleges Open on and normal Admission for on-going Classes	09-07-18 Monday			
Admission Shedule				
Admission Process		upto	13-07-18 Friday	(07 days)
Normal Admission for New classes (except for those Classes in which admission is Through PU-CET(U.G.))	16-07-18 Monday	То	28-07-18 Saturday	(13 days)

Late Admission for, ongoing					
Classes and new classes) to be					
allowed by the Principal of the	30-07-18	То	13-08-18		(15 days)
College with late fee of	Monday		Monday		
Rs. 560/ - per student.					
<u>Commencement of Teaching</u>					
Admission for classes through	Schedule to be prov	ided by Dean	Faculty of Science		
CET tentative					
For new admission classes	As per CET				
(those admitted through PU-					
CET (P.G) tentative					
Late admission in Panjab	14.00.10		-	01 00 10	(10.1.)
University, affiliated Colleges to	14-08-18		То	31-08-18	(18 days)
be allowed by the Vice-	Tuesday			Friday	
Chancellor with fee of Rs.					
2040/-per student					

Academic Term –I (b)	09-07-18	То	07-12-18	(97 teaching days)
I st ,3 rd ,V th	Monday		Friday	

Total teaching days of Academic Term I = 97 Days

			Ba	achelor of	Science	es Sessi	on 2018-2019 (First Semester)
S.No.	Teacher	Class	Paper	Month	Week		Syllabus
1.	Prof.	B.ScI	Paper-III	July	III rd	UNIT-I	UNIT-I (8 Hrs.)
	Vishal		Physical			Mathematical	Mathematical Concepts and Evaluation of Analytical Data :
			Chemistry-			Concepts and	Logarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation
			А			Evaluation of	and integration of functions like ex, xn, sin x, log x; maxima and minima, partial
						Analytical Data :	differentiation and reciprocity relations.
						Logarithmic	Terms of mean and median, precision and accuracy in chemical analysis, determining
						relations, curve	accuracy of methods, improving accuracy of analysis, data treatment for series involving
						sketching, linear	relatively few measurements, linear least squares curve fitting, types of errors, standard
						graphs and	deviation.
					th	calculation of slopes	UNIT-II (7Hrs.)
					IV	Differentiation and	Gaseous States:
						integration of	Postulates of kinetic theory of gases, deviation from ideal behavior, Van der Waal's equation
						functions like ex, xn,	of state.
						sin x, log x	Critical Phenomena : PV isotherms of real gases, continuity of states, the isotherms of Van
				August	\mathbf{I}^{st}	Maxima and minima,	der Waal's equation, relationship between critical constants and Van der Waal's constants,
						partial differentiation	the law of corresponding states, reduced equation of state.
						and reciprocity	Molecular Velocities :Root mean square, average and most probable velocities. Qualitative
						relations	discussion of the Maxwell's distribution of molecular velocities, collision number, mean free
					II nd	Terms of mean and	path and collision diameter.
						median, precision	Liquification of gases (based on Joule-Inomson effect).
						and accuracy in	UNIT-III (8 Hrs.) Chamical Vinctica L
						chemical analysis,	Chemical kinetics and its scone, rate of a reaction, factors influencing the rate of a reaction
						determining accuracy	chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction-
						of methods	concentration, temperature, pressure, sorvent, light, cataryst. Concentration dependence of

			III rd	Improving accuracy of analysis, data treatment for series involving relatively few measurements, linear least squares curve fitting, types of errors, standard deviation. UNIT-II Gaseous States: Postulates of kinetic theory of gases, deviation from ideal behavior, Van der Waal's equation of state. Critical Phenomena : PV isotherms of real gases,	rates, mathematical characteristics of simple chemical reactions – zero order, first order, second order, pseudo order, half life and mean life. Determination of the order of reaction – differential method, method of integration, method of half life period and isolation method. Radioactive decay as a first order phenomenon. Chemical Kinetics-II : <i>Theories of Chemical Kinetics:</i> Effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy. Simple collision theory based on hard sphere model, transition state theory (equilibrium hypothesis). Expression for the rate constant based on equilibrium constant and thermodynamic aspects. Catalysis and general characteristics of catalytic reactions, Homogeneous catalysis, acid-base catalysis and enzyme catalysis including their mechanisms, MichaelisMenten equation for enzyme catalysis and its mechanism.
			V th	Continuity of states, the isotherms of Van der Waal's equation, relationship between critical constants and Vander Waal's constants	
		September	II nd	The law of corresponding states, reduced equation of state. Molecular Velocities: Root mean square, average and most probable velocities. Qualitative	

			1		
				discussion of	
				the Maxwell's	
				distribution of	
				molecular velocities,	
				collision number,	
			IV th	Mean free path and	
				collision diameter	
				Liquification of	
				gases (based on	
				Joula Thomson	
				offect)	
			v th	Chamical Vination I	
			v	Chemical Kineucs-I	
				Chemical kinetics	
				and its scope, rate of	
				a reaction, factors	
				influencing the rate	
				of a reaction-	
				concentration,	
		October	\mathbf{H}^{nd}	Temperature,	
				pressure, solvent,	
				light, catalyst.	
				Concentration	
				dependence of rates	
				mathematical	
				characteristics of	
				simple chemical	
				reactions – zero order	
				first order nseudo	
				order half life and	
				mean life	
			III rd	Determination of the	4
			111	order of reaction	
				differential with a	
			TT zth	anterential method,	4
			1V	Method of	
				integration, method	

				of half	
				life period and	
				isolation method.	
				Radioactive decay as	
				a first order	
				phenomenon.	
				Chemical Kinetics-	
				П:	
				Theories of Chemical	
				<i>Kinetics</i> : Effect of	
				temperature on rate	
				of reaction	
			W th	Arrhanius equation	
			v	Armenius equation,	
				concept of	
				activation energy.	
				Simple collision	
				theory based on hard	
				sphere model,	
				transition state theory	
				(equilibrium	
			-4	hypothesis).	
		November	Ist	Expression for the	
				rate constant based	
				on equilibrium	
				constant and	
				thermodynamic	
				aspects. Catalysis	
				and general	
				characteristics of	
				catalytic reactions,	
				Homogeneous	
				catalysis,	
			$\mathrm{II}^{\mathrm{nd}}$	Acid-base catalysis	
				and enzyme catalysis	
				including their	
				mechanisms,	
				MichaelisMenten	
				equation for enzyme	
				catalysis and its	

						mechanism	
2.	Prof.	B.Sc-I	Paper-II	July	III rd	UNIT-I	UNIT-I (8 Hrs.)
	Ruchika		Organic			Structure and	Structure and Bonding :
			chemistry-			Bonding :	Hybridization, bond lengths and bond angles, bond energy, localized and delocalized
			A			Hybridization, bond	chemical bond, Van der Waals interactions, resonance, hyperconjugation, aromaticity,
						lengths and bond	inductive and field effects, hydrogen bonding.
						angles, bond energy,	Mechanism of Organic Reactions :
						localized and	Curved arrow notation, drawing electron movements with arrows, half-headed and double-
						delocalized chemical	headed arrows, homolytic and heterolytic bond breaking. Types of reagents-electrophiles and
						bond, Vander Waals	nucleophiles. Types of organic reactions. Energy considerations. Reactive intermediates-
						interactions,	Carbocations, carbanions, free radicals, carbenes, arynes and nitrenes (with examples).
					IV th	Resonance,	Assigning formal charges on intermediates and other ionic species. Methods of determination
						hyperconjugation,	of reaction mechanism (product analysis, intermediates, isotope effects, kinetic and
						aromaticity,	stereochemical studies).
						inductive and field	UNIT –II (7 Hrs.)
						effects, hydrogen	Alkanes and Cycloalkanes:
						bonding.	Isomerism in alkanes, sources, methods of formation (with special reference to Wurtz
				August	I st	Mechanism of	reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids),
						Organic Reactions :	physical properties and chemical reactions of alkanes Mechanism of free radical halogenation
						Curved arrow	of alkanes: Orientation, reactivity and selectivity. Cycloalkanes - nomenclature, methods of
						notation, drawing	formation, chemical reactions, Baeyer's strain theory and its limitation. Ring strain in small
						electron movements	rings (cyclopropane and cyclobutane), theory of strainless rings. The case of cyclopropane
						with arrows, half-	ring: banana bonds
						headed and double-	UNIT-III (8 Hrs.)
						headed arrows,	Stereochemistry of Organic Compounds I:
						homolytic and	Concept of isomerism, Types of isomerism. Optical isomerism – Elements of symmetry,
						heterolytic bond	molecular chirality, enantiomers, stereogeniccenter, optical activity, properties of
						breaking. Types of	enantiomers, chiral and achiral molecules with two stereogeniccenters, diastereomers, threo
						reagents electrophiles	and erythrodiastereomers, meso compounds, resolution of enantiomers, inversion, retention
						and nucleophiles.	and racemization.
					\mathbf{H}^{nd}	Types of organic	Relative and absolute configuration, sequence rules, D & L and R & S systems of
						reactions. Energy	nomenclature.
						considerations.	UNIT-IV (7 Hrs.)
						Reactive	Stereochemistry of Organic Compounds II :
						intermediates—	Geometric isomerism: Determination of configuration of geometric isomers. E & Z system of
						Carbocations,	nomenclature, geometric isomerism in oximes and alicyclic compounds. Conformational
						carbanions, free	isomerism—Conformational analysis of ethane and n-butane; conformations of cyclohexane,
		1				radicals, carbenes,	axial and equatorial bonds, conformation of mono and disubstituted cyclohexane derivatives.

				arrange and nitronge	Neuman projection and Southerse formulae Eispher and flying wedge formulae
				(with examples)	Difference between configuration and conformation
			TTTrd	(with examples).	
			111	Assigning format	
				charges on	
				intermediates and	
				other ionic species.	
				Methods of	
				determination of	
				reaction mechanism	
				(product analysis,	
				intermediates,	
				isotope effects,	
				kinetic and	
				stereochemical	
			th	studies).	
			IV th	UNIT- II	
				Alkanes and	
				Cycloalkanes:	
				Isomerism in	
				alkanes, sources,	
				methods of formation	
				(with special	
				reference to Wurtz	
				reaction, Kolbe	
				reaction, Corey-	
				House reaction and	
				decarboxylation of	
				carboxylic acids),	
				physical properties	
				and chemical	
				reactions of alkanes	
		September	I st	Mechanism of free	
		-		radical halogenation	
				of alkanes:	
				Orientation,	
				reactivity and	
				selectivity.	
				Cycloalkanes –	
				nomenclature,	

			mathada of	
			ineurous of	
			formation, chemical	
			reactions	
		II nd	Baeyer's strain	
			theory and its	
			limitation Ring	
			strain in small rings	
			(cyclopropane and	
			cyclobutane), theory	
			of strainless rings.	
			The case of	
			cyclopropane ring:	
			banana bonds	
		III rd	UNIT-III	1
			Stereochemistry of	
			Organic	
			Compounds I:	
			Concept of	
			isomerism Types of	
			isomerism	
			Optical isomorism	
			Elemente of	
			Elements of	
			symmetry, molecular	
			chirality,	
			enantiomers,	
			stereogeniccenter,	
		IV th	Optical activity,	
			properties of	
			enantiomers, chiral	
			and achiral	
			molecules with two	
			stereogeniccenters,	
			diastereomers, threo	
			and	
			erythrodiastereomers,	
			meso compounds,	
		V^{th}	Resolution of	
			enantiomers,	

	1	1			
				inversion, retention	
				and racemization.	
				Relative and absolute	
				configuration,	
				sequence rules. D &	
				L and R & S systems	
				of nomenclature	
				of nomenclature.	
		October	II nd	UNIT-IV	
				Stereochemistry of	
				Organic	
				Compounds II ·	
				Geometric	
				isomerism:	
				Determination of	
				configuration of	
				geometric isomers. E	
				& Z system of	
				nomenclature	
			III rd	Geometric isomerism	
				in oximes and	
				alicyclic compounds.	
				Conformational	
				isomerism—	
				Conformational	
				analysis of ethane	
				and n-butane;	
			IV th	Conformations of	
				cyclohexane, axial	
				and equatorial bonds,	
				conformation of	
				mono and	
				disubstituted	
				cyclohexane	
				derivatives.	
		November	I st	Newman projection	
				and Sawhorse	
				formulae, Fischer	

						and flying wedge	
						formulae.	
					II nd	Difference between	
						configuration and	
						conformation	
3.	Prof. Jyoti	B.ScI	Paper-I	July	III rd	UNIT-I	UNIT-I (8 Hrs.)
			Inorganic			Atomic Structure :	Atomic Structure :
			Chemistry-			Idea of de Broglie	Idea of de Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals,
			А			matter waves,	Schrodinger wave equation, significance of Ψ and Ψ^2 , quantum numbers, radial and angular
						Heisenberg	wave functions and probability distribution curves, shapes of s, p, d orbitals. Aufbau and
						uncertainty principle,	Pauli exclusion principles, Hund's multiplicity rule. Electronic configurations of the elements
						atomic orbitals,	and ions.
						Schrodinger wave	UNIT-II (7 Hrs.)
						equation,	Periodic Properties :
						significance of Y and	Position of elements in the periodic table; effective nuclear charge and its calculations.
						Y2	Atomic and ionic radii, ionization energy, electron affinity and electronegativity-definition,
					IV^{th}	Quantum numbers,	methods of determination or evaluation, trends in periodic table and applications in
						radial and angular	predicting and explaining the chemical behaviour.
						wave functions and	UNIT-III (7 Hrs.)
						probability	Chemistry of Noble Gases and s-Block Elements :
						distribution curves	Chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon
				August	\mathbf{I}^{st}	Shapes of <i>s</i> , <i>p</i> ,	compounds. Comparative study, diagonal relationships, salient features of hydrides, solvation
						dorbitals. Aufbau and	and complexation tendencies including their function in biosystems, an introduction to alkyls
						Pauli exclusion	and aryls.
						principles, Hund's	UNIT-IV (8 Hrs.)
						multiplicity rule.	Chemical Bonding-I : Covalent Bond - Valence bond theory and its limitations, directional
						Electronic	characteristics of covalent bond, various types of hybridization and shapes of simple
						configurations of the	inorganic molecules and ions BeE ₂ BE ₂ CH ₄ PE ₅ SE ₅ IE ₇ SnCl ₂ XeE ₄ BE ⁻ ₄ PE ⁻ ₅ SnCl ²⁻ ₅
						elements and ions.	Valance shall electron pair repulsion (VSEDD) theory to NH. H_{10} SE. C.E. ICL, and
					\mathbf{H}^{nd}	UNIT-II	value of the set of t
						Periodic Properties	H_2O . WO theory, nomonuclear (elements and lons of 1st and 2nd row), and heteronuclear
						:Position of elements	(BO,CN, CO', NO', CO, CN'), diatomic molecules. Percentage ionic character from dipole
						in the periodic table;	moment and electronegativity difference.
						effective nuclear	
						charge and its	
						calculations. Atomic	
						and ionic	
						radii,	

		1			
			III^{rd}	Ionization energy,	
				electron affinity and	
				electronegativity	
				definition, methods	
				of determination or	
				evaluation,	
			IV th	Trends in periodic	
				table and	
				applications in	
				predicting and	
				explaining the	
				chemical behaviour	
			V th	UNIT-III	
			•	Chemistry of Noble	
				Cases and s-Block	
				Flements Chemical	
				properties of the	
				properties of the	
				abomistry of vanon	
				structure and	
				bonding in vonon	
				bonding in xenon	
		C t 1	ттnd	Compounds.	
		September	11	Comparative study,	
				diagonal	
				relationships, salient	
			rd	features of hydrides,	
			III ^{ra}	Solvation and	
				complexation	
				tendencies including	
				their function in	
				biosystems, an	
				introduction to alkyls	
				and aryls.	
			IV^{th}	UNIT-IV	
				Chemical Bonding-I	
				: Covalent Bond -	
				Valence bond theory	
				and its limitations,	

				directional	
				characteristics of	
				covalent bond,	
			V th	Various types of	
				hybridization and	
				shapes of simple	
				inorganic molecules	
				and ions. BeF ₂ , BF ₃ ,	
				CH ₄ , PF ₅ , SF ₆ , IF ₇ ,	
				SnCl ₂ , XeF ₄ , BF ₄ ,	
				PF_6 , $SnCl_6^2$	
		October	II nd	Valence shell	
				electron pair	
				repulsion (VSEPR)	
				theory to NH ₃ , H ₃ O+,	
				SF ₄ , ClF ₃ , ICl $_2$ and	
				$H_2O.$	
			III rd	MO theory	
			IV th	Homonuclear	
				(elements and ions of	
				1st and 2nd row),	
			V^{th}	Heteronuclear (BO,	
				$CN, CO^+, NO^+, CO,$	
				CN ⁻)	
		November	Ist	Diatomic molecules.	
				Percentage ionic	
				character from dipole	
1				moment and	
				electronegativity	
1				difference.	

		Bache	elor of Sci	ences		Session 2018-19	Third Semester
S.No.	Teacher	Class	Paper	Month	Week		Syllabus
1.	Prof. Vishal	B.Sc II	Paper-XI Physical Chemistry- A	July	III rd IV th	UNIT-I Liquid State: Intermolecular forces, structure of liquids (a qualitative description) Structural differences between solids, liquids and gases	UNIT-I (8 Hrs.) Liquid State: Intermolecular forces, structure of liquids (a qualitative description). Structural differences between solids, liquids and gases. <i>Liquid Crystals</i> :Difference between liquid crystal, solid and liquid. Classification, structure of nematic and cholestric phases. Thermography and seven segment cell. UNIT-II (7 Hrs.) Chemical Equilibrium:
				August	I st	Liquid Crystals : Difference between liquid crystal, solid and liquid Classification, structure of nematic and cholestric phases. Thermography and	 Equilibrium constant and free energy. Thermodynamic derivation of law of mass of mass action. Le - Chatelier's principle. Reaction isotherm and Reaction isochore-Clapeyron equation and Clausius –Clapeyron equation, applications. UNIT-III (8 Hrs.) Thermodynamics-II: Second Law of Thermodynamics: Need for the law, different statements of the law, Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature. Concept of Entropy: Entropy as a state function, entropy as a function of V & T, entropy as a function of
					III rd	seven segment cell. UNIT-II Chemical Equilibrium: Equilibrium constant and free energy.	 P & T, entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases. UNIT-IV (7 Hrs.) Thermodynamics-III: Third Law of Thermodynamics: Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz functions (A) as thermodynamic quantities, A
					IV th	Thermodynamic derivation of law of mass of mass action. Le - Chatelier's principle.	&G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V and T.
					V th	Reaction isotherm and Reaction isochore- Clapeyron equation and Clausius –Clapeyron equation, applications.	
				September	$\mathrm{II}^{\mathrm{nd}}$	UNIT-III Thermodynamics-II:	

				Second Law of	
				Thermodynamics: Need	
				for the law, different	
				statements of the law,	
				Carnot cycle and its	
				efficiency	
			III rd	Carnot theorem.	
				Thermodynamic scale	
				of temperature.	
				Concept of Entropy:	
				Entropy as a state	
				function	
			IV th	Entropy as a function of	
				V & T, entropy as a	
				function of P & T,	
				entropy change in	
				physical change	
			V th	Clausius inequality,	
				entropy as a criteria of	
				spontaneity and	
				equilibrium.	
		October			
			II nd	Entropy change in ideal	
				gases and mixing of	
				gases.	
			III rd	UNIT-IV	
				Thermodynamics-III:	
				Third Law of	
				Thermodynamics:	
				Nernst heat theorem,	
				statement and concept	
				of residual entropy,	
			IVth	Evaluation of	
				absolute entropy from	
				heat capacity data.	
				Gibbs and Helmholtz	
			th	functions	
			V ⁱⁱⁱ	Gibbs function (G) and	

						Helmholtz	
						functions (A) as	
						thermodynamic	
						quantities	
				November	Ict	Λ RC as aritaria for	
				November	151	A do as cineria ior	
						equilibrium and	
						spontaneity,	
						their advantage over	
						entropy change.	
					II^{na}	Variation of G and A	
						with P, V and T.	
2.	Prof.Ruchi	B.Sc-II	Paper-X	July	III^{rd}	UNIT-I	UNIT-I (8 Hrs.)
	ka		Organic			Alcohols and Phenols:	Alcohols and Phenols:
			chemistry-			Classification and	Classification and nomenclature. Monohydric alcohols-Nomenclature, methods of formation
			A			nomenclature	by reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding. Acidic
							nature. Reactions of alcohols. Dihydric and Trihydric alcohols-Nomenclature, methods of
					IV th	Monohydric alcohols-	formation, chemical reactions of vicinal glycols and glycerol. Preparation of phenols,
						Nomenclature, methods	physical properties and acidic character. Comparative acidic strengths of alcohols and
						of formation by	phenols resonance stabilization of phenoxide ion Reactions of phenols-electrophilic
						reduction of aldehydes	aromatic substitution acylation and carboxylation Mechanisms of Fries rearrangement
						ketones carboxylic	Claisen rearrangement Gatterman synthesis and Reimer-Tiemann reaction
						acide	UNIT-II (8 Hrs.)
						and astars	Aldahydas and Katanas I
				August	Tst	lludrogen hending	Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with
				August	1	Asidia natura Desetiona	nonienciature and structure of the carbonyl group. Synthesis of aldenydes and ketones with particular reference to the synthesis of aldenydes from acid chorides, synthesis of aldenydes
						Acidic nature. Reactions	particular reference to the synthesis of aldenydes from actu chordes, synthesis of aldenydes
						of alcohols. Dinydric	and ketones using 1,5-diultanes, synthesis of ketones from muttes and from carbox yild actus.
						and Trihydric alcohols-	Physical properties.
						Nomenclature, methods	UNII-III (7 Hrs.)
						of formation, chemical	Aldehydes and Ketones-II
						reactions of vicinal	Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin,
						glycols and glycerol.	aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its
					II nd	Preparation of phenols,	derivatives. Wittig reaction, Mannich reaction. Use of acetals as protecting group. Oxidation
						physical properties and	of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizzaroreaction, MPV, Clemmensen,
						acidic character.	Wolff-Kishner, LiAIH ₄ and NaBH ₄ reductions.
						Comparative acidic	UNIT-IV
						strengths of alcohols	Carboxylic Acids: (7 Hrs.)
						and	Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects

			III rd	phenols,resonancestabilizationofphenoxide ionReactions ofphenols-electrophilicaromatic	of substitutions on acid strength. Preparations of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Synthesis of acid chlorides, esters and amides, Reduction of carboxylic acids. Mechanism of decarboxylation.Methods of formation and chemical reactions of halo acids. Hydroxyl acids: Malic, tartaric and citric acids(structural features only). Methods of formation and chemical reactions of unsaturated monocarboxylic
				acylation and carboxylation.	actos. Dicarboxyne actos: Methods of formation and effects of heat and hydrating agents.
				rearrangement	
			IV th	Claisen rearrangement,	
				Gatterman synthesis, and Reimer-Tiemann	
				reaction.	
		September	I st	UNIT-II	
				Aldehydes and	
				Ketones I	
				Nomenciature and structure of the corbonyl	
				group Synthesis of	
				aldehydes and ketones	
				with particular reference	
				to the synthesis of	
				aldehydes from acid	
				chorides,	
			II nd	Synthesis of aldehydes	
				and ketones using 1,3-	
				dithianes,	
				synthesis of ketones	
				from nitriles and from	
				carboxylic acids,	
			TTT	Physical properties.	
			III "	UNIT-III Aldohudog	
				Ketones-II	
				Mechanism of	
				nucleophilic additions to	
				carbonyl group with	

				particular emphasis
				benzoin aldol Perkin
1				and Knoevenagel
				condensations
			W th	Condensation with
			1 V	condensation with
				ammonia and its
				derivatives. Wittig
				reaction, Mannich
ł				reaction. Use of acetals
			– -th	as protecting group
			V	Oxidation of aldehydes,
				Baeyer-Villiger
				oxidation of ketones,
				Cannizzaro
				reaction, MPV,
				Clemmensen, Wolff-
				Kishner, LiAIH ₄ and
				NaBH ₄ reductions.
		October		
			\mathbf{H}^{nd}	UNIT-IV
				Carboxylic Acids:
				Nomenclature, structure
				and bonding, physical
				properties, acidity of
				carboxylic acids effects
				of substitutions on poid
				strength
			TTTrd	Dependence of
				Preparations of
				carboxylic acids.
				Reactions of carboxylic
				acıds. Hell-Volhard-
			th	Zelinsky reaction
			IV ⁱⁿ	Synthesis of acid
				chlorides, esters and
				amides, Reduction of
				carboxylic acids.
		November	I st	Mechanism of
				decarboxylation.

Amanpreet Kaur II Inorganic Chemistry- A Chemistry of Elements of First Transition Series: Chemistry of Elements of First Transition Series: Chemistry of Elements of A-block elements. Chemistry of Elements of A-block elements. Properties of d-block elements. Properties of d-block elements. IV th Properties of d-block elements. IV th Properties of the elements of the first transition series, their simple compounds and complexes, illustrating relative stability of their oxidation UNIT-II (7 Hrs.) August I st Properties of the elements of the first transition series, their simple compounds and complexes, illustrating relative stability of their oxidation UNIT-III (8 Hrs.) August I st Properties of transition series, their V I st Properties of transition series, their V V I st Properties of transition series, their V V I st Properties of transition series, their V V <tr< th=""><th>3.</th><th>Prof.</th><th>B.Sc</th><th>Paper-IX</th><th>July</th><th>IIInd</th><th>Methods of formation and chemical reactions of halo acids. Hydroxyl acids: Malic, tartaric and citric acids (structural features only).Methods of formation and chemical reactions of unsaturated monocarboxylic acids: Dicarboxylic acids: Methods of formation and effects of heat and hydrating agents.</th><th>UNIT-I (8 Hrs.)</th></tr<>	3.	Prof.	B.Sc	Paper-IX	July	III nd	Methods of formation and chemical reactions of halo acids. Hydroxyl acids: Malic, tartaric and citric acids (structural features only).Methods of formation and chemical reactions of unsaturated monocarboxylic acids: Dicarboxylic acids: Methods of formation and effects of heat and hydrating agents.	UNIT-I (8 Hrs.)
simple compounds and compounds. complexes, illustrating relative stability of their		Amanpreet Kaur	П	Inorganic Chemistry- A	August	IV th	Chemistry of ElementsofFirstTransitionSeries:Characteristic propertiesof d-block elements.Propertiesoftransitionseries, theirsimplecompoundsandcomplexes, illustratingrelativestability of theiroxidationstates,coordinationnumberand geometry.PropertiesPropertiesoftransitionseries, theirsimplecompoundsand geometry.PropertiesPropertiesoftransitionseries, theirsimplecompoundsandcomplexes, illustratingrelativestability oftransitionseries, theirsimplecompoundsandcomplexes, illustratingrelativestability of	 Chemistry of Elements of First Transition Series: Characteristic properties of <i>d</i>-block elements. Properties of the elements of the first transition series, their simple compounds and complexes, illustrating relative stability of their oxidation states, coordination number and geometry. UNIT-II (7 Hrs.) Chemistry of Elements of Second and Third Transition Series: General characteristics, comparative treatment with their 3<i>d</i>-analogues in respect of ionic radii, oxidation states, magnetic behaviour, spectral properties and stereochemistry. UNIT-III (8 Hrs.) Chemistry of Coordination Compounds-I Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds UNIT-IV (7 Hrs.) Chemistry of Coordination Compounds-II Valence bond theory of transition metal complexes. Properties of Coordination compounds i.e. magenetic properties, colours (Qualitative approach only), use of coordination compounds.

				and geometry.	
			II nd	Properties of the	1
				elements of the first	
				transition series their	
				simple compounds and	
				complexes illustrating	
				relative stability of their	
				ovidation states	
				coordination number	
				and geometry	
			TTTrd		-
			111	Chamistry of Flomenta	
				chemistry of Elements	
				Of Second and Third	
				Transition Series:	
			TX th	Comparation for the start	4
			1V	Comparative treatment	
				with their <i>3a</i> -analogues	
				in respect of ionic radii,	
				oxidation states,	
				magnetic behaviour,	
				spectral properties and	
			x .th	stereochemistry.	-
			V	Comparative treatment	
				with their 3d-analogues	
				in respect of ionic radii,	
				oxidation states,	
				magnetic behaviour,	
				spectral properties and	
			nd	stereochemistry.	
		September	II ^{na}	UNIT-III	
				Chemistry of	
				Coordination	
				Compounds-I	
				Werner's coordination	
				theory and its	
				experimental	
				verification	
			III rd	Effective atomic	

				number concept,	
				chelates,	
			IV th	Isomerism in	
				coordination	
				compounds	
			V th	Isomerism in	
				coordination	
				compounds	
		October		······································	
		000000	H nd	UNIT-IV	
			11	Chemistry of	
				Coordination	
				Compounds-II	
				Valence bond theory of	
				transition metal	
				complexes	
			TTTrd	Droportion of	-
			111	Coordination 01	
				compounds i.e.	
				magenetic	
				properties, colours (
				Qualitative approach	
			ww.rth	only),	
			IV	Properties of	
				Coordination	
				compounds i.e.	
				magenetic	
				properties, colours (
				Qualitative approach	
				only),	
			V^{th}	Properties of	
				Coordination	
				compounds i.e.	
				magenetic	
				properties, colours (
				Qualitative approach	
				only),	

			Ba	achelor of	Scienc	es (B.Sc.)	Session 2018-2019 (Fifth Semester)
S.No.	Teacher	Class	Paper	Month	Week		Syllabus
1.	Prof.Jyoti	B.Sc	Paper-	July	III rd	UNIT-I	UNIT-I (8 Hrs.)
		III	XVII			Metal – Ligand	Metal – Ligand Bonding in Transition Metal Complexes:
			Inorganic			Bonding in	Limitations of valence bond theory, an elementary idea of crystal – field theory, crystal field
			Chemistry			Transition Metal	splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal -
						Complexes:	field parameters, Spectro chemical Series.
						Limitations of	UNIT-II (7 Hrs.)
						valence bond theory,	Thermodynamic and Kinetic Aspects of Metal Complexes :
						an elementary idea of	A brief outline of thermodynamic and Kinetic stability of metal complexes and factors
						crystal - field theory	affecting the stability, substitution reactions of square planar complexes.
					IV th	Crystal field splitting	UNIT-III (8 Hrs.)
						in octahedral	Organometallic Chemistry:
						complexes	Definition, nomenclature and classification of organometallic compounds. Preparation,
				August	Ist	Crystal field splitting	properties, bonding and applications of alkyls and aryls of Li, Al, Hg, Sn and Ti, a brief
						in tetrahedral	account of metal - ethylenic complexes and homogeneous hydrogenation, mononuclear
						complexes	carbonyls and the nature of bonding in metal carbonyls
					II nd	Crystal field splitting	UNIT-IV (7 Hrs.)
						in square planar	Bioinorganic Chemistry:
						complexes, factors	Essential and trace elements in biological processes, metalloporphyrins with special
						affecting the crystal –	reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal
						field parameters,	ions. Nitrogen fixation.
						Spectro chemical	
						Series.	
					III rd	UNIT-II	
						Thermodynamic	
						and Kinetic Aspects	
						of Metal Complexes	
						: A brief outline of	
						thermodynamic and	
						Kinetic stability of	
						metal complexes	
					IV th	Factors affecting the	
						stability square	
						planar complexes	
						_	

			V th	Factors affecting th
				substitution reactions
				of square planar
				complexes
			r n d	
		September	IIna	UNIT-III
				Organometallic
				Chemistry:
				Definition,
				nomenclature and
				classification of
				organometallic
				compounds.
			III rd	Preparation,
				properties, bonding
				and applications of
				alkyls and aryls of
				Li, Al
			IV th	Preparation,
				properties, bonding
				and applications of
				alkyls and aryls of
				Hg, Sn and Ti,
			V^{th}	A brief account of
				metal – ethylenic
				complexes and
				homogeneous
				hydrogenation.
		October		,,
			Π^{nd}	Mononuclear
				carbonyls and the
				nature of bonding in
				metal carbonyls
			III rd	LINIT-IV
			111	Rioinorganic
				Chemistry.
				Essential and trace
				alements in
				biological processos
				biological processes

					IV th	Metalloporphyrins	
						with special	
						reference to	
						haemoglobin and	
						mvoglobin.	
					V th	Biological role of	
						alkali and alkaline	
						earth metal ions	
				November	Ist	Nitrogen fixation.	
2	Prof	B Sc-	Paper-	July	III rd	UNIT-III	UNIT-I (7 Hrs.)
	Ruchika	III	XVIII	vary		Spectroscopy [.]	Heterocyclic Compounds:
			Organic			Nuclear magnetic	Introduction · Molecular orbital picture and aromatic character of pyrrole furan thiophene
			chemistry-			resonance (NMR)	and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the
			A			spectroscopy. Proton	mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in
						magnetic resonance	pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole. Introduction
						(^{1}H) NMR)	to condensed – five and six – membered heterocycles. Prenaration and reactions of indole
						spectroscopy.	quinoline and isoquinoline with special reference to Fisher indole synthesis. Skraup synthesis
					IV th	Nuclear shielding	and Bischler Napieralski synthesis. Mechanism of electrophilic substitution reactions of
						and deshielding.	indole, quinoline and isoquinoline.
						chemical shift and	UNIT-II (7 Hrs.)
						molecular structure.	Electromagnetic Spectrum: Absorption Spectra-II:
				August	I st	Spin-spin splitting	Infrared (IR) absorption spectroscopy – Molecular vibrations, Hooke's law, selection rules,
				8		and coupling	intensity and position of IR bands, measurement of IR spectrum, fingerprint region,
						constants, area of	characteristic absorptions of various functional groups and interpretation of IR spectra of
						signals	simple organic compounds. Problems pertaining to the structure elucidation of simple
					II nd	Interpretation of	organic compounds using UV, IR and PMR spectroscopic techniques.
						PMR spectra	UNIT-III (8 Hrs.)
					III rd	Interpretation of	Spectroscopy:
						ethyl bromide.	Nuclear magnetic resonance (NMR) spectroscopy. Proton magnetic resonance (¹ H NMR)
						ethanol.	spectroscopy, nuclear shielding and deshielding, chemical shift and
						acetaldehvde. 1.1.2-	molecular structure, spin-spin splitting and coupling constants, area of signals, interpretation
						tribromoethane. ethvl	of PMR spectra of simple organic molecules such as ethyl bromide, ethanol, acetaldehyde,
						acetate, toluene and	1,1,2-tribromoethane, ethyl acetate, toluene and acetophenone.
						acetophenone.	UNIT-IV (8 Hrs.)
					IV th	Applications of NMR	Carbohydrates:
				September	\mathbf{I}^{st}	UNIT-II	Classification and nomenclature. Monosaccharides, mechanism of osazone formation,
				r r		Electromagnetic	interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses.
						Spectrum:	Configuration of monosaccharides. Erythro and threodiastereomers. Conversion of glucose

				Absorption Spectra-	into mannose. Formation of glycosides, ethers and esters. Determination of ring size of
				II:	monosaccharides. Cyclic structure of $D(+)$ – glucose. Mechanism of mutarotation. Structure
				Infrared (IR)	of ribose and deoxyribose An introduction to disaccharides (maltose sucrose and lactose)
				absorption	and polysaccharides (starch and cellulose) without involving structure determination
				spectroscopy –	and polysuccharaces (surfar and contrasse) while at involving structure determination.
				Molecular vibrations	
				Hooke's law	
				solution rules	
			TTud	Intensity and position	-
			11	intensity and position	
				of IR Dands,	
				measurement of IK	
				spectrum, fingerprint	
			TTT	region,	
			III ^{ra}	Characteristic	
				absorptions of	
				various functional	
				groups and	
				interpretation of IR	
				spectra of simple	
			41-	organic compounds	
			IV th	Problems pertaining	
				to the structure	
				elucidation of simple	
				organic compounds	
				using UV, IR and	
				PMR spectroscopic	
				techniques.	
			V th	UNIT-IV	
				Carbohydrates:	
				Classification and	
				nomenclature.	
				Monosaccharides	
		October			1
			$\mathrm{II}^{\mathrm{nd}}$	Mechanism of	
				osazone formation.	
				interconversion of	
				glucose and fructose.	
				chain lengthening	

		and chain shortening
		of aldoses.
		Configuration of
		monosaccharides
		Frythro and
		thracdiastoreomers
	TTT	
	111	
		glucose into
		mannose. Formation
		of glycosides, ethers
		and esters.
		Determination of ring
		size of
		monosaccharides.
		Cyclic structure of D
		(+) – glucose.
		Mechanism of
		mutarotation.
		Structure of ribose
		and deoxyribose
	IV th	An introduction to
		disaccharides
		(maltose, sucrose and
		lactose) and
		polysaccharides
		(starch and cellulose)
		without involving
		structure
		determination.
		UNIT-I
		Heterocyclic
		Compounds:
		Introduction :
		Molecular orbital
		picture
November	Ist	Aromatic character
		of pyrrole, furan,
		thiophene and
		pyridine. Methods of

						synthesis and	
						chemical reactions	
						with particular	
						emphasis on the	
						mechanism of	
						electrophilic	
						substitution.Mechani	
						sm of nucleophilic	
						substitution reactions	
						in pyridine	
						derivatives.	
						Comparison of	
						basicity of pyridine.	
						piperidine and	
						pvrrole.	
					II nd	Introduction to	
						condensed – five and	
						six – membered	
						heterocycles.	
						Preparation and	
						reactions of indole,	
						quinoline and	
						isoquinoline with	
						special reference to	
						Fisher indole	
						synthesis. Skraup	
						synthesis and	
						Bischler	
						Napieralski	
						synthesis.	
						Mechanism of	
						electrophilic	
						substitution reactions	
						of indole, quinoline	
						and isoquinoline.	
3.	Dr. Rishu	B.Sc	Paper-XIX	July	III rd	UNIT-I	UNIT-I (8 Hrs.)
	Jain	III	Physical			Elementary	Elementary Quantum Mechanics-I:
			Chemistry			Quantum	Black-body radiation, Planck's radiation law, photoelectric effect, heat capacity of solids,
						Mechanics-I:	Bohr's model of hydrogen atom (no derivation) and its defects, Compton effect. De Broglie

				Black-body radiation,	hypothesis, the Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian
				Planck's radiation	operator. Schrodinger wave equation and its importance, physical interpretation of the wave
				law, photoelectric	function, postulates of quantum mechanics, particle in a one dimensional box. Schrodinger
				effect.	wave equation for H-atom. separation into three equations (without derivation), quantum
			IV th	Heat capacity of	numbers and their importance, hydrogen like wave functions, radial wave functions, angular
				solids. Bohr's model	wave functions.
				of hydrogen atom (no	UNIT-II (7 Hrs.)
				derivation) and its	Elementary Quantum Mechanics-II:
				defects. Compton	Molecular orbital theory, basic ideas – criteria for forming M.O. from A.O., construction of
				effect. De Broglie	M.O.'s by LCAO – H_2^+ ion. Calculation of energy levels from wave functions, physical
				hypothesis,	picture of bonding and antibonding wave functions, concept of σ , σ^* , π , π^* orbitals and their
		August	I st	The Heisenberg's	characteristics. Hybrid orbitals $-$ sp, sp ² , sp ³ ; calculation of coefficients of A.O.'s used in
		U		uncertainty principle,	these hybrid orbitals. Introduction to valence bond model of H_2 , comparison of M.O. and
				Sinusoidal wave	V.B. models.
				equation,	UNIT-III (8 Hrs.)
				Hamiltonian	Photochemistry-I:
				operator, Schrodinger	Interaction of radiation with matter, difference between thermal and photochemical
				wave equation and its	processes. Laws of Photochemistry: Grothus - Drapper law, Stark - Einstein law, Jablonski
				importance,	diagram depicting various processes occurring in the excited state.
			II nd	Physical	UNIT-IV (7 Hrs.)
				interpretation of the	Photochemistry-II:
				wave function,	Qualitative description of fluorescence, phosphorescence, non-radiative processes (internal
				postulates of	conversion, intersystem crossing), quantum yield, photosensitized reactions – energy transfer
				quantum mechanics,	processes (simple examples).Photochemistry of carbonyl compounds and alkenes.
				particle in a one	
				dimensional box.	
			III rd	Schrodinger wave	
				equation for H-atom,	
				separation into three	
				equations (without	
				derivation), quantum	
				numbers and their	
				importance,	
			IV th	Hydrogen like wave	
				functions, radial	
				wave functions,	
				angular wave	
				functions.	

			V th	UNIT-II	
				Elementary	
				Quantum	
				Mechanics-II	
				Molecular orbitel	
				theory, basic ideas –	
				criteria for forming	
			nd	M.O. from A.O.,	4
		September	II ^{nu}	Construction of	
				M.O.'s by LCAO –	
				H_2^+ ion. Calculation	
				of energy levels from	
				wave functions,	
				physical picture of	
				bonding and	
				antibonding wave	
				functions	
			III rd	Conceptof σ $\sigma^* \sigma$	1
			111	-* orbitals and their	
				π^{*} orbitals and their	
				characteristics.	
				$\begin{array}{c} \text{Hyprid} \text{ orbitals} - \text{sp,} \\ 2 & 3 & 1 \\ \end{array}$	
				sp ⁻ , sp ⁻ ; calculation	
				of coefficients of	
				A.O.'s used in these	
				hybrid orbitals.	
			IV th	Introduction to	
				valence bond model	
				of H ₂ , comparison of	
				M.O. and V.B.	
				models.	
				UNIT-III	
				Photochemistry_I	
				Interaction of	
				radiation with metter	
			v th	Difference hetere	4
			V	Difference between	
				thermal and	
				photochemical	

				T C
I.				processes. Laws of
				Photochemistry:
				Grothus – Drapper
				law, Stark – Einstein
1				law.
		October		
		October	TTND	T 1 1 1 · 1·
			11	Jablonski diagram
				depicting various
				processes occurring
				in the excited state.
			III rd	UNIT-IV
				Photochemistry-II:
				Qualitative
				description of
				fluorescence,
				phosphorescence,
				non-radiative
				processes (internal
				conversion
				intersystem crossing)
			IVth	Quantum viald
			1 V U1	Quantum yield,
				photosensitized
				reactions – energy
				transfer processes
				(simple examples).
			V th	Photochemistry of
				carbonyl compounds
				and alkenes.

			Master of	Sciences		Session 2018-2019	(I st Semester)
S.No.	Teacher	Class	Paper	Month	Week		Syllabus
1.	Dr.	M.ScI	CH-411	August	I st	UNIT1	UNIT 1 (15 Hrs.)
	Geeta		Inorganic			Stereochemistry And	Stereochemistry And Bonding In Main Group Compounds
	Jallan		Chemistry-			Bonding In Main Group	VSEPR, Walsh diagrams (tri and tetra-molecules), $d\pi$ -p π bonds,
			Ι			Compounds VSEPR,	Bent rule and energetics of hybridization, some simple
						Walsh diagrams (tri and	reactions of covalently bonded molecules.
						tetra-molecules), $d\pi$ -p π	UNIT 2 (15 Hrs.)
						bonds, Bent rule	Metal Ligand Bonding
					II nd	Energetics of	Limitations of crystal field theory, molecular orbital theory,
						hybridization, some simple	octahedral, tetrahedral and square planar complexes, π bonding
						reactions of covalently	and molecular orbital theory.
						bonded molecules	UNIT 4 (15Hrs) Deaction Machanism of Transition Matal Complexes H
					III rd	UNIT 2	Acid hydrolygic factors offacting acid hydrolygic has
						Metal Ligand Bonding	hydrolysis, conjugate base mechanism direct and indirect
						Limitations of crystal field	evidences in favour of conjugate mechanism, uncert and indirect
						theory,	metal-ligand bond cleavage Substitution reactions in square
					IV th	Molecular orbital theory,	planar complexes the trans effect mechanism of substitution
						octahedral,	reaction Redox reactions electron transfer reactions
					V th	Tatrahadral Squara planar	mechanism of one electron transfer reactions, outer sphere type
					v	complexes	reactions, cross reactions and Marcus Hush Theory, inner
						complexes,	sphere type reactions.

September	I st	π bonding and molecular orbital theory.	
	II nd	Unit IV Reaction Mechanism of Transition Metal Complexes –II Acid hydrolysis,	
	III ^{ra} IV th	Factors affecting acid hydrolysis, Base hydrolysis, conjugate base mechanism,	
October	I st II nd	Reactions without metal- ligand bond cleavage Substitution reactions in square planar complexes,	
	III ⁻¹	The trans effect, mechanism of substitution reaction Redox reactions, Electron transfer reactions, mechanism of one electron	
November	V th	transfer reactions Outer sphere type reactions, cross reactions Marcus Hush Theory	
inovember	II nd	Inner sphere type reactions.	

2.	Prof	M.Sc-I	CH-411	August	Ist	UNIT 3	UNIT3 (15Hrs.)
	Jyoti		Inorganic			Metal-Ligand Equilibria	Metal-Ligand Equilibria In Solution
			Chemistry-			In Solution Stepwise and	Stepwise and overall formation constant and their interaction,
			Ι			overall formation constant	trends in stepwise constants, factors affecting the stability of
							metal complexes with reference to the nature of metal ion and
							ligand, chelate effect and its thermodynamic origin,
					II nd	Interaction trends in	determination of binary formation constants by pH
						stepwise constants	spectrophotometry.
					III rd	Factors affecting the	Reaction Mechanism of Transition Metal Complexes-I
						stability of metal	Energy profile of a reaction, reactivity of metal complexes,
						complexes	inert and labile complexes, kinetic application of valance bond
					\mathbf{IV}^{th}	Reference to the nature of	and crystal field theories, kinetics of octahedral substitution.
						metal ion and ligand	
					$\mathbf{V}^{ ext{th}}$	Chelate effect	
				September	\mathbf{I}^{st}	Thermodynamic origin of	
						chelate efffect	
					nd		-
					IIna	Determination of binary	
					rd	formation constants	-
					III ^{ra}	Using pH	
						spectrophotometry.	
					TT zth		
					IV	Reaction Mechanism of	
						I ransition Metal	
						Complexes-1	
				October	Tst	Reactivity of motal	-
				October	1	complexes	
						complexes	
					II nd	Inert and labile complexes	1

				November	III rd IV th I st	Kineticapplicationofvalance bond theoryKineticapplicationKineticapplicationofcrystal field theoriesKineticsofKineticsofoctahedralsubstitution.SubstitutionSubstitution	
3.	Dr. Gurpreet Kaur	M.ScI	CH-412 Organic chemistry- II	August	I st III nd III rd	UNIT 1 Nature of Bonding in Organic Molecule Delocalized chemical bonding, conjugation, Cross conjugation, resonance hyper conjugation Bonding in fullerenes, Tautomerism, Aromaticity in benzenoid and non benzenoid compd. Alternant and non alternant hydrocarbons Huckel's rule. Energy level of π M.O., Annulenes, anti aromaticity, aromaticity, Homo aromaticity PMO approach. Bonds weaker than covalent, addition compound, crown ether complexes and cryptands, Inclusion compound	UNIT 1 (15 Hrs.) Nature of Bonding in Organic Molecule Delocalized chemical bonding, conjugation, Cross conjugation, resonance hyper conjugation, Bonding in fullerenes, Tautomerism, Aromaticity in benzenoid and non benzenoid compd. Alternant and non alternant hydrocarbons, Huckel's rule. Energy level of π M.O., Annulenes, anti aromaticity, aromaticity, Homo aromaticity, PMO approach. Bonds weaker than covalent, addition compound, crown ether complexes and cryptands, Inclusion compound, cyclo dextrins, Catenanes & rotaxanes. Effect of structure on reactivity-resonance and field effects, steric effect, quantitative treatment. The Hammett equation and linear free energy relationship, substituent and reaction constants. Taft equation. UNIT 2 (15 Hrs.) Stereochemistry Conformational analysis of cyclo alkanes, decalins, effect of confirmation on reactivity. Confirmation of sugars, Steric strain due to undesirable crowding of resolution, entatiotropic and diasterotropic atoms. Stereo specific and stereo selective synthesis, chirality due to helical shape. Stereochemistry of compounds containing N,S,P. UNIT 3 (10 Hrs.) Aliphatic Nucleophilic Substitution

			V th	Cyclo dextrins, Catenanes & rotaxanes. Effect of structure on reactivity- resonance and field effects, steric effect, quantitative treatment.	The SN2, SN1, mixed SN1 and SN2 and SET mechanisms. The neighbouring group mechanism, neighbouring group participation by π and σ bonds, Classical and non-classical carbocations, norbornyl system. common carbocation rearrangements. The SNi mechanism. Nucleophilic substitution at an allylic, aliphatic, trigonal and a vinylic carbon. Reactivity effects of substrate structure, attacking nucleophile, leaving group and reaction medium phase transfer catalysis ambident
		September	II st II nd III rd	The Hammett equation and linear free energy relationship, substituent and reaction constants. Taft equation. UNIT 2 Stereochemistry Conformational analysis of cyclo alkanes Decalins, effect of confirmation on reactivity. Confirmation of sugars, Steric strain due to undesirable crowding of resolution Entatiotropic and diasterotropic atoms. Stereo specific and stereo selective synthesis, chirality due to helical shape. Stereochemistry of compounds containing N,S,P.	nucleophile, regioselectivity. UNIT 4 (8 Hrs.) Aromatic Electrophilic Substitution The arenium ion mechanism, orientation and reactivity, energy profile diagrams. The ortho/para ratio, ipso attack, orientation in other ring systems. Quantitative treatment of reactivity in substrates and electrophiles. Diazonium coupling, Vilsmeyer reaction, Gattermann-Koch reaction. Aromatic Nucleophilic Substitution The SNAr, SN1, benzyne and SRN1 mechanisms, Reactivity- effect of substrate structure, leaving group and attacking nucleophile. The Von Richter, Sommelet-Hauser and smiles rearrangements.
			10.	UNII 3	

				Aliphatic Nucleophilic			
				Substitution			
				The SN2, SN1, mixed SN1			
				and SN2 and SET			
				mechanisms. The			
				neighbouring group			
				mechanism			
		October	\mathbf{I}^{st}	Neighbouring group			
				participation by π and σ			
				bonds, Classical and non-			
				classical carbocations,			
				norbornyl system. common			
				carbocation			
				rearrangements.			
			\mathbf{H}^{nd}	The SNi mechanism.			
				Nucleophilic substitution at			
				an allylic, aliphatic,			
				trigonal and a vinvlic			
				carbon. Reactivity effects			
				of substrate structure.			
				attacking nucleophile.			
				leaving group and reaction			
				medium			
			III rd	Phase transfer catalysis			
				ambident nucleophile.			
				regioselectivity.			
				UNIT 4			
				Aromatic Electrophilic			
				Substitution			
				The arenium ion			
				mechanism orientation and			
				reactivity energy profile			
		October	I st	Neighbouringgroupparticipationby π and σ bonds, Classical and non-classicalcarbocations,norbornyl system. commoncarbocationrearrangements.TheSNimechanism.Nucleophilic substitution atanallylic,aliphatic,trigonalanda vinyliccarbon.Reactivity effectsofsubstratestructure,attackingnucleophile,leaving groupand reactionmediumPhasetransfercatalysis,ambidentnucleophile,regioselectivity.UNIT 4Aromatic ElectrophilicSubstitutionTheareniumionmechanism, orientation andreactivity,energyprofile			
						diagrams	
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					IV th	The ortho/para ratio, ipso	
						attack, orientation in other	
						ring systems. Quantitative	
						treatment of reactivity in	
						substrates and	
						electrophiles.	
				November	\mathbf{I}^{st}	S _{RN1} mechanisms,	
						Reactivity-effect of	
						substrate structure, leaving	
						group and attacking	
						nucleophile	
					II nd	The Von Richter,	
						Sommelet-Hauser and	
						smiles rearrangements.	
4.	Prof.	M.Sc-I	CH-413	August	\mathbf{I}^{st}	UNIT 1	UNIT 1 (15 Hrs.)
	Vishal		Physical			Quantum Chemistry	Quantum Chemistry Application of Schrodinger wave
			Chmistry-I			Application of Schrodinger	equation to particle in three dimensional box, simple harmonic
						wave equation to particle	oscillator and rigid rotator. Approximate Methods: The
						in three dimensional box	variation theorem, Linear variation Principle, perturbation
						simple harmonic oscillator	theory (first order, second order and Non degenerate),
						and rigid rotator.	Applications of variation method and perturbation theory to the
					II^{nd}	Approximate Methods:	Helium atom. Self-Consistent-Field theory.
						The variation theorem,	UNIT 2 (15 Hrs.)
						Linear variation Principle,	Angular Momentum:
						perturbation theory (first	Ordinary ang. momentum, generalized angular momentum,
						order, second order and	Ordinary ang. momentum, generalized angular momentum, eigen functions for angular momentum, eigen values of angular
						order, second order and Non degenerate),	Ordinary ang. momentum, generalized angular momentum, eigen functions for angular momentum, eigen values of angular momentum, operator using ladder operators, addition of
					III rd	order, second order and Non degenerate), Applications of variation	Ordinary ang. momentum, generalized angular momentum, eigen functions for angular momentum, eigen values of angular momentum, operator using ladder operators, addition of angular-momenta, spin, anti symmetry and Pauli exclusion
					III rd	perturbationtheory(firstorder,secondorderandNon degenerate),Applicationsofvariationmethodandperturbation	Ordinary ang. momentum, generalized angular momentum, eigen functions for angular momentum, eigen values of angular momentum, operator using ladder operators, addition of angular-momenta, spin, anti symmetry and Pauli exclusion principle.
					III rd	perturbationtheory(firstorder,secondorderandNon degenerate),Applicationsofvariationmethodandperturbationtheory to theHelium atom.	Ordinary ang. momentum, generalized angular momentum, eigen functions for angular momentum, eigen values of angular momentum, operator using ladder operators, addition of angular-momenta, spin, anti symmetry and Pauli exclusion principle. Molecular Orbital Theory :

				theory	Huckel theory of conjugated systems, bond order and charge
			IV^{th}	UNIT 2	density calculations, application to ethylene, allyl, butadiene,
				Angular Momentum:	cyclopropenyl system, cylobutadiene etc.
				Ordinary ang. momentum,	UNIT 3 (15 Hrs.)
				generalized angular	Thermodynamics:
				momentum, eigen	Classical Thermodynamics:
				functions for angular	Partial molal proporties, partial molal free energy, volume &
				momentum, eigen values	heat content and their significance, Determination of these
				of angular momentum,	quantities, concept of fugacity and determination of fugacity.
		September	\mathbf{I}^{st}	Operator using ladder	Non ideal systems, excess functions for non ideal solutions,
				operators, addition of	Activity, Activity coeff, Debye huckel theory for activity coeff.
				angular-momenta, spin,	electrolyte solutions, determination of activity & activity coeff,
				anti symmetry and Pauli	ionic strength. Application of phase rule to 3-component
				exclusion principle.	system, second order phase transitions. Statistical
			nd		Thermodynamics: Concept of distribution, thermodynamic
			II nd	Molecular Orbital	probability & most probable distribution, ensemble averaging,
				Theory :	postulates of ensemble averaging, canonical, grand canonical &
				Huckel theory of	micro canonical ensembles.
				conjugated systems, bond	UNIT 4 (15 Hrs.)
				order and charge density	Statistical Thermodynamics:
				calculations, application to	Corresponding distribution laws (using Lagrange's method of
				ethylene	undetermined multipliers) Partition functions: Translational,
			III ^{ra}	Allyl, butadiene,	Rotational, Vibrational, Electronic partitions functions.
				cyclopropenyl system,	Calculation of Thermodynamic properties in terms of partition
				cylobutadiene etc.	functions. Heat capacity, benavior of solids chemical equilibria
				UNIT 3	and equilibrium constant in terms of partition function, F.D.
				Thermodynamics:	Statistics, distribution law and application to metals. Bose
				Classical	Emsterns statistics. Distribution law & application to Hendrin.
				I nermodynamics:	
				Partial molal proporties,	
			TT 7th	partial molal free energy	
			IV	Volume & heat content and	

				their significance,
				Determination of these
				quantities, concept of
				fugacity and determination
				of fugacity. Non ideal
				systems, excess functions
				for non ideal solutions,
		October	\mathbf{I}^{st}	Activity, Activity coeff,
				Debye huckel theory for
				activity coeff. electrolyte
				solutions, determination of
				activity & activity coeff,
				ionic strength.
			II nd	Application of phase rule
				to 3-component system,
				second order phase
				transitions. Statistical
				Thermodynamics: Concept
				of distribution,
				thermodynamic probability
				& most probable
				distribution
			III rd	Ensemble averaging.
				postulates of ensemble
				averaging, canonical, grand
				canonical & micro
				canonical ensembles.
			\mathbf{IV}^{th}	UNIT 4
				Statistical
				Thermodynamics:
				Corresponding distribution

				laws (using Lagrange's	
				method of undetermined	
				multipliers)	
			V^{th}	Partition functions:	
				Translational, Rotational,	
				Vibrational, Electronic	
				partitions functions.	
				Calculation of	
				Thermodynamic properties	
				in terms of partition	
				functions.	
		November	I st	Heat capacity, behavior of	
				solids chemical equilibria	
				and equilibrium constant in	
				terms of partition function,	
				F.D. statistics,	
			II nd	Distribution law and	
				application to metals. Bose	
				Einsteins statistics.	
				Distribution law &	
				application to Helium.	

	Ι	Master o	f Sciences			Session 2018-2019	(Third Semester)
S.No.	Teacher	Class	Paper	Month	Week		Syllabus
1.	Dr. Geeta Jallan	M.Sc-II	CH-514 Environmental Chemistry-IV	July	III rd	UNIT 1 Environment Introduction.compositi on of atmosphere	UNIT 1 (6 Hrs) Environment Introduction. Ccomposition of atmosphere, vertical temperature, heat budget of the Earth atmospheric system, vertical stability atmosphere. Biogeochemical cycles of C,N,P,S and O. Biodistribution of elements.
					IV th	Vertical temperature, heat budget of the Earth atmospheric system.	Environmental Toxicology(9Hrs.)Chemical solutions to environmental problems, biodegradability, principles of decomposition, better industrial processes Bhopal gas tragedy Chernobyl Three mile island
					v	atmosphere.	Sewozo UNIT 2
				August	I st	Biogeochemical cycles of C,N,P,S and O. Biodistribution of elements.	(15 Hrs.) Industrial Pollution Cement sugar, distillery, drug, paper, thermal power plants, nuclear Power plants, metallurgy. Polymers, drugsetc. Padiopualida analysis Diapasal of wastes and their
					II nd	EnvironmentalToxicologyChemicalsolutionstoenvironmentalproblems,biodegradability,	 Kadiolidende analysis. Disposar of wastes and their management and Minamata disasters. Soils Composition, micro and macro nutrients, pollution-fertilizers, pesticides, plastic and metals. Waste treatment
					III rd	Principles of decomposition,better industrial processes.	

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			IV th	Bhopal gas tragedy,
				Chernobyl
l				Cheffiolyi,
			_et	
		September	In	Three mile island,
				Sewozo
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I			TTud	
			11	UNIT 2
				Industrial Pollution
				Cement sugar.
				distillary drug popor
			#d	distinery, drug, paper,
			III ^{nu}	thermal power plants,
				nuclear Power plants
				matallungy
				metanurgy
			th	
			IV	Polymers, drugsetc.
				Radionuclide analysis
	1	Octobor	Tst	Disposal of wastes and
		October	1	Disposar of wastes and
				their management
			II^{nd}	Minamata disasters

					III rd	Composition, micro and macro nutrients Pollution-fertilizers,	
					V th	Plastic and metals.	
2.	Dr. Arvinder Kaur	M.Sc-II	CH-514 Environmental Chemistry-IV	July	III rd	UNIT 3 Hydrosphere Chemical composition of water bodies-lakes, streams Rivers and wet lands etc. Hydrological cycle.	UNIT 3 (15 Hrs.) Hydrosphere Chemical composition of water bodies-lakes, streams, rivers and wet lands etc. Hydrological cycle. Aquatic pollution – inorganic, organic, pesticide, agricultural, industrial and Sewage, detergents, oil spills and oil pollutants. Water Quality parameters –Dissolved oxygen, biochemical oxygen demand, solids, metals, content of Chloride, sulphate, phosphate, nitrate and micro-organisms. Water quality Standards. Analytical methods for measuring BOD, DO, COD, F, Oils, metals (As,Cd,Cr, Hg,Pb,Se etc.), residual chloride and chlorine demand. Purification and treatment of water.
				August	I st II nd	Aquatic pollution – inorganic, organic, pesticide, agricultural Industrial and Sewage, detergents, oil spills and oil pollutants.	UNIT 4 (15 Hrs.) Atmosphere Chemical composition of atmosphere – particles, ions and redicals and their formation. Chemical and photochemical reactions in

			III rd IV th	Water Qual parameters –Dissolv oxygen, biochemic oxygen demand Solids, metals, conte of Chloride, sulpha phosphate Nitrate and micro organisms. Wa quality Standards.	lity ved ical tent ate, ero- ater	atmosphere, Chlorofluorohyd Ozone depletio rain, air polluti methods for me instruments.	smog drocarbons, on, Global v ion control asuring air	formation, warming. Green s and their che pollutants. Con	oxides house effect emistry. Anal tinuous moni	of , acid lytical toring
	S	eptember	I st II nd	Analytical methods a measuring BOD, D COD, F, metals (As,Cd,G Hg,Pb,Se etc.), residu chloride and chlorid demand Purification a	for DO, Cr, lual tine					
	 C	October	IV th	treatment of water. UNIT 4 Atmosphere Chemical compositi of atmosphere Particles, ions a redicals and th formation	ion and neir					

					II nd III rd IV th	Chemicalandphotochemicalreactions inatmosphereSmogformation,oxidesofChlorofluorohydrocarbonsOzonedepletion,Global warming. Green	
				November	I st II nd	house effectAcid rain, air pollution controls and their chemistry.Analytical methods for measuring air pollutants. Continuous monitoring instruments.	
3.	Dr. Arwinder Kaur	M.Sc-II	CH-513 Heterocyclic Chemistry-II	July	III rd	UNIT 1Nomenclature ofHeterocyclesReplacementandsystematicnomenclature(Hantzsch-widmanSystem)Monocyclic fused andbridged hetrocycles	UNIT 1(4 Hrs.)Nomenclature of HeterocyclesReplacement and systematic nomenclature (Hantzsch-widman System) for monocyclic fused and bridged hetrocyclesAromatic Heterocycles(5Hrs.)(5General chemical behaviour of aromatic heterocycles classification (structural type) criteria of aromaticity(bond length ring current and chemical shift in H NMR- Spectra empirical resonance energy, delocalization energy and Dewar resonance energy Diamagnetic susceptibility exaltations)

			V th	Aromatic	Non- aromatic Heterocycles (6 Hrs.)
				Heterocycles General	Strain-bond angle and torsional strains and their consequences
				chemical behaviour of	in small ring heterocycles. Conformation of six-membered
				aromatic heterocycles	heterocycles with reference to molecular Geometry, barrier to
				classification	ring inversion, pyramidal inversion and 1,3-diaxial
				(structural type) criteria	interaction. Stereo-electronic effects- anomeric and related
				of aromaticity	effects Attractive interactions-hydrogen bonding and
		August	II nd	(bond length ring	intermolecular nucleophilicelectrophilic interactions.
		0		current and chemical	UNIT 2
				shift in 1HNMR-	Heterocyclic synthesis (5 Hrs.)
				Spectra, empirical	Principles of heterocyclic synthesis involving cyclization
				resonance energy	reactions and cycloaddition Reactions.
			IIIrd	Delocalization energy	Small Ring Heterocycles (5 Hrs.)
				and Dewar resonance	Three- membered and four-membered heterocycles-synthesis
				energy Diamagnetic	and reactions of aziridines, oxiranes, thiiranes, azetidines,
				susceptibility	oxetanes and thietanes
				exaltations)	Benzo-Fused Five-Memberd Heterocycles (5 Hrs.)
					Synthesis and reaction including medicinal applications of
			IV th	Non-aromatic	benzopyrroles, benzofurans and benzothiophenes
			- '	Heterocycles Strain-	
				bond angle and	
				torsional strains	
			V th	Consequences in small	
				ring heterocycles	
			 st		
		September	1.	Conformation of six-	
				membered heterocycles	
				with reference to	
				molecular Geometry,	
				barrier to ring	
				inversion,	

			TTNC	D 111 1 1	
			II ^{na}	Pyramidal inversion	
				and 1,3-diaxial	
				interaction. Stereo-	
				electronic effects-	
				anomeric and related	
				effects	
			III rd	Attractive interactions-	
				hydrogen bonding and	
				intermolecular	
				nucleophilicelectrophili	
				c interactions.	
			IV th	UNIT 2	
				Heterocyclic synthesis	
				Principles of	
				heterocyclic synthesis	
				involving cyclization	
				reactions	
		October	\mathbf{I}^{st}	Cycloaddition	
				Reactions.	
				Small Ring	
				Heterocycles Three-	
				membered and four-	
				membered	
				heterocycles-synthesis	
			II nd	Reactions of aziridines	
				. oxiranes, thiiranes	
				, ,	
			TTT	A	
			111	Azetidines, oxetanes	
				and thietanes	
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					IV th	Banzo-Fused Five-	
					1 V	Mombord	
						Hotorocyclos Synthesis	
						and reactions of	
						hand reactions of	
						benzofyrrones,	
					v th	Denzolurans	
					v	Synthesis and	
						reactions of	
						benzotniophenes	
				November	Ist	Medicinal applications	UNIT 3 (5 Hrs.)
						of benzopyrroles,	Meso-ionic Heterocycles
						benzofurans and	General classification chemistry of some important meso-
						benzothiophenes	ionic heterocycles of type-A and B and their applications
4.	Dr. Rish	M.Sc-II	CH-513	July	III rd	UNIT 3	Six-Membered Heterocycles With (5 Hrs.)
	Jain		Heterocyclic			Meso-ionic	One Heteroatom Synthesis and reactions of pyrylium salt and
			Chemistry-II			Heterocycles	pyrones and their comparison with Pyridinium &
						General classification	thiopyrylium salt and Pyridones synthesis and reactions of
						chemistry of some	Quinolizinium and benzopyrylium salt coumarins and
						important meso-ionic	chromones
						heterocycles	Six-Membered Heterocycles with Two or More
					IV^{th}	Type-A and B and their	Hetroatoms (5 Hrs.)
						applications	Synthesis and reactions of diazines, triazines, tetrazines and
							thiazines
							UNIT 4
							1,2-Azoles: pyrazoles, isothiazoles and isoxazoles (7
							Hrs.)
							Introduction to 1,2-azoles, synthesis of 1,2-azoles. Addition
				August	I st	Six-Membered	on nitrogen: protonation, N-alkylation, N-acylation. Reaction
						Heterocycles With	with electrophilic and nucleophilic reagents. Reaction with
						One Heteroatom	bases: reaction of N-metallated pyrazole, reaction of C-
						Synthesis and reactions	metallated 1,2-azoles. Reaction with oxidizing and redusing
						of pyrylium salt	agents.

1		Trnd	D 1 1 1	
		II ^{na}	Pyrones and their	1,3-Azoles: imidazoles, thiazoles and oxazoles (8 Hrs.)
			comparison with	Introduction to 1,3-azoles, synthesis of 1,3-azoles. Addition at
			Pyridinium &	nitrogen: protonation, N-alkylation, N-acylation. Reaction
			thiopyrylium salt and	with electrophilic and nucleophilic reagents. Reaction with
			Pyridones synthesis	bases: reaction of N-metallated imidazole, reaction of C-
			and reactions of	metallated 1.3-azoles Reaction with oxidizing and reducing
			Quinolizinium	agonta Sunthasia and reaction of quaternery 1.2 agolium salt
		IIIrd	Benzopyrylium salt	agents. Synthesis and reaction of quaternary 1,5-azonum san
			coumarins and	and 1,3-azole-N-oxide.
			chromones	
			Six-Membered	
			Heterocycles with	
			Two or More	
			Hetroatoms	
			Synthesis of diazines,	
		TT Th	triazines	
		1	Synthesis of tetrazines	
			and thiazines, reactions	
			of diazines, triazines	
		V^{th}	Reactions of tetrazines	
			and thiazines,	
			UNIT 4	
			1,2-Azoles: pyrazoles,	
			isothiazoles and	
			isoxazoles Introduction	
			to 1,2-azoles, synthesis	
			of 1,2-azoles. Addition	
			on nitrogen	

alkylation, N-acylation. Reaction with electrophilic and nucleophilic reagents. II nd Reaction with bases: reaction of N- metallated pyrazole, reaction of C- metallated 1,2-azoles III rd Reaction with oxidizing and redusing agents. IV th 1,3-Azoles: inidazoles, thiazoles nutroduction to 1,3- azoles, synthesis of 1,3- azoles, synthesis of 1,3- azoles, Addition at nitrogen: protonation N-alkylation, N- acylation. with electrophilic reagents II rd Reaction with bases: reaction with bases: reaction with bases: reaction of N- metallated II rd Reaction with bases: reaction of N- metallated imidazole, reaction of C-		September	I st	Protonation, N-	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$				alkylation, N-acylation.	
electrophilic and nucleophilic reagents. II nd Reaction with bases: reaction of N-metallated pyrazole, reaction of C-metallated 1,2-azoles III nd Reaction with oxidizing and redusing agents. IV th 1,3-Azoles: imidazoles, thiazoles and oxazoles Introduction to 1,3-azoles, synthesis of 1,3-azoles, synthesis of 1,3-azoles, synthesis of 1,3-azoles, synthesis of 1,3-azoles, reaction of normalized synthesis of 1,3-azoles, reaction and nitrogen: protonation October I st N-alkylation, N-azylation, N-azylation, Reaction with electrophilic reagents II nd Reaction with bases: reaction of N-metallated imidazole, reaction N-metallated imidazole, reactio				Reaction with	
$\frac{1}{11^{nd}} = \frac{1}{11^{nd}} = \frac{1}{11^{nd}$				electrophilic and	
III nd Reaction with bases: reaction of N- metallated pyrazole, reaction of C- metallated 1/2-azoles III nd Reaction with oxidizing and redusing agents. IV th 1,3-Azoles: imidazoles, thiazoles and oxazoles Introduction to 1,3- azoles, synthesis of 1,3- azoles. Addition at nitrogen: protonation October I ^{et} N-alkylation, N- acylation, Reaction with electrophilic and nucleophilic reagents III nd Reaction with bases: reaction of C- Reaction with bases midazole, reaction with electrophilic and nucleophilic reagents				nucleophilic reagents	
Image: Construction of the intervention of the interven			H nd	Reaction with bases:	
Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Constraint of the second system Image: Consecond system <t< td=""><td></td><td></td><td></td><td>reaction of N-</td><td></td></t<>				reaction of N-	
Image: Constraint of the second se				metallated pyrazole	
Image: Intervention of the second				reaction of C-	
III rd Reaction 1,2 ^{-axbits} III rd Reaction with oxidizing and redusing agents. IV th 1,3-Azoles: imidazoles, thiazoles and oxazoles Introduction to 1,3-azoles. Introduction to 1,3-azoles. azoles, synthesis of 1,3-azoles. Introduction at nitrogen: protonation October I st N-alkylation, N-acylation. nucleophilic reagents III nd Reaction with bases: reaction of N-metallated imidazole, reaction of C-				metallated 1 2-azoles	
III Reaction with oxidizing and redusing agents. IV th 1,3-Azoles: imidazoles, thiazoles and oxazoles Introduction to 1,3- azoles, synthesis of 1,3- azoles. Addition at nitrogen: protonation October I st N-alkylation, N- acylation. Reaction with electrophilic reagents III nd Reaction with bases: reaction of III nd Reaction of N-metallated imidazole, reaction			III rd	Peaction with	
Image: Solution of the second seco			111	Reaction with	
IV th 1,3-Azoles: imidazoles, thiazoles and oxazoles Introduction to 1,3- azoles, synthesis of 1,3- azoles, synthesis of 1,3- azoles, Addition at nitrogen: protonation October I st N-alkylation, with electrophilic and nucleophilic reagents II nd Reaction with bases: reaction of N-metallated imidazole, reaction reaction				oxidizing and redusing	
IV th 1,3-Azoles: imidazoles, thiazoles and oxazoles Introduction to 1,3- azoles, synthesis of 1,3- azoles, Addition at nitrogen: protonation October I st N-alkylation, N- acylation. Reaction with electrophilic and nucleophilic reagents II nd Reaction with bases: reaction of N- metallated imidazole, reaction of C-				agents.	
Image: Second state of the second s			IV th	1,3-Azoles:	
and oxazoles Introduction to 1,3- azoles, synthesis of 1,3- azoles. Addition at nitrogen: protonation October I st N-alkylation, N- acylation. Reaction with electrophilic and nucleophilic reagents II nd Reaction with bases: reaction of reaction of reaction of reaction of Could be added reaction IIInd Reaction Reaction N- N- N- N- N- N-				imidazoles, thiazoles	
Image: Second				and oxazoles	
azoles, synthesis of 1,3-azoles. Addition at nitrogen: protonation October I st N-alkylation, N-acylation. with electrophilic and nucleophilic reagents II nd Reaction with bases: reaction of N-metallated imidazole, reaction of C-				Introduction to 1,3-	
azoles. Addition at nitrogen: protonation October I st N-alkylation, N-acylation. Reaction with electrophilic and nucleophilic reagents II nd Reaction with bases: reaction of N-metallated imidazole, reaction of C-				azoles, synthesis of 1,3-	
Image: sector of the sector				azoles. Addition at	
October I st N-alkylation, N-acylation. with electrophilic and nucleophilic reagents II nd Reaction with bases: reaction of N-metallated imidazole, reaction of C-				nitrogen: protonation	
acylation. Reaction with electrophilic and nucleophilic reagents II nd Reaction with bases: reaction of metallated imidazole, reaction of C- C-		October	I st	N-alkylation, N-	
with electrophilic and nucleophilic reagents II nd Reaction with bases: reaction of N-metallated imidazole, reaction of C-				acylation. Reaction	
nucleophilic reagents II nd Reaction with bases: reaction of N- metallated imidazole, reaction of C-				with electrophilic and	
II nd Reaction with bases: reaction of N- metallated imidazole, reaction of C-				nucleophilic reagents	
reaction of N- metallated imidazole, reaction of C-			II nd	Reaction with bases	
metallated imidazole, reaction of C-				reaction of N-	
reaction of C-				metallated imidazole	
				reaction of C	
metallated 1.3-azoles	1	-			

					III rd	Reactionwith oxidizing and reducing agents.Synthesis and reaction of azolium salt	
				November	II nd	Synthesis and reaction of 1,3-azole-N-oxide.	
5.	Dr. Gurpreet Kaur	M.Sc-II	CH-511 Applications of Spectroscopy-I	July	III rd IV th	UNIT 3 Infrared Spectroscopy Instrumentation and sample handling. Characteristics vibrational frequencies of alkanes, alkenes Alkynes, aromatic compounds, alcohols ,ethetrs, Phenols and amines . Detailed study of vibrational frequencies of carbonyl compounds (ketones, aldehydes, esters, amides	UNIT 3 (5 Hrs.) Infrared Spectroscopy Instrumentation and sample handling. Characteristics vibrational frequencies of alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethetrs Phenols and amines. Detailed study of vibrational frequencies of carbonyl compounds (ketones, aldehydes, esters, amides, acids, anhydrides, lactones,lactans and conjugated carbonyl compounds). Effect of hydrogrn bonding, solvent effect on vibrational frequencies , overtones, combination bands and Fermi resonance. FT-IR of gaseous, solid and polymeric materials. Nuclear Magnetic Resonance Spectroscopy (10 Hrs.) General introduction and definition, chemical shift, spin spin interaction,shielding mechanism of measurement, chemical shift values and correlation for protons bonded to carbon (aliphatic,olefinic,aldehydic and aromatic) another nuclei
				August	I st	Acids, anhydrides, lactones,lactans and conjugated carbonyl compounds). Effect of hydrogrn bonding	(alcoholic, phenols, enols, carboxylic acids, amines, amides & mercapto),chemical exchange,effect of deuteration,complex spin-spin interaction between two, three, four, five nuclei (first order sperctra) virtual coupling, stereochemistry, hindered rotation, karplus curve variation of coupling

			II nd IIIrd IV th	Solventeffectonvibrationalfrequencies,overtones,combinationbandsandFermiresonance.FT-IR of gaseous, solidandpolymericmaterials.NuclearMagneticResonanceSpectroscopyGeneralintroductionanddefinition,chemicalshiftSpinspininteraction,shieldingmechanismofmeasurement,chemicalshiftvaluesshiftvaluesshiftvaluesdefinition,forgmechanismofmeasurement,chemicalshiftvaluesshiftvaluesandcorrelation(aliphatic,olefinic,aldehydicandanothernuclei(alcoholic, phenols	constant with dihedral angle. simplification of complex spectra- nuclear magnetic double reasonane, contact shift reagents, solvent effects, fourier tansform tecnhnique, nuclear overhauser effect (NOE) resonance of other nuclei –F,P UNIT 4 (6 Hrs.) Carbon-13 NMR spectroscopy General considration chemical shift (aliphatic, olefinic, alkyne, aromatic, heteroaromatic and carbonyl carbon)coupling constants. Two dimension NMR spect- roscopy –COSY,NOESY, DEPT,APT, and INADEQUATE technique. Mass Spectrometry (Introduction, ion production –EI,CI,FD and FAB, factors affecting fragmentation, ion analysis, ion abundance.Mass septra fragmentation of organic compounds, common functional group, molecular ion peak, metastable peak, Mclafferty rearrangement. nitrogen rule, high resolution mass spectrometery. Example of mass spectral fragmentation of organic compounds with respect to their structure determination.
		September	I st	Enols, carboxylic acids, amines, amides & mercapto),chemical exchange,effect of	

	1				
				deuteration,	
			II nd	Complex spin-spin	
				interaction between	
				two, three, four, five	
				nuclei (first order	
				sperctra) virtual	
				coupling,	
				stereochemistry,	
			III rd	Hindered rotation,	
				karplus curve variation	
				of coupling constant	
				with dihedral angle.	
				simplification of	
				complex spectra-	
				nuclear magnetic	
			45	double reasonane	
			IV th	Contact shift reagents,	
				solvent effects, fourier	
				tansform tecnhnique,	
				nuclear overhauser	
				effect (NOE) resonance	
			_et	of other nuclei –F,P	
		October	I	UNIT 4	
				Carbon-13 NMR	
				spectroscopy	
				General considration	
				chemical shift	
				(aliphatic, olefinic	
				Alkyne, aromatic,	
				heteroaromatic and	

				carbonyl carbon)	
				·····	
			nd		_
			IIna	Coupling constants,	,
				Two dimension NMR	
				spect- roscopy –	-
				COSY,NOESY	
			III rd	DEPT, APT, and	1
				INADEQUATE	
				technique. Mass	3
				Spectrometry	
				(Introduction, ion	1
				production –EI,CI	
			IV th	FD and FAB, factors	5
				affecting	
				fragmentation.ion	
				analysis ion	
				abundance	
				uounuunee.	
		November	I st	Mass septra	1
			-	fragmentation of	f
				organic	
				compounds common	
				functional	
				group molecular ion	
				neak metastahl neak	1
			H nd	Molofforty	-
			11	rearrangement	
				nitrogon mile high	
				murogen rule, nigh	
				resolution mass	i l
				spectrometery.	
				Example of mass	,

						spectral fragmentation of organic compounds with respect to their structure determination.	
6.	Prof. Vishal	M.Sc II	CH-511 Applications of Spectroscopy-I	July	III rd	UltravioletandVisible SpectroscopyVariouselectronictransitions(185-800nm),Beer-Lambertlaw,effect of solvent onelectronictransition,ultravioletbandsforcarbonyl compounds,	Ultraviolet and Visible Spectroscopy (4 Hrs.) Various electronic transitions (185-800nm),Beer-Lambert law, effect of solvent on electronic transition, ultraviolet bands for carbonyl compounds, unsaturated carbonyl compounds, dienes, conjugated polyenes. Fieser- Woodwared rules for conjugated dienes and carbonyl , ultraviolet spectra of aromatic and heterocyclic compounds. Steric effect in biphenyles.
				August	I st	Unsaturated carbonyl compounds, dienes, conjugated polyenes	
					II nd	Fieser- Woodwared rules for conjugated dienes and carbonyl	
					III rd	Ultraviolet spectra of aromatic and heterocyclic compounds Steric effect in biphenyles.	

7.	Dr.	M.Sc-II	CH-511	September	I st	UNIT 1	UNIT 1 (8 Hrs.)	
	Shivali		Applications of			Electron Spin	Electron Spin Resonance Spectroscopy	
	Sharma		spectroscopy-I			Resonance	Hyperfine coupling, spin polarization for atoms and transition	on
						Spectroscopy	metal ions, spin orbit coupling and significance of g-tensors	;,
						Hyperfine coupling,	application of transition metal complexes (having one	
						spin polarization for	unpaired electron) including biological systems and to	
						atoms and transition	inorganic free radicals such as PH4, F2 AND [BH3]-	
						metal ions, spin orbit	Nuclear Magnetic Resonence of Paramagnetic Substance	es
						coupling	in Solution (7Hrs.	.)
					II nd	Significance of g-	The contact and pseudo contact shifts , factors affecting	
						tensors, application of	nuclear relaxation, some applications including biochemical	l
						transition metal	systems, an overview of NMR of metal nuclides with	
						complexes (having one	emphasis on ¹⁹⁵ Pt and ¹¹⁹ Sn NMR.	
						unpaired electron)	UNIT 2	
					III ^{ra}	biological systems and	Mossbauer Spectroscopy (6 Hrs.	.)
						to inorganic free	Basic principles, spectral parameters and spectrum display.	
						radicals such as PH4,	Application of the technique to the studies of (1) bonding ar	ıd
						$F_2 AND [BH_3]^2$	structures of Fe^{+2} and Fe^{+3} compounds including those of	
					xx xth		Intermediate spin, (2) Sn ⁺² and Sn ⁺⁴ compounds- nature of N	′ 1 -
					IV	Nuclear Magnetic	L bond, coordination number, structure and (3) detection of	
						Resonence of	Vibrational Spectroscopy (5 Hrs	`
						Paramagnetic	Summetroy and shares of APa APa APa APa APa APa APa APa	,) .da
						Substances in	of bonding of ambidantata liganda, athylanadiamina and	ue
						Solution The contact	dikatonato complexes, applications of resonance Paman	
						and pseudo contact	spectroscopy particularly for the study of active sites of	
						suits, factors affecting	metalloproteins	
				Ostobor	Tst	Some onnligations	inclaitoproteins.	
				October	1	including biochamical		
						systems on overview		
						of NMR of metal		
						nuclides		
						systems, an overview of NMR of metal nuclides		

			n d		
			II nd	¹⁹⁵ Pt and ¹¹⁹ Sn NMR.	
				UNIT 2	
				Mossbauer	
				Spectroscopy	
				Basic principles,	
				spectral parameters and	
				spectrum display.	
			III rd	Application of the	
				technique to the studies	
				of (1) bonding and	
				structures of Fe+2 and	
				Fe ⁺³ compounds	
				including those of	
				intermediate spin	
			IV th	(2) Sn^{+2} and Sn^{+4}	
				compounds- nature of	
				M-L bond,	
				coordination number,	
				structure and (3)	
				detection of oxidation	
				state and inequivalent	
				MB atoms	
			\mathbf{V}^{th}	Vibrational	
				Spectroscopy	
				Symmetrey and shapes	
				of AB ₂ , AB ₃ , AB ₄ , AB ₅	
				and AB_6	
		November	I st	Mode of bonding of	
			-	ambidentate ligands	
				ethylenediamine and	
1				ethyleneurannic and	

						diketonato complexes,	
					II nd	Applications of resonance Raman spectroscopy particularly for the study of active sites of metalloproteins.	
8.	Prof Amanpree t Kaur	M.Sc-II	CH-512 Organotransiti on Metal Chemistry-II	July	IIIrd	UNIT 1 Compounds of Transition Metal- Carbon Multiple Bonds Alkylidenes, alkylidynes, low valent Carbenes and carbynes-	UNIT 1(12 Hrs.)Compounds of Transition Metal-Carbon Multiple BondsAlkylidenes, alkylidynes, low valent Carbenes and carbynes- Synthesis, nature of bond, Structural Characteristics, nucleophilic and Electrophilic reaction on the ligands, role in organic synthesisUNIT 4(15 Hrs.)
					IV th	Synthesis, nature of bond, Structural Characteristics,	Homogeneous Catalysis Stoichiometric reaction for catalysis, homogeneous catalytic hydrogenation, Zeigler-Natta polymerization of olefins, catalytic reations involving carbon monoxide such as hydrocarbonylation of olefins (oxo reaction) oxopalladation
						Electrophilic reaction on the ligands	reactions, activation of C-H bond.
				August	I st	UNIT 4 Homogeneous Catalysis Stoichiometric reaction for catalysis,	

						homogeneous catalytic	
						hudrogenetion	
						nydrogenation,	
					II nd	Zeigler-Natta	
						polymerization of	
						olefins, catalytic	
						reations involving	
						carbon monoxide	
					III rd	Hydrocarbonylation of	
						olefins (oxo reaction)	
						oxopalladation	
						reactions,	
					IV th	activation of C-H bond.	
0	Dr Shivali	M Sc II	CH 512	Sentember	Tst	LINIT 1	LINUT 1
9.	DI.SIIIvali Shormo	WI.SC-II	Organatransiti	September	1	Transition Motel	UNIT I Transition Motel Compounds with Dends to Hydrogen
	Sharma		on Motol			Compounds with	(2 Hrg.)
			Chamistry II			Compounds with Bonds to Hydrogen	(J IIIS.) Transition motal Compounds with bonds to hydrogen
			Chemistry-II			Transition metal	INIT 2
						Compounds with bonds	UNIT 2 Transition Motel Complexed (15 Urg)
						to hydrogen	Transition Metal Complexes (15 firs.)
					TTND		Transition Metal Complexes with unsaturated Organic
					11		trionyl complexes, argumetical properties, neture of bonding
						I ransition Metal	and structural factures important reactions relating to
						Complexes Transition Matal	and structural features important features relating to
						Complexes with	nucleopinic and electropinic attack on ligands and to
						Complexes with	UNIT 2
						unsaturated Organic	UNII J Allerda and Angla of Thomastican Matala ((Hara))
			1			molecules,	AIKYIS AND ATYIS OF FRANSITION METAIS (O HTS.)
-						, •	Towners wanted of formula and discussed in the second states of the second states and the second states and the second states are states and the second states are st
						preparations,	Types, routes of synthesis, Stability and decomposition

				bonding and structural features alkenes, alkynes,	Synthesis. Fluxional organometallic compounds (9 Hrs.) Fluxionality and dynamic equilibria in compounds such as η2
			III rd	Preparations, properties, nature of bonding and structural features Allyl, diene,	olefin, η2 Allyl and dienyl Complexes.
			IV th	preparations, properties, nature of bonding and structural features of trienyl complexes	
		October	I st	UNIT 3 Alkyls and Aryls of Transition Metals Types, routes of synthesis,	
			II nd	Stability and decomposition Pathways,organocopper in OrganicSynthesis.	
			III rd	FluxionalorganometalliccompoundsFluxionalityanddynamicequilibriaincompoundssuch as η2olefin	

			IV th	η2 Allyl	
		November	II nd	Dienyl Complexes	
					I

End Semester	08-12-18	То	24-12-18	(13 days)
Examinations	Saturday		Monday	
		_		
Semester Vacation	25-12-18	То	06-01-19	(13days)
(Winter Break)	Tuesday		Sunday	
Academic Term –II				
2 nd ,4 th ,6 th				
College reopens after	07-01-19	То	09-05-19	(83 teaching
Semester Examination	Monday		Thursday	days)

Total teaching days of Academic Term II= 83 days

		В	achelor of S	Sciences		Session 2018-19	Second Semester
S.No.	Teacher	Class	Paper	Month	Week		Syllabus
1.	Prof.	B.ScI	Paper-VII	January	II nd	UNIT-I	UNIT-I (8 Hrs.)
	Vishal		Physical			Thermodynamics-I:	Thermodynamics-I:
			Chemistry-			Definition of	Definition of Thermodynamic Terms: System, surroundings etc. Types of systems, intensive
			В			Thermodynamic	and extensiveproperties. State and path functions and their differentials. Thermodynamic
						Terms: System,	process. Concept of heat andwork. First Law of Thermodynamics: Statement, definition of
						surroundings etc.	internal energy and enthalpy, Heat capacity, heatcapacities at constant volume and pressure
						Types of systems,	and their relationship. Joule's Law-Joule-Thomson coefficient and inversion temperature.
						intensive and	Calculations of w, q, dU&dH for the expansion of ideal gases under isothermal andadiabatic
						extensive	conditions for reversible process.
						properties.	UNIT-II (7 Hrs.)
					III rd	State and path	Thermochemistry:
						functions and their	Standard state, standard enthalpy of formation-Hess's Law of constant Heat Summation and
						differentials	its applications.Heat of reaction at constant pressure and at constant volume. Enthalpy of
						Thermodynamic	neutralization. Bond dissociationenergy and its calculation from thermo-chemical data,
						process. Concept of	temperature dependence of enthalpy. Kirchoff'sequation.
						heat and work.	UNIT- III (7 Hrs.)
						First Law of	Colloidal State:
						Thermodynamics:	Definition of colloids, classification of colloids. Solids in liquids (sols): Properties –kinetic,
						Statement, definition	optical and electrical; stability of colloids, protective action, Hardy-Schulze rules, gold
						of internal energy	number. Liquids in liquids (emulsions): Types of emulsions, preparation. Emulsifier. Liquids
						and enthalpy, Heat	in solids (gels): Classification, preparation and properties, inhibition, general applications of
						capacity, heat	colloids.
						capacities at constant	UNIT-IV (8 Hrs.)
						volume and pressure	Solutions, Dilute Solutions and Colligative Properties:
					th	and their relationship	Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and
					IV	Joule's Law-Joule-	activitycoefficient. Dilute solution, colligative properties, Raoult's law, relative lowering of
						Thomson coefficient	vapour pressure, molecular weightdetermination. Osmosis, law of osmotic pressure and its
						and inversion	measurement, determination of molecular weight fromosmotic pressure. Elevation of boiling
						temperature.	point and depression of freezing point. Thermodynamic derivation of relation between
						Calculations of w, q,	molecular weight and elevation in boiling point and depression of freezing

				dU&dH for the	point.Experimental methods for determining various colligative properties. Abnormal molar
				expansion of ideal	mass, degree of dissociation and association of solutes.
				gases under	
				isothermal for	
				reversible process	
			V th	Joule's Law-Joule-	
				Thomson coefficient	
				and	
				inversion	
				temperature.	
				Calculations of w, q,	
				dU&dH for the	
				expansion of ideal	
				gases under adiabatic	
				conditions for	
				reversible process.	
		February	H nd	IINIT.II	
		i cordary		Thermochemistry.	
				Standard state	
				standard enthalpy of	
				formation_Hess's	
				I aw of constant Heat	
				Summation and its	
				applications	
			111 rd	Heat of reaction at	
			111	near of feaction at	
				constant pressure and	
				at constant volume.	
				Enthalpy of	
				neutralization. Bond	
				dissociation	
			xx xth	energy	
			IV	Bond dissociation	
				energy calculation	
				trom thermo-	
				chemical data,	
				temperature	
				dependence of	
				enthalpy. Kirchoff's	

 1	1	1	1		
				equation.	
			V th	UNIT- III	
				Colloidal State:	
				Definition of	
				colloids	
				classification of	
				colloide	
				Solids in liquids	
				(acla): Dependenties	
				(<i>sols</i>). Properties –	
				kinetic, optical and	
				electrical.	
		March	II nd	Stability of colloids,	
				protective action,	
				Hardy-	
				Schulze rules, gold	
				number.	
			III rd	Liquids in liquids	
				(emulsions) :Types	
				of emulsions.	
				preparation.	
				Emulsifier	
			IV th	Liquids in solids	
			- '	(gels). Classification	
				preparation and	
				properties inhibition	
				general applications	
				of colloids	
			V th		
			, v	Solutions Diluto	
				Solutions and	
				Colligative	
				Droportios.	
				Ideal and non ideal	
				ideal and non-ideal	

	1		1	1	1
				solutions, methods of	
				expressing	
				concentrations of	
				solutions, activity	
				and activity	
				Coefficient.	
		April	Ist	Dilute solution,	
		1		colligative	
				properties. Raoult's	
				law relative	
				lowering of vapour	
				pressure molecular	
				woight	
				determination	
			TTNG		
			11	Osmosis, law of	
				osmotic pressure and	
				its measurement,	
				determination of	
				molecular weight	
				from	
				osmotic pressure	
			III rd	Elevation of boiling	
				point and depression	
				of freezing point.	
				Thermodynamic	
				derivation of	
				relation between	
				molecular weight and	
				elevation in boiling	
				point and depression	
				of fragzing point	
				or neezing point.	
			TX th	Enn anim antal	4
			10	Experimental	
				methods for	
				determining various	
				colligative	
				properties.	
				Abnormal molar	

						mass, degree of	
						dissociation and	
						association of	
						solutes.	
2.	Prof.Ruchi	B.Sc-I	Paper-VI	January	II nd	UNIT-I	UNIT-I (8 Hrs.)
	ka		Organic			Alkenes,	Alkenes, Cycloalkenes:
			chemistry-			Cycloalkenes:	Nomenclature of alkenes, methods of formation, mechanisms of dehydration of alcohols and
			В			Nomenclature of	dehydrohalogenation of alkyl halides, regioselectivity in alcohol dehydration. The Saytzeff's
						alkenes, methods of	Rule, Hofmann elimination, physical properties and relative stabilities of alkenes. Chemical
						formation,	reactions of alkenes - mechanisms involved in hydrogenation, electrophilic and free radical
						mechanisms of	additions, Markownikoff's rule, hydroboration - oxidation, oxymercuration-reduction.
						dehydration of	Epoxidation, ozonolysis, hydration, hydroxylation and oxidation with KMnO4.
						alcohols and	Polymerization of alkenes. Substitution at the allylic and vinylic positions of alkenes.
						dehydrohalogenation	Industrial applications of ethylene and propene.
						of alkyl halides,	UNIT-II (7 Hrs.)
						regioselectivity in	Dienes and Alkynes :
						alcohol dehydration	Methods of formation, conformation and chemical reactions of cycloalkenes. Nomenclature
					III^{rd}	The Saytzeff's Rule,	and classification of dienes : Isolated, conjugated and cumulated dienes. Structure of allenes
						Hofmann	and butadiene, methods of formation, polymerization. Chemical reactions - 1,2 and 1,4
						elimination, physical	additions, Diels-Alder reaction. Nomenclature, structure and bonding in alkynes. Methods of
						properties and	formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and
						relative stabilities of	nucleophilic addition reactions, hydroboration-oxidation, metal-ammonia reductions,
						alkenes.Chemical	oxidation and polymerization.
						reactions of alkenes -	UNIT-III (8 Hrs.)
						mechanisms involved	Arenes and Aromaticity:
						in hydrogenation,	Nomenclature of benzene derivatives. The aryl group, Aromatic nucleus and side chain,
						electrophilic and free	Structure of benzene, Molecular formula and Kekule structure. Stability and carbon-carbon
						radicaladditions	bond lengths of benzene, resonance structure, MO picture. Aromaticity : The Huckel rule,
					IV th	Markownikoff's rule,	aromatic ions. Aromatic electrophilic substitution-General pattern of the mechanism, role
						hydroboration –	of σ and π complexes. Mechanism of nitration, halogenation, sulphonation, mercuration and
						oxidation,	Friedel-Crafts reaction. Energy profile diagrams. Activating and deactivating substituents,
						oxymercuration-	orientation and ortho/para ratio. Side chain reactions of benzene derivatives. Methods of
						reduction.	formation and chemical reactions of alkylbenzenes, alkynyl benzenes and biphenyl.
						Epoxidation,	UNIT-IV (7 Hrs.)
						ozonolysis,	Alkyl and Aryl Halides
						hydration,	Nomenclature and classes of alkyl halides, methods of formation, chemical reactions.
						hydroxylation and	Mechanisms of nucleophilic substitution reactions of alkyl halides, SN2 and SN1 reactions
						oxidation with	with energy profile diagrams. Polyhalogencompounds : chloroform, carbon tetrachloride.
						KMnO4.	Methods of formation of aryl halides, nuclear and side chain reactions. The addition-

		February	I st	Polymerization of	elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution
		,		alkenes. Substitution	reactions. Relative relativities of alkyl halides vs. allyl. vinyl and arvl halides.
				atthe allylic and	
				vinvlic positions of	
				alkenes. Industrial	
				applications of	
				ethylene and	
				propene	
			II nd	UNIT-II	
				Dienes and Alkynes	
				:Methods of	
				formation.	
				conformation and	
				chemical reactions of	
				cycloalkenes.	
				Nomenclature and	
				classification of	
				dienes: Isolated,	
				conjugated and	
				cumulated dienes.	
			III rd	Structure of allenes	
				and butadiene,	
				methods of	
				formation,	
				polymerization.	
				Chemical reactions –	
				1,2 and 1,4 additions,	
				Diels-Alder	
				reaction.	
			IV th	Nomenclature,	
				structure and	
				bonding in alkynes.	
				Methods of	
				formation. Chemical	
				reactions of alkynes,	
				acidity of alkynes	
		March	I st	Mechanism of	
				electrophilic and	

				nucleophilic addition	
				reactions,	
				hydroboration-	
				oxidation,	
				metal-ammonia	
				reductions, oxidation	
				and polymerization.	
			II nd	UNIT-III	
				Arenes and	
				Aromaticity:	
				Nomenclature of	
				benzene derivatives.	
				The aryl group,	
				Aromatic nucleus	
				and side chain.	
				Structure of benzene	
				: Molecular formula	
				and Kekule structure.	
			III^{rd}	Stability and carbon-	
				carbon bond lengths	
				of benzene.	
				resonance	
				structure. MO	
				picture Aromaticity :	
				The Huckel rule.	
				aromatic ions.	
			IV th	Aromatic	
				electrophilic	
				substitution—	
				General pattern of	
				the mechanism, role	
				of σ and π	
				complexes.	
				Mechanism of	
				nitration.	
				halogenation.	
				sulphonation.	
				mercuration and	
				Friedel-Crafts	
	L			i neuer cruito	

				reaction Energy
				profile diagrams
			Wth	Activating and
			v	Activating and
				deactivating
				substituents,
				orientation and
				ortho/para ratio. Side
				chain reactions of
				benzene derivatives.
				Methods of
				formation and
				chemical reactions of
				alkylbenzenes
				alkynyl benzenes and
				hiphonyl
		A	тst	
		April	1	UNIT-IV
				Alkyl and Aryl
				Halides
				Nomenclature and
				classes of alkyl
				halides, methods of
				formation
			II nd	Chemical reactions.
				Mechanisms of
				nucleophilic
				substitution reactions
				of alley halidaa SN2
				of alkyl handes, SN2
				and SN1 reactions
				with energy profile
				diagrams.
			III^{rd}	Polyhalogen
				compounds:
				chloroform, carbon
				tetrachloride.
				Methods of
				formation of arvl
				halides nuclear and
				side abain reportions
				side chain reactions.

					IV th	The addition	
					1 V	adultion and the	
						alimination addition	
						mechanisms of	
						nucleonbilic erometic	
						substitution	
						reactions Polativa	
						relativities of alkyl	
						halidas vs allyl	
						vinyl and aryl	
						halides	
3	Drof Ivoti	BS c I	Papar V	Ionuory	H nd		
5.	r tot.j you	D.SC1	Inorganic	January	11	Chamical Bonding	Chamical Ronding II
			Chomistry			II Ionia Solida	Lonic Solids Concept of close packing Jonic structures (NaCl type Zine blande Wurtzite
			P			Concept of close	CoE and antifluorita) radius ratio rule and coordination number limitation of radius ratio
			D			packing	rule lettice defects, semiconductors
					TITL	Jonia structures	INIT II (8 Hrs.)
					111	(NeCl type Zine	Chamical Ronding III
						hlanda Wurtzita	Lattice energy and Born Haber cycle solvation energy and solubility of ionic solids
						CaE and	polarizing power and polarizability of ions Fajan's rule. Metallic bond free electron valence
						cal ² and	bond and band theories. Weak Interactions – Hydrogen bonding. Van der Waals forces
					Wth	Padius ratio rule and	UNIT_III (7 Hrs.)
					1 V	coordination number	n-Block Flements_I
						limitation of radius	Comparative study (including diagonal relationship) of groups 13-14 elements compounds
						rotio rulo lottico	like hydrides oxides oxyacids and halides of groups 13-14 hydrides of boron-diborane and
						defects	higher horanes, horazine, horohydrides, fullerenes, carbides, fluorocarbons
						semiconductors	INIT-IV (8 Hrs)
					W th		n-Block Flements.II
					v	Chamical Bonding	Comparative study of groups 15-17 elements compounds like hydrides oxides oxyacids and
						III Lattice operav	halides of groups 15-17 silicates (structural principle) tetrasulphurtetranitride basic
						and Born-Haber	properties of balogens interhalogens and polyhalides
							properties of hardgens, internatogens and porfinances.
				Fabruary	H nd	Solvation operate and	
				rebruary	11	solubility of jonio	
						solide polarizing	
						nower and	
						power and polarisability of ions	
					III rd	Faian's rule Metallic	
				February	III nd	Chemical Bonding- III Lattice energy and Born-Haber cycle Solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule. Metallic	Comparative study of groups 15-17 elements, compounds like hydrides, oxides, oxyacids and halides of groups 15-17, silicates (structural principle), tetrasulphurtetranitride, basic properties of halogens, interhalogens and polyhalides.

				bond-free electron,	
				valence bond and	
				band theories.	
			IV th	WeakInteractions –	
				Hydrogen bonding,	
				Van der Waals	
				forces.	
			V th	UNIT-III	
				<i>n</i> -Block Elements-I	
				Comparative study	
				(including diagonal	
				relationship) of	
				groups 13-14	
				elements compounds	
				lika hydridas	
				ovidos ovvocido	
		Moroh	TTung	Componentive study	-
		March	11	(including diagonal	
				(including diagonal	
				relationship) of	
				groups 15-14	
				liles heideides	
				inke hydrides,	
			TTT	oxides, oxyacids	
			III ^{ra}	Hydrides of boron-	
				diborane and higher	
				boranes, borazine,	
			41-	borohydrides,	
			IV	Fullerenes, carbides,	
			V ^{tn}	Fluorocarbons	
		April	I^{st}	UNIT-IV	
				p-Block Elements-II	
				Comparative study of	
				groups 15-17	
				elements, compounds	
				like hydrides, oxides,	
				oxyacids and halides	
				ofgroups 15-17	
			II nd	Comparative study of	1
			ш	Comparative study of	

			groups 15-17	
			elements, compounds	
			like hydrides, oxides,	
			oxyacids and halides	
			ofgroups 15-17	
		III rd	Halides of groups 15-	
			17, silicates	
			(structural principle	
		IV th	Tetrasulphurtetranitri	
			de basic properties of	
			halogens,	
			interhalogens and	
			polyhalides.	

Bachelor of Sciences					Sessior	n 2018-19	Fourth Semester
S.No.	Teacher	Class	Paper	Month	Week		Syllabus
1.	Prof.	B.Sc	Paper-XV	January	II nd	UNIT-I (8 Hrs.)	UNIT-I (8 Hrs.)
	Vishal	II	Physical			Phase equilibrium:	Phase equilibrium:
			Chemistry-			Statement and meaning	Statement and meaning of the terms – phase, component and degree of freedom, derivation
			В			of the terms – phase,	of Gibbs phase rule, phase equilibria of one component system—water, CO ₂ and S systems.
						component and degree	Phase equilibria of two component system –solid –liquid equilibria, simple eutectic – Bi-Cd
						of freedom, derivation	system, desiliverisation of lead. Solid solutions-compound formation with congruent
						of Gibbs phase rule	melting point (Mg-Zn) and incongruent melting point, (NaCl-H ₂ O) system. Freezing
					III rd	Phase equilibria of one	mixtures, acetone-dry ice. Partially Miscible Liquids –Phenol-water, trimethylamine – water,
						component system—	nicotine -water systems. Lower and upper consolute temperature. Effect of impurity on
						water, CO2 and S	consolute temperature, immiscible liquids, steam distillation. Nernst distribution law-
						systems.	thermodynamic derivation, applications.
					IV th	Phase equilibria of two	UNIT-II (7 Hrs.)
						component system –	Electrochemistry –I:
						solid –liquid equilibria,	Electrical transport -Conduction in metals and in electrolyte solutions, specific conductance
						simple eutectic – Bi-Cd	and equivalent conductance, measurement of equivalent conductance, variation of equivalent
						system,	and specific conductance with dilution. Migration of ions and Kohlrausch Law, Arrhennius
						desiliverisation of lead.	theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's
			\mathbf{V}^{th}	Solid solutions—	dilution law its uses and limitations. Debye-Huckel-Onsager's equation for strong		
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			•	compound formation	electrolytes (elementary treatment only) Transport number definition and determination by		
				with congruent melting	Hittorf method and moving boundary method		
				point $(Mq Tr)$ and	INIT III (8 Hrs.)		
				incongruent molting	CIVIT-III (8 III S.)		
				incongruent menning	Electrochemistry-in;		
				point,	Types of reversible electrodes – gas metal – ion, metal –insoluble sait – amon and redox		
			TTNG	(NaCI-H ₂ O) system.	electrodes. Electrode reactions, Nernst equation, derivation of cell E.M.F. and single		
		February	11	Freezing mixtures,	electrode potential, standard hydrogen electrode – reference electrodes – standard electrode		
				acetone-dry ice.	potential, sign conventions, electrochemical series and its significance.		
			III ^{ra}	Partially Miscible			
				Liquids –Phenol-water,	Electrolytic and Galvanic cells – reversible and irreversible cells, conventional representation		
				trimethylamine – water,	of electrochemical cells. E.M.F. of a cell and its measurements. Computation of cell E.M.F.		
				nicotine –water systems.	Calculation of thermodynamic quantities of cell reactions (ΔG , ΔH and K), Polarization, over		
			IV th	Lower and upper	potential and hydrogen overvoltage.		
				consolute temperature.	Concentration cell with and without transport, liquid junction potential, application of		
				Effect of impurity on	concentration cells, valency of ions, solubility product and activity coefficient,		
				consolute temperature,	potentiometric titrations.		
				immiscible liquids,			
				steam distillation.			
			V th	Nernst distribution law-			
			•	thermodynamic			
				derivation applications			
		March	H nd				
		Iviai CII	11	Electrochomistry I.			
				Electrical transport			
				Conduction in metals			
				conduction in metals			
				and in electrolyte			
				solutions, specific			
				conductance and			
				equivalent			
				conductance,			
				ineasurement of			
			TTLrd	Variation of activalant	4		
			111	variation of equivalent			
				and specific			
				dilution Migration of			
				iona and Kahlmanal			
				ions and Konirausch			

				Law, Arrhennius theory
				of electrolyte
ł				dissociation and its
l				limitations
l			IV th	Weak and strong
l			1.4	electrolytes Octwald's
l				dilution law its uses
l				and limitations Dakes
ł				Luckel Openant's
				nucker-Olisager s
				equation for strong
				electrolytes (elementary
			x rth	treatment only).
			V	Transport number,
				definition and
				determination by Hittorf
				method and moving
				boundary method.
		April	I st	UNIT-III
				Electrochemistry-II:
				Types of reversible
				electrodes – gas metal –
				ion, metal –insoluble
				salt – anion and redox
				electrodes. Electrode
				reactions
			H nd	Nernst equation
				derivation of cell F M F
				and single electrode
				notantial standard
				bydrogon electrode
				nyurogen electrode –
				reference electrodes –
				standard electrode
				potential, sign
				conventions,
				electrochemical series
				and its
				Significance.
			III^{rd}	UNIT-IV (7 Hrs.)

						Electrolytic and	
						Galvanic cells –	
						reversible and	
						irreversible cells	
						conventional	
						representation of	
						electrochemical	
						cells EME of a cell	
						and its measurements	
						Computation of cell	
						E M F	
					IVth	Calculation of	
					1 v ui	thermodynamia	
						quantities of	
						cell reactions ((AG AH	
						and \mathbf{K} Polarization	
						and K), Fold Ization,	
						bydrogen overweltage	
						Concentration cell with	
						concentration cen with	
						liquid junction potential	
						inquid junction potential,	
						application of	
						concentration cens,	
						valency of folls,	
						solubility product and	
						activity coefficient,	
2	D (D 1)	DOU		т	TTNG	potentiometric titrations.	
2.	Prof.Ruchi	B.Sc-II	Paper-XIV	January	11		UNIT-II (7 Hrs.)
	ка		Organic			Carboxylic Acid	Carboxylic Acid Derivatives: Structure and nomenclature of acid chlorides, esters, amides
			chemistry-			Derivatives: Structure	and acid annydrides. Relative stability α reactivity of acyl derivatives. Physical properties,
			В			and nomenclature of	interconversion of acid derivatives by nucleophilic acyl substitution. Preparation of
						acid chlorides, esters,	carboxylic acid derivatives, chemical reactions. Mechanisms of esterification and
						amides and acid	nydrolysis(acidic and basic).
					TTT	annydrides.	$\begin{bmatrix} \text{UNI1-III} (8 \text{ Hrs.}) \\ \text{Eval} \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \end{bmatrix} \begin{bmatrix} 1$
					111."	Relative stability &	Etners, Epoxides Fats, Oils and Detergents:
						reactivityof acyl	Nomenciature of etner and methods of their formation, physical properties. Chemical
						derivatives. Physical	reaction-cleavage and autoxidation, Ziesel's method. Synthesis of epoxides. Acid and base-
						properties,	catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard
1						interconversion of acid	and organolithium reagents with epoxides. Natural fats, edible and industrial oils of vegetable

				derivatives by	origin, common fatty acids, glycerides, hydrogenation of unsaturated oils. Saponification
				nucleophilic acvl	value, jodine value, acid value, Soaps, synthetic detergents; alkyl and aryl sulphonates.
				substitution	UNIT-IV (7 Hrs.)
			IV th	Preparation of	Organic Compounds of Nitrogen:
			1 V	carboxylic acid	Preparation of nitroalkanes and nitroarenes. Chemical reactions of nitroalkanes. Mechanisms
				derivatives chemical	of nucleophilic substitution in nitroarenes and their reductions in acidic, neutral and alkaline
				reactions Machanisms	media. Picric acid. Structure and nomenclature of amines, physical properties.
				of esterification and	Stereochemistry of amines. Separation of a mixture of primary, secondary and tertiary
				bydrolygig(agidig and	amines. Structural features effecting basicity of amines. Amine salts as phasetransfer
				hasia)	catalysis. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles).
		Echnycony	Tst		reductive amination of aldehydic and ketonic compounds. Gabriel-phthalimide reaction,
		February	1	UNII-II Ethang Engelides Esta	Hofmann bromamide reaction.
				Ethers, Epoxides Fais,	UNIT-IV
				Vision and Detergents:	Electromagnetic Spectrum: Absorption Spectra –I: (7 Hrs.)
				Nomenciature of ether	Ultraviolet (UV) absorption spectroscopy – Absorption laws (Beer – Lambert Law), molar
				formation physical	absorptivity, presentation and analysis of UV spectra, types of electronic transitions, effect of
				proportion Chamical	conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic,
				properties. Chemical	hyperchromic and hypochromic shifts. UV spectra of conjugated enes and enones.
				autovidation	Woodward Fieser Rules and their applications in calculating maximum values of conjugated
				Ziosal'smathad	alkenes (cyclic as well as acyclic) and conjugated carbonyl compounds.
			und	Symthesis of apovides	
			11	Acid and base catalyzed	
				ring opening of	
				anovides orientation of	
				epoxides, orientation of	
				reportions of Grignard	
				and organolithium	
				reagents with anovides	
			III rd	Natural fate adible and	
			111	industrial oils of	
				vagatabla origin	
				common fatty acids	
				glycoridos	
				hydrogenation of	
				unsaturated oils	
			IV th	Saponification value	
			1.4	jodine value, acid value,	
				Soone synthetic	
				soaps, synthetic	

				detergents; alkyl and
				aryl sulphonates.
		March	Ist	UNIT-III
		1.141.011	-	Organic Compounds
				of Nitrogen.
				Dreparation of
				nitroalkanes and
				nitrographs allu
			TTN	muroarenes.
			11	Chemical reactions of
				nitroalkanes.
				Mechanisms of
				nucleophilic substitution
				in nitroarenes and their
				reductions in acidic,
				neutral and alkaline
				media.
			III rd	Picric acid. Structure
				and nomenclature of
				amines, physical
				properties
				Stereochemistry of
				amines
			IV th	Constant of a minimum
			1 V	separation of a mixture
				of primary, secondary
				and tertiary amines.
				Structural features
				effecting basicity of
				amines. Amine salts as
				phasetransfer catalysis.
			V th	Preparation of alkyl and
				aryl amines (reduction
				of nitro compounds.
				nitriles) reductive
				amination of aldebydic
				and ketonic compounds
				Gabriel phthalimida
				reaction, Hofmann
				bromamide reaction.

				April	I^{st}	UNIT-IV	
				1		Electromagnetic	
						Spectrum: Absorption	
						Spectra –I:	
						Ultraviolet (UV)	
						absorption spectroscopy	
						– Absorption laws (Beer	
						– Lambert Law), molar	
						absorptivity.	
						presentation and	
						analysis of UV spectra	
						types of electronic	
						transitions	
					II nd	Effect of conjugation	
						Concept of	
						chromophore and	
						auxochrome	
						Bathochromic	
						hypsochromic	
						hyperchromic and	
						hypochromic shifts.	
					III rd	UV spectra of	
						conjugated enes and	
						enones.	
					IV th	Woodward Fieser Rules	
						and their applications in	
						calculating maximum	
						values of conjugated	
						alkenes (cyclic as well	
						as acyclic) and	
						conjugated carbonvl	
						compounds.	
3.	Prof.Aman	B.Sc	Paper-XIII	January	II nd	UNIT-I	UNIT-I (8 Hrs.)
	preet Kaur	II	Inorganic	-		Chemistry of	Chemistry of Lanthanide Elements:
	-		Chemistry-			Lanthanide Elements:	Electronic structure, oxidation states and ionic radii and lanthanide contraction, complex
			В			Electronic structure,	formation, occurrence and isolation, lanthanide compounds.
						oxidation states	Chemistry of Actinides:
					III rd	Ionic radii and	General features and chemistry of actinides, chemistry of separation of Np, Pu and Am from

				lanthanide contraction	U, similarities between the later actinides and the later lanthanides.
			IV th	Complex formation,	UNIT-II (7 Hrs.)
				occurrence and	Acids and Bases:
				isolation,	Arrhenius, Bronsted-Lowry, the Lux-Flood, solvent system and Lewis concepts of acids and
			V th	Lanthanide compounds	bases.
		February	II nd	Chemistry of	UNIT-III (8 Hrs.)
		5		Actinides:	Oxidation and Reduction:
				General features and	Use of redox potential data - analysis of redox cycle, redox stability in water - Frost, Latimer
				chemistry of actinides	and Pourbaix diagrams. Principles involved in the extraction of the elements.
					UNIT-IV (7 Hrs.)
			III rd	Chemistry of separation	Non-aqueous Solvents:
				of Np, Pu and Am from	Physical properties of a solvent, types of solvents and their general characteristics, reactions
				U,	in non-aqueous solvents with reference to liquid NH ₃ and liquid SO ₂ .
			IV th	Similarities between the	
				later actinides and the	
				later lanthanides	
			V th	UNIT-II	
				Acids and Bases:	
				Arrhenius, Bronsted-	
				Lowry	
		March	II nd	The Lux-Flood, solvent	
				system	
			III rd	Lewis concepts of acids	
				and bases.	
			IV th	UNIT-III	
				Oxidation and	
				Reduction:	
				Use of redox potential	
				data – analysis of redox	
			41-	cycle	
			V th	Redox stability in water	
				– Frost, Latimer and	
			at	Pourbaix diagrams	
		April	I st	Principles involved in	
				the extraction of the	
			nd	elements	
			II ^{na}	UNIT-IV	
				Non-aqueous Solvents:	

			Physical properties of a	
			solvent, types of	
			solvents	
		III^{rd}	General characteristics	
			of solvent, reactions in	
			non-aqueous solvents	
			with reference to liquid	
			NH ₃	
		IV th	Reactions in non-	
			aqueous solvents with	
			reference to liquid SO ₂ .	

Bache	elor of Scier	ices			Ses	sion 2018-2019	(Sixth Semester)
S.No.	Teacher	Class	Paper	Month	Week		Syllabus
1.	Prof.Jyoti	B.Sc	Paper-XXI	January	$\mathrm{II}^{\mathrm{nd}}$	UNIT-I	UNIT-I (7 Hrs.)
		III	Inorganic			Silicones and	Silicones and Phosphazenes:
			Chemistry-			Phosphazenes:	Silicones and phosphazenes as examples of inorganic polymers, nature of bonding in
			В			Silicones	triphosphazenes.
					III rd	Phosphazenes	UNIT-II (8 Hrs.)
					TV7th	Noture of honding in	Hard and Soft Acids and Bases (HSAB):
					IV	Nature of bonding in	Classification of acids and bases as hard and soft Pearson's HSAB concept, acid-base
						tripnosphazenes.	strength and hardness and softness. Symbiosis, theoretical basis of hardness and softness,
					V th	UNIT-II	electronegativity and hardness and softness.
						Hard and Soft	UNIT-III (8 Hrs.)
						Acids and Bases	Electronic Spectra of Transition Metal Complexes:
						(HSAB):	Types of electronic transitions, $L - S$ coupling, selection rules for d-d transitions,
						Classification of	spectroscopic ground states, Orgel – energy level diagram for $d1$ and d^0 states, discussion of
						acids and bases	the electronic spectrum of $[Ti(H2O)_6]^{3+}$ complex ion.
				February	II nd	Pearson's HSAB	UNIT-IV (7 Hrs.)
				-		concept	Magnetic Properties of Transition Metal Complexes:
					III rd	Acid-base strength	Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only
						and hardness and	formula. Correlation of μ_s and μ_{eff} values, orbital contribution to magnetic moments,
						softness.	application of magnetic moment data for $3d$ metal complexes.

			TX 7th	C 1	
			1.	Symbiosis,	
				theoretical basis of	
				hardness and	
				softness,	
				electronegativity and	
				hardness and	
				softness.	
			V th	UNIT-III]
				Electronic Spectra	
				of Transition Metal	
				Complexes:	
				Types of electronic	
				transitions	
		March	II nd	L – S coupling.	1
				selection rules for d -	
				d transitions	
			III rd	spectroscopic ground	
				states. Orgel –	
				energy level diagram	
				for $d1$ state	
			IV th	Orgel – energy level	
				diagram for d state	
			V th	Discussion of the	
			*	electronic spectrum	
				of $[Ti(H2O)_{2}]^{3+}$	
				complex ion	
		April	I st	UNIT-IV	4
		7 P111	1	Magnetic Properties	
				of Transition Metal	
				Complexes.	
				Types of magnetic	
				hehaviour	
			H nd	Methods of	
			11	determining	
				magnetic	
				suscentibility enin-	
				only formula	
			III rd	Correlation of u and	4
			ш	Correlation of μ_s and	

						$\begin{array}{ll} \mu_{eff} values, & orbital \\ contribution & to \end{array}$	
						magnetic moments,	
					IV th	Application of	
						magnetic moment	
						data for $3d$ metal	
						complexes.	
2.	Prof.	B.Sc-	Paper-	January	II nd	UNIT-I	UNIT-I (8 Hrs.)
	Vishal	III	XXII			Amino Acids,	Amino Acids, Peptides, Proteins and Nucleic Acids:
	Sharma		Organic			Peptides, Proteins	Classification, structure and stereochemistry of amino acids. Acid- base behavior, isoelectric
			chemistry-			and Nucleic Acids:	point and electrophoresis. Preparation and reactions of L- amino acids.Structure and
			В			Classification,	nomenclature of peptides and proteins. Classification of proteins. Peptide structure
						structure and	determination, end group analysis, selective hydrolysis of peptides. Classical peptide
						stereochemistry of	synthesis, solid – phase peptide synthesis. Structures of peptides and proteins. Levels of
						amino acids. Acid-	protein structure. Protein denaturation/renaturation.Nucleic Acids : Introduction. Constituents
						base behavior,	of nucleic acids. Ribonucleosides and ribonucleotides. The double helical Structure of DNA.
						isoelectric point and	UNIT-II (/ Hrs.)
					TTT	electrophoresis.	Synthetic Polymers:
					III ^{.a}	Preparation and	Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl
						reactions of L- amino	polymerization, Ziegier – Natta polymerization and vinyi polymers. Condensation or step
					th	acius	formaldehyde resins, operations, polyamides, piterior formaldehyde resins, drea
					IV	Structure and	INIT III (7 Hrs.)
						nomenclature of	Organic Synthesis via Englates
						peptides and	Acidity of $\dot{\alpha}$ -hydrogens alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of
						proteins.	ethyl acetoacetate: the Claisen condensation Keto-enoltautomerism of ethyl acetoacetate
						Classification of	Alkylation and acylation of enamines
				E i martina	тst	proteins.	UNIT-IV (8 Hrs.)
				February	1	determination and	Organometallic Compounds:
						group analysis	Organomagnesium Compounds: The Grignard reagents – Formation, structure and chemical
					H nd	selective bydrolysis	reactions. Organozinc Compounds: Formation and Chemical reactions.
					11	of peptides	Organolithium Compounds: Formation and Chemical reactions.
					III rd	Classical peptide	1
						synthesis, solid –	
						phase peptide	
						synthesis. Structures	
						of peptides and	
						proteins	

	1		41-		
			IV th	Levels of protein	
				structure. Protein	
				denaturation/renatura	
				tion. Nucleic Acids :	
				Introduction.	
				Constituents of	
				nucleic acids	
				Ribonucleosides and	
				ribonucleotides The	
				double balical	
				Structure of DNA	
			TST	Structure of DNA.	
		March	I	UNIT-II	
				Synthetic Polymers:	
				Addition or chain-	
				growth	
				polymerization. Free	
				radical vinyl	
				polymerization, ionic	
				vinyl polymerization,	
			II nd	Ziegler – Natta	
				polymerization and	
				vinyl polymers.	
				Condensation or step	
				growth	
				polymerization.	
				Polyesters	
				polyamides	
			III rd	Phenol formaldehyde	4
				resing uroa	
				formaldehyde resins	
				apovy regins and	
				polyurothenes	
			TX 7th	Notes and south at its	
			1.0	ivatural and synthetic	
				rubbers.	
				Organic Synthesis	
				via Enolates:	
				Acidity of ά-	

						hydrogens,	
					V th	Alkylation of diethyl	
						malonate and ethyl	
						acetoacetate.	
				April	I st	Synthesis of ethyl	
				_		acetoacetate: the	
						Claisen	
						condensation. Keto-	
						enoltautomerism of	
						ethyl acetoacetate.	
						Alkylation and	
						acylation of	
						enamines.	
					Π^{nd}	UNIT-IV	
						Organometallic	
						Compounds:	
						Organomagnesium	
						Compounds: The	
						Grignard reagents -	
						Formation, structure	
						and chemical	
						reactions.	
					III^{rd}	Organozinc	
						Compounds:	
						Formation and	
						Chemical reactions.	
					IV th	Organolithium	
						Compounds:	
						Formation and	
						Chemical reactions.	
3.	Dr.Rishu	B.Sc	Paper-	January	II nd	UNIT-I	UNIT-I (7 Hrs.)
	Jain	III	XXIII			Solid State-I:	Solid State-I:
			Physical			Definition of space	Definition of space lattice, unit cell and Miller Indices Laws of Crystallography – (i) Law of
			Chemistry-			lattice, unit cell and	Constancy of Interfacial Angles, (ii) Law of Rationality of Indices, (iii) Law of Symmetry.
			В			Miller Indices	Symmetry elements in crystals.
					III rd	Laws of	UNIT-II (8 Hrs.)
						Crystallography – (i)	Solid State-II:
						Law of Constancy of	X-ray diffraction by crystals. Derivation of Bragg equation. Determination of crystal

	1	1	1		
				Interfacial Angles,	structure of NaCl, KCl and CsCl (Laue's method and powder method). Applications of
				(ii) Law of	Powder diffraction for structure determination, Thermal and photochemical reaction in solid
				Rationality of	state
				Indices, (iii) Law of	UNIT-III (8 Hrs.)
				Symmetry.	Spectroscopy :
			IV th	Symmetry elements	Introduction : Electromagnetic radiation, regions of the spectrum, basic features of different
				in crystals.	spectrometers, statement of the Born-Oppenheimer approximation, degrees of freedom.
			V th	UNIT-II (8 Hrs.)	Rotational Spectrum:
				Solid State-II:	Diatomic molecules. Energy levels of a rigid rotor (semi – classical principles), selection
				X-ray diffraction by	rules, spectral intensity, determination of bond length, qualitative description of non-rigid
				crystals. Derivation	rotor, isotope effect.
				of Bragg equation.	UNIT-IV (7 Hrs.)
		February	II nd	Determination of	Vibrational Spectrum:
				crystal structure of	Infrared Spectrum : Energy levels of simple harmonic oscillator, selection rules, pure
				NaCl, KCl and CsCl	vibrational spectrum intensity, determination of force constant and qualitative relation of
				(Laue's method and	force constant and bond energies, effect of anharmonic motion and isotope on the spectrum,
				powder method).	idea of vibrational frequencies of different functional groups. Raman Spectrum : Concept of
			III rd	Applications of	polarizability, pure rotational and pure vibrational, Raman spectra of diatomic molecules,
				Powder diffraction	selection rules.
				for structure	Electronic Spectrum:
				determination	Concept of potential energy curves for bonding and antibonding molecular orbitals,
			IV th	Thermal and	qualitative description of selection rules and Franck- Condon principle. Qualitative
				photochemical	description of σ , π and n M.O., their energy levels and the respective transitions.
				reaction in solid state	
			V th	UNIT-III	
				Spectroscopy :	
				Introduction :	
				Electromagnetic	
				radiation, regions of	
				the spectrum,	
		March	II nd	Basic features of	
				different	
				spectrometers,	
				statement of the	
				Born-Oppenheimer	
				approximation,	
				degrees of freedom.	
			III rd	Rotational	
	1				

		1			
				Spectrum:	
				Diatomic molecules.	
				Energy levels of a	
				rigid rotor (semi –	
				classical principles),	
				selection rules,	
				spectral intensity,	
			IV th	Determination of	
				bond length,	
				qualitative	
				description of non-	
				rigid rotor, isotope	
				effect.	
			V th	UNIT-IV	
				Vibrational	
				Spectrum:	
				Infrared Spectrum :	
				Energy levels of	
				simple harmonic	
				oscillator. selection	
				rules, pure	
				vibrational spectrum	
				intensity	
				determination of	
				force constant and	
				qualitative relation of	
				force constant and	
				hond energies	
		April	I st	Effect of anharmonic	
			-	motion and isotope	
				on the spectrum, idea	
				of vibrational	
				frequencies of	
				different functional	
				groups.	
			Π^{nd}	Raman Spectrum :	1
				Concept of	
				polarizability. pure	
		1		1	

rotational and pure vibrational, Raman spectra of diatomic molecules, selection rule IIII rd Electronic	
vibrational, Raman spectra of diatomic molecules, selection rule IIII rd Electronic	
spectra of diatomic molecules, selection rule IIII rd Electronic	
molecules, selection rule III rd Electronic	
rule III rd Electronic	
III rd Electronic	
Spectrum:Concept	
of potential energy	
curves for bonding	
and	
antibondingmolecula	
r orbitals, qualitative	
description of	
selection rules and	
Franck- Condon	
principle.	
IV th Qualitative	
description of s, p –	
and n M.O., their	
energy levels and the	
respective	
transitions.	

	Master of Sciences			Session 2018-2019 (nd Semester)
S.No.	Teacher	Class	Paper	Month	Week		Syllabus
1.	Dr.	M.ScI	CH-421-	January	II nd	UNIT 1	UNIT 1
	Gurpreet		Inorganic			Electronic Spectra and	Electronic Spectra and Magnetic Properties Of Transition
	Kaur		chemistry			Magnetic Properties Of	Metal Complexes-I (15 Hrs.)
						Transition Metal	Spectroscopic ground states, correlation, Orgel and Tanabe-
						Complexes-Spectroscopic	Sugano diagrams for transition metal complexes (d1-d9 states),
						ground states, correlation,	calculations of D_{α} B and β parameters, charge transfer spectra
						Orgel and Tanabe-Sugano	and Hatawanaly, Asida And Salta
						diagrams	and neteropory Acids And Sans

		III rd IV th	For transition me complexes $(d_1-d_9 \text{ states})$ calculations of D _q , B and parameters, Charge transfer spectra a Heteropoly Acids And Salts UNIT 2 Electronic Spectra a Magnetic Properties Transition Me Complexes-II Spectroscopic method assignment of absol configuration in optica active metal chelates Their stereo chemi information, Anomale magnetic moments,	 UNIT 2 Electronic Spectra and Magnetic Properties Of Transition Metal Complexes-II (15 Hrs.) Spectroscopic method of assignment of absolute configuration in optically active metal chelates and their stereo chemical information, anomalous magnetic moments, magnetic exchange coupling and spin crossover. UNIT 3 Metal II-Complexes (15 Hrs.) Metal carbonyls, structure and bonding, vibrational spectra of metal carbonyls for bonding and structure elucidation, important reaction of metal carbonyls. Preparation, bonding structure and important reactions of transition metal nitrosyl, dinitrogen and dioxygen complexes, tertiary phosphine as ligand. UNIT 4 Metal Cluster (15 Hrs.) Higher boranes, carboranes, metallobranes and metallocarboranes, metal carbonyl and halide clusters, compounds with metal-metal multiple bonds.

		February	I st	Magnetic exchange coupling and spin crossover. UNIT 3 Metal II–Complexes
				Metal carbonyls, structure and bonding
			II nd	Vibrational spectra of metal carbonyls for bonding and structure elucidation,
			III rd	Important reaction of metal carbonyls. Preparation, bonding, structure of transition metal nitrosyl,
			IV th	Preparation, bonding, structure of transition metal dinitrogen and dioxygen complexes, tertiary phosphine as ligand.
		March	I st	Important reactions of transition metal nitrosyl, dinitrogen and dioxygen complexes
			II nd	important reactions of transition metal tertiary phosphine as ligand.
			III ^{ra}	UNIT 4 Metal Cluster Higher boranes, carboranes, metallobranes

					IV th	Metallocarboranes, metal carbonyl and halide clusters,	
				April	I st	Compounds with metal- metal multiple bonds.	
2.	Dr.Rishu	M.Sc-I	CH-422	January	II nd	UNIT 3	UNIT 3
	Jain		Organic	-		Free Radical Reactions	Free Radical Reactions(8 Hrs.)
			Chemistry-			Type of free radical	Type of free radical reactions, free radical substitution
			II			reactions, free radical	mechanism at an aromatic substrate, neighbouring group
						substitution mechanism at	assistance. Reactivity for aliphatic and aromatic substrates at a
						an aromatic substrate	bridgehead. Reactivity in the attacking radicals. The effect of
					III rd	Neighbouring group	solvents on reactivity. Allylic halogenation (NBS), oxidation of
						assistance. Reactivity for	aldehydes to carboxylic acids, auto-oxidation. Coupling of
						aliphatic and aromatic	alkynes and arylation of aromatic compounds by diazonium
					th	substrates at a bridgehead.	salts. Sandmeyer reaction. Free Radical Rearrangement.
					IV ⁱⁿ	Reactivity in the attacking	Hunsdiecker reaction.
						radicals. The effect of	Elimination Reaction (7 Hrs.)
						solvents on reactivity.	The E2, E1 and E1cB mechanisms and their spectrum,
					x .th	Allylic halogenation (NBS)	Orientation of the double bond. Reactivity effects of substrate
					V	Oxidation of aldehydes to	structure, attacking base, the leaving group and the medium.
						carboxylic acids, auto-	Nechanism and orientation in pyrolytic elimination.
						oxidation.	UNIT 4 Deviavelia Departiena (1511ma)
							Molecular orbital symmetry frontiar orbitals of athylana 1.2
					- st		butadiene 1, 3, 5 beyatriene and allyl system Classification of
				February	1"	Coupling of alkynes and	pericyclic reactions Woodward-Hoffmann correlation
						arylation of aromatic	diagrams FMO and PMO approach Electrocyclic reactions
						compounds by diazonium	control to reaction of the second discontatory motions $4n + 2$ and all system
						salts. Sandmeyer reaction.	Cycloadditions-antarafacial suprafacial additions $4n$ and $4n\pm 2$
						Free Radical	systems 2+2 addition of ketenes 1 3-dipolar cycloadditions
						Kearrangement.	and cheleotropic reactions Signatropic rearrangements.
						Hunsdiecker reaction.	and encredulopic reactions. Signatiopic realitangements-

		Г	nd		
			II nd	Elimination Reaction The	Suprafacial and antarafacial shifts of H. Sigmatropic shifts
				E2, E1 and E1cB	involving carbon moieties, [3, 3]-and [5, 5]- sigmatropic
				mechanisms and their	rearrangements. Claisen, Cope and aza-Cope rearrangement.
				spectrum,	Fluxional tautomerism. Ene reaction.
			III^{rd}	Orientation of the double	
				bond. Reactivity effects of	
				substrate structure,	
				attacking base,	
			IV th	The leaving group and the	
				medium. Mechanism and	
				orientation in pyrolytic	
				elimination.	
		March	I^{st}	Pericyclic Reactions	
				Molecular orbital	
				symmetry, frontier orbitals	
				of ethylene, 1,3-butadiene	
			II nd	1, 3, 5-hexatriene and allyl	
				system. Classification of	
				pericyclic reactions.	
				Woodward-Hoffmann	
				correlation diagrams.	
			III rd	FMO and PMO approach.	
				Electrocyclic reactions	
				conrotatory and disrotatory	
				motions $4n$, $4n + 2$ and allyl	
				system.	
			IV th	Cycloadditions-antarafacial	
				suprafacial additions, 4n	
				and $4n+2$ systems, $2+2$	
				additiion of ketenes, 1, 3-	
				dipolar cycloadditions	

				April	I st	Cheleotropicreactions.Sigmatropicrearrangements-Suprafacialand antarafacial shifts of H.Sigmatropicshiftsinvolving carbon moieties[3,3]-and[5,5]-	
						sigmatropic rearrangements. Claisen, Cope and aza-Cope rearrangement. Fluxional tautomerism. Ene reaction.	
3.	Dr. Gurpree Kaurt	M.ScI	CH-42 Organic chemistry- II	January	II nd III rd IV th	UNIT 1ReactionMechanism,Structure and ReactivityTypes of mechanism, typesofreactions,thermodynamicsandkinetic requirement.Kinetic andthermodynamics control,Hammond's postulate,Curtin-Hammett Principle,Potential energy diagrams,transitionstatesintermediates,method ofdeterminingmechanisms,isotope effects.AdditiontoCarbonMultipleBondsMechanisticandstereochemical aspects	 UNIT 1 Reaction Mechanism, Structure and Reactivity (8 Hrs.) Types of mechanism, types of reactions, thermodynamics and kinetic requirement. Kinetic and thermodynamics control, Hammond's postulate, Curtin-Hammett Principle, Potential energy diagrams, transition states and intermediates, method of determining mechanisms, isotope effects. Addition to Carbon-Carbon Multiple Bonds (7 Hrs.) Mechanistic and stereochemical aspects of addition reaction involving electrophiles, nucleophiles and free radicals, regio and chemoselectivity, orientation and reactivity. Addition to cyclopropane ring. Hydrogenation of double and triple bonds, hydrogenation of aromatic ring. Hydroboration. Michael reaction. Sharpless asymmetric epoxidation. UNIT 2 Addition To Carbon-Heteroatom Multiple Bonds (15 Hrs.) Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, esters and nitriles. Addition of grignard reagents, organozinc and organolithium reagents to carbonyl and unsaturated carbonyl compounds. Wittig reaction.

				addition reaction involving electrophiles, nucleophiles	Mechanism of condensation reactions involving enolates- Aldol, Knoevenagel, Claisen, Mannich, Benzoin, Perkin and Stobbe reactions. Hydrolysis of esters and amides.
		February	I st	Free radicals, regio and chemoselectivity, orientation and reactivity.	ammonolysis of esters.
			II nd	Addition to cyclopropane ring. Hydrogenation of double and triple bonds,	
			III rd	Hydrogenation of aromatic ring. Hydroboration. Michael reaction. Sharpless	
			IV th	asymmetric epoxidation. UNIT 2 Addition To Carbon-	
				Heteroatom MultipleBondsMechanismofmetal	
				hydride reduction of saturated and unsaturated carbonyl compounds	
		March	I st	Esters and nitriles. Addition of grignard reagents, organozinc and	
			II nd	organolithium reagentsTocarbonylunsaturatedcarbonylcompoundsWittig	
			TTL	reaction. Mechanism of condensation reactions	
			111	Knoevenagel, Claisen,	

						Mannich, Benzoin,	
					IV th	Perkin and Stobbe	
						reactions.	
				April	I st	Hydrolysis of esters and	
						amides, ammonolysis of	
						esters.	
4.	Prof.	M.Sc-I	CH-424	January	II nd	UNIT 1	UNIT 1
	Vishal		Group			Symmetry And Group	Symmetry And Group Theory In Chemistry: (15 Hrs.)
			Theory,			Theory In Chemistry:	Symmetry elements & symmetry operation, definitions of
			Spectrosco			Symmetry elements &	group, subgroup, relation between orders of a finite group & its
			py and			symmetry operation,	sub groups. Point group symmetry. Representations of groups
			Diffraction			definitions of group,	by matrices (representation for the Cn, Cnv, Cnn, Dnn etc. group)
			Methods-			subgroup,	character of a representation. The great orthogonality theorem
			IV		III rd	Relation between orders of	and its importance character tables and there use-in
						a finite group & its sub	spectroscopy.
						groups. Point group	UNIT 2
						symmetry.	Microwave Spectroscopy: (15 Hrs.)
					IV th	symmetry. Representations of groups	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of
					IV th	symmetry. Representations of groups by matrices (representation	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin
					IV th	symmetry. Representations of groups by matrices (representation for the Cn, Cnv, Cnn, Dnn etc.	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.
					IV th	symmetry. Representations of groups by matrices (representation for the Cn, Cnv, Cnn, Dnn etc. group) character of a	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.Vibrational Spectroscopy:
					IV th	symmetry. Representations of groups by matrices (representation for the Cn, Cnv, Cnn, Dnn etc. group) character of a representation.	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.Vibrational Spectroscopy:InfraredSpectroscopy:-LinearHarmonicOscillator,
					IV th	symmetry. Representations of groups by matrices (representation for the Cn, Cnv, Cnn, Dnn etc. group) character of a representation. The great orthogonality	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.Vibrational Spectroscopy:Infrared Spectroscopy:-Linear Harmonic Oscillator, Vibrational energy of diatomic molecule zero point energy,
					IV th	symmetry. Representations of groups by matrices (representation for the C _n , C _{nv} , C _{nn} , D _{nn} etc. group) character of a representation. The great orthogonality theorem and its importance	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.Vibrational Spectroscopy:Infrared Spectroscopy:-Linear Harmonic Oscillator, Vibrational energy of diatomic molecule zero point energy, force constants & bond lengths anharmonicity, morse potential
					IV th	symmetry. Representations of groups by matrices (representation for the Cn, Cnv, Cnn, Dnn etc. group) character of a representation. The great orthogonality theorem and its importance character tables and there	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.Vibrational Spectroscopy:Infrared Spectroscopy:-Linear Harmonic Oscillator, Vibrational energy of diatomic molecule zero point energy, force constants & bond lengths anharmonicity, morse potential energy diagram. Vibrational rotational spectroscopy, P, Q, R,
					IV th	symmetry. Representations of groups by matrices (representation for the C _n , C _{nv} , C _{nn} , D _{nn} etc. group) character of a representation. The great orthogonality theorem and its importance character tables and there use-in spectroscopy.	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.Vibrational Spectroscopy:Infrared Spectroscopy:-Linear Harmonic Oscillator, Vibrational energy of diatomic molecule zero point energy, force constants & bond lengths anharmonicity, morse potential energy diagram. Vibrational rotational spectroscopy, P, Q, R, branches. Selection rules Normal modes of vibration, group
				February	IV th	symmetry. Representations of groups by matrices (representation for the Cn, Cnv, Cnn, Dnn etc. group) character of a representation. The great orthogonality theorem and its importance character tables and there use-in spectroscopy. UNIT 2	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.Vibrational Spectroscopy:Infrared Spectroscopy:-Linear Harmonic Oscillator, Vibrational energy of diatomic molecule zero point energy, force constants & bond lengths anharmonicity, morse potential energy diagram. Vibrational rotational spectroscopy, P, Q, R, branches. Selection rules Normal modes of vibration, group frequencies, overtones, hot bands, Raman Vibrational:-
				February	IV th	symmetry. Representations of groups by matrices (representation for the Cn, Cnv, Cnn, Dnn etc. group) character of a representation. The great orthogonality theorem and its importance character tables and there use-in spectroscopy. UNIT 2 Microwave Spectroscopy:	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.Vibrational Spectroscopy:Infrared Spectroscopy:-Linear Harmonic Oscillator, Vibrational energy of diatomic molecule zero point energy, force constants & bond lengths anharmonicity, morse potential energy diagram. Vibrational rotational spectroscopy, P, Q, R, branches. Selection rules Normal modes of vibration, group frequencies, overtones, hot bands, Raman Vibrational:- Classical & quantum theories of Raman effect pure rotational,
				February	IV th V th	symmetry.Representations of groupsby matrices (representationfor the Cn, Cnv, Cnn, Dnn etc.group) character of arepresentation.The great orthogonalitytheorem and its importancecharacter tables and thereuse-in spectroscopy.UNIT 2Microwave Spectroscopy:Classification of molecules	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.Vibrational Spectroscopy:Infrared Spectroscopy:-Linear Harmonic Oscillator, Vibrational energy of diatomic molecule zero point energy, force constants & bond lengths anharmonicity, morse potential energy diagram. Vibrational rotational spectroscopy, P, Q, R, branches. Selection rules Normal modes of vibration, group frequencies, overtones, hot bands, Raman Vibrational:- Classical & quantum theories of Raman effect pure rotational, and vibrational. Rotational Raman spectroscopy. Coherent anti
				February	IV th	symmetry.Representations of groupsby matrices (representationfor the Cn, Cnv, Cnn, Dnn etc.group) character of arepresentation.The great orthogonalitytheorem and its importancecharacter tables and thereuse-in spectroscopy.UNIT 2Microwave Spectroscopy:Classification of moleculesrigid rotor model, effect of	Microwave Spectroscopy:(15 Hrs.)Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field.Vibrational Spectroscopy:Infrared Spectroscopy:-Linear Harmonic Oscillator, Vibrational energy of diatomic molecule zero point energy, force constants & bond lengths anharmonicity, morse potential energy diagram. Vibrational rotational spectroscopy, P, Q, R, branches. Selection rules Normal modes of vibrational:- Classical & quantum theories of Raman effect pure rotational, and vibrational. Rotational Raman spectroscopy. Coherent anti stokes Raman spectroscopy.
				February	IV th	symmetry. Representations of groups by matrices (representation for the Cn, Cnv, Cnn, Dnn etc. group) character of a representation. The great orthogonality theorem and its importance character tables and there use-in spectroscopy. UNIT 2 Microwave Spectroscopy: Classification of molecules rigid rotor model, effect of isotopes;	 Microwave Spectroscopy: (15 Hrs.) Classification of molecules rigid rotor model, effect of isotopes; non rigid rotor Stark effect, nuclear and electron spin interaction & effect of external field. Vibrational Spectroscopy: Infrared Spectroscopy:- Linear Harmonic Oscillator, Vibrational energy of diatomic molecule zero point energy, force constants & bond lengths anharmonicity, morse potential energy diagram. Vibrational rotational spectroscopy, P, Q, R, branches. Selection rules Normal modes of vibration, group frequencies, overtones, hot bands, Raman Vibrational:- Classical & quantum theories of Raman effect pure rotational, and vibrational. Rotational Raman spectroscopy. Coherent anti stokes Raman spectroscopy.

effect, nuclear and electron
spin interaction
III rd Effect of external field.
Vibrational
Spectroscopy:
Infrared Spectroscopy:-
Linear Harmonic
Oscillator,
IV th Vibrational energy of
diatomic molecule zero
point energy, force
constants & bond lengths
anharmonicity, morse
potential energy diagram.
March I st Vibrational rotational
spectroscopy, P, Q, R,
branches. Selection rules
Normal modes of vibration
II nd Group frequencies,
overtones, hot bands,
III rd Raman Vibrational:-
Classical & quantum
theories of Raman effect
pure rotational,
IV th Vibrational. Rotational
Raman spectroscopy.
Coherent anti stokes

5.	Dr.	M.Sc-I	CH-424	January	II nd	UNIT 3	UNIT 3
	Shivali		Group			Molecular Spectroscopy:	Molecular Spectroscopy: (15 Hrs.)
	Sharma		Theory,			Energy levels, molecular	Energy levels, molecular orbital, Frank Condon's Principles,
			Spectrosco			orbital, Frank Condon's	electronic spectra of polyatomic molecules emission spectra;
			py and Diffraction			Principies,	radiative & non radiative decay. Spectra of transition metal
			Methods-		III ^{ra}	Electronic spectra of	Basic Principles Photoelectric Effect Ionization Process
			IV			polyatomic molecules	Koopman's theorem, photoelectron spectra of simple
						emission spectra; radiative	molecule. Auger electron spectroscopy.
					TTT	& non radiative decay	Diffraction:
					10	Spectra of transition metal	Bragg's condition, Miller indices. Debye-Scherrer method for
						spectra	structure analysis. Principal and applications of neutron
					vth	Bagia Bringin lag	diffraction and electron diffraction
					v	Basic Principles Photoelectric Effect	UNII 4 Magnetia Desenance Spectroscopy (15 Hrs.)
						Ionization Process:	Nuclear Magnetic Resonance Spectroscopy: -
						Koopman's theorem,	Nuclear spin. Nuclear resonance, shielding of magnetic nuclei.
						photoelectron spectra of	chemical shifts deshielding, spin spin interactions, (ABX,
						simple molecule.	AMX, ABC, A ₂ B ₂) spin decoupling. Electron Spin resonance
				February	I st	Auger electron	spectroscopy:-Basic values factors affecting 'g' value.
						spectroscopy.	Measurements, techniques, applications. Nuclear Quadrupole
						Diffraction:	Resonance spectroscopy:- Quadrupole Nuclear moments,
						Bragg's condition, Miller	electic field gradient complex constants applications.
						indices.	
					II nd	Debye-Scherrer method for	
						structure analysis. Principal	
						diffraction and electron	
						diffraction	

		III rd	UNIT 4 Magnetic Resonance Spectroscopy: (15 Hrs.) Nuclear Magnetic Resonance Spectroscopy:- Nuclear spin, Nuclear resonance, shielding of magnetic nuclei, Chemical shifts deshielding, spin spin interactions, (ABX, AMX, ABC, A2 B2) spin decoupling.	
	March	I st II nd III rd	decoupling.Electron Spin resonance spectroscopy:-Basic values factors affecting 'g' value.Measurements, techniques, applicationsNuclear Resonance Quadrupole Muclear moments,	

					IV th	Electic field gradient complex constants applications.	
6.	Dr.	M.ScI	CH-423	January	II nd	UNIT 1	UNIT 1
6.	Dr. Geeta Jallan	M.ScI	CH-423 Physical Chemistry- III	January	III rd III rd IV th	UNIT 1 Chemical Dynamics: Methods of determining rate laws, ionic reactions*, kinetic salt effects, steady state kinetics Kinetic & thermodynamic control of reactions, treatments of unimolecular reactions, Dynamic chain (pyrolysis of acetaldehyde composition of ethane), Photochemical (H ₂ -Cl ₂) reactions & oscillatory reactions (Belousov- Zhabotinsky reaction), homogeneous catalysis, kinetics of enzyme reactions, General features of fast reactions by flow method, relaxation method, flash	UNIT 1 Chemical Dynamics: (15 Hrs.) Methods of determining rate laws, ionic reactions*, kinetic salt effects, steady state kinetics, kinetic & thermodynamic control of reactions, treatments of unimolecular reactions, Dynamic chain (pyrolysis of acetaldehyde composition of ethane), photochemical (H ₂ -Cl ₂) reactions & oscillatory reactions (Belousov-Zhabotinsky reaction), homogeneous catalysis, kinetics of enzyme reactions, general features of fast reactions, study of fast reactions by flow method, relaxation method, flash photolysis, and NMR method, dynamics of molecular motion, probing the transition state, dynamics of barrierless chemical reactions in solution, dynamics of unimolecular reaction (Lindemann-Hinshelwood and Rice-Ramsperger- Kassel-Marcus Theories of unimolecular reactions) UNIT 2 Non-equilibrium Thermodynamics: (15Hrs.) Thermodynamic criteria for non eqbm states, entropy production and entropy flow, entropy balance eqns for different irreversible processes (eg. heat flow, chemical reaction etc.), transformation of generalized fluxes and forces, noneqbm stationary states, phenomenological equators, microscopic reversibility and onsager's reciprocity relations, electro kinetic phenomenon, diffusion, electrical conduction,
						photolysis, and NMR method,	irreversible thermodynamics for biological system, coupled reactions.

		February	I st	Dynamics of molecular motion, probing the	<i>Macromolecules:</i> Electrically conducting, fire resistant, liquid crystal polymers.
				transition state, dynamics	Kinetics of polymerization, mechanism of polymerization, mol mass determination (osmometry, viscometry, diffusion &
				reactions in solution,	light scattering methods), sedimentation, chain config. of
			II nd	Dynamics of unimolecular reaction (Lindemann- Hinshelwood and Rice- Ramsperger-Kassel- Marcus Theories of unimolecular reactions)	macromolecules, calculation of average dimensions.
			III rd	UNIT 2 Non-equilibrium Thermodynamics: Thermodynamic criteria for non eqbm states, entropy production and entropy flow, Entropy balance eqns for different irreversible processes (eg. heat flow, chemical reaction etc.), transformation of generalized fluxes and forces,	
		March	I st	Noneqbm stationary states, phenomenological equators, microscopic reversibility and onsager's reciprocity relations,	

					TTNG	T 1	
					11	Electro kinetic	
						phenomenon, diffusion,	
						electrical conduction,	
					III rd	Irreversible	
						thermodynamics for	
						biological system coupled	
						roactions	
						reactions.	
					IV th	Macromolecules:	
						Electrically conducting	
						fire resistant liquid ervetal	
						The resistant, inquite crystal	
						polymers, Kinetics of	
						polymerization,	
				April	I st	Mechanism of	
				r		polymerization mol mass	
						determination (osmometry	
						determination (Osmonieu y,	
						viscometry, diffusion &	
						light scattering methods),	
					II nd	Sedimentation. chain	
						config of macromolecules	
						colculation of average	
						dimensional	
						dimensions.	
7.	Prof.	M.Sc-I	CH-423	January	II nd	UNIT 3	UNIT 3
	Vishal		Physical			Surface Chemistry	Surface Chemistry (15 Hrs.)
			Chemistry-			Adsorption: Surface	Adsorption: Surface tension. capillary action. pressure
			III			tension capillary action	difference across curved surface (Laplace eqn) vapour
						prassura difference across	pressure of droplets (Kelvin ean) Gibb's adsorption isotherm
						pressure unificience across	pressure of diopiers, (Kervin equi), Oloo's ausorption isotherm,

		III rd IV th	curved surface (Laplace eqn), vapour pressure of droplets (Kelvin eqn), Gibb's adsorption isotherm, estimation of surface area (BET eqn), surface films on liquids (electro kinetic phenomenon), Catalytic activity at surfaces. Micelles: Surface active agents, classification of surface active agents, micellisation, hydrophobic interactions, Critical micellar concentration, factors affecting CMC of surfactants, counter ions binding to micelles, thermodynamics of micellization-phase separation	estimation of surface area (BET eqn), surface films on liquids (electro kinetic phenomenon), catalytic activity at surfaces. Micelles: Surface active agents, classification of surface active agents, micellisation, hydrophobic interactions, critical micellar concentration, factors affecting CMC of surfactants, counter ions binding to micelles, thermodynamics of micellization-phase separation & mass action models, solubilization, microemulsion, reverse micelles. UNIT 4 Electrochemistry: (15 Hrs.) Electrochemistry of solutions, Debye-Huckel treatment, and its extension, ion solvent interaction, Debye-Huckel-Jerrum model, Thermodynamics of electrified interface equations, derivation of electrocapillarity, Lippmann equations (surface excess), Methods of determining structures of electrified interfaces, Guoy-Chapman, Stern. Over potentials, exchange current density, derivation of Butler-volmer equation. Tafel plots. Quantum aspects of charge transfer at electrode solution interfaces, quantization of charge transfer, tunnelling Semiconductor interfaces- theory of double layer interfaces, effects of light at semiconductor solution interface. Electrocatalysis : Influence of various parameters, H-electrode, polarography, theory Ilkovic eqn, (excluding derivation), Half wave potential & its significance, electrocardiography, introduction to corrosion, homogeneous, theory, forms of corrosion, corrosion monitoring.

		February	I st	Mass action models, solubilization, microemulsion, reverse micelles.	
			II nd III rd IV th	UNIT 4 Electrochemistry: Electrochemistry: Electrochemistry of solutions, Debye-Huckel treatment, and its extension, ion solvent interaction, Debye-Huckel- Jerrum model, Thermodynamics of electrified interface equations, derivation of electrocapillarity, Lippmann equations (surface excess), Methods of determining structures of electrified interfaces, Guoy-Chapman, Stern. Over potentials, exchange current density, derivation of Butler-volmer equation. Tafel plots.	
		March	I st	Quantum aspects of charge transfer at electrode solution interfaces, quantization of charge transfer, tunnelling	

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			II nd	Semiconductor interfaces- theory of double layer interfaces, effects of light at semiconductor solution interface.	
			III rd	Electrocatalysis : Influence of various parameters, H-electrode, polarography, theory Ilkovic eqn, (excluding derivation), Half wave potential & its significance, electrocardiography,	
		April	I st	Introduction to corrosion, homogeneous, theory, forms of corrosion,	
			II nd	Corrosion monitoring.	

		Mas	ster of Scier	nces	Session 2018-2019		(IV th Semester)	
S.No.	Teacher	Class	Paper	Month		Week	Syllabus	
1.	Dr. Arwinder Kaur	M.Sc-II	CH-522 (III) Organic Synthesis – I	January	II nd	UNIT 2 Organic Synthesis Linear & Conversion Synthesis, Reterosynthetic Approach,	UNIT 2Organic Synthesis(15 Hrs.)Linear & Conversion Synthesis, Reterosynthetic Approach,Umpolung, Regeoselectivity, Chemoselectivity andDiastereoselectivity, Cram's Rule, Felkin-Ahn Model (withrelevant examples)UNIT 4	
					III rd IV th	Umpolung, Regeoselectivity, Chemoselectivity Diastereoselectivity, Cram's Rule,	Rearrangements(15 Hrs.)General mechanistic considerations-nature of migration, migratory aptitude, memory effects A detailed Study of the following rearrangements Pinacol-pinacolone, Wagner- Meerwein, Demjanov, Benzil- Benzilic Acid, Favorskii, Arndt Eistert synthesis, Neber, Beckmann, Hofman, Curtius, Schmidt, Baeyer- Villiger, Shapiro reaction.	
					v	relevant examples)		
				February	I st	UNIT 4 Rearrangements General mechanistic considerations-nature of migration,		
					II nd	Migratory aptitude, memory effects		

					III rd	A detailed Study of the following rearrangements Pinacol-pinacolone, Wagner-Meerwein, Demjanov,	
				March	I st II nd	Benzil- Benzilic Acid, Favorskii Arndt Eistert synthesis, Neber, Beckmann Hofman	
					IV th	Curtius, Schmidt, Baeyer- Villiger,	
				April	I st	Shapiro reaction	
2.	Dr.	M.Sc-II	CH-522	January	II nd	UNIT 1	UNIT 1
	Shivali Sharma		(III) Organic Synthesis – I		III rd	Organometallic Reagents Principle, Preparations, properties and applications of Organolithium and organomagnesium compounds Principle, Preparations, properties and applications of Hg, Zn and Ce Compounds Principle, Preparations,	Organometallic Reagents(15 Hrs.)Principle, Preparations, properties and applications of the following in organic synthesis with mechanistic detailsOrganolithium and organomagnesium compounds : Hg, Zn and Ce CompoundsTransition metals: Cu,Pd,Ni, Fe , Co, Rh ,Cr and Ti CompoundsOther elements : Si ,B and iodine (I) CompoundsUNIT 3 OxidationOxidationIntroduction. Different oxidative Processes Hydrocarbon- alkanas, aromatic rings, saturated C H groups(activated and
						of Cu,Pd	Unactivated) Alcohols, diols, aldehydes, ketones, ketals and

			V th	Principle, Preparations,	carboxylic acids, amines, hydrazines, and sulphides. Oxidation
				properties and applications	with ruthenium tetaoxide, iodobenzene diacetate and
				of Ni, Fe , Co	Thallium(III) nitrate.
		February	\mathbf{I}^{st}	Principle, Preparations,	Reduction(8 Hrs.)
				properties and applications	Introduction Different reductive processes Hydrocarbons-
				of	alkanes, alkenes, alkynes and aromatic rings carbonyl
			II nd	Principle, Preparations,	compounds-aldehydes, ketones, acids and their derivatives.
				properties and applications	epoxides. nitro, nitroso, azo and oxime groups.
				of Co, Rh ,Cr	Hydrogenolysis.
			III rd	Principle, Preparations,	
				properties and applications	
				of Ti Compounds, Si ,B	
				and iodine (I) Compounds	
			IV th	UNIT 3	
				Oxidation Introduction.	
				Different oxidative	
				Processes Hydrocarbon-	
				alkenes, aromatic rings,	
		March	I^{st}	Saturated C-H	
				groups(activated and	
				Unactivated) Alcohols,	
				diols,	
			II nd	Aldehydes, ketones, ketals	
				and carboxylic acids,	
				amines,	
			III rd	Hydrazines, and sulphides.	
				Oxidation with ruthenium	
				tetaoxide, iodobenzene	
				diacetate and Thallium(III)	
				nitrate.	

				April	IV th	ReductionIntroductionDifferentreductiveprocessesHydrocarbons-alkanes, alkenes,Alkynes and aromatic ringscarbonylcompoundsaldehydes, ketones, acidsandtheirderivatives.epoxides.	
					11	oxime groups. Hydrogenolysis.	
3.	Dr. Arwinder Kaur	M.Sc-II	CH-523 (III) Chemistry of Natural Products	January	III nd III rd IV th	UNIT 1TerpenoidsandCarotenoidsClassification, nomenclatureoccurrenceisolation general methods of structure determination,Isoprene rule. Structure determination stereochemistry, Biosynthesis and synthesis of citral ,TerpeneolStructuredetermination stereochemistry, Biosynthesis and synthesis of Farnesol, santoninStructuredetermination stereochemistry, Biosynthesis and synthesis of Farnesol, santoninStructuredetermination stereochemistry, Biosynthesis and synthesis of Farnesol, santoninStructuredetermination stereochemistry, Biosynthesis and synthesis of Farnesol, santonin	UNIT 1 Terpenoids and Carotenoids (15 Hrs.) Classification, nomenclature occurrence isolation general methods of structure Determination, isoprene rule. Structure determination stereochemistry, Biosynthesis and synthesis of the following representative molecules: citral ,Terpeneol, Farnesol, santonin, phytol, Abietic Acid and Beta-Carotene UNIT 2 Alkaloids (15 hrs.) Definition, nomenclature and physiological action, occurrence isolation, general method of structure elucidation, degradation classification based on nitrogen heterocyclic ring role of alkaloids in plants. Structure, stereochemistry, synthesis and biosynthesis of the following: Ephedrine, (+)- Conine, Nicotine, Atropine, Quinine and Morphine

		February	I st	Structure determination			
				stereochemistry,			
				Biosynthesis and synthesis			
				of Beta-Carotene			
			II nd	UNIT 2			
				Alkaloids Definition,			
				nomenclature and			
				physiological action			
				occurrence, isolation,			
				general method of structure			
				elucidation			
			III rd	Degradation classification			
				based on nitrogen			
				heterocyclic ring role of			
				alkaloids in plants.			
			IV^{th}	Structure, stereochemistry,			
				synthesis and biosynthesis			
				of Ephedrine,			
		March	I^{st}	Structure, stereochemistry,			
				synthesis and biosynthesis			
				of (+)- Conine			
			II nd	Structure, stereochemistry,			
				synthesis and biosynthesis			
				of Nicotine			
			III rd	Structure, stereochemistry,			
				synthesis and biosynthesis			
				of Atropine			
			IV th	Structure, stereochemistry,			
				synthesis and biosynthesis			
				of Quinine			
		April	I st	Structure, stereochemistry,			
				synthesis and biosynthesis			
						of Morphine	
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4.	Dr.	M.Sc-II	CH-523	January	II nd	UNIT 3	UNIT 3
	Shivali		(III)			Steroids Occurrence	Steroids (15 Hrs.)
	Sharma		Chemistry			nomenclature basic	Occurrence nomenclature basic skeleton. Diel's hydrocarbon
			of Natural			skeleton. Diel's	and Stereochemistry Isolation, structure determination and
			Products			hydrocarbon and	synthesis of cholesterol, Bile acids, Androsterone
						Stereochemistry	,Testosterone, Estrone, Progestrone, Aldosterone. Biosynthesis
					III rd	Isolation, structure	of Steroids
						determination and	UNIT 4
						synthesis of cholesterol	Plant Pigments (5 Hrs.)
					IV^{th}	Isolation, structure	Occurrence nomenclature and general methods of structure
						determination and	determinations, isolation and synthesis ,Quercetin , Quercetin-
						synthesis of Bile acids,	3-Glucoside Vitexin, Diadzein, Cyanidin-7-arabinoside
						Androsterone ,Testosterone	cyanidine, Hirsutidin Biosynthesis of Flavonoids: Acetate path
					\mathbf{V}^{th}	Isolation, structure	way and shikimic acid path way.
						determination and	Porphyrins (3 Hrs.)
						synthesis of Estrone,	Structure and synthesis of Haemoglobin and chlorophyll
						Progestrone, Aldosterone	Prostaglandins (5 Hrs.)
				February	Ist	UNIT 4	Occurrence, nomenclature, classification, biogenesis and
						Plant Pigments	physiological effects. Synthesis of PGE2 and PGF 2
						Occurrence nomenclature	Pyrethroids and rotenones : (2 Hrs.)
						and general methods of	Synthesis and reaction of Pyrethroids and rotenones
					nd	structure determinations,	
					II nd	Isolation and synthesis of	
						,Quercetin , Quercetin-3-	
					rd	Glucoside, Vitexin,	
					III nd	Isolation and synthesis of	
						Diadzein, Cyanidin-7-	
					TT th	arabinoside cyanidine,	
					IV	Isolation and synthesis of	
						Hirsutidin Biosynthesis of	
						Flavonoids: Acetate path	

						way and shikimic acid path		
						way.		
				March	Ist	Porphyrins Structure and		
						synthesis of Haemoglobin		
					II nd	Structure and synthesis of		
						chlorophyll		
					III rd	Prostaglandins		
						Occurrence, nomenclature,		
						classification, biogenesis		
						and physiological effects		
					IV th	Synthesis of PGE2 and		
						PGF 2		
				April	\mathbf{I}^{st}	Pyrethroids and		
						rotenones : Synthesis and		
						reaction of Pyrethroids		
					II nd	Synthesis and reaction of		
						rotenones		
5.	Dr. Geeta	M.Sc	CH-	January	II nd	UNIT 3	UNIT 3	
	Jallan	II	524(IV)			Solid state chemistry	Solid state chemistry	
			Photochem			Solid state reactions	Solid state reactions (4)	Hrs.)
			istry and			General principles,	General principles, experimental procedures, co-precipitat	ion as
			Solid state			experimental procedures,	a precursor to solid state reactions, kinetics of solid	state
						co-precipitation as a	reactions.	
						precursor to solid state	Crystal defects and non-stochiometry (6	Hrs.)
						reactions,	Perfect and imperfect crystals, intrinsic and extrinsic de	efects-
					III ^{ra}	Kinetics of solid state	point defect, line defects, vacancies-Schottky defects	s and
						reactions.	Frenkel defects. Thermodynamics of Schottky defects	s and
						Crystal defects and non-	Frenkel defect formation, colour centers, non-stoichio	metry
						stochiometry Perfect and	and defects.	
						imperfect crystals,	Organic solids (5 H	(rs.)

	IV th	Intrinsic and extrinsic defects-point defect, line defects, vacancies- Schottky defects Frenkel defects. Thermodynamics of Schottky defects and Frenkel defect formation,	Electrically conducting solids, organic charge transfer complex, organic metals, new superconductors. UNIT 4 Electronic properties and Band Theory (15 Hrs.) Metals, insulators and semiconductors, electronic structure of solids-band theory of metals, insulators and semiconductors, intrinsic and extrinsic semiconductors. doping semiconductors, p-n junctions, superconductors. Optical properties-Optical reflectance, photoconduction-photoelectric effects. Magnetic properties-Classification of materials: Quantum theory of
February	I st III nd	Colour centers, non- stoichiometry and defects. Organic solids Electrically conducting solids, organic charge transfer complex, Organic metals, new superconductors. UNIT 4 Electronic properties and Band Theory Metals, insulators and semiconductors, Electronic structure of solids-band theory of metals, insulators and semiconductors,	paramagnetics cooperative phenomena-magnetic domains, hysteresis.

					IV th	Intrinsic and extrinsic	
						semiconductors. doping	
						semiconductors, p-n	
						junctions	
				March	I^{st}	Superconductors. Optical	
						properties-Optical	
						reflectance,	
						photoconduction-	
					II nd	Photoelectric effects.	
						Magnetic properties-	
						Classification of materials:	
					III rd	Quantum theory of	
						paramagnetics cooperative	
						phenomena	
					IV th	Magnetic domains.	
						hysteresis.	
-					nd		
6.	Dr.	M.Sc-II	CH-	January	II nd	UNIT 1	UNIT 1
	Gurpreet		524(IV)			Photochemistry	Photochemistry
	Kaur		Photochem			Photochemical Reactions	Photochemical Reactions (4 Hrs.)
			istry and			Interaction of	Interaction of electromagnetic radiation with matter, types of
			Solid state			electromagnetic radiation	excitations, fate of excited molecule, quantum yield ,transfer of
						with matter, types of	excitation energy, actinometry
						excitations, fate of excited	Determination of reaction mechanism (5Hrs.)
						molecule,	Classification, rate constants and life times of reactive energy

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			III rd	Quantum yield ,transfer of excitation energy, actinometry Determination of reaction mechanism Classification, rate constants and life times of reactive energy	states –determination of rate constants of reaction. Effect of light intensity on the rate of photochemical reactions. Types of photochemical reaction–photo-dissociation, gas –phase photolysis. Photochemistry of Alkenes (6 Hrs.) Interamolecular reaction of the olefinic bond-geometrical isomerism, cyclisation reaction, rearrangementof 1,4- and 1,5- dienes UNIT 2
				states –determination of rate constants of reaction	Photochemistry of Carbonyl compound(7Hrs.)Intramolecularreactionofcarbonylcompoundscompoundscompounds
			V th	Effect of light intensity on the rate of photochemical reactions. Types of photochemical reaction	saturated, cyclic and acyclic $\beta \gamma$ unsaturated and α - β unsaturated compounds. Cyclohexadienes. intermolecular cycloadditio reactions—dimerisation and oxetane formation. Photochemistry of aromatic compounds (4 Hrs.) Isomerisations, additions and substitutions.
		February	I st	Photo-dissociation, gas – phase photolysis. Photochemistry of Alkenes Interamolecular reaction of the olefinic bond	Miscellaneous photochemical reactions (4 Hrs.) Photofries reactions of anilids. photo-fries rearrangement. Barton reaction. singlet molecular oxygen reactions. photochemical formation of smog. photodegradation of polymers. photochemistry of vision.
			П	Geometrical isomerism, cyclisation reaction, rearrangementof 1,4- and 1,5-dienes	

			IV th	Ortil 2PhotochemistryofCarbonylcompoundIntramolecularreaction ofcarbonylcompoundssaturated,cyclicand acyclic β y unsaturated and α - β unsaturated compounds.Cyclohexadienes.intermolecular cycloadditioreactions—dimerisationand oxetane formation.
		March	I st II nd	Photochemistry of aromatic compoundsIsomerisations, additions and substitutions.Miscellaneous photochemical reactionsPhotofries
			III rd	Barton reaction. singlet molecular oxygen reactions.

			IV th	Photochemical formation of smog.	
		April	I st	Photodegradation of polymers.	
			TTNC		
			11	Photochemistry of vision.	

End Semester Examinat	tions 10-05-19	То	30-05-19	(17 days)
	Friday		Thursday	
Summer vacation	31-05-19	То	07-07-19	(38 days)
(tentative)	Friday		Sunday	
T			0 -100 1	

Total teaching days of academic term I & II 97+83 =180 days