P.S.B. DEGREE COLLEGE,LAMBGAON
B. Sc. [CHEMISTRY, PAPER I : INORGANIC CHEMISTRY (PAPER CODE : CH-101]– I Year
TEACHING PLAN FOR ACADEMIC SESSION 2020-21
COURSE TEACHER: **DURGA PRASAD**
COURSE TITLE AND OTHERS PECIFICATION

Course Title: Course No.: Credits: Maximum Marks:	**INORGANIC CHEMISTRY PAPER-I Six (Five for Theory and One for Tutorial) End-term examination: Internal assessment: 50**
Course Description	This course contains basic idea of Inorganic Chemistry

UNIT	TOPIC	Number of Lectures	Name of the Course teacher
UNIT I: ATOMIC STRUCTURE	Idea of de Broglie matter waves, Heisenberg uncertainty principle	2	Durga Prasad
	Atomic orbitals, Schrodinger wave equation, significance of ψ and $\psi2$	2	
	Quantum numbers, radial and angular wave functions and probability distribution curves	3	
	Shapes of s,p d,f orbitals,Aufbau and Pauli exclusion principles, Hund's multiplicity rule, electronic configurations of the elements, Effective nuclear charge	3	
UNIT II: PERIODIC PROPERTIES	Atomic radii and ionic radii, Ionization energy, Electron affinity and Electronegativity-definition, methods of determination or evaluation	4	Durga Prasad
	Trends in periodic table and applications in predicting and explaining the chemical behaviour	4	
UNIT III: CHEMICAL BONDING	(A) COVALENT BOND- Valence bond Theory and its limitations, directional charcteristics of covalent bond, Various types of hybridization and shapes of simple inorganic molecules and ions	3	Durga Prasad
	Valence shall electron pair repulsion(VSEPR)theory to $NH3,H2O+,SF4,ClF3,ICl-2$ and $H2O$	2	
	MO theory, homonuclear and heteronuclear ($CO,NO,CN+,CO+,CN-$) diatomic molecules	3	
	Multicentered bonding in electron deficient molecules,Bond strength and bond energy, percentage ionic character from dipole moment and electronegativity difference	3	
	Ionic Solids- Ionic Structures, radius ratio effect and coordination number, limitation of radius ratio rule, lattice defects, semicoductors	2	

	(B) Lattice energy and Born –Haber cycle, solvtion energy and solubility of ionic solids,polarizing poworieser and polarizability of ions, Fajan's rule Metallic bond-free electron,valence bond and band theories (C) WEAK INTERACTIONS- Hydrogen bonding, (D) vander waals forces	5	
UNIT IV: S-BLOCK ELEMENTS, CHEMISTRY OF NOBLE GASES	S- Block Elements: Cmparative study, diagonal relationship	3	Durga Prasad
	Salient features of hydrides, solvation and complexation tendencies including their function in Biosystems,an introduction to alkyls and aryls	3	
	Chemistry of Noble Gases- Chemical properties of noble gases, Chemistry of xenon, structure and bonding in xenon compounds	4	
UNIT V: P-BLOCK ELEMENTS	Comparative study (including diagonal relationship) of group 13-17 elements	2	Durga Prasad
	Compounds like hydrides,oxides,oxyacids and halides of group 13-16,hydrides of boron-diborane and higher boranes, borazine, borohydrides	4	
	Fullerenes, carbides, fluorocarbons, silicates(structural principle),tetrasulphur tetra nitride,	4	
	Basic properties of halogens, interhalogens and polyhalides	4	

Note1:The calculation for total number of lectures is done on the basis of 180 teaching days per Year and 6 periods. 5 for theory and 1 for tutorial] allotted for the course per week during the Year. The duration of one lecture is 45 min.

The distribution of maximum marks for internal assessment will be according to the rules of the University.

Reference Books:

- J.D Lee concise, Inorganic chemistry, E.L.V.S

- Puri, Sharma and Kaliya,Principles of inorganic ch emistry, Milestone Publisher and Distributers
- R.L. Madan, Chemistry for degree students, S. Chand & company, New Delhi
- Selected topics in Inorganic Chemistry, Malik, Tuli and Madan, S. Chand & company, New Delhi
- Satya Prakash, Modern Inorganic Chemistry, S. Chand & company, New Delhi, I.L Finar,Organic chemistry, Pearson

Counter signed [Principal]   Sig. [Head]   Sig. [Course teacher]

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<tr><td colspan="4" align="center">P.S.B. DEGREE COLLEGE,LAMBGAON
B. Sc. [CHEMISTRY, PAPER-II: ORGANIC CHEMISTRY] (PAPER CODE : CH-102]– I Year
TEACHING PLAN FOR ACADEMIC SESSION 2020-21</td></tr>
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P.S.B. DEGREE COLLEGE,LAMBGAON			
B. Sc. [CHEMISTRY, PAPER-II: ORGANIC CHEMISTRY] (PAPER CODE : CH-102]– I Year			
TEACHING PLAN FOR ACADEMIC SESSION 2020-21			
COURSE TEACHER: **DURGA PRASAD**			
COURSE TITLE AND OTHERS PECIFICATION			
Course Title: Course No.: Credits: Maximum Marks:			**ORGANIC CHEMISTRY PAPER-II** **Six (Five for Theory and One for** **Tutorial)** **End-term examination:** **Internal** **assessment: 50**
Course Description			This course contains basic idea of organic chemistry
UNIT	**TOPIC**	**Number of Lectures**	**Name of the Course teacher**
UNIT I: STRUCTUERE AND BONDING,MECHANISM OF ORGANIC REACTIONS, ALKANES AND CYCLOALKANES	Hybridization, Bond lengths, and bond angles, bond energy, localized and delocalized chemical bonding	2	Durga prasad
	Van der Waals interaction, inclusion compounds,clatherates, Charge transefer compexes	2	
	Resonances,hyperconjugation,aromaticity,inductive and field effects, hydrogen bonding	2	
	Homolytic and heterolytic bond fission, types of reagents-electrophiles and nuceophiles, types of organic reactions, energy considerations	2	
	Reactive intermediates- Carbocations, carbanions ,free radicals, carbenes, arynes and nitrines (with examples) Assigning formal charges on intermediates and other ionic species	2	
	Methods of determination of reaction mechanism(product analysis,intermediates,isotope effects,kinetic and stereochemical studies	2	
	IUPAC nomenclature of branched and unbranched alkanes, the alkyl group, classification of carbon atom in akanes, Isomerism in alkanes	2	
	Methods of preparation (with special reference to Wurtz reaction,Kolbe's reaction,corey –House reaction and decarboxylation of carboxylic acids)	2	
	Physical and chemical properties of alkanes, mechanism of free radical halogenation of alkanes,	2	

	orientation, reactivity and selectivity		
	Cycloalkanes- Nomenclature, methods of formation,chemical ractions, Baeyer's strain theory and its limitations	2	
	Ring strain in small rings(cyclopropane and cyclobutane), Theory of strain less rings. The case of cyclopropane ring banana bonds	2	
UNIT II: STEREOCHEMISTRY OF ORGANIC COMPOUNDS	Concept of isomerism, types of isomerism, optical isomerism- elements of symmetry, molecular chirality, enantiomers, stereogenic center optical activity	2	Durga Prasad
	Properties of enantiomers, chiral and achiral molecules with two stereogenic centers, distereomers, threo and erythro diastereomers , meso compounds, resolution of enantiomers inversion, retention and recemization	3	
	Relative and absolute configuration, sequence rules D & L and R & S systems of nomenclature	2	
	Geometrical isomerism- determination of configuration of geometric isomers, E & Z system of nomenclature, geometric isomerism in oximes and alicyclic compounds	2	
	Conformational isomerism- conformational analysis of ethane and n- butane, conformations of cyclohexane, axial and equatorial bonds	2	
	Conformation of monosubstituted cyclohexane derivatives, newman projection and sawhorse formulae, Fischer and flying wedge formulae, Defference between configuration and conformation	2	
UNIT III: Alkenes, Cycloalkenes, Dienes and Alkynes	Nomenclature of alkenes, methods of formation, mechanisms of dehydration of alcohols and dehydrohalgenation of alkyl halides, regioselectivity in alcohol dehydration,The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes	3	Durga Prasad
	Chemical reactions of alkenes- mechanism involved in hydrogenation, electrophilic and free radical additions,Markownikoff's rule, hydrogenation-oxidation,oxymecuration- reduction, Epoxidation, ozonolysis,hydration, hydroxylation and oxidation with KMnO4,Polymerization of alkenes Substitution at the allylic and vinylic positions of alkenes, Industrial applications of ethylene and propene	3	
	Methods of formation,conformation and chemical reactions of cycloalkenes,Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes, Structure of alkenes and butadiene, methods of formation, polymerization, chemical reaction-1,2 and 1,4 additions,Diels-Alder reaction	3	
	Nomenclature,structure and bonding in alkynes,	2	

	Methods of formation, chemical reactions of alkynes, acidity of alkynes, Mechanism of electrophilic and nucleophilic addition reactions, hydroboration-oxidation, metal-ammonia reductions,oxidation and polymerization		
UNIT IV: Arenes and Aromaticity	Nomenclature of benzene derivatives,The aryl group,Aromatic nucleus and side chain,structure of benzene, molecular formula and kekule structure, stability and carbon-carbon bond lengths of benzene,resonance structure, MO picture, Aromaticity: The Huckle rule, aromatic ions	2	Durga Prasad
	Aromatic electrophilic substitution-general pattern of the mechanism, role of sigma and pi complexes, Mechanism of nitration, halogenation,sulphonation,mercuration and Friedel-Crafts reaction	2	
	Energy profile diagrams,Activating and deactivating substituents,orientation and ortho/ para ratio,Side chain reactions of benzene derivatives	2	
	Birch reduction; Methods of formation and chemical reactions of alkylbenzenes,alkynylbenzenes and biphenyl,naphthalene and Anthracene	2	
UNIT V: Alkyl and Aryl Halides	Nomenclature and classes of alkyl halides, methods of formation, chemical reactions, Mechanism of nucleophilic substitution reactions of alkyl halides $SN1$ and $SN2$ reactions with energy profile diagram;	2	Durga Prasad
	Polyhalogen compounds: Chloroform, carbon tetra chloride;Methods of formation of aryl halides, nuclear and side chain reactions,	2	
	The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions,Relative reactivities of alkyl halides VS allyl, vinyl and aryl halides, Synthesis and uses of DDT and BHC	2	

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Reference Books:

● E.L. Eliel, Stereochemistry of organic compounds, Willey.

• Morrison and Boyd, Organic chemistry, Prentice-Hall, New Delhi.
• S.M. Mukherji and Singh. Reaction mechanism in organic chemistry, Macmillan, Reprint
• Elementary Spectroscopy, Y.R. Sharma, S. Chand
• G. Marc Loudon, Organic Chemistry, Oxford University Press (Replica Press), Kundali, Haryana.

Counter signed [Principal]   Sig. [Head]   Sig. [Course teacher]

	P.S.B. DEGREE COLLEGE,LAMBGAON		
	B. Sc. [CHEMISTRY, PAPER III : PHYSICAL CHEMISTRY (PAPER CODE : CH-103]– I Year		
	TEACHING PLAN FOR ACADEMIC SESSION 2020-21		
	COURSE TEACHER: **DURGA PRASAD**		
	COURSE TITLE AND OTHERS PECIFICATION		
Course Title:		**PHYSICAL CHEMISTRY PAPER-III**	
Course No.: Credits:		**Six (Five for Theory and One for Tutorial)**	
Maximum Marks:		**End-term examination: Internal assessment: 50**	
Course Description		This course contains basic idea of Physical Chemistry	
UNIT	**TOPIC**	**Number of Lectures**	**Name of the Course teacher**
UNIT I: Gaseous States	Postulates of Kinetic theory of gases, deviation from ideal behavior, Van der Waals equation of states	3	Durga Prasad
	Critical phenomena: PV isotherms of real gases, continuity of states, the isotherms of Van der Waal equation, relationship between critical constants and Van der Waals constants	3	
	Relationship between critical constants and Van der Waals constants, the law of corresponding states, reduced equation of states.	3	
	Molecular Velocities: Root mean square, average and most probable velocities, Qualitative discussion of the Maxwell's distribution of molecular velocities,	4	
	collision number, mean free path and collision diameter, Liqufaction of gases (based on Joule-Thomson effect)	3	
UNIT II: Liquid States	Intermolecular forces, Structure of liquids (a qualitative description), Structural differences between solids, liquids and gases	3	Durga Prasad
	Liquid crystals: Difference between liquid crystal, solid and liquid, Classification , Structure of nematic and cholestic phases, Thermography and seven segment cells	3	
UNIT III: Solid States Colloidal States	Solid States:Definition of space lattice, unit cell, Laws of crystallography- (i) Law of constancy of interfacial angles, (ii) Law of rationality of indices, (iii) Law of Symmetry	3	Durga Prasad
	Symmetry elements in crystals. X-ray diffraction by crystals, Derivation of Bragg equation, Determination of crystal structure of NaCl, KCl and CsCl (Laue's method and powder method	3	
	Colloidal States: Definition of colloids, classification of colloids, solid in liquids (sols):	3	

	properties- kinetic, optical and electrical; Stability of colloids, protective action		
	Hardy-Schulze law, gold number, Liquids in liquids (emulsions): types of emulsions, preparation, Emulsifier, Liqiuds in Solids (gels): Classification,preparation and properties, inhibition, general application of colloids, colloidal electrolytes	4	Durga Prasad
UNIT IV: Chemical kinetics and Catalysis	Chemical kinetics and its scope, rate of reaction, factors influencing the rate of a reaction- concentration,temperature,pressure,solvent,light catalyst, concentration dependence of rates	3	Durga Prasad
	Mathematical characteristics of simple chemical reactions- Zero order, first order, second order, pseudo order, Half life and mean life,	4	
	Determination of the order of reaction- Differential method, method of integration, method of half life period and isolation method.	3	
	Radioactive decay as first order phenomenon, Experimental methods of chemical kinetics: Conductometric , potentiometric,optical methods, polarimetry and spectrophotometer.	3	
	Theories of chemical kinetics: effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy.	4	
	Simple collision theory based on hard sphare model, transition state theory(equilibrium hypothesis),Expression for the rate constant based on equilibrium constant and thermodynamic aspects	4	
	Catalysis: Characteristics of catalyzed reactions, classification of catalysis homogeneous and heterogeneous catalysis, enzyme catalysis, miscellaneous examples	4	

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Reference Books:

● Atkins P.W. Physical Chemistry, Oxford University Press

• Bell D.W. Physical Chemistry, Thomson Press
• R.L. Madan, Chemistry for degree students, S. Chand & company, New Delhi
• Puri and Sharma and Pathaniya, Principles of Physical Chemistry, Milestone Publisher and Distributors, New Delhi
• Behl and Tuli, Essential of Physical Chemistry, S. Chand & Company, New Delhi

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