SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. First year

LESSON PLAN FOR THE SESSION 2017-18(Odd Semester)

Name of the Faculty **:** Dr.NShankaresha, Shridhar G B, Rashmi B J Premakumari A C, Hemalatha K M and Archana (Theory and Practical)

Semester **: 1st**

Title of the Paper **:** CHEMISTRY (**Paper: I)**

Subject code **:**

Lesson Plan Duration **:** 14 weeks (from August, 2017 to October, 2017)

Total teaching period **: 42 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Elements of quantum mechanics: Wave mechanical concept of the atom, dual nature of electron, derivation of de-Broglie's equation. Heisenberg's uncertainty principle and its significance.	1	Introduction to lab – identification of components, chemicals and equipment used in laboratory.
		2	Introduction to organic chemistry- Definition and importance of organic compounds to life and		

1			applications in food, fuels.		
		3	Gases: Maxwell-Boltzmann distribution of molecular velocities (no derivation – assume equation) explanation. Effect of temperature on distribution of molecular velocities using distribution curve (graph).		
	2	4	Schrodinger wave equation-explanation of the terms therein (no derivation) Eigen values and functions, significance of ψ and ψ2 .	2	Calibration of : (i) Pipette (ii) Burette (iii) Volumetric flask
		5	Definition and importance of organic compounds to life and applications in textiles, dyes, drugs and cosmetics with examples. Nomenclature (IUPAC) of bifunctional, aliphatic and aromatic compounds.		
		6	Boltzmann factor (significance and equation). Energy distribution as a function of temperature. Types of molecular velocities – average (uav) - root mean square velocity (urms) - most probable velocity (ump) – their definition and equations (no derivation).		
	3	7	Quantum numbers and their significance. Shapes of s, p and d orbitals. Effective nuclear charge, screening effect-based on Slater's rules (problems to be worked out).		Preparation of 2N solutions of H2SO4,HCL, HNO3,CH3COOH and NH3.

		8	Basic Concepts in Organic Chemistry: Generation, stability and reactions involving carbocations, carbanions.	3	
		9	Relation between uav, urms and ump velocities of molecules and their calculations (based on temperature dependence).		
1	4	10	General energy level diagram of multi electron atom (up to n=4). Pauli's exclusion principle, Hund's rule, (n+1) rule, Aufbau principle. Electronic configuration of elements (up to At. No. 40).	4	Preparation of standard sodium carbonate solution and standardization of hydrochloric acid solution (methyl orange indicator). Estimation of sodium hydroxide present in the solution using phenolphthalein indicator.
		11	Basic Concepts in Organic Chemistry: Generation, stability and reactions involving free radicals, nitrene and carbenes.		
		12	critical phenomena – Andrew's experiments on CO2, critical constants – Tc, Pc and Vc. definitionsexperimental determination of Critical temperature and Critical pressure by using CagniarddelaTour's apparatus.		
2	5	13	stability of completely filled and half filled orbitals based on the concepts of pairing energy, promotional energy and symmetric charge distribution.	5	Preparation of standard oxalic acid solution and standardization of sodium hydroxide solution. Estimation of sulphuric acid present in the solution
		14	Types of organic reactions: Definition with examples of addition, substitution, elimination, isomerisation, condensation and rearrangement		

			reactions.		
		15	critical volume by Cailletes and Mathias method – Vander Waal's equation – relation between Vander Waal's Constants 'a' and 'b' and critical constants Tc, Pc and Vc to be derived using isotherms of CO2		
2	6	16	Revision of inorganic chemistry unit -1	6	Preparation of standard potassium biphthalate solution and standardization of sodium hydroxide solution. Estimation of oxalic acid present in the solution
		17	Revision of organic chemistry unit -1		
		18	Revision of physical chemistry unit-1		
	7	19	Inorganic chemistry internal test	7	. Preparation of standard oxalic acid solution and standardization of potassium permanganate solution. Estimation of hydrogen peroxide present in the solution.
		20	Organic chemistry internal test		
		21	Physical chemistry internal test		
2	8	22	Periodic Table and Periodicity: Classification of elements into s, p, d, and f-blocks, cause of periodicity.	8	Estimation of sulphuric acid and oxalic acid in a mixture using standard sodium hydroxide and standard potassium permanganate solutions.
		23	Hybridization: Tetravalency of carbon, sp3 , sp2 and sp – hybridization (in brief). Bond length, bond angle, bond energy		
		24	Law of corresponding states and reduced equation of state (to be derived) Liquefaction of gases – Principle underlying liquefaction		

			of gases – Joule Thomson effect, Joule Thomson experiment – Show that Joule Thomson effect is an isoenthalphic process ($\Delta H = 0$).		
3	9	25	1) Atomic radius: Covalent, ionic, Vanderwaal's and crystal radii. Additive nature of covalent radii. Determination of ionic radii by Lande's method.	9	Practical internals
		26	localized and delocalized chemical bonds – resonance and hyperconjugation effects.		
		27	Joule Thomson coefficient, Inversion temperature, definitions and its relation between Vander Waal's constants ('a' and 'b').		
3	10	28	Variation of covalent radii in a group and in a periodexplanation for the observed trends. Comparison of the size of the atoms with the corresponding anions and cations, Variation of ionic radii in isoelectronic ions.	10	Determination of the percentage of available chlorine in the given sample of bleaching powder
		29	Alkanes: Preparation by Corey-House reaction, conversion of alkanes to aromatic compounds via alkenes and alkynes-aromatization and pyrolysis		
		30	Indicator – Definitions, types (acid-base, redox, adsorption indicators), examples for each type.		
		31	Ionization enthalpy: Successive ionization enthalpy, factors affecting ionization enthalpy,		Preparation of standard zinc sulphate solution and

	11		applications of ionization enthalpy. Variation in a group and in a period – explanation for the observed trends.	11	standardization of EDTA. Estimation of total hardness of water.
		32	Alkenes: Preparation of alkenes by Witting's reaction, Hoffmann's elimination, Stereoselectivity. Mechanism of electrophillic addition, oxymercuration.		
		33	Theory of indicators – Oswald's theory and Quinonoid theory – indicator constant – action of phenolphthalein and methyl orange in acid-base solutions – pH titration curves for strong acid vs strong base, weak acid vs strong base.		

3	12	34	Electron gain enthalpy: Successive electron gain enthalpy variation of electron gain enthalpy in period and in a group- explanation for the observed trends	12	Estimation of ammonium chloride using standard sodium hydroxide and standard hydrochloric acid solutions (back titration).
		35	hydroboration – oxidation and epoxidation. Mechanism of oxidation with KMnO4 and OsO4, ozonolysis. industrial applications of ethene and propene.		
		36	Adsorption: Introduction, principle involved. Sorption, absorption and adsorption (statement, differences and examples) physical and chemical adsorption – definition and differences.		
	13	37	Electronegativity: Variation of electronegativity in a group and in a period- explanation for the observed trends. Factors determining electro negativity (charge on the atom and hybridization). Pauling, Mulliken and Allred-Rochow scale of electronegativity. Applications of electronegativity.	13	Revision of lab experiments
		38	Dienes: Types, relative stabilities of dienes, conjugated dienes – 1,3 butadiene-structure, 1,2 and 1,4-addition reactions with H2 and halogens, Diel's Alder reaction with an example.		
		39	Adsorption of gases on solids – factors which influence. Adsorption isotherms (definition) – mathematical expression for Freundlich's and Langmuir's adsorption isotherms. Applications of adsorption.		

	14	40	Old question paper revision	14	Internal practical test (IA)
		41	Revision of syllabus.		
		42	Internal theory test (IA)		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE , CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. First year

LESSON PLAN FOR THE SESSION 2017-18 (Even Semester)

Name of the Faculty **:** Dr.NShankaresha, Shridhar G B, Rashmi B J, Premakumari A C,Hemalatha K M and Archana (Theory and Practical)

Semester **: 2nd**

Title of the Paper **:** CHEMISTRY (**Paper: II)**

Subject code **:**

Lesson Plan Duration **:** 14 weeks (from December, 2017 to April, 2018)

Total teaching period **: 42 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Chemical bonding-I: Ionic bond: Factors that favor the formation of ionic bonds, Lattice energy, BornLande's equation (no derivation	1	Introduction to lab – identification of components, chemicals and equipment used in laboratory.
		2	Organic Reagents: One method of preparation and applications of acetic anhydride, benzoyl chloride.		
		3	Liquid mixtures: Classification of binary mixtures – partially miscible, completely miscible and completely immiscible pairs of liquids (explanation with examples for each type).		

1	2	4	setting up of Born-Haber cycle for 1:1 ionic solids. Numerical calculations of LE and EA based on Born-Haber cycle for 1:1 ionic solids, uses of Born-Haber cycle.	2	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 1) Acids
		5	One method of preparation and applications of dimethyl sulphate, raney nickel and sodium ethoxide.		
		6	Raoult's law, definition of ideal and non-ideal solutions based on Raoult's law. Partially miscible liquids: Critical solution temperature (CST) – types – phenol-water system.		
	3	7	Role of lattice energy and hydration energy and their importance in the context of stability and solubility of ionic solids. Covalent bond: Factors favouring the formation of covalent bond (ionization energy, electron affinity, electronegativity, nuclear charge, inter nuclear distance and number of valence electrons).	3	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 2. Alcohols
		8	Cycloalkanes: Definition, examples, relative stability Bayer's strain theory and its limitations.		
		9	Triethylamine-water system, nicotine-water system (mutual solubility temperature (MST) vs composition curves to be drawn). Effect of addition of non-volatile solute on CST. Binary mixtures of completely miscible liquids.		
		10	Valence bond approach – explanation with examples (H2, F2, HF, O2 and N2) to illustrate valence bond approach.	4	Qualitative analysis of mono functional organic compounds through functional

1	4	11	Mohr's theory of strainless rings. Chair and boat conformations of cyclohexane and their stability.		group analysis. Determination of physical constant. Preparation of suitable derivative of 3. Aldehydes
		12	Vapour pressure – definition, vapor pressure – composition diagrams and boiling point – composite diagrams. Classification into the types – obeying Raoult's law (type I), showing positive deviation from Raoult's Law (type II) and showing negative deviation from Raoult's Law (type III) – examples for each type.		
2	5	13	Sigma and Pi bonds – explanation by taking H2, O2 and N2 as examples. Fajan's rules of polarization and their explanation.	5	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 4. Amides
		14	Aromatic hydrocarbons: Nomenclature of benzene derivatives, Huckel's rule with respect to benzenoids, (benzene, naphthalene, anthracene and phenanthracene) and non-benzenoid compounds (cyclopentadienyl anion, cycloheptadienylcation) anti-aromaticity.		
		15	Principles of fractional distillation: Fractional distillation of type I, type II and type III liquid mixtures (with examples). Azeotropic mixtures (definition)		
	6	16	Revision of inorganic chemistry unit -1	6	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of
		17	Revision of organic chemistry unit -1		
		18	Revision of physical chemistry unit-1		

2					suitable derivative of 5. Amines
	7	19	Inorganic chemistry internal test	7	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 6. Halogenated hydrocarbons
		20	Organic chemistry internal test		
		21	Physical chemistry internal test		
2	8	22	Bond length, bond order, bond energy and their significance, polarity of covalent bonds, polar and non-polar molecules, Dipole moment and polarity of molecules to be explained by taking HCl, CO2, CCl4 and H2O as examples.	8	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 7. Hydrocarbons
		23	Aromatic electrophillic substitution – General mechanism, electronic interpretation of orientating influence of electron donating groups (-CH3, -Cl, -NH2 and -OH groups).		
		24	Binary mixtures of completely immiscible liquids (with examples), weight fraction of distillates (no derivation), principle of distillation, applications (numerical problem on weight fractions of components).		

3	9	25	Chemical bonding-II: Hybridization-directional property and geometry of sp, sp2 , sp3 - taking BeCl2, BF3, SiCl4.	9	Practical internals
		26	electron withdrawing groups (-NO2, - CHO, -COOH and –SO3H groups) on electrophillic substitution reactions.		
		27	Colligative Properties: Concept of vapour pressure, variation of vapour pressure with temperature. Definition of boiling point and freezing point, effect of dissolution of solute on the vapour pressure of the solvent.		
3	10	28	Hybridization-directional property and geometry of sp3 d and sp3 d 2 hybrid orbitals taking PCl5 and SF6 as examples respectively. VSEPR theory with SO2, NH3, H2O, SF4 and ClF3 as examples. Coordinate bond: Explanation with examples H3O + , NH4 + , NH3-BF3 molecule	10	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 8. Ketones
		29	Hydrogenation of aromatic compounds: Birch reduction, side chain oxidation of toluene to benzaldehyde and benzoic acid.		

		30	Lowering of vapour pressure. Raoult's law – relation between relative lowering of vapour pressure and molar mass (to be derived). Determination of relative molar mass of solute by dynamic method. Elevation of boiling point and its relation to lowering of vapour pressure and molar mass (to be derived).		
	11	31	Coordinate bond: Explanation with examples H3O +, NH4 + , NH3-BF3 molecule. Molecular Orbital Theory: An elementary account of MOT, linear combination of atomic orbitals (no mathematical approach). Bonding and antibonding molecular orbitals, conditions for the combination, energy levels of molecular orbitals.	11	Organic preparations: Recrystallisation and determination of melting point and its importance may be mentioned 1. Acetylation : Preparation of acetanilide from aniline.
		32	Resonating structures of benzene, naphthalene and anthracene. Diel's Alder reactions of anthracene with maleic anhydride.		
		33	Ebullioscopic constant of the solvent and its relation to the boiling point (only equation). Determination of molar mass of the solute by Walker-Lumsden method. Depression in freezing point and its relation to lowering of vapour pressure and molar mass (to be derived). Cryoscopic constant and its relation to the melting point (equation).		

3	12	34	Molecular orbital structures and bond orders of species like H2, He2, He2 + , N2, O2, HF, LiH, and CO, Prediction of magnetic properties of these species. Statistical treatment of results of quantitative analysis: Classification of errors, accuracy, precision, minimization of errors (calibration of apparatus, running of blank determination,	12	Organic preparations: Recrystallisation and determination of melting point and its importance may be mentioned - Oxidation: Preparation of benzoin acid from benzaldehyde
		35	Biphenyls: Preparation – Ullmann reaction. Alkenyl Benzenes: Cis and Trans stilbene and their preparation (any one method).		
		36	Cryoscopic constant and its relation to the melting point (equation). Determination of molar mass of a non-volatile solute by Beckmann's method (problems to be worked out). Semi permeable membrane – natural and artificial, preparation of copper ferrocyanide membrane by MorseFrazer method.		
	13	37	significant figures and computation, mean and standard deviation (explanation with an example), distribution of random errors (explanation with the help of curve), reliability of results (F-test and t-test).	13	Practice lab experiments
		38	Revision of syllabus		
		39	Definition of osmosis, osmotic pressure (mention application), determination of osmotic pressure by Berkley-Hartley's method, laws of osmotic pressure analogy with gas laws, determination of molar mass from osmotic pressure measurements (relation to be derived), isotonic solutions, plasmolysis.		

	14	40	Old question paper revision	14	Internal practical test (IA)
		41	Revision/ doubt discussion section. Assignment submission		
		42	Internal theory test (IA)		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. Second year

LESSON PLAN FOR THE SESSION 2017-18 (Odd Semester)

Name of the Faculty **:** Dr.N Shankaresha, Shridhar G B, Rashmi B J, Premakumari A C,Hemalatha K M and Archana (Theory and Practical)

Semester **: 3rd**

Title of the Paper **:** CHEMISTRY (**Paper: III)**

Subject code **:**

Lesson Plan Duration **:** 14 weeks (from August, 2017 to October, 2017)

Total teaching period **: 42 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Metallic bond: Definition, factors favouring the formation of metallic bond, Band theory, explanation of electrical conductance of metals.	1	Introduction to lab – identification of components, chemicals and equipment used in laboratory.
		2	Organic halides: Alkyl halides: isomerism and classification, elimination reaction: dehydrohalogenation. Saytzeff and Hoffmann elimination with mechanism.		
		3	Polymers: Introduction, monomer, repeating units, types (linear, branches and network) with examples.		
		4	Insulators and Superconductors (explanation and applications		Systematic semi-micro qualitative

1	2		with suitable examples). Hydrogen bonding: Types of hydrogen bonding, conditions for the formation of H-bond.	2	analysis of a mixture of two simple salts Ca2+, Mg2+, Cl-, CO3 2-
		5	Nucleophilic substitution reaction. SN 1 and SN 2 with energy profile diagram.		
		6	classification (arrangement and shape) with examples, polymerization reaction (addition and condensation), molar masses of polymers – types (number average and mass average).		
	3	7	Hydrogen bonding in HF, H2O, NH3, alcohols, carboxylic acids and nitrophenols.	3	Salt number 2) Ca2+ , K+, Cl-, NO3 - ,
		8	Effect of nature of alkyl groups, nature of leaving groups, nucleophiles and solvents. [3 Hours.		
		9	determination of molar mass (viscosity and osmotic pressure method) (Numerical problems).		
1	4	10	Appropriate anomalous properties like physical state, boiling point and solubility. Structure of ice. Theories (or nature) of hydrogen bond (electrostatic approach, VBT and MOT treatments) .	4	Salt number 3) Mg2+, CO3 2-, NH4 +, Cl-.
		11	Aryl halides: Relative reactivity of alkyl, allyl halides towards nucleophilic substitution reactions.		
		12	Ionic equilibria: Ionic equilibria in aqueous solutions, strong and weak electrolytes – definition and examples. Ostwald's dilution law (to be derived) and its limitations (numerical problems).		
		13	Metal carbonyls: Definition, classification with examples, nature of M-CO bonding in		Salt number

2	5		carbonyls.	5	4) Sr 2+, SO4 2-, Zn2+, Cl-.
		14	Aryl halides: Relative reactivity of vinyl and aryl halides towards nucleophilic substitution reactions.		
		15	Activity and activity coefficients – definition and their relation. Mean ionic activity coefficients – ionic strength – determination and its calculation. Debye-Huckel theory of strong electrolytes (relaxation time effect, electrophoretic effect and viscous effect).		
2	6	16	Revision of inorganic chemistry unit -1	6	Salt number 5) Al3 +, NO3 - , Ba2+, Cl-.
		17	Revision of organic chemistry unit -1		
		18	Revision of physical chemistry unit-1		
	7	19	Inorganic chemistry internal test	7	Salt number 6) Al3 +, NO3 - , SO4 2-, Zn2+,
		20	Organic chemistry internal test		
		21	Physical chemistry internal test		
2	8	22	Preparation, properties and structures of mono nuclear and binuclear metal carbonyls- Ni(CO)4, Cr(CO)6, Fe(CO)5, Mn2(CO)10, Co2(CO)8	8	Salt number 7) CO3 2-, NH4 +, Cl-, Ca2+.
		23	Generation of benzyne-trapping with dienes (furan and anthracene).		
		24	Debye-Huckel-Onsagar equation (no derivation), Debye-Huckel Limiting equation for activity coefficients (no derivation). Solvent system concept of acids and bases. Role of solvents in altering strengths of acids and bases.		

3	9	25	Applications of EAN rule to mononuclear metalcarbonyls. Boron: Boron hydrates – diborane, preparation, structure and uses.	9	Practical internals
		26	Organometallic compounds: Definition with example, organo zinc compounds – preparation of diethyl zinc and its applications.		
		27	Solvent system concept of acids and bases. Role of solvents in altering strengths of acids and bases.		
3	10	28	Carbon: Fullerenes – production, structure of C60 and C70. Diamond, graphite – properties and structure. Silicon: Structure of silica. Silicates – types and structure with one example for each type.	10	Salt number 8) Na^+, Ba^{2+}, Br^-, SO_4^{2-}.
		29	Organolithium Compounds: Preparation and synthetic applications.		
		30	Hydrolysis of salts – derivation of hydrolysis constant and degree of hydrolysis of the salt of weak acid and weak base (ammonium acetate), effect of temperature on degree of hydrolysis.		
	11	31	Nitrogen: Preparation, properties, structure and applications of hydrazine, hydroxyl amine and nitrogen	11	Salt number 9) Zn^{2+}, Ba^{2+}, Br^-, CO_3^{2-}.

			trichloride.		
		32	Alcohols: Definition and classification. Monohydric alcohols: Preparation of alcohols by hydroboration and oxidation method. Hydration of alkenes.		
		33	Distribution Law: Nernst distribution law in liquid-liquid systems, distribution coefficient		

3	12	34	Sulphur: Preparation, properties, structures and applications of thionyl chloride, sulphuryl chloride and SF6.	12	Give reason and problems related to inorganic analysis.
		35	Distinction tests between 1°, 2°, and 3° alcohols by Victor Meyer oxidation method. Conversion of 1° to 2°, 2° to 3° and 1° to 3° alcohols. Dehydration of 1°, 2°, 3° alcohols and comparison of their rates.		
		36	Nernst distribution law – verification of distribution law taking distribution of I2 in H2O and CCl4 – limitations of the law, conditions for the validity of distribution law.		
	13	37	Halogens: Bleaching powder – preparation, properties and structure. Pseudo halogens: Preparation, properties and structure of cyanogen and thiocyanogen (any one method of preparation and any three properties to be discussed).	13	Practice lab experiments revision.
		38	Dihydric alcohols: Glycol – preparation from vicinal dihalides and uses. Pinacoles – synthesis, mechanism of pinacol-pinacolone rearrangement		
		39	association of the solute in one of the solvents, dissociation of the solute in one of the solvents, application of distribution law with respect to solvent extraction process (numerical problems)		
	14	40	Old question paper revision	14	Internal practical test (IA)
		41	Revision/ doubt discussion section. Assignment submission		
		42	Internal theory test (IA)		

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B.Sc. Second year

LESSON PLAN FOR THE SESSION 2017-18 (Even Semester)

Name of the Faculty **:** Dr.N Shankaresha, Shridhar G B, Rashmi B J Premakumari A C,Hemalatha K M and Archana (Theory and Practical)

Semester **: 4th**

Title of the Paper **:** CHEMISTRY (**Paper: IV)**

Subject code **:**

Lesson Plan Duration **:** 14 weeks (from December, 2017 to April, 2018)

Total teaching period **: 42 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
1	1	1	Noble gases: Isolation from air by Rayleigh's method, preparation, separation of Noble gases-Dewar's method.	1	Introduction to lab – identification of components, chemicals and equipment used in laboratory.
		2	Ethers: Nomenclature, Williamson ether synthesis, reactions – cleavage and auto-oxidation-Ziesel's method.		
		3	Second law of thermodynamics: Limitations of First Law of Thermodynamics – need for II Law of thermodynamics, spontaneous, non-spontaneous and equilibrium processes (definitions and examples for each).		
	2	4	Preparation, Structure and applications of compounds of Xenon and Krypton (XeF2, XeOF2, XeO3, KrF2, KrF4, KrO3 XH2O-one method of preparation for each	2	Determination of the density using specific gravity bottle and viscosity of a liquid using Ostwald's viscometer.

		5	Epoxides: Synthesis by Darzen's method. Acid and base catalyzed opening of epoxides.		
		6	different ways of stating II Law, heat engine (example) Carnot cycle, efficiency of Carnot cycle (derivation).		
	3	7	Clathrates (explanation with suitable examples, essential conditions for the formation and uses).	3	Determination of the density using specific gravity bottle and surface tension of a liquid using stalagmometer.
		8	Crown ethers: Introduction with examples.		
		9	concept of entropy – definition and physical significances of entropy – criteria of spontaneity in terms of entropy change, statements of II law in terms of entropy (numerical problems to be worked out on entropy and efficiency of Carnot engine).		
1	4	10	Non-aqueous solvents: Liquid ammonia-reasons for the solvent properties, typical reactions-solubility of alkali metals; acid-base.	4	Determination of molecular mass of a non-volatile solute by Walker-Lumsden method.
		11	Carbonyl Compounds: Distinction between aldehydes and ketones – oxidation and reduction method. Addition of alcohols- formation of hemiacetal and acetal.		
		12	Free energy: Helmholtz and Gibb's free energy – their definitions and their relationship, Gibb's – Helmholtz equation at constant pressure and volume (derivations), thermodynamic criteria of equilibrium and spontaneity, variation of free energy with temperature and pressure, Claussius – Clappeyron equation (differential form to be derived)		
		13	precipitation, ammonolysis, Ionization of weak acids,		Determination of rate constant of the

2	5		advantages and disadvantages. Liquid SO2-reasons for the solvent properties, typical reactions-acid-base, solvolysis, precipitation, amphoteric and redox.	5	decomposition of hydrogen peroxide catalyzed by FeCl3.
		14	Condensation with NH2OH and 2,4-DNP. Mechanism of aldol condensation.		
		15	integrated form of Claussius – Clappeyron equation (to be assumed) and its applications (enthalpy of vapourization, boiling point and freezing point at different temperatures), (numerical problems on these applications), Van't Hoff's reaction isotherms and isochore equations (to be derived).		
2	6	16	Revision of inorganic chemistry unit -1	6	Determination of transition temperature of the salt hydrates.
		17	Revision of organic chemistry unit -1		
		18	Revision of physical chemistry unit-1		
	7	19	Inorganic chemistry internal test	7	Determination of percentage composition of sodium chloride solution by determining the miscibility temperature of phenol - water system
		20	Organic chemistry internal test		
		21	Physical chemistry internal test		
2	8	22	HSAB: Classification of acids and bases as Hard and Soft. Pearson's HSAB concept, acid-base strength, hardness and softness, symbiosis.	8	Determination of the mass present in the given solution of a strong acid using stro ng base by thermometric titration method.
		23	Perkins reaction, Cannizzaro reaction, Claisen condensation, Knovenagel reaction.		

		24	Elementary Quantum Mechanics: black body radiation – Planck's Law, Photoelectric effect, Compton effect.		
3	9	25	Nuclear chemistry: Fundamental particles of nucleus- nucleons, isotopes, isobars and isotones (definition with suitable examples), Nuclear forces (brief explanation).	9	Practical internals
		26	Carboxylic acids: Definition, classification with examples. Synthesis by Arndt-Eistert reaction, resonance structure of carboxylate ion and its stability.		
		27	Schrodinger's wave equation (no derivation) and its importance, physical interpretation of wave function.		
3	10	28	Nuclear stability-n/p ratio, Mass defect, Binding energy, Inner structure of nucleus- Liquid drop model, Nuclear fission- (definition with suitable examples).	10	Determination of molecular weight of a polymer material by viscosity measurements (cellulose acetate/methyl acrylate).
		29	Effect of substituents on acidity of aliphatic and aromatic carboxylic acids. Hydroxy acids: Synthesis of lactic, citric and tartaric acids.		
		30	Particle in one dimensional box (no derivation), Hamiltonian operator.		

	11	31	Plutonium as a fissionable material (Plutonium bomb), nuclear fusion and its advantages over nuclear fission reactions, hydrogen bomb, nuclear transmutation-artificial radioactivity.	11	Study of kinetics of reaction between K2S2O8 and KI, second order, determination of rate constant.
		32	Effect of heat on α, β, γ-hydroxy acids. Amines: Definition, classification with example.		
		33	Physical Properties and chemical constitution: Additive and constitutive properties, properties of liquids – viscosity, definition of coefficient of viscosity, factors affecting viscosity – temperature, size, weight, shape of molecule		

3	12	34	Detection and measurement of radioactivity – G. M. counter. Cyclotron, Nuclear reactor, Breeder reactor, Q values of nuclear reactions.	12	Determination of rate constant of saponification of ethyl acetate titrimetrically.
		35	Separation of amine mixture by Hinsberg's method using toluene sulphonyl chloride. Distinction tests for 1°, 2°, 3° amines (acetylation and Hoffmann's exhaustive methylation. Action of nitric acid on different amines. Both aliphatic and aromatic 1°, 2°, 3° amines, basicity of amines, effect of substituents on basicity of aliphatic and aromatic amines.		
		36	Parachor: Definition – Sugden equation, calculation of parachor and its application with respect to structural elucidation of benzene and quinone.		
	13	37	Uses of radio isotopes – tracer technique, agriculture, medicine, food preservation and dating (explanation). Separation of uranium isotopes – Laser irradiation method (atomic and molecular routes).	13	Practice lab experiments revision.
		38	Hoffmann-Martius rearrangement. Diazonium Compounds: preparation, mechanism of preparation and synthetic applications of benzene diazonium chloride. Conversion to phenol, halobenzene, phenyl hydrazine and coupling reaction.		
		39	numerical problems based on surface tension, viscosity and parachor applications.		
	14	40	Old question paper revision	14	Internal practical test (IA)
		41	Revision/ doubt discussion section. Assignment submission		
		42	Internal theory test (IA)		

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DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2017-18 (Even Semester)

Name of the Faculty **:** Dr.N Shankaresha, Shridhar G B, Rashmi B J, Premakumari A C,Hemalatha K M and Archana (Theory and Practical)

Semester **:** 6th

Title of the Paper **: Inorganic chemistry(Paper: VIII)**

Subject code **:**

LessonPlan Duration **:** 14weeks (from December, 2017 to April, 2018)

Total teaching period **: 28Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 00

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Inorganic polymers: Definition – examples, general properties, comparison with organic polymers, glass transition temperature		
		2	Silicones: Definition, nomenclature, preparation (linear, cross-linked and cyclic). Factors affecting the nature of silicon polymers, properties (chemical and thermal stabilities, chemical properties)		
		3	uses of silicon polymers, silicon fluids/oils – uses, silicon elastomers – rubbers, silicon resins (preparation and uses)		

1&2	2	4	Phosphazenes: Definition, types, structures, preparation, properties and uses. Crystalline polymetaphosphates – Maddrell's and Kuroll's salts – properties and uses.		
	3	5	Nature of bonding in phosphazenes. Fluorocarbons: Definition, examples, preparation, properties and uses of Freon-12, Freon-22, PTFE and poly per fluorovinyl chloride.		
		6	Abrasives: Definition, classification with examples – hardness, manufacture and applications of carborundum, alundum and tungsten carbide.		
	4	7	Refractories: Definition, properties, classification with examples. Different steps involved in the manufacture of refractories. Applications of refractories.		
		8	Explosives: Definition, classification with examples, characteristics of explosives. Preparation and uses of dynamite, cordite and RDX.		
	5	9	Paints: Constituents and their functions, manufacture of lithopone and titanium dioxide.		
		10	Fuels: Definition, classification with examples – characteristics, calorific value, determination of calorific value of a solid or liquid fuel.		
		11	Applications of gaseous fuels. Compressed natural gas, water gas, producer gas and LPG – their		

3&4	6		production, composition and applications		
		12	Propellants: Definition, characteristics, classification and applications.		
	7	13	Inorganic chemistry internal test		
		14	Inorganic chemistry internal test		
5	8	15	Fertilizers: Definition and classification, manufacture of nitrogeneous fertilizers – CAN and urea. Phosphatic fertilizers – calcium dihydrogen phosphate, NPK type fertilizers.		
		16	Metallurgy: Types of metallurgy: Pyrometallurgy: Extraction of Nickel from sulphide ore – general metallurgy followed by Mond's process (purification).		
	9	17	manganese from oxide ores – reduction by the Aluminothermite process – refining by electrolytic process.		
		18	Hydrometallurgy: Extraction of gold from native ore by cyanide process and refining by quartation process.		
	10	19	Electrometallurgy: Extraction of lithium by fusion method followed by electrolysis of lithium chloride.		

5		20	Powder metallurgy: Importance, metal powder production and applications, production of tungsten powder.		
	11	21	Extraction of (1) Thorium from monazite sand – purification by iodine method, (2) uranium from pitch blende – production of U3O8 by carbonate method.		
		22	U3O8 to UO2 by reduction, UO2 to U by fluoride method.		

6	12	23	Nanotechnology: Definition, uses and nature of nanotechnology, Nanomaterials-definition, properties and applications		
		24	Carbon nanotubes- definition, types, methods of preparation (mention).		
	13	25	properties and industrial applications of carbon nanotubes.		
		26	Nanowires-definition, types.		
	14	27	production of crystalline nanowires by vapour-liquid-solid synthesis method, applications of nanowires.		

		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2017-18 (Even Semester)

Name of the Faculty **:** Dr.N Shankaresha, Shridhar G B, Rashmi B J, Premakumari A C,Hemalatha K M and Archana (Theory and Practical)

Semester **:** 6th

Title of the Paper **: Organic chemistry(Paper: IX)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from December , 2017 to April, 2018

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
1&2	1	1	Hetrocyclic Compounds: Definition, classification with examples, synthesis of furan, thiophene,	1	Introduction of organic chemistry experiments
		2	pyrrole, pyridine, indole (Fischer method) quinoline (Skrup's synthesis with mechanism), isoquinoline, pyrimidine (one method each),		
	2	3	Uric acid: Elucidation of structure and synthesis by Fischer's method, conversion of uric acid to purine and caffeine	2	Separation of p- and o-nitroaniline by TLC method (Solvent extraction)
		4	Alkaloids: Definition, classification based on heterocyclic rings-isolation		
	3	5	synthesis and structural elucidation of nicotine and morphine, physiological importance of alkaloids.		Separation of p- and o-nitroaniline by column chromatography

		6	Vitamins: Definition, classification, structural elucidation and synthesis of Vit-A, Synthesis of Vit-C	3	
	4	7	structural formulae of Vit B1, B2, B6, calciferol, E and K and their importance.	4	Estimation of glucose by Fehling solution method
		8	Hormones: Definition, classification, synthesis of adrenaline, thyroxine, struc tural formulae of estradiol, progesterone and testosterone and their importance.		
	5	9	Drugs: Chemotherapy and chemotherapeutic agents, definition of drugs, types of drugs, antipyretics, analgesics, anesthetics.	5	Estimation of Phenol by acetylation method.
		10	sedatives, narcotics, antiseptics, antibacterials, antibiotics, antimalarials and sulpha drugs with examples.		
3&4	6	11	Synthesis of paracetamol, sulphanilamide, sulphaguanidine.	6	Estimation of ascorbic acid by iodometric method.
		12	Special techniques in organic synthesis: a) Polymer supported reagents – introduction, properties of polymer support-advantages of polymer support reagents, choice of polymers, types and applications.		
		13	Organic chemistry internal test	7	Determination of Iodine value of oils by chloromine-T.

	7	14	Organic chemistry internal test		
5	8	15	Phase transfer catalysis – introduction, definition, types, preparation, mechanism and advantages.	8	Isolation of Caffeine from tea powder
		16	c) Microwave induced organic synthesis – introduction, reaction vessel, reaction medium, advantages, limitations, precaution and applications		
	9	17	Sonochemistry – use of ultra sound in organic synthesis, introduction, instrumentation, physical aspects, types and applications.	9	Estimation of neutral amino acids by titrametric method.
		18	Amino acids: Structure of α-amino acids, peptide bond, protecting groups-Boc, Z, F-moc groups, use of HOBt and HOAt.		
5	10	19	Spectroscopy of organic compounds: UV-visible spectroscopy: Introduction, chromophores and auxo chrome, blue shift and red shift.	10	Organic chemistry practical test

		20	representation of spectra of 1,3-butadiene, benzene and lycopene. Influence of conjugation on UV absorption-comparison of UV spectra of acetone and methylvinyl ketone.		
	11	21	IR-Spectroscopy: Introduction, stretching frequency of –OH (free and H-bonded), alkyl –C-H, C=C, C=C, C-C, C=O and C-O groups (by taking suitable examples).	11	Estimation of carboxylic acid by titrametric method.
		22	Graphical representation of IR spectra of benzoic acid and methyl benzoate		

6	12	23	NMR Spectroscopy: Basic principles of proton magnetic resonance , nuclear magnetic spin quantum number I, influence of the magnetic field on the spin of nuclei	12	Estimation of –NH2 group by acetylation method.
		24	spin population, saturation using radio frequency, nuclear magnetic resonance-chemical shift (δ value), uses of TMS reference		
	13	25	Nuclear shielding effects, equivalent and non-equivalent protons, spin-spin splitting and coupling.		Determination of saponification value of oils.

		26	Applications of NMR spectroscopy to simple organic molecules (like ethyl alcohol, ethane, propane, ethylene, methylamine.	13	
	14	27	Aniline, benzene, toluene, acetone, acetophenone, methyl cyanide and other simple molecules.	14	Revision of experiments
		28	Revision of syllabus		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2017-18 (Even Semester)

Name of the Faculty **:** Dr.N Shankaresha, Shridhar G B, Rashmi B J, Premakumari A C,Hemalatha K M and Archana (Theory and Practical)

Semester **:** 6th

Title of the Paper **: Physical chemistry(Paper: X)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from December , 2017 to April, 2018)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
1&2	1	1	Electrochemistry-I: Introduction, conductance – specific conductance, equivalent conductance and molar conductance – their definitions and SI units.	1	Introduction of laboratory physical chemistry equipments.
		2	Conductance cell and cell constant. Determination of equivalent conductance by meter – bridge method, ionic mobility, ionic conductance, Kohlrausch's law and its significance – determination of equivalent conductance at infinite dilution for weak electrolyte.		
		3	Transport number: Definition and explanation, anomalous transport number – explanation with examples – relationship between ionic conductance and transport number (to be derived)	2	Determination of equivalent conductance of the given electrolyte (strong and weak) by using Meter Bridge.

	2	4	determination of transport number by moving boundary method – transport number of H+ using CdCl2 as supporting electrolyte (numerical problems on equivalent conductance, transport numbers and kohlrausch's law).		
	3	5	Application of conductance measurements – (a) solubility and solubility product of sparingly soluble salt, (b) ionic product of water.	3	Determination of solubility of sparingly soluble salt (like BaSO4) by conductometric method
		6	degree of ionization of weak electrolyte. Numerical problems for the applications of a, b and c to be worked out.		
	4	7	Conductometric titration: strong acid vs strong base, weak acid vs strong base, strong acid vs weak base, weak acid vs weak base, with suitable examples for each.	4	Determination of solubility of sparingly soluble salt (like BaSO4) by conductometric method.
		8	Electromotive force-I: Electrolytic and electrochemical cells, electrode reaction of Daniel cell, single electrode potential.		
	5	9	sign of electrode potential-convention (reduction potential to be adopted), convention of representing a cell, EMF and standard EMF of a cell, cell reaction, reversible and irreversible cells,	5	Determination of rate constant of saponification of ethyl acetate by conductivity measurements
		10	Nernst equation (to be derived) and calculation of electrode potential, standard hydrogen gas electrode, reference electrodes-calomel.		
		11	Ag-AgCl electrode-construction		Conductometric

3&4	6		and working, electrochemical series and its significance, equilibrium constant and free energy of cell reaction, spontaneity of a cell reaction.	6	titration of strong acid and strong base and weak acid and strong base.
		12	EMF of concentration cells: Definition with explanation – with transference and without transference, concentration cells – with examples.		
	7	13	Physical chemistry internal test	7	Determination of percentage composition of a given mixture containing two miscible liquids by Abbe's refractometer.
		14	Physical chemistry internal test		
5	8	15	Liquid junction potential and salt bridge. (Numerical problems on Nernst equation and EMF calculations).	8	pH titration of strong acid against strong base (by observing change in pH).
		16	Fuel cells: Working of H2-O2 fuel cell and its importance.		
	9	17	Electromotive force-II Application of EMF measurements: (a) Determination of pH of a solution using quinhydrone electrode.	9	Laboratory internals
		18	Glass electrode (using dip type Calomel electrode) – Explanation with principle and procedure.		
5	10	19	Potentiometric titration – principle, location of end points in - (1) Neutralization reactions [NaOH Vs HCl] (2) Oxidation-reduction reactions [K2Cr2O7 Vs FAS]		

		20	Precipitation reaction [KCl Vs AgNO3] and (4) Complexometric reactions (ZnSO4 Vs K3[Fe(CN)6])		
	11	21	Chemical Kinetics: Introduction – differential and integrated rate equations for second order kinetics, derivation of second order rate equation when a=b and a≠b.	10	Potentiometric titration of mixture of HCl and CH3COOH using NaOH solution.
		22	unit of rate constant, half-life period, experimental verification of second order reactions – study of kinetics of saponificaiton of an ester.		

	12	23	Determination of the order of reaction – differential, time for half-change method and isolation method. Experimental methods of chemical kinetics.	11	Colorimeteric estimation of Fe3+ ion using ammonium thiocyanate as complexing agent.

6		24	conductometric – example - saponification of esters. Potentiometric - example – kinetics of bromination of N,N-di-methyl aniline and spectrophotometric – example – colorimetric study of kinetics of oxidation of Indigocarmine by chloramine-T.		
	13	25	Application of kinetic studies: Arriving at the mechanism of urea formation from ammonium cyanate.	12	Colorimeteric estimation of Cu2+ ion using NH4OH as complexing agent.
		26	Phase equilibria: Gibb's phase rule – definition of the terms with examples, application to one component system (water system).		
	14	27	Reduced phase rule – statement, reduced systems, two component system – simple eutectic type KI-water system, freezing mixtures, Pb-Ag system (desilverization of argentiferrous lead)	13	Revision of experiments
		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2017-18(Odd Semester)

Name of the Faculty **:** Dr.N Shankaresha, Shridhar G B, Rashmi B J, Premakumari A C,Hemalatha K M and Archana (Theory and Practical)

Semester **:** 5th

Title of the Paper **: Inorganic chemistry(Paper: V)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2017 to October, 2017)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
1&2	1	1	Chemistry of transition elements: Position in the periodic table, electronic configuration, general characteristics- atomic and ionic radii.	1	Introduction of laboratory equipments.
		2	ionization energy, variable oxidation states, spectral properties, redox potentials, colour and magnetic properties,		
	2	3	catalytic activity, complex formation and interstitial compounds formation (3d, 4d and 5d series). Chemistry of inner transition elements: Electronic configuration and position in the periodic table,	2	Gravimetric estimation of barium as barium sulphate.
		4	oxidation states, spectral properties, colour and magnetic properties, complex formation		

			sand ionic radii.		
	3	5	lanthanide contraction – cause and its consequences. General survey of actinides – comparison with lanthanides, transuranic elements.	3	Gravimetric estimation of iron as iron (III) oxide
		6	Ion-exchange: Introduction, action of ion exchange resins – cation exchange and anion exchange resins.		
	4	7	Exchange of inorganic ions, ion exchange capacity, separation of lanthanides by ion- exchange method.	4	Gravimetric estimation of copper as copper (I) thiocyanate.
		8	Gravimetry: Introduction to gravimetric analysis – precipitation methods (various steps involved to be discussed), advantages of gravimetric analysis		
	5	9	purity of the precipitates, co-precipitation and postprecipitation, conditions of precipitation, precipitation from homogeneous solution (hydroxides and sulphates)	5	Gravimetric estimation of nickel as nickel dimethylglyoximate
		10	washing and ignition of precipitate (general discussion only). Electro-gravimetric analysis estimation of copper.		
		11	Organic precipitants: Advantages of organic precipitants over		Gravimetric estimation of magnesium as

3&4	6		inorganic precipitants, DMG, 8-hydroxy quinoline (Oxine)	6	magnesium -8-hydroxy oxinate.
		12	1,10-phenanthroline and EDTA. Structure of Ni2+ -DMG and Mg2+ -oxine complexes.		
	7	13	Inorganic chemistry internal test	7	Gravimetric estimation of sulphate as barium sulphate
		14	Inorganic chemistry internal test		
5	8	15	Coordination Chemistry: Ligands, classification of ligands and chelation, nomenclature of co-ordination compounds.	8	Gravimetric estimation of aluminum as aluminum oxide.
		16	physical methods in the study of complexes – change in conductance, colour and pH.		
	9	17	Stability of complexes – stability constant, a brief outline of thermodynamic stability of metal complexes.	9	Laboratory internals
		18	Factors affecting the stability of complexes. Polynuclear complexes, inner metallic complexes.		
5	10	19	Isomerism in co-ordination complexes: Stereo-isomerism – Geometrical and optical isomerism exhibited by co-ordination compounds of co-ordination number 4 and 6.		

		20	Metal-ligand bonding in transition metal complexes: Valence bond theory: Salient features, formation of octahedral complexes on the basis of VBT, outer and inner orbital octahedral complexes- [Fe(CN)6] 4- .		
	11	21	Formation of octahedral complexes on the basis of VBT [Fe(CN)6] 3- , [Co(CN)6] 3- , [CoF6] 3- [Cr(H2O)6] 3+ and [Fe(H2O)6] 2+	10	Gravimetric estimation of zinc as zinc oxide
		22	Formation of tetrahedral and square planner complexes on the basis of VBT – [Ni(CN)4] 2- , [Cu(NH3)]2+, [Zn(NH3)4] 2+and [Ni(CO)4], limitations of VBT.		

	12	23	Crystal field theory: Important features of crystal field theory, crystal field splitting of d-orbitals in tetrahedral, octahedral and square planar complexes,	11	Gravimetric estimation of calcium as calcium oxide.

6		24	crystal field stabilization energy (CFSE), factors affecting the magnitude of Δo, (nature of ligand, oxidation state of the metal ion, size of the orbitals, geometry of the complex), high spin (HS) and low spin (LS) complexes		
	13	25	magnetic properties of metal complexes based on crystal field theory-[Co(NH3)6] 3+, [CoF6] 3- , [Fe(CN)6] 4- , [Fe(CN)6] 3- and [Ni(CN)4] 2- .	12	Paper chromatographic separation of Fe3+ and Ni2+ ions
		26	Magnetic susceptibility, measurement of magnetic moment by Gouy's method. Limitations of CFT. Ligand field theory: Evidences for metal ligand covalent bonding in complexes.		
	14	27	Bio-inorganic chemistry: Essential and trace elements in biological process, metalloporphyrins with special reference to haemoglobin and myoglobin, biological role of alkali and alkaline earth metal ions with respect to Na+ and Ca2+ ions.	13	Revision of experiments
		28	Revision of syllabus		

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LESSON PLAN FOR THE SESSION 2017-18 (Odd Semester)

Name of the Faculty **:** Dr.N Shankaresha, Shridhar G B, Rashmi B J, Premakumari A C,Hemalatha K M and Archana (Theory and Practical)

Semester **:** 5th

Title of the Paper **: Organic chemistry(Paper: VI)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2017 to October, 2017)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
1&2	1	1	Carbohydrates: Definition and importance, classification based on composition with examples-reducing and non-reducing sugars.	1	Introduction of laboratory equipments.
		2	Monosaccharides: Glucose: reactions of glucose (with H2N-OH, HCN, C6H5NHNH2, Br2 water, Conc. HNO3, reductions with HI/red P , methanols, (dry HCl), acetic anhydride and reduction reactions.		
	2	3	Structural elucidation of glucose: Open chain structure, configuration, drawbacks of open chain structure, ring structure – Fisher and Haworth structure. Determination of ring size by methylation method. Fischer and Haworth structures of fructose, galactose and mannose.	2	Gravimetric estimation of barium as barium sulphate.

		4	Conversion reactions – 1. Ascending (Kiliani's synthesis) 2. Descending (Wohl's degradation) 3. Aldose to ketose 4. Ketose to Aldose 5. Epimerisation		
	3	5	Disaccharides: Structural elucidation of sucrose, structural formulae of maltose and lactose (Haworth structure). Polysaccharides: Partial structural formulae of starch, cellulose, glycogen and their uses.	3	Gravimetric estimation of iron as iron (III) oxide
		6	Stereochemistry: Introduction, definition, elements of symmetry (plane, centre, simple axes and alternative axes), asymmetry and dissymmetry, Chirality		
	4	7	Designation of configuration – R-S notation. Optical activity – explanation – cause of optical activity (non-super impossibility). Enantiomers and diastereomers optical isomerism in tartaric acid and biphenyls.	4	Gravimetric estimation of copper as copper (I) thiocyanate.
		8	Racemisation, resolution, methods of resolution (Chemical and biochemical methods) Walden inversion, asymmetric synthesis (partial and absolute).		
	5	9	Geometrical isomerism: Definition with example, designation of cis-trans and E-Z notations with examples. Geometrical isomerization of aldoximes and ketoximes, Beckmann rearrangement	5	Gravimetric estimation of nickel as nickel dimethylglyoximate

		10	Green Chemistry: Purpose, principles to be followed for green chemistry. Synthesis of acetamide, ibuprofen.		
3&4	6	11	Green Chemistry: Purpose, principles to be followed for green chemistry. Synthesis of acetamide, ibuprofen.	6	Gravimetric estimation of magnesium as magnesium -8-hydroxy oxinate.
		12	Synthesis of benzoin, benzylic acid and para-bromo acetanilide.		
	7	13	Organic chemistry internal test	7	Gravimetric estimation of sulphate as barium sulphate
		14	Organic chemistry internal test		
5	8	15	Active methylene compounds: Definition, ethyl acetoacetate, preparation and keto-enol tautomerism in ethyl acetoacetate-its evidence.	8	Gravimetric estimation of aluminum as aluminum oxide.
		16	Synthetic applications: Acid hydrolysis, ketonic hydrolysis, mono carboxylic acids, dicarboxylic acidssuccinic acid		
		17	Synthetic applications: adipic acid, antipyrine, uracil, acetyl acetone, crotonic acid and cinnamic acid.		Laboratory internals

	9	18	Synthetic Polymers: Definition, vehicle, fixative, odorous substances. Classification, synthesis of 1. Methyl anthranilate	9	
5	10	19	synthesis of 2. Phenyl alcohol 3. Linalool 4. Mask ketone 5. α and β-Ionones, Vanillin.	10	Experiments revision
		20	Formation of tetrahedral and square planner complexes on the basis of VBT – [Ni(CN)4] 2-		
	11	21	Formation of octahedral complexes on the basis of VBT [Fe(CN)6] 3- , [Co(CN)6] 3- , [CoF6] 3- [Cr(H2O)6] 3+ and [Fe(H2O)6] 2+	11	Gravimetric estimation of zinc as zinc oxide
		22	Formation of tetrahedral and square planner complexes on the basis of VBT – , [Cu(NH3)]2+, [Zn(NH3)4] 2+and [Ni(CO)4], limitations of VBT.		

6	12	23	Crystal field theory: Important features of crystal field theory, crystal field splitting of d-orbitals in tetrahedral, octahedral and square planar complexes,	12	Gravimetric estimation of calcium as calcium oxide.
		24	crystal field stabilization energy (CFSE), factors affecting the magnitude of Δo, (nature of ligand, oxidation state of the metal ion, size of the orbitals, geometry of the complex), high spin (HS) and low spin (LS) complexes		
	13	25	magnetic properties of metal complexes based on crystal field theory-[Co(NH3)6] 3+, [CoF6] 3- , [Fe(CN)6] 4- , [Fe(CN)6] 3- and [Ni(CN)4] 2- .	13	Paper chromatographic separation of Fe3+ and Ni2+ ions
		26	Magnetic susceptibility, measurement of magnetic moment by Gouy's method. Limitations of CFT. Ligand field theory: Evidences for metal ligand covalent bonding in complexes.		
	14	27	Bio-inorganic chemistry: Essential and trace elements in biological process, metalloporphyrins with special reference to haemoglobin and myoglobin, biological role of alkali and alkaline earth metal ions with respect to Na+ and Ca2+ ions.	14	Revision of experiments
		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE HOLENARASIPURA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2017-18 (Odd Semester)

Name of the Faculty **:** Dr.N Shankaresha, Shridhar G B, Rashmi B J, Premakumari A C,Hemalatha K M and Archana (Theory and Practical)

Semester **:** 5th

Title of the Paper **: Physical chemistry(Paper: VII)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2017 to October, 2018)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 00

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Crystallography: Elements of symmetry – plane, axis and centre, elements of symmetry in cubic crystals, law of rational indices – Weiss and Miller indices, lattice planes in cubic crystals.		
		2	Crystal lattice and unit cell, types of Lattice – Bravais lattices, X-Ray diffraction and Bragg's Law (to be derived).		

1&2	2	3	determination of crystal structure of rock salt by rotating crystal method using Bragg's spectrometer.		
		4	application of X-ray studies – distance between lattice planes, density of crystals, determination of Avogadro Number.		
	3	5	(numerical problems on applications).		
		6	Liquid Crystals: Defination, classification of thermotropic liquid crystals into smectic and nematic with examples-molecular arrangement of these and their uses.		
	4	7	Spectrophotometry and photochemistry: Lambert – Beer's law – statement and mathematical form (to be derived).		
		8	Molar extinction coefficient – definition – spectrophotometer – construction and working, its application.		
	5	9	Laws of photochemistry – Grotthus-Draper law of photochemical activation and Einstein's law of photochemical equivalence.		
		10	quantum efficiency, reasons for low quantum yield (HBr formation as example) and high quantum yield (HCl formation as example).		

3&4	6	11	Aactinometry – Uranyl oxalate actinometer. Photophysical processes: Definition with examples – photosensitization (eg. photosynthesis in plants),		
		12	photo inhibition, fluorescence, phosphorescence, chemiluminescence and bioluminescence with examples.		
	7	13	Organic chemistry internal test		
		14	Organic chemistry internal test		
5	8	15	Determination of absorbed intensity – schematic diagram of apparatus used. Detectors – thermopile, photoelectric cell and actinometer (Uranyl oxalate).		
		16	Radiation Chemistry: Definition, primary and secondary stages in radiochemical reactions, ionic yield, energy yield, comparison with photochemistry.		
		17	units of radiation – rad, gray and roentgen, Dosimeter – Fricke dosimeter, theories of radiolysis – Lind’s and EHT theories.		

	9	18	Radiolysis of water vapour, benzene and acetic acid.		
5	10	19	Molecular Spectroscopy: Regions of spectra, types of spectra, microwave spectra – rotational spectra of diatomic molecules, moment of inertia (expression to be derived).		
		20	Expression for rotational energy, selection rule and transition, calculation of bond length.		
	11	21	IR Spectra – vibrational spectra of diatomic molecules – force constant (no derivation), expression for vibrational energy.		
		22	zero point energy, selection rule and transitions. Vibrational modes of polyatomic molecules taking H_2O and CO_2 molecules as examples. Applications of IR spectroscopy (mention).		

6	12	23	NMR Spectroscopy: Introduction – spin number, chemical shift, instrumentation.		
		24	NMR spectra of ethyl alcohol – low and high resolution, applications (mention).		
	13	25	Raman Spectra: Concept of polarizability, pure rotation, vibration (qualitative study) stoke's and antistoke's lines, selection rule, applications (mention).		
		26	Electronic Spectra: Potential energy curves for bonding and antibonding molecular orbitals, band theory, electronic transitions.		
	14	27	Qualitative description of non-bonding orbitals and transition between them. Selection rule and Franck Condon principle.		
		28	Revision of syllabus		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. First year

LESSON PLAN FOR THE SESSION 2016-17(Odd Semester)

Name of the Faculty **: Dr. N Shankaresha ,**Premakumari A C,Manasa A K Asha H D and Pavithra G S(Theory and Practical)

Semester **: 1st**

Title of the Paper **:** CHEMISTRY (**Paper: I)**

Subject code **:**

Lesson Plan Duration **:** 14 weeks (from August, 2016to October, 2016)

Total teaching period **: 42 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 05, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Elements of quantum mechanics: Wave mechanical concept of the atom, dual nature of electron, derivation of de-Broglie's equation. Heisenberg's uncertainty principle and its significance.	1	Introduction to lab – identification of components, chemicals and equipment used in laboratory.
		2	Introduction to organic chemistry- Definition and importance of organic compounds to life and applications in food, fuels.		
		3	Gases: Maxwell-Boltzmann distribution of molecular velocities (no derivation – assume equation) explanation. Effect of temperature on distribution of molecular velocities using distribution		

1			curve (graph).		
	2	4	Schrodinger wave equation-explanation of the terms therein (no derivation) Eigen values and functions, significance of ψ and ψ2 .	2	Calibration of : (i) Pipette (ii) Burette (iii) Volumetric flask
		5	Definition and importance of organic compounds to life and applications in textiles, dyes, drugs and cosmetics with examples. Nomenclature (IUPAC) of bifunctional, aliphatic and aromatic compounds.		
		6	Boltzmann factor (significance and equation). Energy distribution as a function of temperature. Types of molecular velocities – average (uav) - root mean square velocity (urms) - most probable velocity (ump) – their definition and equations (no derivation).		
	3	7	Quantum numbers and their significance. Shapes of s, p and d orbitals. Effective nuclear charge, screening effect-based on Slater's rules (problems to be worked out).	3	Preparation of 2N solutions of H2SO4,HCL, HNO3,CH3COOH and NH3.
		8	Basic Concepts in Organic Chemistry: Generation, stability and reactions involving carbocations, carbanions.		
		9	Relation between uav, urms and ump velocities of molecules and their calculations (based on temperature dependence).		
1	4	10	General energy level diagram of multi electron atom (up to n=4). Pauli's exclusion principle, Hund's rule, (n+1) rule, Aufbau principle. Electronic configuration of elements (up to At. No. 40).	4	Preparation of standard sodium carbonate solution and standardization of hydrochloric acid solution (methyl orange indicator).

		11	Basic Concepts in Organic Chemistry: Generation, stability and reactions involving free radicals, nitrene and carbenes.		Estimation of sodium hydroxide present in the solution using phenolphthalein indicator.
		12	critical phenomena – Andrew's experiments on CO2, critical constants – Tc, Pc and Vc. definitionsexperimental determination of Critical temperature and Critical pressure by using CagniarddelaTour's apparatus.		
2	5	13	stability of completely filled and half filled orbitals based on the concepts of pairing energy, promotional energy and symmetric charge distribution.	5	Preparation of standard oxalic acid solution and standardization of sodium hydroxide solution. Estimation of sulphuric acid present in the solution
		14	Types of organic reactions: Definition with examples of addition, substitution, elimination, isomerisation, condensation and rearrangement reactions.		
		15	critical volume by Cailletes and Mathias method – Vander Waal's equation – relation between Vander Waal's Constants 'a' and 'b' and critical constants Tc, Pc and Vc to be derived using isotherms of CO2		
2	6	16	Revision of inorganic chemistry unit -1	6	Preparation of standard potassium biphthalate solution and standardization of sodium hydroxide solution. Estimation of oxalic acid present in the solution
		17	Revision of organic chemistry unit -1		
		18	Revision of physical chemistry unit-1		
		19	Inorganic chemistry internal test	7	. Preparation of standard oxalic acid solution and standardization of potassium
		20	Organic chemistry internal test		

	7	21	Physical chemistry internal test		permanganate solution. Estimation of hydrogen peroxide present in the solution.
2	8	22	Periodic Table and Periodicity: Classification of elements into s, p, d, and f-blocks, cause of periodicity.	8	Estimation of sulphuric acid and oxalic acid in a mixture using standard sodium hydroxide and standard potassium permanganate solutions.
		23	Hybridization: Tetravalency of carbon, sp3 , sp2 and sp – hybridization (in brief). Bond length, bond angle, bond energy		
		24	Law of corresponding states and reduced equation of state (to be derived) Liquefaction of gases – Principle underlying liquefaction of gases – Joule Thomson effect, Joule Thomson experiment – Show that Joule Thomson effect is an isoenthalphic process ($\Delta H = 0$).		
3	9	25	1) Atomic radius: Covalent, ionic, Vanderwaal's and crystal radii. Additive nature of covalent radii. Determination of ionic radii by Lande's method.	9	Practical internals
		26	localized and delocalized chemical bonds – resonance and hyperconjugation effects.		
		27	Joule Thomson coefficient, Inversion temperature, definitions and its relation between Vander Waal's constants ('a' and 'b').		
3	10	28	Variation of covalent radii in a group and in a periodexplanation for the observed trends. Comparison of the size of the atoms with the corresponding anions and cations, Variation of ionic radii in isoelectronic ions.	10	Determination of the percentage of available chlorine in the given sample of bleaching powder
		29	Alkanes: Preparation by Corey-House reaction, conversion of		

			alkanes to aromatic compounds via alkenes and alkynes-aromatization and pyrolysis		
		30	Indicator – Definitions, types (acid-base, redox, adsorption indicators), examples for each type.		
	11	31	Ionization enthalpy: Successive ionization enthalpy, factors affecting ionization enthalpy, applications of ionization enthalpy. Variation in a group and in a period – explanation for the observed trends.	11	Preparation of standard zinc sulphate solution and standardization of EDTA. Estimation of total hardness of water.
		32	Alkenes: Preparation of alkenes by Witting's reaction, Hoffmann's elimination, Stereoselectivity. Mechanism of electrophillic addition, oxymercuration.		
		33	Theory of indicators – Oswald's theory and Quinonoid theory – indicator constant – action of phenolphthalein and methyl orange in acid-base solutions – pH titration curves for strong acid vs strong base, weak acid vs strong base.		

3	12	34	Electron gain enthalpy: Successive electron gain enthalpy variation of electron gain enthalpy in period and in a group- explanation for the observed trends	12	Estimation of ammonium chloride using standard sodium hydroxide and standard hydrochloric acid solutions (back titration).
		35	hydroboration – oxidation and epoxidation. Mechanism of oxidation with KMnO4 and OsO4, ozonolysis. industrial applications of ethene and propene.		
		36	Adsorption: Introduction, principle involved. Sorption, absorption and adsorption (statement, differences and examples) physical and chemical adsorption – definition and differences.		
	13	37	Electronegativity: Variation of electronegativity in a group and in a period- explanation for the observed trends. Factors determining electro negativity (charge on the atom and hybridization). Pauling, Mulliken and Allred-Rochow scale of electronegativity. Applications of electronegativity.	13	Revision of lab experiments
		38	Dienes: Types, relative stabilities of dienes, conjugated dienes – 1,3 butadiene-structure, 1,2 and 1,4-addition reactions with H2 and halogens, Diel's Alder reaction with an example.		
		39	Adsorption of gases on solids – factors which influence. Adsorption isotherms (definition) – mathematical expression for Freundlich's and Langmuir's adsorption isotherms. Applications of adsorption.		
	14	40	Old question paper revision	14	Internal practical test (IA)
		41	Revision of syllabus.		
		42	Internal theory test (IA)		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE , CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. First year

LESSON PLAN FOR THE SESSION 2016-17 (Even Semester)

Name of the Faculty :Dr. N Shankaresha ,Premakumari A C, Manasa A K Asha H D and Pavithra G S(Theory and Practical)

Semester : 2nd

Title of the Paper : CHEMISTRY (**Paper: II)**

Subject code :

Lesson Plan Duration : 14 weeks (from December, 2016 to April, 2017)

Total teaching period : 42 Hrs.

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 05, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Chemical bonding-I: Ionic bond: Factors that favor the formation of ionic bonds, Lattice energy, BornLande's equation (no derivation	1	Introduction to lab – identification of components, chemicals and equipment used in laboratory.
		2	Organic Reagents: One method of preparation and applications of acetic anhydride, benzoyl chloride.		
		3	Liquid mixtures: Classification of binary mixtures – partially miscible, completely miscible and completely immiscible pairs of liquids (explanation with examples for each type).		
			setting up of Born-Haber cycle for 1:1 ionic solids. Numerical		Qualitative analysis of mono functional

1	2	4	calculations of LE and EA based on Born-Haber cycle for 1:1 ionic solids, uses of Born-Haber cycle.	2	organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 1) Acids
		5	One method of preparation and applications of dimethyl sulphate, raney nickel and sodium ethoxide.		
		6	Raoult's law, definition of ideal and non-ideal solutions based on Raoult's law. Partially miscible liquids: Critical solution temperature (CST) – types – phenol-water system.		
	3	7	Role of lattice energy and hydration energy and their importance in the context of stability and solubility of ionic solids. Covalent bond: Factors favouring the formation of covalent bond (ionization energy, electron affinity, electronegativity, nuclear charge, inter nuclear distance and number of valence electrons).	3	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 2. Alcohols
		8	Cycloalkanes: Definition, examples, relative stability Bayer's strain theory and its limitations.		
		9	Triethylamine-water system, nicotine-water system (mutual solubility temperature (MST) vs composition curves to be drawn). Effect of addition of non-volatile solute on CST. Binary mixtures of completely miscible liquids.		
		10	Valence bond approach – explanation with examples (H2, F2, HF, O2 and N2) to illustrate valence bond approach.	4	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of
			Mohr's theory of strainless rings. Chair and boat conformations of		

1	4	11	cyclohexane and their stability.		physical constant. Preparation of suitable derivative of 3. Aldehydes
		12	Vapour pressure – definition, vapor pressure – composition diagrams and boiling point – composite diagrams. Classification into the types – obeying Raoult's law (type I), showing positive deviation from Raoult's Law (type II) and showing negative deviation from Raoult's Law (type III) – examples for each type.		
2	5	13	Sigma and Pi bonds – explanation by taking H2, O2 and N2 as examples. Fajan's rules of polarization and their explanation.	5	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 4. Amides
		14	Aromatic hydrocarbons: Nomenclature of benzene derivatives, Huckel's rule with respect to benzenoids, (benzene, naphthalene, anthracene and phenanthracene) and non-benzenoid compounds (cyclopentadienyl anion, cycloheptadienylcation) anti-aromaticity.		
		15	Principles of fractional distillation: Fractional distillation of type I, type II and type III liquid mixtures (with examples). Azeotropic mixtures (definition)		
	6	16	Revision of inorganic chemistry unit -1	6	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of
		17	Revision of organic chemistry unit -1		
		18	Revision of physical chemistry unit-1		

2					5. Amines
	7	19	Inorganic chemistry internal test	7	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 6. Halogenated hydrocarbons
		20	Organic chemistry internal test		
		21	Physical chemistry internal test		
2	8	22	Bond length, bond order, bond energy and their significance, polarity of covalent bonds, polar and non-polar molecules, Dipole moment and polarity of molecules to be explained by taking HCl, CO2, CCl4 and H2O as examples.	8	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 7. Hydrocarbons
		23	Aromatic electrophillic substitution – General mechanism, electronic interpretation of orientating influence of electron donating groups (-CH3, -Cl, -NH2 and -OH groups).		
		24	Binary mixtures of completely immiscible liquids (with examples), weight fraction of distillates (no derivation), principle of distillation, applications (numerical problem on weight fractions of components).		

3	9	25	Chemical bonding-II: Hybridization-directional property and geometry of sp, sp2 , sp3 - taking BeCl2, BF3, SiCl4.	9	Practical internals
		26	electron withdrawing groups (-NO2, - CHO, -COOH and –SO3H groups) on electrophillic substitution reactions.		
		27	Colligative Properties: Concept of vapour pressure, variation of vapour pressure with temperature. Definition of boiling point and freezing point, effect of dissolution of solute on the vapour pressure of the solvent.		
3	10	28	Hybridization-directional property and geometry of sp3 d and sp3 d 2 hybrid orbitals taking PCl5 and SF6 as examples respectively. VSEPR theory with SO2, NH3, H2O, SF4 and ClF3 as examples. Coordinate bond: Explanation with examples H3O + , NH4 + , NH3-BF3 molecule	10	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 8. Ketones
		29	Hydrogenation of aromatic compounds: Birch reduction, side chain oxidation of toluene to benzaldehyde and benzoic acid.		

		30	Lowering of vapour pressure. Raoult's law – relation between relative lowering of vapour pressure and molar mass (to be derived). Determination of relative molar mass of solute by dynamic method. Elevation of boiling point and its relation to lowering of vapour pressure and molar mass (to be derived).		
	11	31	Coordinate bond: Explanation with examples H3O +, NH4 + , NH3-BF3 molecule. Molecular Orbital Theory: An elementary account of MOT, linear combination of atomic orbitals (no mathematical approach). Bonding and antibonding molecular orbitals, conditions for the combination, energy levels of molecular orbitals.	11	Organic preparations: Recrystallisation and determination of melting point and its importance may be mentioned 1. Acetylation : Preparation of acetanilide from aniline.
		32	Resonating structures of benzene, naphthalene and anthracene. Diel's Alder reactions of anthracene with maleic anhydride.		
		33	Ebullioscopic constant of the solvent and its relation to the boiling point (only equation). Determination of molar mass of the solute by Walker-Lumsden method. Depression in freezing point and its relation to lowering of vapour pressure and molar mass (to be derived). Cryoscopic constant and its relation to the melting point (equation).		

3	12	34	Molecular orbital structures and bond orders of species like H2, He2, He2 + , N2, O2, HF, LiH, and CO, Prediction of magnetic properties of these species. Statistical treatment of results of quantitative analysis: Classification of errors, accuracy, precision, minimization of errors (calibration of apparatus, running of blank determination,	12	Organic preparations: Recrystallisation and determination of melting point and its importance may be mentioned - Oxidation: Preparation of benzoin acid from benzaldehyde
		35	Biphenyls: Preparation – Ullmann reaction. Alkenyl Benzenes: Cis and Trans stilbene and their preparation (any one method).		
		36	Cryoscopic constant and its relation to the melting point (equation). Determination of molar mass of a non-volatile solute by Beckmann's method (problems to be worked out). Semi permeable membrane – natural and artificial, preparation of copper ferrocyanide membrane by MorseFrazer method.		
	13	37	significant figures and computation, mean and standard deviation (explanation with an example), distribution of random errors (explanation with the help of curve), reliability of results (F-test and t-test).	13	Practice lab experiments
		38	Revision of syllabus		
		39	Definition of osmosis, osmotic pressure (mention application), determination of osmotic pressure by Berkley-Hartley's method, laws of osmotic pressure analogy with gas laws, determination of molar mass from osmotic pressure measurements (relation to be derived), isotonic solutions, plasmolysis.		

	14	40	Old question paper revision	14	Internal practical test (IA)
		41	Revision/ doubt discussion section. Assignment submission		
		42	Internal theory test (IA)		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. Second year

LESSON PLAN FOR THE SESSION 2016-17 (Odd Semester)

Name of the Faculty **:Dr. N Shankaresha ,**Premakumari A C,Manasa A K, Asha H D and Pavithra G S(Theory and Practical)

Semester **: 3rd**

Title of the Paper **:** CHEMISTRY (**Paper: III)**

Subject code **:**

Lesson Plan Duration **:** 14 weeks (from August, 2016 to October, 2016)

Total teaching period **: 42 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 05, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Metallic bond: Definition, factors favouring the formation of metallic bond, Band theory, explanation of electrical conductance of metals.	1	Introduction to lab – identification of components, chemicals and equipment used in laboratory.
		2	Organic halides: Alkyl halides: isomerism and classification, elimination reaction: dehydrohalogenation. Saytzeff and Hoffmann elimination with mechanism.		
		3	Polymers: Introduction, monomer, repeating units, types (linear, branches and network) with examples.		
		4	Insulators and Superconductors (explanation and applications with suitable examples).		Systematic semi-micro qualitative analysis of a mixture

1	2		Hydrogen bonding: Types of hydrogen bonding, conditions for the formation of H-bond.	2	of two simple salts Ca2+, Mg2+, Cl-, CO3 2-
		5	Nucleophilic substitution reaction. SN 1 and SN 2 with energy profile diagram.		
		6	classification (arrangement and shape) with examples, polymerization reaction (addition and condensation), molar masses of polymers – types (number average and mass average).		
	3	7	Hydrogen bonding in HF, H2O, NH3, alcohols, carboxylic acids and nitrophenols.	3	Salt number 2) Ca2+ , K+, Cl-, NO3 - ,
		8	Effect of nature of alkyl groups, nature of leaving groups, nucleophiles and solvents. [3 Hours.		
		9	determination of molar mass (viscosity and osmotic pressure method) (Numerical problems).		
1	4	10	Appropriate anomalous properties like physical state, boiling point and solubility. Structure of ice. Theories (or nature) of hydrogen bond (electrostatic approach, VBT and MOT treatments) .	4	Salt number 3) Mg2+, CO3 2-, NH4 +, Cl-.
		11	Aryl halides: Relative reactivity of alkyl, allyl halides towards nucleophilic substitution reactions.		
		12	Ionic equilibria: Ionic equilibria in aqueous solutions, strong and weak electrolytes – definition and examples. Ostwald's dilution law (to be derived) and its limitations (numerical problems).		
		13	Metal carbonyls: Definition, classification with examples, nature of M-CO bonding in		Salt number

2	5		carbonyls.	5	4) Sr 2+, SO4 2-, Zn2+, Cl-.
		14	Aryl halides: Relative reactivity of vinyl and aryl halides towards nucleophilic substitution reactions.		
		15	Activity and activity coefficients – definition and their relation. Mean ionic activity coefficients – ionic strength – determination and its calculation. Debye-Huckel theory of strong electrolytes (relaxation time effect, electrophoretic effect and viscous effect).		
2	6	16	Revision of inorganic chemistry unit -1	6	Salt number 5) Al3 +, NO3 - , Ba2+, Cl-.
		17	Revision of organic chemistry unit -1		
		18	Revision of physical chemistry unit-1		
	7	19	Inorganic chemistry internal test	7	Salt number 6) Al3 +, NO3 - , SO4 2-, Zn2+,
		20	Organic chemistry internal test		
		21	Physical chemistry internal test		
2	8	22	Preparation, properties and structures of mono nuclear and binuclear metal carbonyls- Ni(CO)4, Cr(CO)6, Fe(CO)5, Mn2(CO)10, Co2(CO)8	8	Salt number 7) CO3 2-, NH4 +, Cl-, Ca2+.
		23	Generation of benzyne-trapping with dienes (furan and anthracene).		
		24	Debye-Huckel-Onsagar equation (no derivation), Debye-Huckel Limiting equation for activity coefficients (no derivation). Solvent system concept of acids and bases. Role of solvents in altering strengths of acids and bases.		

3	9	25	Applications of EAN rule to mononuclear metalcarbonyls. Boron: Boron hydrates – diborane, preparation, structure and uses.	9	Practical internals
		26	Organometallic compounds: Definition with example, organo zinc compounds – preparation of diethyl zinc and its applications.		
		27	Solvent system concept of acids and bases. Role of solvents in altering strengths of acids and bases.		
3	10	28	Carbon: Fullerenes – production, structure of C60 and C70. Diamond, graphite – properties and structure. Silicon: Structure of silica. Silicates – types and structure with one example for each type.	10	Salt number 8) Na^+, Ba^{2+}, Br^-, SO_4^{2-}.
		29	Organolithium Compounds: Preparation and synthetic applications.		
		30	Hydrolysis of salts – derivation of hydrolysis constant and degree of hydrolysis of the salt of weak acid and weak base (ammonium acetate), effect of temperature on degree of hydrolysis.		
	11	31	Nitrogen: Preparation, properties, structure and applications of hydrazine, hydroxyl amine and nitrogen trichloride.	11	Salt number 9) Zn^{2+}, Ba^{2+}, Br^-, CO_3^{2-}.

		32	Alcohols: Definition and classification. Monohydric alcohols: Preparation of alcohols by hydroboration and oxidation method. Hydration of alkenes.		
		33	Distribution Law: Nernst distribution law in liquid-liquid systems, distribution coefficient		

3	12	34	Sulphur: Preparation, properties, structures and applications of thionyl chloride, sulphuryl chloride and SF6.	12	Give reason and problems related to inorganic analysis.
		35	Distinction tests between 1°, 2°, and 3° alcohols by Victor Meyer oxidation method. Conversion of 1° to 2°, 2° to 3° and 1° to 3° alcohols. Dehydration of 1°, 2°, 3° alcohols and comparison of their rates.		
		36	Nernst distribution law – verification of distribution law taking distribution of I2 in H2O and CCl4 – limitations of the law, conditions for the validity of distribution law.		
	13	37	Halogens: Bleaching powder – preparation, properties and structure. Pseudo halogens: Preparation, properties and structure of cyanogen and thiocyanogen (any one method of preparation and any three properties to be discussed).	13	Practice lab experiments revision.
		38	Dihydric alcohols: Glycol – preparation from vicinal dihalides and uses. Pinacoles – synthesis, mechanism of pinacol-pinacolone rearrangement		
		39	association of the solute in one of the solvents, dissociation of the solute in one of the solvents, application of distribution law with respect to solvent extraction process (numerical problems)		
	14	40	Old question paper revision	14	Internal practical test (IA)
		41	Revision/ doubt discussion section. Assignment submission		
		42	Internal theory test (IA)		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. Second year

LESSON PLAN FOR THE SESSION 2016-17 (Even Semester)

Name of the Faculty **: Dr. N Shankaresha ,**Premakumari A C,Manasa A K Asha H D and Pavithra G S(Theory and Practical)

Semester **: 4th**

Title of the Paper **:** CHEMISTRY (**Paper: IV)**

Subject code **:**

Lesson Plan Duration **:** 14 weeks (from December, 2016 to April, 2017)

Total teaching period **: 42 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 05, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
1	1	1	Noble gases: Isolation from air by Rayleigh's method, preparation, separation of Noble gases-Dewar's method.	1	Introduction to lab – identification of components, chemicals and equipment used in laboratory.
		2	Ethers: Nomenclature, Williamson ether synthesis, reactions – cleavage and auto-oxidation-Ziesel's method.		
		3	Second law of thermodynamics: Limitations of First Law of Thermodynamics – need for II Law of thermodynamics, spontaneous, non-spontaneous and equilibrium processes (definitions and examples for each).		
		4	Preparation, Structure and applications of compounds of Xenon and Krypton (XeF2, XeOF2, XeO3, KrF2, KrF4, KrO3 XH2O-one method of		Determination of the density using specific gravity bottle and viscosity of a liquid using Ostwald's

	2		preparation for each	2	viscometer.
		5	Epoxides: Synthesis by Darzen's method. Acid and base catalyzed opening of epoxides.		
		6	different ways of stating II Law, heat engine (example) Carnot cycle, efficiency of Carnot cycle (derivation).		
	3	7	Clathrates (explanation with suitable examples, essential conditions for the formation and uses).	3	Determination of the density using specific gravity bottle and surface tension of a liquid using stalagmometer.
		8	Crown ethers: Introduction with examples.		
		9	concept of entropy – definition and physical significances of entropy – criteria of spontaneity in terms of entropy change, statements of II law in terms of entropy (numerical problems to be worked out on entropy and efficiency of Carnot engine).		
1	4	10	Non-aqueous solvents: Liquid ammonia-reasons for the solvent properties, typical reactions-solubility of alkali metals; acid-base.	4	Determination of molecular mass of a non-volatile solute by Walker-Lumsden method.
		11	Carbonyl Compounds: Distinction between aldehydes and ketones – oxidation and reduction method. Addition of alcohols- formation of hemiacetal and acetal.		
		12	Free energy: Helmholtz and Gibb's free energy – their definitions and their relationship, Gibb's – Helmholtz equation at constant pressure and volume (derivations), thermodynamic criteria of equilibrium and spontaneity, variation of free energy with temperature and pressure, Claussius – Clappeyron equation (differential form to be derived)		

2	5	13	precipitation, ammonolysis, Ionization of weak acids, advantages and disadvantages. Liquid SO2-reasons for the solvent properties, typical reactions-acid-base, solvolysis, precipitation, amphoteric and redox.	5	Determination of rate constant of the decomposition of hydrogen peroxide catalyzed by FeCl3.
		14	Condensation with NH2OH and 2,4-DNP. Mechanism of aldol condensation.		
		15	integrated form of Claussius – Clappeyron equation (to be assumed) and its applications (enthalpy of vapourization, boiling point and freezing point at different temperatures), (numerical problems on these applications), Van't Hoff's reaction isotherms and isochore equations (to be derived).		
2	6	16	Revision of inorganic chemistry unit -1	6	Determination of transition temperature of the salt hydrates.
		17	Revision of organic chemistry unit -1		
		18	Revision of physical chemistry unit-1		
	7	19	Inorganic chemistry internal test	7	Determination of percentage composition of sodium chloride solution by determining the miscibility temperature of phenol - water system
		20	Organic chemistry internal test		
		21	Physical chemistry internal test		
2	8	22	HSAB: Classification of acids and bases as Hard and Soft. Pearson's HSAB concept, acid-base strength, hardness and softness, symbiosis.		Determination of the mass present in the given solution of a strong acid using strong base by

		23	Perkins reaction, Cannizzaro reaction, Claisen condensation, Knovenagel reaction.	8	thermometric titration method.
		24	Elementary Quantum Mechanics: black body radiation – Planck's Law, Photoelectric effect, Compton effect.		
3	9	25	Nuclear chemistry: Fundamental particles of nucleus- nucleons, isotopes, isobars and isotones (definition with suitable examples), Nuclear forces (brief explanation).	9	Practical internals
		26	Carboxylic acids: Definition, classification with examples. Synthesis by Arndt-Eistert reaction, resonance structure of carboxylate ion and its stability.		
		27	Schrodinger's wave equation (no derivation) and its importance, physical interpretation of wave function.		
3	10	28	Nuclear stability-n/p ratio, Mass defect, Binding energy, Inner structure of nucleus- Liquid drop model, Nuclear fission- (definition with suitable examples).	10	Determination of molecular weight of a polymer material by viscosity measurements (cellulose acetate/methyl acrylate).
		29	Effect of substituents on acidity of aliphatic and aromatic carboxylic acids. Hydroxy acids: Synthesis of lactic, citric and tartaric acids.		

		30	Particle in one dimensional box (no derivation), Hamiltonian operator.		
	11	31	Plutonium as a fissionable material (Plutonium bomb), nuclear fusion and its advantages over nuclear fission reactions, hydrogen bomb, nuclear transmutation-artificial radioactivity.	11	Study of kinetics of reaction between K2S2O8 and KI, second order, determination of rate constant.
		32	Effect of heat on α, β, γ-hydroxy acids. Amines: Definition, classification with example.		
		33	Physical Properties and chemical constitution: Additive and constitutive properties, properties of liquids – viscosity, definition of coefficient of viscosity, factors affecting viscosity – temperature, size, weight, shape of molecule		

3	12	34	Detection and measurement of radioactivity – G. M. counter. Cyclotron, Nuclear reactor, Breeder reactor, Q values of nuclear reactions.	12	Determination of rate constant of saponification of ethyl acetate titrimetrically.
		35	Separation of amine mixture by Hinsberg's method using toluene sulphonyl chloride. Distinction tests for 1°, 2°, 3° amines (acetylation and Hoffmann's exhaustive methylation. Action of nitric acid on different amines. Both aliphatic and aromatic 1°, 2°, 3° amines, basicity of amines, effect of substituents on basicity of aliphatic and aromatic amines.		
		36	Parachor: Definition – Sugden equation, calculation of parachor and its application with respect to structural elucidation of benzene and quinone.		
	13	37	Uses of radio isotopes – tracer technique, agriculture, medicine, food preservation and dating (explanation). Separation of uranium isotopes – Laser irradiation method (atomic and molecular routes).	13	Practice lab experiments revision.
		38	Hoffmann-Martius rearrangement. Diazonium Compounds: preparation, mechanism of preparation and synthetic applications of benzene diazonium chloride. Conversion to phenol, halobenzene, phenyl hydrazine and coupling reaction.		
		39	numerical problems based on surface tension, viscosity and parachor applications.		
	14	40	Old question paper revision	14	Internal practical test (IA)
		41	Revision/ doubt discussion section. Assignment submission		
		42	Internal theory test (IA)		

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2016-17 (Even Semester)

Name of the Faculty **: Dr. N Shankaresha ,**Premakumari A C,Manasa A K Asha H D and Pavithra G S(Theory and Practical)

Semester **:** 6th

Title of the Paper **: Inorganic chemistry(Paper: VIII)**

Subject code **:**

LessonPlan Duration **:** 14weeks (from December, 2016 to April, 2017)

Total teaching period **: 28Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 05, Practical – 00

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Inorganic polymers: Definition – examples, general properties, comparison with organic polymers, glass transition temperature		
		2	Silicones: Definition, nomenclature, preparation (linear, cross-linked and cyclic). Factors affecting the nature of silicon polymers, properties (chemical and thermal stabilities, chemical properties)		
		3	uses of silicon polymers, silicon fluids/oils – uses, silicon elastomers – rubbers, silicon		

1&2	2		resins (preparation and uses)		
		4	Phosphazenes: Definition, types, structures, preparation, properties and uses. Crystalline polymetaphosphates – Maddrell's and Kuroll's salts – properties and uses.		
	3	5	Nature of bonding in phosphazenes. Fluorocarbons: Definition, examples, preparation, properties and uses of Freon-12, Freon-22, PTFE and poly per fluorovinyl chloride.		
		6	Abrasives: Definition, classification with examples – hardness, manufacture and applications of carborundum, alundum and tungsten carbide.		
	4	7	Refractories: Definition, properties, classification with examples. Different steps involved in the manufacture of refractories. Applications of refractories.		
		8	Explosives: Definition, classification with examples, characteristics of explosives. Preparation and uses of dynamite, cordite and RDX.		
	5	9	Paints: Constituents and their functions, manufacture of lithopone and titanium dioxide.		
		10	Fuels: Definition, classification with examples – characteristics, calorific value, determination of calorific value of a solid or liquid fuel.		
		11	Applications of gaseous fuels. Compressed natural gas, water gas, producer gas and LPG – their production, composition and		

3&4	6		applications		
		12	Propellants: Definition, characteristics, classification and applications.		
	7	13	Inorganic chemistry internal test		
		14	Inorganic chemistry internal test		
5	8	15	Fertilizers: Definition and classification, manufacture of nitrogeneous fertilizers – CAN and urea. Phosphatic fertilizers – calcium dihydrogen phosphate, NPK type fertilizers.		
		16	Metallurgy: Types of metallurgy: Pyrometallurgy: Extraction of Nickel from sulphide ore – general metallurgy followed by Mond's process (purification).		
	9	17	manganese from oxide ores – reduction by the Aluminothermite process – refining by electrolytic process.		
		18	Hydrometallurgy: Extraction of gold from native ore by cyanide process and refining by quartation process.		
	10	19	Electrometallurgy: Extraction of lithium by fusion method followed by electrolysis of lithium chloride.		

5		20	Powder metallurgy: Importance, metal powder production and applications, production of tungsten powder.		
	11	21	Extraction of (1) Thorium from monazite sand – purification by iodine method, (2) uranium from pitch blende – production of U3O8 by carbonate method.		
		22	U3O8 to UO2 by reduction, UO2 to U by fluoride method.		

6	12	23	Nanotechnology: Definition, uses and nature of nanotechnology, Nanomaterials-definition, properties and applications		
		24	Carbon nanotubes- definition, types, methods of preparation (mention).		
	13	25	properties and industrial applications of carbon nanotubes.		

		26	Nanowires-definition, types.		
	14	27	production of crystalline nanowires by vapour-liquid-solid synthesis method, applications of nanowires.		
		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2016-17 (Even Semester)

Name of the Faculty **: Dr. N Shankaresha ,**Premakumari A C,Manasa A K Asha H D and Pavithra G S(Theory and Practical)

Semester **:** 6th

Title of the Paper **: Organic chemistry(Paper: IX)**

Subject code **:**

Lesson **Plan Duration : 14 weeks (from December , 2016 to April, 2017)**

Total teaching period : 28 Hrs

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 05, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
1&2	1	1	Hetrocyclic Compounds: Definition, classification with examples, synthesis of furan, thiophene,	1	Introduction of organic chemistry experiments
		2	pyrrole, pyridine, indole (Fischer method) quinoline (Skrup's synthesis with mechanism), isoquinoline, pyrimidine (one method each),		
	2	3	Uric acid: Elucidation of structure and synthesis by Fischer's method, conversion of uric acid to purine and caffeine	2	Separation of p- and o-nitroaniline by TLC method (Solvent extraction)
		4	Alkaloids: Definition, classification based on heterocyclic rings-isolation		
	3	5	synthesis and structural elucidation of nicotine and morphine, physiological importance of alkaloids.	3	Separation of p- and o-nitroaniline by column chromatography
		6	Vitamins: Definition, classification, structural elucidation and synthesis of Vit-A, Synthesis of Vit-C		
	4	7	structural formulae of Vit B1, B2, B6, calciferol, E and K and their importance.		Estimation of glucose by Fehling solution method

		8	Hormones: Definition, classification, synthesis of adrenaline, thyroxine, structural formulae of estradiol, progesterone and testosterone and their importance.	4	
	5	9	Drugs: Chemotherapy and chemotherapeutic agents, definition of drugs, types of drugs, antipyretics, analgesics, anesthetics.	5	Estimation of Phenol by acetylation method.
		10	sedatives, narcotics, antiseptics, antibacterials, antibiotics, antimalarials and sulpha drugs with examples.		
3&4	6	11	Synthesis of paracetamol, sulphanilamide, sulphaguanidine.	6	Estimation of ascorbic acid by iodometric method.
		12	Special techniques in organic synthesis: a) Polymer supported reagents – introduction, properties of polymer support-advantages of polymer support reagents, choice of polymers, types and applications.		
	7	13	Organic chemistry internal test	7	Determination of Iodine value of oils by chloromine-T.
		14	Organic chemistry internal test		

5	8	15	Phase transfer catalysis – introduction, definition, types, preparation, mechanism and advantages.	8	Isolation of Caffeine from tea powder
		16	c) Microwave induced organic synthesis – introduction, reaction vessel, reaction medium, advantages, limitations, precaution and applications		
	9	17	Sonochemistry – use of ultra sound in organic synthesis, introduction, instrumentation, physical aspects, types and applications.	9	Estimation of neutral amino acids by titrametric method.
		18	Amino acids: Structure of α-amino acids, peptide bond, protecting groups-Boc, Z, F-moc groups, use of HOBt and HOAt.		
5	10	19	Spectroscopy of organic compounds: UV-visible spectroscopy: Introduction, chromophores and auxo chrome, blue shift and red shift.	10	Organic chemistry practical test
		20	representation of spectra of 1,3-butadiene, benzene and lycopene. Influence of conjugation on UV absorption-comparison of UV spectra of acetone and methylvinyl ketone.		
	11	21	IR-Spectroscopy: Introduction, stretching frequency of –OH (free and H-bonded), alkyl –C-H, C=C,	11	Estimation of carboxylic acid by titrametric method.

			C=C, C-C, C=O and C-O groups (by taking suitable examples).		
		22	Graphical representation of IR spectra of benzoic acid and methyl benzoate		

6	12	23	NMR Spectroscopy: Basic principles of proton magnetic resonance , nuclear magnetic spin quantum number I, influence of the magnetic field on the spin of nuclei	12	Estimation of –NH2 group by acetylation method.
		24	spin population, saturation using radio frequency, nuclear magnetic resonance-chemical shift (δ value), uses of TMS reference		
	13	25	Nuclear shielding effects, equivalent and non-equivalent protons, spin-spin splitting and coupling.	13	Determination of saponification value of oils.
		26	Applications of NMR spectroscopy to simple organic molecules (like ethyl alcohol, ethane, propane, ethylene, methylamine.		

	14	27	Aniline, benzene, toluene, acetone, acetophenone, methyl cyanide and other simple molecules.	14	Revision of experiments
		28	Revision of syllabus		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2016-17 (Even Semester)

Name of the Faculty **: Dr. N Shankaresha ,**Premakumari A C,Manasa A K Asha H D and Pavithra G S(Theory and Practical)

Semester **:** 6th

Title of the Paper **: Physical chemistry(Paper: X)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from December , 2016 to April, 2017)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 05, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture	Topic including	Practical	Topic

		Day	Assignment/Test	Day	
1&2	1	1	Electrochemistry-I: Introduction, conductance – specific conductance, equivalent conductance and molar conductance – their definitions and SI units.	1	Introduction of laboratory physical chemistry equipments.
		2	Conductance cell and cell constant. Determination of equivalent conductance by meter – bridge method, ionic mobility, ionic conductance, Kohlrausch's law and its significance – determination of equivalent conductance at infinite dilution for weak electrolyte.		
	2	3	Transport number: Definition and explanation, anomalous transport number – explanation with examples – relationship between ionic conductance and transport number (to be derived)	2	Determination of equivalent conductance of the given electrolyte (strong and weak) by using Meter Bridge.
		4	determination of transport number by moving boundary method – transport number of H+ using CdCl2 as supporting electrolyte (numerical problems on equivalent conductance, transport numbers and kohlrausch's law).		
	3	5	Application of conductance measurements – (a) solubility and solubility product of sparingly soluble salt, (b) ionic product of water.	3	Determination of solubility of sparingly soluble salt (like BaSO4) by conductometric method
		6	degree of ionization of weak electrolyte. Numerical problems for the applications of a, b and c to be worked out.		
	4	7	Conductometric titration: strong acid vs strong base, weak acid vs strong base, strong acid vs weak base, weak acid vs weak base,	4	Determination of solubility of sparingly soluble salt (like BaSO4) by

			with suitable examples for each.		conductometric method.
		8	Electromotive force-I: Electrolytic and electrochemical cells, electrode reaction of Daniel cell, single electrode potential.		
	5	9	sign of electrode potential-convention (reduction potential to be adopted), convention of representing a cell, EMF and standard EMF of a cell, cell reaction, reversible and irreversible cells,	5	Determination of rate constant of saponification of ethyl acetate by conductivity measurements
		10	Nernst equation (to be derived) and calculation of electrode potential, standard hydrogen gas electrode, reference electrodes-calomel.		
3&4	6	11	Ag-AgCl electrode-construction and working, electrochemical series and its significance, equilibrium constant and free energy of cell reaction, spontaneity of a cell reaction.	6	Conductometric titration of strong acid and strong base and weak acid and strong base.
		12	EMF of concentration cells: Definition with explanation – with transference and without transference, concentration cells – with examples.		
	7	13	Physical chemistry internal test	7	Determination of percentage composition of a given mixture containing two miscible liquids by Abbe's refractometer.
		14	Physical chemistry internal test		
	8	15	Liquid junction potential and salt bridge. (Numerical problems on Nernst equation and EMF calculations).	8	pH titration of strong acid against strong base (by observing change in pH).

5		16	Fuel cells: Working of H2-O2 fuel cell and its importance.		
	9	17	Electromotive force-II Application of EMF measurements: (a) Determination of pH of a solution using quinhydrone electrode.	9	Laboratory internals
		18	Glass electrode (using dip type Calomel electrode) – Explanation with principle and procedure.		
5	10	19	Potentiometric titration – principle, location of end points in - (1) Neutralization reactions [NaOHVsHCl] (2) Oxidation-reduction reactions [K2Cr2O7 Vs FAS]		
		20	Precipitation reaction [KClVs AgNO3] and (4) Complexometric reactions (ZnSO4 Vs K3[Fe(CN)6])		
	11	21	Chemical Kinetics: Introduction – differential and integrated rate equations for second order kinetics, derivation of second order rate equation when a=b and a≠b.	10	Potentiometric titration of mixture of HCl and CH3COOH using NaOH solution.

		22	unit of rate constant, half-life period, experimental verification of second order reactions – study of kinetics of saponificaiton of an ester.		

6	12	23	Determination of the order of reaction – differential, time for half-change method and isolation method. Experimental methods of chemical kinetics.	11	Colorimeteric estimation of Fe3+ ion using ammonium thiocyanate as complexing agent.
		24	conductometric – example - saponification of esters. Potentiometric - example – kinetics of bromination of N,N-di-methyl aniline and spectrophotometric – example – colorimetric study of kinetics of oxidation of Indigocarmine by chloramine-T.		
	13	25	Application of kinetic studies: Arriving at the mechanism of urea formation from ammonium cyanate.	12	Colorimeteric estimation of Cu2+ ion using NH4OH as complexing agent.
		26	Phase equilibria: Gibb's phase rule – definition of the terms with examples, application to one component system (water system).		
	14	27	Reduced phase rule – statement, reduced systems, two component system – simple eutectic type KI-water system, freezing mixtures, Pb-Ag system (desilverization of argentiferrous lead)	13	Revision of experiments

		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2016-17(Odd Semester)

Name of the Faculty **: Dr. N Shankaresha ,**Premakumari A C,Manasa A K Asha H D and Pavithra G S(Theory and Practical)

Semester **:** 5th

Title of the Paper **: Inorganic chemistry(Paper: V)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2016 to October, 2016)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 05, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
		1	Chemistry of transition elements: Position in the periodic table, electronic configuration, general characteristics- atomic and ionic radii.		Introduction of laboratory equipments.

1&2	1	2	ionization energy, variable oxidation states, spectral properties, redox potentials, colour and magnetic properties,	1	
	2	3	catalytic activity, complex formation and interstitial compounds formation (3d, 4d and 5d series). Chemistry of inner transition elements: Electronic configuration and position in the periodic table,	2	Gravimetric estimation of barium as barium sulphate.
		4	oxidation states, spectral properties, colour and magnetic properties, complex formation sand ionic radii.		
	3	5	lanthanide contraction – cause and its consequences. General survey of actinides – comparison with lanthanides, transuranic elements.	3	Gravimetric estimation of iron as iron (III) oxide
		6	Ion-exchange: Introduction, action of ion exchange resins – cation exchange and anion exchange resins.		
	4	7	Exchange of inorganic ions, ion exchange capacity, separation of lanthanides by ion- exchange method.	4	Gravimetric estimation of copper as copper (I) thiocyanate.
		8	Gravimetry: Introduction to gravimetric analysis – precipitation methods (various steps involved to be discussed), advantages of gravimetric analysis		
		9	purity of the precipitates, co-		Gravimetric estimation of nickel as

	5		precipitation and postprecipitation, conditions of precipitation, precipitation from homogeneous solution (hydroxides and sulphates)	5	nickel dimethylglyoximate
		10	washing and ignition of precipitate (general discussion only). Electro-gravimetric analysis estimation of copper.		
3&4	6	11	Organic precipitants: Advantages of organic precipitants over inorganic precipitants, DMG, 8-hydroxy quinoline (Oxine)	6	Gravimetric estimation of magnesium as magnesium -8-hydroxy oxinate.
		12	1,10-phenanthroline and EDTA. Structure of Ni2+ -DMG and Mg2+ -oxine complexes.		
	7	13	Inorganic chemistry internal test	7	Gravimetric estimation of sulphate as barium sulphate
		14	Inorganic chemistry internal test		
5	8	15	Coordination Chemistry: Ligands, classification of ligands and chelation, nomenclature of co-ordination compounds.	8	Gravimetric estimation of aluminum as aluminum oxide.
		16	physical methods in the study of complexes – change in conductance, colour and pH.		
		17	Stability of complexes – stability constant, a brief outline of thermodynamic stability of metal complexes.		Laboratory internals

	9	18	Factors affecting the stability of complexes. Polynuclear complexes, inner metallic complexes.	9	
5	10	19	Isomerism in co-ordination complexes: Stereo-isomerism – Geometrical and optical isomerism exhibited by co-ordination compounds of co-ordination number 4 and 6.		
		20	Metal-ligand bonding in transition metal complexes: Valence bond theory: Salient features, formation of octahedral complexes on the basis of VBT, outer and inner orbital octahedral complexes- [Fe(CN)6] 4- .		
	11	21	Formation of octahedral complexes on the basis of VBT [Fe(CN)6] 3- , [Co(CN)6] 3- , [CoF6] 3- [Cr(H2O)6] 3+ and [Fe(H2O)6] 2+	10	Gravimetric estimation of zinc as zinc oxide
		22	Formation of tetrahedral and square planner complexes on the basis of VBT – [Ni(CN)4] 2- , [Cu(NH3)]2+, [Zn(NH3)4] 2+and [Ni(CO)4], limitations of VBT.		

	12	23	Crystal field theory: Important features of crystal field theory, crystal field splitting of d-orbitals in tetrahedral, octahedral and square		Gravimetric estimation of calcium as calcium oxide.

6			planar complexes,	11	
		24	crystal field stabilization energy (CFSE), factors affecting the magnitude of Δo, (nature of ligand, oxidation state of the metal ion, size of the orbitals, geometry of the complex), high spin (HS) and low spin (LS) complexes		
	13	25	magnetic properties of metal complexes based on crystal field theory-[Co(NH3)6] 3+, [CoF6] 3- , [Fe(CN)6] 4- , [Fe(CN)6] 3- and [Ni(CN)4] 2- .	12	Paper chromatographic separation of Fe3+ and Ni2+ ions
		26	Magnetic susceptibility, measurement of magnetic moment by Gouy's method. Limitations of CFT. Ligand field theory: Evidences for metal ligand covalent bonding in complexes.		
	14	27	Bio-inorganic chemistry: Essential and trace elements in biological process, metalloporphyrins with special reference to haemoglobin and myoglobin, biological role of alkali and alkaline earth metal ions with respect to Na+ and Ca2+ ions.	13	Revision of experiments
		28	Revision of syllabus		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2016-17 (Odd Semester)

Name of the Faculty **: Dr. N Shankaresha ,**Premakumari A C,Manasa A K Asha H D and Pavithra G S(Theory and Practical)

Semester **:** 5th

Title of the Paper **: Organic chemistry(Paper: VI)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2016 to October, 2017)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 05, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
1&2	1	1	Carbohydrates: Definition and importance, classification based on composition with examples-reducing and non-reducing sugars.	1	Introduction of laboratory equipments.
		2	Monosaccharides: Glucose: reactions of glucose (with H2N-OH, HCN, C6H5NHNH2, Br2 water, Conc. HNO3, reductions with HI/red P , methanols, (dry HCl), acetic anhydride and reduction reactions.		
	2	3	Structural elucidation of glucose: Open chain structure, configuration, drawbacks of open chain structure, ring structure – Fisher and Haworth structure. Determination of ring size by methylation method. Fischer and Haworth structures of fructose, galactose and mannose.	2	Gravimetric estimation of barium as barium sulphate.

		4	Conversion reactions – 1. Ascending (Kiliani's synthesis) 2. Descending (Wohl's degradation) 3. Aldose to ketose 4. Ketose to Aldose 5. Epimerisation		
	3	5	Disaccharides: Structural elucidation of sucrose, structural formulae of maltose and lactose (Haworth structure). Polysaccharides: Partial structural formulae of starch, cellulose, glycogen and their uses.	3	Gravimetric estimation of iron as iron (III) oxide
		6	Stereochemistry: Introduction, definition, elements of symmetry (plane, centre, simple axes and alternative axes), asymmetry and dissymmetry, Chirality		
	4	7	Designation of configuration – R-S notation. Optical activity – explanation – cause of optical activity (non-super impossibility). Enantiomers and diastereomers optical isomerism in tartaric acid and biphenyls.	4	Gravimetric estimation of copper as copper (I) thiocyanate.
		8	Racemisation, resolution, methods of resolution (Chemical and biochemical methods) Walden inversion, asymmetric synthesis (partial and absolute).		
	5	9	Geometrical isomerism: Definition with example, designation of cis-trans and E-Z notations with examples. Geometrical isomerization of aldoximes and ketoximes, Beckmann rearrangement	5	Gravimetric estimation of nickel as nickel dimethylglyoximate

		10	Green Chemistry: Purpose, principles to be followed for green chemistry. Synthesis of acetamide, ibuprofen.		
3&4	6	11	Green Chemistry: Purpose, principles to be followed for green chemistry. Synthesis of acetamide, ibuprofen.	6	Gravimetric estimation of magnesium as magnesium -8-hydroxy oxinate.
		12	Synthesis of benzoin, benzylic acid and para-bromo acetanilide.		
	7	13	Organic chemistry internal test	7	Gravimetric estimation of sulphate as barium sulphate
		14	Organic chemistry internal test		
5	8	15	Active methylene compounds: Definition, ethyl acetoacetate, preparation and keto-enoltautomerism in ethyl acetoacetate-its evidence.	8	Gravimetric estimation of aluminum as aluminum oxide.
		16	Synthetic applications: Acid hydrolysis, ketonic hydrolysis, mono carboxylic acids, dicarboxylicacidssuccinic acid		
		17	Synthetic applications: adipic acid, antipyrine, uracil, acetyl acetone, crotonic acid and cinnamic acid.		Laboratory internals

	9	18	Synthetic Polymers: Definition, vehicle, fixative, odorous substances. Classification, synthesis of 1. Methyl anthranilate	9	
5	10	19	synthesis of 2. Phenyl alcohol 3. Linalool 4. Mask ketone 5. α and β-Ionones, Vanillin.	10	Experiments revision
		20	Formation of tetrahedral and square planner complexes on the basis of VBT – [Ni(CN)4] 2-		
	11	21	Formation of octahedral complexes on the basis of VBT [Fe(CN)6] 3- , [Co(CN)6] 3- , [CoF6] 3- [Cr(H2O)6] 3+ and [Fe(H2O)6] 2+	11	Gravimetric estimation of zinc as zinc oxide
		22	Formation of tetrahedral and square planner complexes on the basis of VBT – , [Cu(NH3)]2+, [Zn(NH3)4] 2+and [Ni(CO)4], limitations of VBT.		

	12	23	Crystal field theory: Important features of crystal field theory, crystal field splitting of d-orbitals in tetrahedral, octahedral and square planar complexes,	12	Gravimetric estimation of calcium as calcium oxide.

6		24	crystal field stabilization energy (CFSE), factors affecting the magnitude of Δo, (nature of ligand, oxidation state of the metal ion, size of the orbitals, geometry of the complex), high spin (HS) and low spin (LS) complexes		
	13	25	magnetic properties of metal complexes based on crystal field theory-[Co(NH3)6] 3+, [CoF6] 3- , [Fe(CN)6] 4- , [Fe(CN)6] 3- and [Ni(CN)4] 2- .	13	Paper chromatographic separation of Fe3+ and Ni2+ ions
		26	Magnetic susceptibility, measurement of magnetic moment by Gouy's method. Limitations of CFT. Ligand field theory: Evidences for metal ligand covalent bonding in complexes.		
	14	27	Bio-inorganic chemistry: Essential and trace elements in biological process, metalloporphyrins with special reference to haemoglobin and myoglobin, biological role of alkali and alkaline earth metal ions with respect to Na+ and Ca2+ ions.	14	Revision of experiments
		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE HOLENARASIPURA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2016-17 (Odd Semester)

Name of the Faculty **: Dr. N Shankaresha ,**Premakumari A C,Manasa A K Asha H D and Pavithra G S(Theory and Practical)

Semester **:** 5th

Title of the Paper **: Physical chemistry(Paper: VII)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2016 to October, 2017)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 05, Practical – 00

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Crystallography: Elements of symmetry – plane, axis and centre, elements of symmetry in cubic crystals, law of rational indices – Weiss and Miller indices, lattice planes in cubic crystals.		
		2	Crystal lattice and unit cell, types of Lattice – Bravais lattices, X-Ray diffraction and Bragg's Law (to be derived).		
		3	determination of crystal structure of rock salt by rotating crystal method using Bragg's		

1&2	2		spectrometer.		
		4	application of X-ray studies – distance between lattice planes, density of crystals, determination of Avogadro Number.		
	3	5	(numerical problems on applications).		
		6	Liquid Crystals: Defination, classification of thermotropic liquid crystals into smectic and nematic with examples-molecular arrangement of these and their uses.		
	4	7	Spectrophotometry and photochemistry: Lambert – Beer's law – statement and mathematical form (to be derived).		
		8	Molar extinction coefficient – definition – spectrophotometer – construction and working, its application.		
	5	9	Laws of photochemistry – Grotthus-Draper law of photochemical activation and Einstein's law of photochemical equivalence.		
		10	quantum efficiency, reasons for low quantum yield (HBr formation as example) and high quantum yield (HCl formation as example).		

3&4	6	11	Aactinometry – Uranyl oxalate actinometer. Photophysical processes: Definition with examples – photosensitization (eg. photosynthesis in plants),		
		12	photo inhibition, fluorescence, phosphorescence, chemiluminescence and bioluminescence with examples.		
	7	13	Organic chemistry internal test		
		14	Organic chemistry internal test		
5	8	15	Determination of absorbed intensity – schematic diagram of apparatus used. Detectors – thermopile, photoelectric cell and actinometer (Uranyl oxalate).		
		16	Radiation Chemistry: Definition, primary and secondary stages in radiochemical reactions, ionic yield, energy yield, comparison with photochemistry.		
		17	units of radiation – rad, gray and roentgen, Dosimeter – Fricke dosimeter, theories of radiolysis – Lind’s and EHT theories.		

	9	18	Radiolysis of water vapour, benzene and acetic acid.		
5	10	19	Molecular Spectroscopy: Regions of spectra, types of spectra, microwave spectra – rotational spectra of diatomic molecules, moment of inertia (expression to be derived).		
		20	Expression for rotational energy, selection rule and transition, calculation of bond length.		
	11	21	IR Spectra – vibrational spectra of diatomic molecules – force constant (no derivation), expression for vibrational energy.		
		22	zero point energy, selection rule and transitions. Vibrational modes of polyatomic molecules taking H2O and CO2 molecules as examples. Applications of IR spectroscopy (mention).		

6	12	23	NMR Spectroscopy: Introduction – spin number, chemical shift, instrumentation.		
		24	NMR spectra of ethyl alcohol – low and high resolution, applications (mention).		
	13	25	Raman Spectra: Concept of polarizability, pure rotation, vibration (qualitative study) stoke's and antistoke's lines, selection rule, applications (mention).		
		26	Electronic Spectra: Potential energy curves for bonding and antibonding molecular orbitals, band theory, electronic transitions.		
	14	27	Qualitative description of non-bonding orbitals and transition between them. Selection rule and Franck Condon principle.		
		28	Revision of syllabus		

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SRI ADICHUNCHANA FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. First year (CBCS)

LESSON PLAN FOR THE SESSION 2019-20 (Odd Semester)

Name of the Faculty **:**Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Manasa A K , Asha H D, Meghana R C and Hithashree (Theory and Practical)

Semester **:1st**

Title of the Paper **:** CHEMISTRY –I (DSC-2A)

Subject code **: A24-1**

Lesson Plan Duration **:** 16 weeks (from July, 2019 to October, 2019)

Total teaching period **: 60 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 07, Practical – 04

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Atomic Structure: Review of Bohr's theory and its limitations, dual behaviour of matter and radiation.	1	Introduction to laboratory experiments.
		2	Basic Concepts in Organic Chemistry: Bond cleavage, reactive intermediates, Generation, stability and reactions involving carbocations.		
		3	Indicators: Definition, types (acid-base, redox, adsorption indicators), examples for each type.		
		4	Purification of compounds: Crystallisation, fractional crystallization.		

A	2	5	Heisenberg's uncertainty principle. Hydrogen atomic spectra. Need of a new approach to Atomic structure.	2	Acidimetry/Alkalimetry Titrations Preparation of standard sodium carbonate solution and standardization of hydrochloric acid solution (methyl orange indicator). Estimation of sodium hydroxide present in the solution using phenolphthalein indicator.
		6	Basic Concepts in Organic Chemistry: Bond cleavage, reactive intermediates, Generation, stability and reactions involving carbanions, free radicals.		
		7	Theory of indicators – Oswald's theory and Quinonoid theory – indicator constant – action of phenolphthalein and methyl orange in acid-base solutions.		
		8	Distillation, steam distillation, fractional distillation.		
	3	9	Elements of Quantum chemistry- Schrodinger wave equation and meaning of various terms in it. Significance of ψ and ψ 2.	3	Preparation of standard oxalic acid solution and standardization of sodium hydroxide solution. Estimation of sulphuric acid present in the solution.
		10	Basic Concepts in Organic Chemistry: Bond cleavage, reactive intermediates, Generation, stability and reactions involving nitrenes and carbenes.		
		11	pH titration curves for strong acid vs strong base, weak acid vs strong base.		
		12	Distillation under reduced pressure, sublimation techniques with suitable examples.		

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
A	4	13	Schrödinger equation for hydrogen atom. Radial and angular parts of the hydogenic wave functions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation).	4	Preparation of standard potassium biphthalate solution and standardization of sodium hydroxide solution. Estimation of oxalic acid present in the solution.
		14	Types of organic reactions: Definition with examples of addition, substitution, elimination.		
		15	pH titration curves for weak base vs strong acid, choice of indicators in these types of titrations. Calculation of pH in mixture of acid and base.		
		16	Stoichiometry : Mole concept, Concentration terms: normality, molarity (Problems to be worked).		
	5	17	Radial and angular nodes and their significance. Quantum numbers and their Significance.	5	Permanganometry Titrations: Preparation of standard oxalic acid solution and standardization of potassium permanganate solution. Estimation of ferrous ammonium sulphate present in the solution.
		18	Types of organic reactions: Definition with examples of condensation and rearrangement reactions with examples.		
		19	choice of indicators in these types of titrations. Calculation of pH in mixture of acid and base.		
		20	molality, mole fraction and ppm(Problems to be worked).		
	6	21	Shapes of s, p and d atomic orbitals, nodal planes. Rules for filling up of electrons in various orbitals (Aufbau principle, Pauli's exclusion principle, Hund's rule of maximum multiplicity and n+l rule).		Preparation of standard oxalic acid solution and standardization of potassium permanganate solution. Estimation of hydrogen

		22	Electronic effects : Electronic displacement effects: Inductive Effect.	6	peroxide present in the solution.
		23	Partially miscible liquids: Critical solution temperature (CST) – types – phenol-water system, triethylamine-water system, nicotine-water system (mutual solubility temperature (MST) vs composition curves to be drawn).		
		24	Calculation of equivalent mass (acids).		
	7	25	Electronic configuration of the elements (up to Z=30) and anomalous electronic configurations.	7	Preparation of viva questions on experiments.
		26	Electronic effects : Electronic displacement effects: Electromeric Effect		
		27	Effect of addition of non-volatile solute on CST. Binary mixtures of completely miscible liquids.		
		28	Calculation of equivalent mass(bases).		
	8	29	Inorganic chemistry internals (C1)	8	Repetition of experiments
		30	Organic chemistry internals (C1)		
		31	Physical chemistry internals (C1)		
		32	General chemistry internals (C1)		

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	9	33	Stability of half-filled and completely filled orbitals- concept of pairing and exchange energy.	9	Estimation of NaOH and Na2CO3 in a mixture (or caustic soda) by double indicator method using approximately 0.1N HCl.
		34	Resonance, Hyperconjugation and their significance		
		35	Vapour pressure – definition, vapour pressure – composition diagrams and boiling point – composition diagrams.		
		36	Calculation of equivalent mass (salts, oxidising and reducing agents)		
	10	37	Periodic Table and Periodicity: Classification of elements into s, p, d, and f-blocks, cause of periodicity.	10	Estimation of sulphuric acid and oxalic acid in a mixture using standard sodium hydroxide and standard potassium permanganate solutions.
		38	Alkanes: Preparation by Corey-House reaction, conversion of alkanes to aromatic compounds via alkenes and alkynes- aromatization and pyrolysis.		
		39	Classification into the types – obeying Raoult's law (type I), showing positive deviation from Raoult's Law (type II) and showing negative deviation from Raoult's Law (type III) – examples for each type.		
		40	oxidation number of element in a molecule. Applications of oxidation number.		
	11	41	Atomic radius: Covalent, ionic, van der Waal's and crystal radii. Additive nature of covalent radii. Determination of ionic radii by Lande's method. Variation of covalent radii in a group and in a period- explanation for the observed trends.	11	Iodometry Titrations Determination of BOD in sewage water.
		42	Alkenes: Preparation of alkenes by		

B			Wittig's reaction, Hoffmann's elimination, Stereoselectivity. Mechanism of electrophillic addition, oxymercuration, reduction.		
		43	Principles of fractional distillation: Fractional distillation of type I, type II and type III liquid mixtures (with examples). Azeotropic mixtures (definition). Binary mixtures of completely immiscible liquids (with examples).		
		44	Applications of oxidation number, balancing of redox reactions by oxidation number method. Oxidation number and valency (comparison).		
	12	45	Comparison of the size of atoms with their corresponding anions and cations, variation of ionic radii in isoelectronic ions. Ionization enthalpy: Successive ionization enthalpy, factors affecting ionization enthalpy,	12	Complexometric Titration Preparation of zinc sulphate solution and standardization of EDTA. Estimation of total hardness of water.
		46	hydroboration – oxidation and epoxidation. Mechanism of oxidation with KMnO4 and OsO4, ozonolysis. Industrial applications of ethene and propene.		
		47	Binary mixtures of completely immiscible liquids (with examples), weight fraction of distillates (no derivation), principle of distillation, applications (numerical problem on weight fractions of components).		
		48	Introduction to organic chemistry- Definition and importance of organic compounds to life and applications in food, fuels.		

	13	49	Ionization enthalpy: Variation in a group and in a period – explanation for the observed trends. Electron gain enthalpy: Successive electron gain enthalpy, variation of electron gain enthalpy in a period and in a group- explanation for the observed trends.	13	Determination of dissolved oxygen in sewage water.
		50	Dienes: Types, relative stabilities of dienes, conjugated dienes – 1,3 butadiene-structure.		
		51	Distribution Law: Nernst distribution law – statement, distribution coefficient, verification of distribution law taking distribution of I2 in H2O and CCl4 – limitations of the law, conditions for the validity of distribution law.		
		52	Definition and importance of organic compounds to textiles, dyes, drugs and cosmetics with examples.		
	14	53	Electronegativity: Variation of electronegativity in a group and in a period- explanation for the observed trends. Factors determining electro negativity (charge on the atom and hybridization). Pauling, Mulliken and Alfred-Rochow scale of electronegativity. Applications of electronegativity.	14	Repetition of experiments
		54	Dienes: Types, relative stabilities of dienes, conjugated dienes – 1,2 and 1,4-addition reactions with H2 and halogens, Diel's Alder reaction with an example. Alkynes: Methods of preparation – Dehydrohalogenation, vicinal and gem dihalides, reactions of alkynes – Electrophillic additions with HCN, CH3COOH and H2O polymerization.		

		55	Association of the solute in one of the solvents, dissociation of the solute in one of the solvents, application of distribution law with respect to solvent extraction process (numerical problems) .		
		56	Nomenclature(IUPAC) of bifunctional, aliphatic and aromatic compounds.		
Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
B	15	57	Revision of syllabus.	15	Practice lab
		58	Revision of syllabus.		
		59	Revision of syllabus.		
		60	Revision of syllabus.		

Reference Books:

1. Douglas, B.E., McDaniel, D.H. & Alexander, J.J. Concepts and Models in Inorganic Chemistry, John Wiley & Sons.
2. Huheey, J.E., Keiter, E.A., Keiter, R.L. &Medhi, O.K. Inorganic Chemistry: Principles of structure and Reactivity, Pearson Education India, 2006.
3. Graham Solomon, T.W., Fryhle, C.B. &Dnyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
4. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S.
5. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010
6. Bahl, A. &Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.
7. Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
8. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).

Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt.

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. First year (CBCS)

LESSON PLAN FOR THE SESSION 2019-20 (Even Semester)

Name of the Faculty **:**Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Manasa A K , Asha H D, Meghana R C and Hithashree (Theory and Practical)

Semester **:**2nd

Title of the Paper **: CHEMISTRY –II (DSC-2B)**

Subject code **: B24**

Lesson Plan Duration **:** 16 weeks (from December, 2019 to April, 2020)

Total teaching period **: 60Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 07, Practical – 04

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	**Chemical Bonding and Molecular Structure** **Ionic Bonding:** Definition and explanation with suitable examples. General characteristics of ionic bonding.	1	Introduction to laboratory experiments.
		2	**Cycloalkanes:** Sache-Mohr theory. Conformation of cyclopentane and cyclohexane.		
		3	**Chemical Kinetics:** Introduction – differential and integrated rate equations for second order		

A			Kinetics.		
		4	Preparation and synthetic applications of organic reagents – acetyl chloride, acetic anhydride.		
	2	5	Energy considerations in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds.	2	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 1) Acids
		6	Conformation of mono and disubstituted cyclohexane.		
		7	Derivation of second order rate equation when a=b and a≠b.		
		8	Preparation and synthetic applications of organic reagents – Raney Nickel, Dimethyl sulphate, Lithium aluminium hydride.		
	3	9	Born-Landé equation for calculation of lattice energy, Born-Haber cycle and its applications.	3	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 2. Alcohols
		10	Conformational analysis of butane and ethylene glycol with energy profile diagram.		
		11	unit of rate constant, half life period, problems.		
		12	**Polymers:** Introduction, monomer, repeating units, types (linear, branches and network) with Examples.		

Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
A	4	13	polarizing power and polarizability. Fajan's rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character.	4	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 3. Aldehydes
		14	**Aromatic hydrocarbons:** Nomenclature of benzene derivatives, Huckel's rule with respect to benzenoids, (benzene, naphthalene, anthracene and phenanthracene).		
		15	Experimental verification of second order reactions – study of kinetics of saponificaiton of an ester.		
		16	polymerization reaction (addition and condensation).		
	5	17	**Covalent bonding:** Definition and explanation with suitable examples, factors favouring the formation of covalent bond.	5	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 4. Amides
		18	Huckel's rule with respect to non-benzenoid compounds (cyclopentadienyl anion, cycloheptadienylcation) anti-aromaticity. Annulenes (14 to 18 carbon atoms)		
		19	Determination of the order of reaction – differential, time for half change method and isolation method.		
		20	molar masses of polymers – types (number average and mass average).		

	6	21	Valance bond approach -Shapes of some inorganic molecules and ions on the basis of VSEPR theory(NH_3, H_2O,SO_4^{2-} & ClO_4^-).	6	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 5. Amines
		22	Aromatic electrophillic substitution – General mechanism, electronic interpretation of orientating influence of electron donating groups (-CH_3, -Cl, -NH_2 and -OH groups).		
		23	Effect of temperature on rate of a reaction, Arrhenius equation, concept of activation energy, problems.		
		24	Determination of molar mass (viscosity and osmotic pressure method) (Numerical problems).		
	7	25	Hybridization of linear, trigonal planar, ($BeCl_2$, BF_3, $[Ni(CN)_4]_2$	7	Preparation of viva questions on experiments.
		26	Electron withdrawing groups (-NO_2, -CHO, -COOH and –SO_3H groups) on electrophillic substitution reactions.		
		27	Theories of reaction rates-simple collision theory and transition state theory, comparison of two theories.		
		28	**Organic reagents in inorganic analysis-** Advantages of organic precipitants over inorganic Precipitants, DMG.		
	8	29	Inorganic chemistry internals (C1)	8	Repetition of experiments
		30	Organic chemistry internals (C1)		
		31	Physical chemistry internals (C1)		
		32	General chemistry internals (C1)		

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	9	33	Hybridization of tetrahedral, trigonalbipyramidal and octahedral arrangements ($SiCl_4$, PCl_5 and SF_6 respectively).	9	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 6. Halogenated hydrocarbons
		34	**Hydrogenation of aromatic compounds:** Birch reduction, side chain oxidation of toluene to benzaldehyde and benzoic acid. Resonating structures of benzene, naphthalene and anthracene.		
		35	Experimental methods of chemical kinetics, conductometric – example - saponification of esters and spectrophotometric – example – colorimetric study of kinetics of oxidation of Indigocarmine by chloramine-T.		
		36	**Organic reagents in inorganic analysis-** Advantages of organic precipitants over inorganic Precipitants 8-hydroxy quinoline (Oxine), 1,10-phenanthroline.		
	10	37	Concept of resonance and resonating structures in various inorganic compounds and ions (CO, CO_2, N_2O)	10	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 7. Hydrocarbons
		38	Diel's Alder reactions of anthracene with maleic anhydride. **Biphenyls:** Preparation – Ullmann reaction.		
		39	**Ionic equilibria:** Debye-Huckel theory of strong electrolytes (relaxation time effect, electrophoretic effect and viscous		

B			effect).		
		40	**Organic reagents in inorganic analysis-** Advantages of organic precipitants over inorganic Precipitants ,EDTA. Structure of Ni^{2+}-DMG and Mg^{2+}-oxine complexes.		
	11	41	**MO approach**: Rules for the LCAO method, bonding and antibonding MOs and their characteristics for s-s, s-p and p-p combinations of atomic orbitals.	11	Organic preparations: Recrystallisation and determination of melting point and its importance may be mentioned 1. Acetylation : Preparation of acetanilide from aniline.
		42	**Organic halides:** Alkyl halides: isomerism and classification.		
		43	Debye-Huckel-Onsagar equation (no derivation), Debye-Huckel Limiting equation for activity coefficients (no derivation).		
		44	**Soaps, detergents and waxes** : definition and types of soaps.		
	12	45	Nonbonding combination of orbitals, MO treatment of homonuclear diatomic molecules of 1st and 2nd periods (H_2, He_2.	12	Oxidation: Preparation of benzoic acid from benzaldehyde.
		46	Elimination reaction: dehydrohalogenation. Saytzeff rule, Nucleophilic substitution reaction. S_{N1} with energy profile diagram.		
		47	Hydrolysis of salts – (four types) derivation - degree of hydrolysis and its relationship with K_h.		
		48	manufacture of soap by hot process, cleansing action of soap.		
	13	49	MO treatment of homonuclear diatomic molecules of 1st and 2nd		Nitration : Preparation of m-dinitrobenzene

			periods (N_2, O_2 and F_2)		from benzene.
		50	Nucleophilic substitution reaction. S_{N2} with energyprofile diagram. Effect of nature of alkyl groups.	13	
		51	Relationship between K_h, K_w, $K_a$and K_b.		
		52	Detergents, types with examples.		
	14	53	Heteronuclear diatomic molecules such as CO, NO and NO^+. Comparison of VB and MO approaches.	14	Diazotization : preparation of methyl orange.
		54	Effect of nature of nucleophiles and solvents.		
		55	pH of salt solutions and problems.		
		56	Differences between soaps and detergents. Waxes – Definition, types with examples.		
Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
B	15	57	Revision of syllabus.	15	Repetition of experiments
		58	Revision of syllabus.		
		59	Revision of syllabus.		
		60	Revision of syllabus.		

Reference Books:

1. Douglas, B.E., McDaniel, D.H. & Alexander, J.J. Concepts and Models in Inorganic Chemistry, John Wiley & Sons.
2. Huheey, J.E., Keiter, E.A., Keiter, R.L. &Medhi, O.K. Inorganic Chemistry: Principles of structure and Reactivity, Pearson Education India, 2006.
3. Graham Solomon, T.W., Fryhle, C.B. &Dnyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
4. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S.
5. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010
6. Bahl, A. &Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.
7. Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
8. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).
9. Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009).

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. Second year(CBCS)

LESSON PLAN FOR THE SESSION 2019-20 (Odd Semester)

Name of the Faculty **:**Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Manasa A K , Asha H D, Meghana R C and Hithashree (Theory and Practical)

Semester **:**3rd

Title of the Paper **: CHEMISTRY –III (DSC-2C)**

Subject code **:**

Lesson Plan Duration **:** 16 weeks (from July, 2019 to October, 2019)

Total teaching period **: 60Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 07, Practical – 04

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
A	1	1	**Chemistry of transition elements:** Position in the periodic table, electronic configuration, general characteristics- atomic and ionic radii.	1	Introduction to Lab experiments
		2	**Alcohols:** Definition and classification. **Monohydric alcohols:** Preparation of alcohols by Hydroboration-oxidation method. Hydration of alkenes.		
		3	**Second law of thermodynamics:** Limitations of First Law of Thermodynamics – need for II Law of thermodynamics,		

			spontaneous, non-spontaneous and equilibrium processes (definitions and examples for each),		
		4	**Chromatography:** Paper: introduction to ascending, descending and circular, R_f value and it's Applications.		
A	2	5	Ionization energy, variable oxidation states of transition elements.	2	Systematic semi-micro qualitative analysis of a mixture of two simple salts Ca^{2+}, Mg^{2+}, Cl^-, CO_3^{2-}
		6	Distinction tests between 1°, 2°, and 3° alcohols by Victor Meyer and oxidation method. Conversion of 1° to 2°, 2° to 3° and 1° to 3° alcohols. Dehydration of 1°, 2°, 3° alcohols and comparison of their rates.		
		7	Different ways of stating II Law, concept of entropy – definition and physical significances of entropy – criteria of spontaneity in terms of entropy change, statements of II law in terms of entropy.		
		8	**TLC:** Introduction and applications.		
A	3	9	spectral properties, redox potentials, colour and magnetic properties of (3d, 4d and 5d series).	3	Salt number 2) Ca^{2+} , K^+, Cl^-, NO_3^- ,
		10	**Dihydric alcohols:** Glycol – preparation from vicinal dihalides and uses. Pinacoles – synthesis, mechanism of pinacol-pinacolone rearrangement.		
		11	**Free energy:** Helmholtz and Gibb's free energy – their definitions and their relationship, Gibb's – Helmholtz equation at constant pressure and volume (derivations).		
		12	**Column Chromatography:**		

			Introduction, principle and experimental details and applications		
Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
A	4	13	catalytic activity, complex formation and interstitial compounds formation (3d, 4d and 5d series).	4	Salt number 3) Mg2+, CO3 2-, NH4 +, Cl-.
		14	**Trihydric alcohols:** Glycerol, synthesis from propene, reactions with HNO_3, H_2SO_4, oxalic acid and HI. Uses of glycerol.		
		15	Thermodynamic criteria of equilibrium and spontaneity, variation of free energy with temperature and pressure, Claussius – Clappeyron equation (differential form to be derived), integrated form of Claussius – Clappeyron equation (to be assumed) .		
		16	**Gas Chromatography:** Introduction, apparatus, programmed temperature gas chromatography, quantitative analysis of GLC.		
A	5	17	**Chemistry of inner transition elements:** Electronic configuration and position in the periodic table, oxidation states.	5	Salt number 4) Sr 2+, SO4 2-, Zn2+, Cl-.
		18	**Phenols:** Definition, classification with examples.		
		19	Claussius – Clappeyron equation applications (enthalpy of vapourization, boiling point and freezing point at different temperatures), (numerical problems on these applications)		

		20	**HPLC:** Introduction, schematic diagram of instrumentation and application.		
A	6	21	**Chemistry of inner transition elements:** spectral properties, colour and magnetic properties	6	Salt number 5) Al3 +, NO3 - , Ba2+, Cl-.
		22	Acidity of phenols, effect of substituents on acidity of phenols.		
		23	Calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data.		
		24	**Energy sources**-Dry cell.		
A	7	25	**Chemistry of inner transition elements:** complex formation and ionic radii, lanthanide contraction – cause and its consequences.	7	Salt number 6) Al3 +, NO3 - , SO4 2-, Zn2+,
		26	Mechanism of Reimer-Tiemann reaction and Kolbe reaction. Fries and claisen rearrangement with examples.		
		27	**Crystallography:** Amorphous and Crystalline solids, differences. Crystal systems and their Characteristics.		
		28	**Energy sources** -lead storage battery		
A	8	29	Inorganic chemistry internals (C1)	8	Salt number 7) CO3 2-, NH4 +, Cl-, Ca2+.
		30	Organic chemistry internals (C1)		
		31	Physical chemistry internals (C1)		
		32	General chemistry internals (C1)		

B	9	33	General survey of actinides – comparison with lanthanides, transuranic elements.	9	Practical internals
		34	conversion of phenol to phenolphthalein and fluoroscein.		
		35	Elements of symmetry – plane, axis and centre, elements of symmetry in cubic crystals, law of rational indices – Weiss and Miller indices.		
		36	**Energy sources** -solar cell and fuel cell.		
B	10	37	**Organometallic Compounds** Definition and Classification with appropriate examples based on nature of metal-carbon bond (ionic, s, p and multicentre bonds).	10	Salt number 8) Na^+, Ba^{2+}, Br^-, SO_4^{2-}.
		38	**Ethers:** Nomenclature, Williamson ether synthesis, reactions – cleavage and auto-oxidation- Ziesel's method.		
		39	Crystal systems and their characteristics,Crystal lattice and unit cell, types of Lattice – Bravais lattices.		
		40	**Nanotechnology:** Definition, uses and nature of nanotechnology, **Nanomaterials**-definition, properties and applications.		

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
B	11	41	Structures of methyl lithium, Zeiss salt and ferrocene.	11	**Part 2: Inorganic preparations** 1. Preparation of Chloropentaminecobalt(III)chloride.
		42	**Epoxides:** Synthesis by Darzen's method. Acid and base catalyzed opening of epoxides. **Crown ethers:** Introduction with examples.		
		43	X-Ray diffraction and Bragg's Law (to be derived), determination of crystal structure of rock salt by rotating crystal method using Bragg's spectrometer.		
		44	**Carbon nanotubes**- definition, types, methods of preparation (mention), properties and industrial applications of carbon nanotubes		
B	12	45	EAN rule as applied to carbonyls. Preparation, structure, bonding and properties of mononuclear carbonyls.	12	Preparation of Cuprammoniumsulphate.
		46	**Carbonyl Compounds:** Distinction between aldehydes and ketones – oxidation and reduction method.		
		47	Structure of NaCl, KCl&CsCl (only qualitative), application of X-ray studies – distance between lattice planes		
		48	**Nanowires**- definition,types,production of crystalline nanowires by vapour-liquid-solid synthesis method, applicationsof nanowires.		

B	13	49	Preparation, structure, bonding and properties of polynuclear carbonyls of 3d metals.	13	Preparation of ferrousoxalate.
		50	Addition of alcohols- formation of hemiacetal and acetal. Condensation with NH_2OH and 2,4-DNP.		
		51	Determination of Avogadro Number (numerical problems on applications), Qualitative treatment of Nernst heat theorem and III law of thermodynamics-statement only.		
		52	**Amino acids and proteins:** Structure, classification with examples, peptide bond, N-protecting & C-protecting groups, peptide synthesis (Gly-Gly, Gly-Ala).		
B	14	53	p-acceptorbehaviour of carbon monoxide.	14	Preparation of Ferric alum.
		54	Mechanism of aldol condensation, Perkins reaction, Cannizzaro reaction, Claisen condensation, Knovenagel reaction.		
		55	**Liquid Crystals:** Defintion, classification of thermotropic liquid crystals into smectic, nematic andcholesteric with examples-molecular arrangement of these and their uses.		
		56	Proteins-types-based on functional properties. Denaturation, colour reaction (Biuret, Ninhydrin and Millon's test)		
B		57	Revision of syllabus.		
		58	Revision of syllabus.		

		60	Revision of syllabus.	15	Repetition of experiments

Reference Books:

1. Douglas, B.E., McDaniel, D.H. & Alexander, J.J. Concepts and Models in Inorganic Chemistry, John Wiley & Sons.
2. Huheey, J.E., Keiter, E.A., Keiter, R.L. &Medhi, O.K. Inorganic Chemistry: Principles of structure and Reactivity, Pearson Education India, 2006.
3. Graham Solomon, T.W., Fryhle, C.B. &Dnyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
4. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S.
5. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010
6. Bahl, A. &Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.
7. Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
8. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).
9. Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009).

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. Second year(CBCS)

LESSON PLAN FOR THE SESSION 2019-20 (Even Semester)

Name of the Faculty **:**Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Manasa A K , Asha H D, Meghana R C and Hithashree (Theory and Practical)

Semester **:**4th

Title of the Paper **: CHEMISTRY –IV (DSC-2D)**

Subject code **:**

Lesson Plan Duration **:** 16 weeks (from December, 2019 to April, 2020)

Total teaching period **: 60Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 7, Practical – 04

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
A	1	1	**Coordination Chemistry:** Ligands, classification of ligands and chelation.	1	Introduction to Lab experiments
		2	**Stereochemistry:** Introduction, definition, elements of symmetry (plane, centre, simple axes and alternative axes).		
		3	**Elementary Quantum Mechanics:** black body radiation – Planck's Law, Photoelectric effect.		
		4	**HSAB:** Classification of acids and bases as Hard and Soft.		

A	2	5	physical methods in the study of complexes – change in conductance, colour and pH. Stability of complexes – stability constant.	2	Determination of the density using specific gravity bottle and viscosity of a liquid using Ostwald's viscometer.
		6	Asymmetry and dissymmetry, Chirality, designation of configuration (D-L and R-S).		
		7	Compton effect, Schrodinger's wave equation (no derivation) and its importance.		
		8	Pearson's HSAB concept.		
A	3	9	A brief outline of thermodynamic stability of metal complexes, factors affecting the stability of complexes. Polynuclear complexes, inner metallic complexes.	3	Determination of the density using specific gravity bottle and surface tension of a liquid usingstalagmometer.
		10	Optical activity – explanation – cause of optical activity (non-super impossibility).		
		11	Eigen function and Eigen values, significance of Ψ and Ψ_2.		
		12	Acid-base strength, hardness and softness, symbiosis.		
Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
A	4	13	Applications of complexes: Cisplatin in cancer therapy, $Na_2CaEDTA$ in treatment of heavy metals (Pb& Hg) poisoning.	4	Determination of molecular mass of a non-volatile solute by Walker-Lumsden method.
		14	Enantiomers and diastereomers		

			optical isomerism in tartaric acid and biphenyl compounds.		
		15	particle in one dimensional box (derivation), operators-linear, and ^{2} and Hamiltonian operator.		
		16	**Gravimetry:** Introduction to gravimetric analysis – precipitation methods (various steps involved to be discussed).		
A	5	17	**Isomerism in co-ordination complexes:** Stereo-isomerism – Geometrical and optical isomerism exhibited by co-ordination compounds of co-ordination number 4.	5	Determination of rate constant of the decomposition of hydrogen peroxide catalyzed by $FeCl_3$.
		18	Racemisation, resolution, methods of resolution (Chemical and biochemical methods)		
		19	**Electrochemistry-I:** Introduction, conductance – specific conductance, equivalent conductance and molar conductance – their definitions and SI units.		
		20	Advantages of gravimetric analysis, purity of the precipitates, coprecipitation and post-precipitation		
A	6	21	**Isomerism in co-ordination complexes:** Stereo-isomerism – Geometrical and optical isomerism exhibited by co-ordination compounds of co-ordination number 6.	6	Determination of percentage composition of sodium chloride solution by determining the miscibility temperature of phenol - water
		22	**Geometrical isomerism:** Definition with example, designation of cis-trans and E-Z notations		

			with examples.		system.
		23	Conductivity cell and cell constant. Determination of equivalent conductance by meter – bridge method, ionic mobility.		
		24	conditions of precipitation, precipitation from homogeneous solution (hydroxides and sulphates).		
A	7	25	**Valence bond theory:** Salient features, formation of octahedral complexes on the basis of VBT, outer and inner orbital octahedral complexes- $[Fe(CN)_6]^{4-}$, $[Fe(CN)_6]^{3-}$, $[Co(CN)_6]^{3-}$	7	Estimation of the given strong acid using strong base by thermometric titration method [HCl X NaOH].
		26	Characteristics of geometrical isomers, Identification of geometrical isomers.		
		27	Determination of equivalent conductance by meter – ionic conductance, Kohlrausch's law and its significance – determination of equivalent conductance at infinite dilution for weak electrolyte.		
		28	washing and ignition of precipitate (general discussion only). Electro-gravimetric analysis- estimation of copper.		
A	8	29	Inorganic chemistry internals (C1)	8	Study of kinetics of reaction between $K_2S_2O_8$ and KI, 2^{nd} order, determination of rate constant.
		30	Organic chemistry internals (C1)		
		31	Physical chemistry internals (C1)		
		32	General chemistry internals (C1)		
		33	**Valence bond theory:** Salient features, formation of octahedral complexes on the basis of VBT, outer and inner orbital octahedral		Practical internals

B	9		complexes- $[CoF_6]^{3-}$ $[Cr(H_2O)_6]^{3+}$ and $[Fe(H_2O)_6]^{2+}$.	9	
		34	Geometrical isomerism in aldoximes and ketoximes, Beckmann rearrangement with mechanism.		
		35	**Transport number:** Definition and explanation, anomalous transport number – explanation with Examples.		
		36	**Dyes:** Colour and constitution, chromophore - Auxochrome theory.		
B	10	37	**Crystal field theory:** Important features of crystal field theory, crystal field splitting of dorbitals in tetrahedral, octahedral and square planar complexes.	10	**Organic Estimations:** 1. Estimation of glucose by Fehling solution method.
		38	**Carbohydrates:** Definition and importance, classification based on composition with examplesreducing and non-reducing sugars.		
		39	relationship between ionic conductance and transport number (to be derived), determination of transport number by moving boundary method – transport number of H^+ using $CdCl_2$ as supporting electrolyte (numerical problems on equivalent conductance, transport numbers and kohlrausch's law).		
		40	classification of dyes based onchromophore present and applications with examples.		

Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
B	11	41	crystal field stabilization energy (CFSE), factors affecting the magnitude of Δ_o, (nature of ligand, oxidation state of the metal ion, size of the orbitals, geometry of the complex).	11	Estimation of ascorbic acid by iodometric method.
		42	**Monosaccharides:** Glucose: reactions of glucose (with H_2N-OH, HCN, $C_6H_5NHNH_2$, Br_2 water, Conc. HNO_3, reductions with HI/red P , methanol/dry HCl, acetic anhydride and reduction reactions.		
		43	**Application of conductance measurements** – (a) solubility and solubility product of sparingly soluble salt, (b) ionic product of water.		
		44	synthesis of indigo, malachite green, congo red, structural elucidation of alizarin and its synthesis.		
B	12	45	High spin (HS) and low spin (LS) complexes, magnetic properties of metal complexes based on crystal field theory-$[Co(NH_3)_6]^{3+}$, $[CoF_6]^{3-}$, $[Fe(CN)_6]^{4-}$, $[Fe(CN)_6]^{3-}$ and $[Ni(CN)_4]^{2-}$.	12	Estimation of neutral amino acids by titrametric method.
		46	**Structural elucidation of glucose:** Open chain structure, configuration, drawbacks of open chain structure, ring structure –		

			Fisher and Haworth structure. Determination of ring size by methylation method.		
		47	**Application of conductance measurements:** degree of ionization of weak electrolyte. Numerical problems.		
		48	**Physical Properties and chemical constitution:** Additive and constitutive properties, properties of liquids – viscosity, definition of coefficient of viscosity, factors affecting viscosity – temperature, size and weight of molecules, intermolecular forces, determination of viscosity of liquids by Ostwald's method.		
B	13	49	Magnetic susceptibility, measurement of magnetic moment by Gouy's method. Limitations of CFT.	13	Estimation of carboxylic acid by titrametric method.
		50	Conversion reactions – 1. Ascending (Kiliani's synthesis) 2. Descending (Wohl's degradation) 3. Aldose to ketose 4. Ketose to Aldose 5. Epimerisation		
		51	Conductometric titration: strong acid vs strong base, weak acid vs strong base.		
		52	**Surface tension:** Definition, effect of temperature and solute on surface tension, determination of surface tension of liquids using stalagmometer.		
		53	**Ligand field theory:** Evidences for metal ligand covalent bonding in complexes.		Isolation of Caffeine from tea powder.

B	14	54	**Disaccharides:** Structural elucidation of sucrose, structural formulae of maltose and lactose (Haworth structure). **Polysaccharides:** Partial structural formulae of starch, cellulose, glycogen and their uses.	14	
		55	Conductometric titration: strong acid vs weak base, weak acid vs weak base, with suitable examples for each.		
		56	**Parachor:** Definition – Sugden equation, calculation of parachor and its application with respect to structural elucidation of benzene and quinone, numerical problems based on surface tension, viscosity and parachor applications.		
B		57	Revision of syllabus.	15	Repetition of experiments.
		58	Revision of syllabus.		
		59	Revision of syllabus.		
		60	Revision of syllabus.		

Reference Books:

1. Douglas, B.E., McDaniel, D.H. & Alexander, J.J. Concepts and Models in Inorganic Chemistry, John Wiley & Sons.
2. Huheey, J.E., Keiter, E.A., Keiter, R.L. &Medhi, O.K. Inorganic Chemistry: Principles of structure and Reactivity, Pearson Education India, 2006.
3. Graham Solomon, T.W., Fryhle, C.B. &Dnyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
4. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S.
5. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010
6. Bahl, A. &Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.
7. Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
8. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).
9. Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009)

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA

DEPARTMENT OF CHEMISTRY

B.Sc. Final year(NON CBCS)

LESSON PLAN FOR THE SESSION 2019-20 (Even Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Manasa A K , Asha H D, Meghana R C and Hithashree (Theory and Practical)

Semester **:** 6th

Title of the Paper **: Inorganic chemistry(Paper: VIII)**

Subject code **:**

LessonPlan Duration **:** 14weeks (from December, 2019 to April, 2020)

Total teaching period **: 28Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 07, Practical – 00

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
		1	Inorganic polymers: Definition – examples, general properties, comparison with organic polymers, glass transition temperature		

1&2	1	2	Silicones: Definition, nomenclature, preparation (linear, cross-linked and cyclic). Factors affecting the nature of silicon polymers, properties (chemical and thermal stabilities, chemical properties)		
	2	3	uses of silicon polymers, silicon fluids/oils – uses, silicon elastomers – rubbers, silicon resins (preparation and uses)		
		4	Phosphazenes: Definition, types, structures, preparation, properties and uses. Crystalline polymetaphosphates – Maddrell's and Kuroll's salts – properties and uses.		
	3	5	Nature of bonding in phosphazenes. Fluorocarbons: Definition, examples, preparation, properties and uses of Freon-12, Freon-22, PTFE and poly per fluorovinyl chloride.		
		6	Abrasives: Definition, classification with examples – hardness, manufacture and applications of carborundum, alundum and tungsten carbide.		
	4	7	Refractories: Definition, properties, classification with examples. Different steps involved in the manufacture of refractories. Applications of refractories.		

		8	Explosives: Definition, classification with examples, characteristics of explosives. Preparation and uses of dynamite, cordite and RDX.		
	5	9	Paints: Constituents and their functions, manufacture of lithopone and titanium dioxide.		
		10	Fuels: Definition, classification with examples – characteristics, calorific value, determination of calorific value of a solid or liquid fuel.		
3&4	6	11	Applications of gaseous fuels. Compressed natural gas, water gas, producer gas and LPG – their production, composition and applications		
		12	Propellants: Definition, characteristics, classification and applications.		
	7	13	Inorganic chemistry internal test		
		14	Inorganic chemistry internal test		
	8	15	Fertilizers: Definition and classification, manufacture of nitrogeneous fertilizers – CAN and urea. Phosphatic fertilizers –		

5			calcium dihydrogen phosphate, NPK type fertilizers.		
		16	Metallurgy: Types of metallurgy: Pyrometallurgy: Extraction of Nickel from sulphide ore – general metallurgy followed by Mond's process (purification).		
	9	17	manganese from oxide ores – reduction by the Aluminothermite process – refining by electrolytic process.		
		18	Hydrometallurgy: Extraction of gold from native ore by cyanide process and refining by quartation process.		
5	10	19	Electrometallurgy: Extraction of lithium by fusion method followed by electrolysis of lithium chloride.		
		20	Powder metallurgy: Importance, metal powder production and applications, production of tungsten powder.		
	11	21	Extraction of (1) Thorium from monazite sand – purification by iodine method, (2) uranium from pitch blende – production of U3O8 by carbonate method.		

		22	U3O8 to UO2 by reduction, UO2 to U by fluoride method.		
6	12	23	Nanotechnology: Definition, uses and nature of nanotechnology, Nanomaterials-definition, properties and applications		
		24	Carbon nanotubes- definition, types, methods of preparation (mention).		
	13	25	properties and industrial applications of carbon nanotubes.		
		26	Nanowires-definition, types.		
	14	27	production of crystalline nanowires by vapour-liquid-solid synthesis method, applications of nanowires.		
		28	Revision of syllabus		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA

DEPARTMENT OF CHEMISTRY

B.Sc. Final year(NON CBCS)

LESSON PLAN FOR THE SESSION 2019-20 (Even Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Manasa A K , Asha H D, Meghana R C and Hithashree (Theory and Practical)

Semester **:** 6th

Title of the Paper **: Organic chemistry(Paper: IX)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from December , 2019 to April, 2020)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 07, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
		1	Hetrocyclic Compounds: Definition, classification with examples, synthesis of furan, thiophene,	1	Introduction of organic chemistry experiments

1&2	1	2	pyrrole, pyridine, indole (Fischer method) quinoline (Skrup's synthesis with mechanism), isoquinoline, pyrimidine (one method each),		
	2	3	Uric acid: Elucidation of structure and synthesis by Fischer's method, conversion of uric acid to purine and caffeine	2	Separation of p- and o-nitroaniline by TLC method (Solvent extraction)
		4	Alkaloids: Definition, classification based on heterocyclic rings-isolation		
	3	5	synthesis and structural elucidation of nicotine and morphine, physiological importance of alkaloids.	3	Separation of p- and o-nitroaniline by column chromatography
		6	Vitamins: Definition, classification, structural elucidation and synthesis of Vit-A, Synthesis of Vit-C		
	4	7	structural formulae of Vit B1, B2, B6, calciferol, E and K and their importance.	4	Estimation of glucose by Fehling solution method
		8	Hormones: Definition, classification, synthesis of adrenaline, thyroxine, struc tural formulae of estradiol, progesterone and testosterone and their importance.		
		9	Drugs: Chemotherapy and		Estimation of Phenol by acetylation

	5		chemotherapeutic agents, definition of drugs, types of drugs, antipyretics, analgesics, anesthetics.	5	method.
		10	sedatives, narcotics, antiseptics, antibacterials, antibiotics, antimalarials and sulpha drugs with examples.		
3&4	6	11	Synthesis of paracetamol, sulphanilamide, sulphaguanidine.	6	Estimation of ascorbic acid by iodometric method.
		12	Special techniques in organic synthesis: a) Polymer supported reagents – introduction, properties of polymer support-advantages of polymer support reagents, choice of polymers, types and applications.		
	7	13	Organic chemistry internal test	7	Determination of Iodine value of oils by chloromine-T.
		14	Organic chemistry internal test		
5	8	15	Phase transfer catalysis – introduction, definition, types, preparation, mechanism and advantages.	8	Isolation of Caffeine from tea powder

		16	c) Microwave induced organic synthesis – introduction, reaction vessel, reaction medium, advantages, limitations, precaution and applications		
	9	17	Sonochemistry – use of ultra sound in organic synthesis, introduction, instrumentation, physical aspects, types and applications.	9	Estimation of neutral amino acids by titrametric method.
		18	Amino acids: Structure of α-amino acids, peptide bond, protecting groups-Boc, Z, F-moc groups, use of HOBt and HOAt.		
5	10	19	Spectroscopy of organic compounds: UV-visible spectroscopy: Introduction, chromophores and auxo chrome, blue shift and red shift.	10	Organic chemistry practical test
		20	representation of spectra of 1,3-butadiene, benzene and lycopene. Influence of conjugation on UV absorption-comparison of UV spectra of acetone and methylvinyl ketone.		
	11	21	IR-Spectroscopy: Introduction, stretching frequency of –OH (free and H-bonded), alkyl –C-H, C=C,	11	Estimation of carboxylic acid by titrametric method.

			C=C, C-C, C=O and C-O groups (by taking suitable examples).		
		22	Graphical representation of IR spectra of benzoic acid and methyl benzoate		

6	12	23	NMR Spectroscopy: Basic principles of proton magnetic resonance , nuclear magnetic spin quantum number I, influence of the magnetic field on the spin of nuclei	12	Estimation of –NH2 group by acetylation method.
		24	spin population, saturation using radio frequency, nuclear magnetic resonance-chemical shift (δ value), uses of TMS reference		
	13	25	Nuclear shielding effects, equivalent and non-equivalent protons, spin-spin splitting and coupling.	13	Determination of saponification value of oils.
		26	Applications of NMR spectroscopy to simple organic molecules (like ethyl alcohol, ethane, propane, ethylene, methylamine.		
	14	27	Aniline, benzene, toluene, acetone, acetophenone, methyl cyanide and other simple molecules.	14	Revision of experiments
		28	Revision of syllabus		

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year(NON CBCS)

LESSON PLAN FOR THE SESSION 2019-20 (Even Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Manasa A K , Asha H D, Meghana R C and Hithashree (Theory and Practical)

Semester **:** 6th

Title of the Paper **: Physical chemistry(Paper: X)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from December , 2019 to April, 2020)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 07, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
		1	Electrochemistry-I: Introduction, conductance – specific conductance, equivalent conductance and molar conductance – their definitions and SI units.		Introduction of laboratory physical chemistry equipments.

1&2	1	2	Conductance cell and cell constant. Determination of equivalent conductance by meter – bridge method, ionic mobility, ionic conductance, Kohlrausch's law and its significance – determination of equivalent conductance at infinite dilution for weak electrolyte.	1	
	2	3	Transport number: Definition and explanation, anomalous transport number – explanation with examples – relationship between ionic conductance and transport number (to be derived)	2	Determination of equivalent conductance of the given electrolyte (strong and weak) by using Meter Bridge.
		4	determination of transport number by moving boundary method – transport number of H+ using CdCl2 as supporting electrolyte (numerical problems on equivalent conductance, transport numbers and kohlrausch's law).		
	3	5	Application of conductance measurements – (a) solubility and solubility product of sparingly soluble salt, (b) ionic product of water.	3	Determination of solubility of sparingly soluble salt (like BaSO4) by conductometric method
		6	degree of ionization of weak electrolyte. Numerical problems for the applications of a, b and c to be worked out.		
	4	7	Conductometric titration: strong acid vs strong base, weak acid vs strong base, strong acid vs weak base, weak acid vs weak base,	4	Determination of solubility of sparingly soluble salt (like BaSO4) by

			with suitable examples for each.		conductometric method.
		8	Electromotive force-I: Electrolytic and electrochemical cells, electrode reaction of Daniel cell, single electrode potential.		
	5	9	sign of electrode potential-convention (reduction potential to be adopted), convention of representing a cell, EMF and standard EMF of a cell, cell reaction, reversible and irreversible cells,	5	Determination of rate constant of saponification of ethyl acetate by conductivity measurements
		10	Nernst equation (to be derived) and calculation of electrode potential, standard hydrogen gas electrode, reference electrodes-calomel.		
3&4	6	11	Ag-AgCl electrode-construction and working, electrochemical series and its significance, equilibrium constant and free energy of cell reaction, spontaneity of a cell reaction.	6	Conductometric titration of strong acid and strong base and weak acid and strong base.
		12	EMF of concentration cells: Definition with explanation – with transference and without transference, concentration cells – with examples.		
		13	Physical chemistry internal test	7	Determination of percentage composition of a given mixture containing two miscible liquids by
		14	Physical chemistry internal test		

	7				Abbe’s refractometer.
5	8	15	Liquid junction potential and salt bridge. (Numerical problems on Nernst equation and EMF calculations).	8	pH titration of strong acid against strong base (by observing change in pH).
		16	Fuel cells: Working of H2-O2 fuel cell and its importance.		
	9	17	Electromotive force-II Application of EMF measurements: (a) Determination of pH of a solution using quinhydrone electrode.	9	Laboratory internals
		18	Glass electrode (using dip type Calomel electrode) – Explanation with principle and procedure.		
5	10	19	Potentiometric titration – principle, location of end points in - (1) Neutralization reactions [NaOH Vs HCl] (2) Oxidation-reduction reactions [K2Cr2O7 Vs FAS]		
		20	Precipitation reaction [KCl Vs AgNO3] and (4) Complexometric reactions (ZnSO4 Vs K3[Fe(CN)6])		
	11	21	Chemical Kinetics: Introduction – differential and integrated rate equations for second order	10	Potentiometric titration of mixture of HCl and CH3COOH using NaOH solution.

			kinetics, derivation of second order rate equation when a=b and a≠b.		
		22	unit of rate constant, half-life period, experimental verification of second order reactions – study of kinetics of saponificaiton of an ester.		

6	12	23	Determination of the order of reaction – differential, time for half-change method and isolation method. Experimental methods of chemical kinetics.	11	Colorimeteric estimation of Fe3+ ion using ammonium thiocyanate as complexing agent.
		24	conductometric – example - saponification of esters. Potentiometric - example – kinetics of bromination of N,N-di-methyl aniline and spectrophotometric – example – colorimetric study of kinetics of oxidation of Indigocarmine by chloramine-T.		
	13	25	Application of kinetic studies: Arriving at the mechanism of urea formation from ammonium cyanate.		Colorimeteric estimation of Cu2+ ion using NH4OH as

		26	Phase equilibria: Gibb's phase rule – definition of the terms with examples, application to one component system (water system).	12	complexing agent.
	14	27	Reduced phase rule – statement, reduced systems, two component system – simple eutectic type KI-water system, freezing mixtures, Pb-Ag system (desilverization of argentiferrous lead)	13	Revision of experiments
		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA

DEPARTMENT OF CHEMISTRY

B.Sc. Final year(NON CBCS)

LESSON PLAN FOR THE SESSION 2019-20(Odd Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Manasa A K , Asha H D, Meghana R C and Hithashree (Theory and Practical)

Semester **:** 5th

Title of the Paper **: Inorganic chemistry(Paper: V)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2019 to October, 2019)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 07, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
		1	Chemistry of transition elements: Position in the periodic table, electronic configuration, general characteristics- atomic and ionic radii.		Introduction of laboratory equipments.

1&2	1	2	ionization energy, variable oxidation states, spectral properties, redox potentials, colour and magnetic properties,	1	
	2	3	catalytic activity, complex formation and interstitial compounds formation (3d, 4d and 5d series). Chemistry of inner transition elements: Electronic configuration and position in the periodic table,	2	Gravimetric estimation of barium as barium sulphate.
		4	oxidation states, spectral properties, colour and magnetic properties, complex formation sand ionic radii.		
	3	5	lanthanide contraction – cause and its consequences. General survey of actinides – comparison with lanthanides, transuranic elements.	3	Gravimetric estimation of iron as iron (III) oxide
		6	Ion-exchange: Introduction, action of ion exchange resins – cation exchange and anion exchange resins.		
	4	7	Exchange of inorganic ions, ion exchange capacity, separation of lanthanides by ion- exchange method.	4	Gravimetric estimation of copper as copper (I) thiocyanate.

		8	Gravimetry: Introduction to gravimetric analysis – precipitation methods (various steps involved to be discussed), advantages of gravimetric analysis		
	5	9	purity of the precipitates, co-precipitation and postprecipitation, conditions of precipitation, precipitation from homogeneous solution (hydroxides and sulphates)	5	Gravimetric estimation of nickel as nickel dimethylglyoximate
		10	washing and ignition of precipitate (general discussion only). Electro-gravimetric analysis estimation of copper.		
3&4	6	11	Organic precipitants: Advantages of organic precipitants over inorganic precipitants, DMG, 8-hydroxy quinoline (Oxine)	6	Gravimetric estimation of magnesium as magnesium -8-hydroxy oxinate.
		12	1,10-phenanthroline and EDTA. Structure of Ni2+ -DMG and Mg2+ -oxine complexes.		
	7	13	Inorganic chemistry internal test	7	Gravimetric estimation of sulphate as barium sulphate
		14	Inorganic chemistry internal test		

5	8	15	Coordination Chemistry: Ligands, classification of ligands and chelation, nomenclature of co-ordination compounds.	8	Gravimetric estimation of aluminum as aluminum oxide.
		16	physical methods in the study of complexes – change in conductance, colour and pH.		
	9	17	Stability of complexes – stability constant, a brief outline of thermodynamic stability of metal complexes.	9	Laboratory internals
		18	Factors affecting the stability of complexes. Polynuclear complexes, inner metallic complexes.		
5	10	19	Isomerism in co-ordination complexes: Stereo-isomerism – Geometrical and optical isomerism exhibited by co-ordination compounds of co-ordination number 4 and 6.		
		20	Metal-ligand bonding in transition metal complexes: Valence bond theory: Salient features, formation of octahedral complexes on the basis of VBT, outer and inner orbital octahedral complexes- [Fe(CN)6] 4- .		
	11	21	Formation of octahedral complexes on the basis of VBT	10	Gravimetric estimation of zinc as zinc oxide

			[Fe(CN)6] 3- , [Co(CN)6] 3- , [CoF6] 3- [Cr(H2O)6] 3+ and [Fe(H2O)6] 2+		
		22	Formation of tetrahedral and square planner complexes on the basis of VBT – [Ni(CN)4] 2- , [Cu(NH3)]2+, [Zn(NH3)4] 2+and [Ni(CO)4], limitations of VBT.		

6	12	23	Crystal field theory: Important features of crystal field theory, crystal field splitting of d-orbitals in tetrahedral, octahedral and square planar complexes,	11	Gravimetric estimation of calcium as calcium oxide.
		24	crystal field stabilization energy (CFSE), factors affecting the magnitude of Δo, (nature of ligand, oxidation state of the metal ion, size of the orbitals, geometry of the complex), high spin (HS) and low spin (LS) complexes		
	13	25	magnetic properties of metal complexes based on crystal field theory-[Co(NH3)6] 3+, [CoF6] 3- , [Fe(CN)6] 4- , [Fe(CN)6] 3- and [Ni(CN)4] 2- .	12	Paper chromatographic separation of Fe3+ and Ni2+ ions

		26	Magnetic susceptibility, measurement of magnetic moment by Gouy's method. Limitations of CFT. Ligand field theory: Evidences for metal ligand covalent bonding in complexes.		
	14	27	Bio-inorganic chemistry: Essential and trace elements in biological process, metalloporphyrins with special reference to haemoglobin and myoglobin, biological role of alkali and alkaline earth metal ions with respect to Na+ and Ca2+ ions.	13	Revision of experiments
		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA

DEPARTMENT OF CHEMISTRY

B.Sc. Final year(CBCS)

LESSON PLAN FOR THE SESSION 2019-20(Odd Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Manasa A K , Asha H D, Meghana R C and Hithashree (Theory and Practical)

Semester **:** 5th

Title of the Paper **: Organic chemistry(Paper: VI)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2019 to October, 2019)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 07, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
		1	Carbohydrates: Definition and importance, classification based on composition with examples-reducing and non-reducing sugars.		Introduction of laboratory equipments.

1&2	1	2	Monosaccharides: Glucose: reactions of glucose (with H2N-OH, HCN, C6H5NHNH2, Br2 water, Conc. HNO3, reductions with HI/red P , methanols, (dry HCl), acetic anhydride and reduction reactions.	1	
	2	3	Structural elucidation of glucose: Open chain structure, configuration, drawbacks of open chain structure, ring structure – Fisher and Haworth structure. Determination of ring size by methylation method. Fischer and Haworth structures of fructose, galactose and mannose.	2	Gravimetric estimation of barium as barium sulphate.
		4	Conversion reactions – 1. Ascending (Kiliani's synthesis) 2. Descending (Wohl's degradation) 3. Aldose to ketose 4. Ketose to Aldose 5. Epimerisation		
	3	5	Disaccharides: Structural elucidation of sucrose, structural formulae of maltose and lactose (Haworth structure). Polysaccharides: Partial structural formulae of starch, cellulose, glycogen and their uses.	3	Gravimetric estimation of iron as iron (III) oxide
		6	Stereochemistry: Introduction, definition, elements of symmetry (plane, centre, simple axes and alternative axes), asymmetry and dissymmetry, Chirality		
	4	7	Designation of configuration – R-S notation. Optical activity – explanation – cause of optical activity (non-super impossibility).	4	Gravimetric estimation of copper as copper (I)

			Enantiomers and diastereomers optical isomerism in tartaric acid and biphenyls.		thiocyanate.
		8	Racemisation, resolution, methods of resolution (Chemical and biochemical methods) Walden inversion, asymmetric synthesis (partial and absolute).		
	5	9	Geometrical isomerism: Definition with example, designation of cis-trans and E-Z notations with examples. Geometrical isomerization of aldoximes and ketoximes, Beckmann rearrangement	5	Gravimetric estimation of nickel as nickel dimethylglyoximate
		10	Green Chemistry: Purpose, principles to be followed for green chemistry. Synthesis of acetamide, ibuprofen.		
3&4	6	11	Green Chemistry: Purpose, principles to be followed for green chemistry. Synthesis of acetamide, ibuprofen.	6	Gravimetric estimation of magnesium as magnesium -8-hydroxy oxinate.
		12	Synthesis of benzoin, benzylic acid and para-bromo acetanilide.		
		13	Organic chemistry internal test	7	Gravimetric estimation of sulphate

	7	14	Organic chemistry internal test		as barium sulphate
5	8	15	Active methylene compounds: Definition, ethyl acetoacetate, preparation and keto-enol tautomerism in ethyl acetoacetate-its evidence.	8	Gravimetric estimation of aluminum as aluminum oxide.
		16	Synthetic applications: Acid hydrolysis, ketonic hydrolysis, mono carboxylic acids, dicarboxylic acidssuccinic acid		
	9	17	Synthetic applications: adipic acid, antipyrine, uracil, acetyl acetone, crotonic acid and cinnamic acid.	9	Laboratory internals
		18	Synthetic Polymers: Definition, vehicle, fixative, odorous substances. Classification, synthesis of 1. Methyl anthranilate		
5	10	19	synthesis of 2. Phenyl alcohol 3. Linalool 4. Mask ketone 5. α and β-Ionones, Vanillin.	10	Experiments revision
		20	Formation of tetrahedral and square planner complexes on the basis of VBT – [Ni(CN)4] 2-		
		21	Formation of octahedral		Gravimetric estimation of zinc as

	11		complexes on the basis of VBT [Fe(CN)6] 3- , [Co(CN)6] 3- , [CoF6] 3- [Cr(H2O)6] 3+ and [Fe(H2O)6] 2+	11	zinc oxide
		22	Formation of tetrahedral and square planner complexes on the basis of VBT – , [Cu(NH3)]2+, [Zn(NH3)4] 2+and [Ni(CO)4], limitations of VBT.		

6	12	23	Crystal field theory: Important features of crystal field theory, crystal field splitting of d-orbitals in tetrahedral, octahedral and square planar complexes,	12	Gravimetric estimation of calcium as calcium oxide.
		24	crystal field stabilization energy (CFSE), factors affecting the magnitude of Δo, (nature of ligand, oxidation state of the metal ion, size of the orbitals, geometry of the complex), high spin (HS) and low spin (LS) complexes		

	13	25	magnetic properties of metal complexes based on crystal field theory-[Co(NH3)6] 3+, [CoF6] 3- , [Fe(CN)6] 4- , [Fe(CN)6] 3- and [Ni(CN)4] 2- .	13	Paper chromatographic separation of Fe3+ and Ni2+ ions
		26	Magnetic susceptibility, measurement of magnetic moment by Gouy's method. Limitations of CFT. Ligand field theory: Evidences for metal ligand covalent bonding in complexes.		
	14	27	Bio-inorganic chemistry: Essential and trace elements in biological process, metalloporphyrins with special reference to haemoglobin and myoglobin, biological role of alkali and alkaline earth metal ions with respect to Na+ and Ca2+ ions.	14	Revision of experiments
		28	Revision of syllabus		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE HOLENARASIPURA

DEPARTMENT OF CHEMISTRY

B.Sc. Final year(NON CBCS)

LESSON PLAN FOR THE SESSION 2019-20 (Odd Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Manasa A K , Asha H D, Meghana R C and Hithashree (Theory and Practical)

Semester **:** 5th

Title of the Paper **: Physical chemistry(Paper: VII)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2019 to October, 2019)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 07, Practical – 00

Unit No.	Week	Theory		Practical	
		Lecture	Topic including	Practical	Topic

		Day	Assignment/Test	Day	
1&2	1	1	Crystallography: Elements of symmetry – plane, axis and centre, elements of symmetry in cubic crystals, law of rational indices – Weiss and Miller indices, lattice planes in cubic crystals.		
		2	Crystal lattice and unit cell, types of Lattice – Bravais lattices, X-Ray diffraction and Bragg's Law (to be derived).		
	2	3	determination of crystal structure of rock salt by rotating crystal method using Bragg's spectrometer.		
		4	application of X-ray studies – distance between lattice planes, density of crystals, determination of Avogadro Number.		
	3	5	(numerical problems on applications).		
		6	Liquid Crystals: Defination, classification of thermotropic liquid crystals into smectic and nematic with examples-molecular arrangement of these and their uses.		
	4	7	Spectrophotometry and photochemistry: Lambert – Beer's law – statement and mathematical form (to be derived).		

		8	Molar extinction coefficient – definition – spectrophotometer – construction and working, its application.		
	5	9	Laws of photochemistry – Grotthus-Draper law of photochemical activation and Einstein's law of photochemical equivalence.		
		10	quantum efficiency, reasons for low quantum yield (HBr formation as example) and high quantum yield (HCl formation as example).		
3&4	6	11	Aactinometry – Uranyl oxalate actinometer. Photophysical processes: Definition with examples – photosensitization (eg. photosynthesis in plants),		
		12	photo inhibition, fluorescence, phosphorescence, chemiluminescence and bioluminescence with examples.		
		13	Organic chemistry internal test		
		14	Organic chemistry internal test		

	7				
5	8	15	Determination of absorbed intensity – schematic diagram of apparatus used. Detectors – thermopile, photoelectric cell and actinometer (Uranyl oxalate).		
		16	Radiation Chemistry: Definition, primary and secondary stages in radiochemical reactions, ionic yield, energy yield, comparison with photochemistry.		
	9	17	units of radiation – rad, gray and roentgen, Dosimeter – Fricke dosimeter, theories of radiolysis – Lind's and EHT theories.		
		18	Radiolysis of water vapour, benzene and acetic acid.		
5	10	19	Molecular Spectroscopy: Regions of spectra, types of spectra, microwave spectra – rotational spectra of diatomic molecules, moment of inertia (expression to be derived).		

		20	Expression for rotational energy, selection rule and transition, calculation of bond length.		
	11	21	IR Spectra – vibrational spectra of diatomic molecules – force constant (no derivation), expression for vibrational energy.		
		22	zero point energy, selection rule and transitions. Vibrational modes of polyatomic molecules taking H2O and CO2 molecules as examples. Applications of IR spectroscopy (mention).		

6	12	23	NMR Spectroscopy: Introduction – spin number, chemical shift, instrumentation.		
		24	NMR spectra of ethyl alcohol – low and high resolution, applications (mention).		
			Raman Spectra: Concept of polarizability, pure rotation,		

	13	25	vibration (qualitative study) stoke's and antistoke's lines, selection rule, applications (mention).		
		26	Electronic Spectra: Potential energy curves for bonding and antibonding molecular orbitals, band theory, electronic transitions.		
	14	27	Qualitative description of non-bonding orbitals and transition between them. Selection rule and Franck Condon principle.		
		28	Revision of syllabus		

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SRI ADICHUNCHANA FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. First year (CBCS)

LESSON PLAN FOR THE SESSION 2018-19 (Odd Semester)

Name of the Faculty **:**Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Rashmi B J ,Manasa A K and Archana (Theory and Practical)

Semester **:** 1st

Title of the Paper **:** CHEMISTRY –I (DSC-2A)

Subject code **: A24-1**

Lesson Plan Duration **:** 16 weeks (from July, 2018 to October, 2018)

Total teaching period **: 60 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 04

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Atomic Structure: Review of Bohr's theory and its limitations, dual behaviour of matter and radiation.	1	Introduction to laboratory experiments.
		2	Basic Concepts in Organic Chemistry: Bond cleavage, reactive intermediates, Generation, stability and reactions involving carbocations.		
		3	Indicators: Definition, types (acid-base, redox, adsorption indicators), examples for each type.		
		4	Purification of compounds:		

A			Crystallisation, fractional crystallization.		
	2	5	Heisenberg's uncertainty principle. Hydrogen atomic spectra. Need of a new approach to Atomic structure.	2	Acidimetry/Alkalimetry Titrations Preparation of standard sodium carbonate solution and standardization of hydrochloric acid solution (methyl orange indicator). Estimation of sodium hydroxide present in the solution using phenolphthalein indicator.
		6	Basic Concepts in Organic Chemistry: Bond cleavage, reactive intermediates, Generation, stability and reactions involving carbanions, free radicals.		
		7	Theory of indicators – Oswald's theory and Quinonoid theory – indicator constant – action of phenolphthalein and methyl orange in acid-base solutions.		
		8	Distillation, steam distillation, fractional distillation.		
	3	9	Elements of Quantum chemistry- Schrodinger wave equation and meaning of various terms in it. Significance of ψ and ψ 2.	3	Preparation of standard oxalic acid solution and standardization of sodium hydroxide solution. Estimation of sulphuric acid present in the solution.
		10	Basic Concepts in Organic Chemistry: Bond cleavage, reactive intermediates, Generation, stability and reactions involving nitrenes and carbenes.		
		11	pH titration curves for strong acid vs strong base, weak acid vs strong base.		
		12	Distillation under reduced pressure, sublimation techniques with suitable examples.		

Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
A	4	13	Schrödinger equation for hydrogen atom. Radial and angular parts of the hydogenic wave functions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation).	4	Preparation of standard potassium biphthalate solution and standardization of sodium hydroxide solution. Estimation of oxalic acid present in the solution.
		14	Types of organic reactions: Definition with examples of addition, substitution, elimination.		
		15	pH titration curves for weak base vs strong acid, choice of indicators in these types of titrations. Calculation of pH in mixture of acid and base.		
		16	Stoichiometry : Mole concept, Concentration terms: normality, molarity (Problems to be worked).		
	5	17	Radial and angular nodes and their significance. Quantum numbers and their Significance.	5	Permanganometry Titrations: Preparation of standard oxalic acid solution and standardization of potassium permanganate solution. Estimation of ferrous ammonium sulphate present in the solution.
		18	Types of organic reactions: Definition with examples of condensation and rearrangement reactions with examples.		
		19	choice of indicators in these types of titrations. Calculation of pH in mixture of acid and base.		
		20	molality, mole fraction and ppm(Problems to be worked).		
		21	Shapes of s, p and d atomic orbitals, nodal planes. Rules for filling up of electrons in various orbitals (Aufbau principle, Pauli’s exclusion principle, Hund’s rule of maximum multiplicity and		Preparation of standard oxalic acid solution and standardization of potassium permanganate solution.

	6		n+l rule).	6	Estimation of hydrogen peroxide present in the solution.
		22	Electronic effects : Electronic displacement effects: Inductive Effect.		
		23	Partially miscible liquids: Critical solution temperature (CST) – types – phenol-water system, triethylamine-water system, nicotine-water system (mutual solubility temperature (MST) vs composition curves to be drawn).		
		24	Calculation of equivalent mass (acids).		
	7	25	Electronic configuration of the elements (up to Z=30) and anomalous electronic configurations.	7	Preparation of viva questions on experiments.
		26	Electronic effects : Electronic displacement effects: Electromeric Effect		
		27	Effect of addition of non-volatile solute on CST. Binary mixtures of completely miscible liquids.		
		28	Calculation of equivalent mass(bases).		
	8	29	Inorganic chemistry internals (C1)	8	Repetition of experiments
		30	Organic chemistry internals (C1)		
		31	Physical chemistry internals (C1)		
		32	General chemistry internals (C1)		

Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
	9	33	Stability of half-filled and completely filled orbitals- concept of pairing and exchange energy.	9	Estimation of NaOH and Na2CO3 in a mixture (or caustic soda) by double indicator method using approximately 0.1N HCl.
		34	Resonance, Hyperconjugation and their significance		
		35	Vapour pressure – definition, vapour pressure – composition diagrams and boiling point – composition diagrams.		
		36	Calculation of equivalent mass (salts, oxidising and reducing agents)		
	10	37	Periodic Table and Periodicity: Classification of elements into s, p, d, and f-blocks, cause of periodicity.	10	Estimation of sulphuric acid and oxalic acid in a mixture using standard sodium hydroxide and standard potassium permanganate solutions.
		38	Alkanes: Preparation by Corey-House reaction, conversion of alkanes to aromatic compounds via alkenes and alkynes- aromatization and pyrolysis.		
		39	Classification into the types – obeying Raoult's law (type I), showing positive deviation from Raoult's Law (type II) and showing negative deviation from Raoult's Law (type III) – examples for each type.		
		40	oxidation number of element in a molecule. Applications of oxidation number.		
	11	41	Atomic radius: Covalent, ionic, van der Waal's and crystal radii. Additive nature of covalent radii. Determination of ionic radii by Lande's method. Variation of covalent radii in a group and in a period- explanation for the observed trends.	11	Iodometry Titrations Determination of BOD in sewage water.

B		42	Alkenes: Preparation of alkenes by Wittig's reaction, Hoffmann's elimination, Stereoselectivity. Mechanism of electrophillic addition, oxymercuration, reduction.		
		43	Principles of fractional distillation: Fractional distillation of type I, type II and type III liquid mixtures (with examples). Azeotropic mixtures (definition). Binary mixtures of completely immiscible liquids (with examples).		
		44	Applications of oxidation number, balancing of redox reactions by oxidation number method. Oxidation number and valency (comparison).		
	12	45	Comparison of the size of atoms with their corresponding anions and cations, variation of ionic radii in isoelectronic ions. Ionization enthalpy: Successive ionization enthalpy, factors affecting ionization enthalpy,	12	Complexometric Titration Preparation of zinc sulphate solution and standardization of EDTA. Estimation of total hardness of water.
		46	hydroboration – oxidation and epoxidation. Mechanism of oxidation with KMnO4 and OsO4, ozonolysis. Industrial applications of ethene and propene.		
		47	Binary mixtures of completely immiscible liquids (with examples), weight fraction of distillates (no derivation), principle of distillation, applications (numerical problem on weight fractions of components).		
		48	Introduction to organic chemistry- Definition and importance of organic compounds to life and applications in food, fuels.		

	13	49	Ionization enthalpy: Variation in a group and in a period – explanation for the observed trends. Electron gain enthalpy: Successive electron gain enthalpy, variation of electron gain enthalpy in a period and in a group- explanation for the observed trends.	13	Determination of dissolved oxygen in sewage water.
		50	Dienes: Types, relative stabilities of dienes, conjugated dienes – 1,3 butadiene-structure.		
		51	Distribution Law: Nernst distribution law – statement, distribution coefficient, verification of distribution law taking distribution of I2 in H2O and CCl4 – limitations of the law, conditions for the validity of distribution law.		
		52	Definition and importance of organic compounds to textiles, dyes, drugs and cosmetics with examples.		
	14	53	Electronegativity: Variation of electronegativity in a group and in a period- explanation for the observed trends. Factors determining electro negativity (charge on the atom and hybridization). Pauling, Mulliken and Alfred-Rochow scale of electronegativity. Applications of electronegativity.	14	Repetition of experiments
		54	Dienes: Types, relative stabilities of dienes, conjugated dienes – 1,2 and 1,4-addition reactions with H2 and halogens, Diel's Alder reaction with an example. Alkynes: Methods of preparation – Dehydrohalogenation, vicinal and gem dihalides, reactions of alkynes – Electrophillic additions with HCN, CH3COOH and H2O polymerization.		

		55	Association of the solute in one of the solvents, dissociation of the solute in one of the solvents, application of distribution law with respect to solvent extraction process (numerical problems) .		
		56	Nomenclature(IUPAC) of bifunctional, aliphatic and aromatic compounds.		
Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
B	15	57	Revision of syllabus.	15	Practice lab
		58	Revision of syllabus.		
		59	Revision of syllabus.		
		60	Revision of syllabus.		

Reference Books:

1. Douglas, B.E., McDaniel, D.H. & Alexander, J.J. Concepts and Models in Inorganic Chemistry, John Wiley & Sons.
2. Huheey, J.E., Keiter, E.A., Keiter, R.L. &Medhi, O.K. Inorganic Chemistry: Principles of structure and Reactivity, Pearson Education India, 2006.
3. Graham Solomon, T.W., Fryhle, C.B. &Dnyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
4. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S.
5. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010
6. Bahl, A. &Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.
7. Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
8. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).

Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt.

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE, CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. First year (CBCS)

LESSON PLAN FOR THE SESSION 2018-19 (Even Semester)

Name of the Faculty **:**Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Rashmi B J ,Manasa A K and Archana (Theory and Practical)

Semester **:**2nd

Title of the Paper **: CHEMISTRY –II (DSC-2B)**

Subject code **: B24-1**

Lesson Plan Duration **:** 16 weeks (from December, 2019 to April, 2020)

Total teaching period **: 60Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 04

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	**Chemical Bonding and Molecular Structure** **Ionic Bonding:** Definition and explanation with suitable examples. General characteristics of ionic bonding.	1	Introduction to laboratory experiments.
		2	**Cycloalkanes:** Sache-Mohr theory. Conformation of cyclopentane and cyclohexane.		
		3	**Chemical Kinetics:** Introduction – differential and integrated rate equations for second order		

A			Kinetics.		
		4	Preparation and synthetic applications of organic reagents – acetyl chloride, acetic anhydride.		
	2	5	Energy considerations in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds.	2	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 1) Acids
		6	Conformation of mono and disubstituted cyclohexane.		
		7	Derivation of second order rate equation when a=b and a≠b.		
		8	Preparation and synthetic applications of organic reagents – Raney Nickel, Dimethyl sulphate, Lithium aluminium hydride.		
	3	9	Born-Landé equation for calculation of lattice energy, Born-Haber cycle and its applications.	3	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 2. Alcohols
		10	Conformational analysis of butane and ethylene glycol with energy profile diagram.		
		11	unit of rate constant, half life period, problems.		
		12	**Polymers:** Introduction, monomer, repeating units, types (linear, branches and network) with Examples.		

Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
A	4	13	polarizing power and polarizability. Fajan's rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character.	4	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 3. Aldehydes
		14	**Aromatic hydrocarbons:** Nomenclature of benzene derivatives, Huckel's rule with respect to benzenoids, (benzene, naphthalene, anthracene and phenanthracene).		
		15	Experimental verification of second order reactions – study of kinetics of saponificaiton of an ester.		
		16	polymerization reaction (addition and condensation).		
	5	17	**Covalent bonding:** Definition and explanation with suitable examples, factors favouring the formation of covalent bond.	5	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 4. Amides
		18	Huckel's rule with respect to non-benzenoid compounds (cyclopentadienyl anion, cycloheptadienylcation) anti-aromaticity. Annulenes (14 to 18 carbon atoms)		
		19	Determination of the order of reaction – differential, time for half change method and isolation method.		
		20	molar masses of polymers – types (number average and mass average).		

	6	21	Valance bond approach -Shapes of some inorganic molecules and ions on the basis of VSEPR theory(NH_3, H_2O,SO_4^{2-} & ClO_4^-).	6	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 5. Amines
		22	Aromatic electrophillic substitution – General mechanism, electronic interpretation of orientating influence of electron donating groups (-CH_3, -Cl, -NH_2 and -OH groups).		
		23	Effect of temperature on rate of a reaction, Arrhenius equation, concept of activation energy, problems.		
		24	Determination of molar mass (viscosity and osmotic pressure method) (Numerical problems).		
	7	25	Hybridization of linear, trigonal planar, ($BeCl_2$, BF_3, $[Ni(CN)_4]_2$	7	Preparation of viva questions on experiments.
		26	Electron withdrawing groups (-NO_2, -CHO, -COOH and –SO_3H groups) on electrophillic substitution reactions.		
		27	Theories of reaction rates-simple collision theory and transition state theory, comparison of two theories.		
		28	**Organic reagents in inorganic analysis-** Advantages of organic precipitants over inorganic Precipitants, DMG.		
	8	29	Inorganic chemistry internals (C1)	8	Repetition of experiments
		30	Organic chemistry internals (C1)		
		31	Physical chemistry internals (C1)		
		32	General chemistry internals (C1)		

Part	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	9	33	Hybridization of tetrahedral, trigonalbipyramidal and octahedral arrangements ($SiCl_4$, PCl_5 and SF_6 respectively).	9	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 6. Halogenated hydrocarbons
		34	**Hydrogenation of aromatic compounds:** Birch reduction, side chain oxidation of toluene to benzaldehyde and benzoic acid. Resonating structures of benzene, naphthalene and anthracene.		
		35	Experimental methods of chemical kinetics, conductometric – example - saponification of esters and spectrophotometric – example – colorimetric study of kinetics of oxidation of Indigocarmine by chloramine-T.		
		36	**Organic reagents in inorganic analysis-** Advantages of organic precipitants over inorganic Precipitants 8-hydroxy quinoline (Oxine), 1,10-phenanthroline.		
	10	37	Concept of resonance and resonating structures in various inorganic compounds and ions (CO, CO_2, N_2O)	10	Qualitative analysis of mono functional organic compounds through functional group analysis. Determination of physical constant. Preparation of suitable derivative of 7. Hydrocarbons
		38	Diel's Alder reactions of anthracene with maleic anhydride. **Biphenyls:** Preparation – Ullmann reaction.		
		39	**Ionic equilibria:** Debye-Huckel theory of strong electrolytes (relaxation time effect, electrophoretic effect and viscous		

B			effect).		
		40	**Organic reagents in inorganic analysis-** Advantages of organic precipitants over inorganic Precipitants ,EDTA. Structure of Ni^{2+}-DMG and Mg^{2+}-oxine complexes.		
	11	41	**MO approach**: Rules for the LCAO method, bonding and antibonding MOs and their characteristics for s-s, s-p and p-p combinations of atomic orbitals.	11	Organic preparations: Recrystallisation and determination of melting point and its importance may be mentioned 1. Acetylation : Preparation of acetanilide from aniline.
		42	**Organic halides:** Alkyl halides: isomerism and classification.		
		43	Debye-Huckel-Onsagar equation (no derivation), Debye-Huckel Limiting equation for activity coefficients (no derivation).		
		44	**Soaps, detergents and waxes** : definition and types of soaps.		
	12	45	Nonbonding combination of orbitals, MO treatment of homonuclear diatomic molecules of 1st and 2nd periods (H_2, He_2.	12	Oxidation: Preparation of benzoic acid from benzaldehyde.
		46	Elimination reaction: dehydrohalogenation. Saytzeff rule, Nucleophilic substitution reaction. S_{N1} with energy profile diagram.		
		47	Hydrolysis of salts – (four types) derivation - degree of hydrolysis and its relationship with K_h.		
		48	manufacture of soap by hot process, cleansing action of soap.		
	13	49	MO treatment of homonuclear diatomic molecules of 1st and 2nd		Nitration : Preparation of m-dinitrobenzene

			periods (N_2, O_2 and F_2)		from benzene.
		50	Nucleophilic substitution reaction. S_{N2} with energyprofile diagram. Effect of nature of alkyl groups.	13	
		51	Relationship between K_h, K_w, $K_a$and K_b.		
		52	Detergents, types with examples.		
	14	53	Heteronuclear diatomic molecules such as CO, NO and NO^+. Comparison of VB and MO approaches.	14	Diazotization : preparation of methyl orange.
		54	Effect of nature of nucleophiles and solvents.		
		55	pH of salt solutions and problems.		
		56	Differences between soaps and detergents. Waxes – Definition, types with examples.		
Part	**Week**	**Theory**		**Practical**	
		Lecture Day	**Topic including Assignment/Test**	**Practical Day**	**Topic**
B	15	57	Revision of syllabus.	15	Repetition of experiments
		58	Revision of syllabus.		
		59	Revision of syllabus.		
		60	Revision of syllabus.		

Reference Books:

1. Douglas, B.E., McDaniel, D.H. & Alexander, J.J. Concepts and Models in Inorganic Chemistry, John Wiley & Sons.
2. Huheey, J.E., Keiter, E.A., Keiter, R.L. &Medhi, O.K. Inorganic Chemistry: Principles of structure and Reactivity, Pearson Education India, 2006.
3. Graham Solomon, T.W., Fryhle, C.B. &Dnyder, S.A. Organic Chemistry, John Wiley & Sons (2014).
4. Finar, I.L. Organic Chemistry (Vol. I & II), E.L.B.S.
5. Morrison, R.T. & Boyd, R.N. Organic Chemistry, Pearson, 2010
6. Bahl, A. &Bahl, B.S. Advanced Organic Chemistry, S. Chand, 2010.
7. Barrow, G.M. Physical Chemistry Tata McGraw-Hill (2007).
8. Castellan, G.W. Physical Chemistry 4th Ed. Narosa (2004).
9. Kotz, J.C., Treichel, P.M. & Townsend, J.R. General Chemistry Cengage Learning India Pvt. Ltd., New Delhi (2009).

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. Second year

LESSON PLAN FOR THE SESSION 2018-19(Odd Semester)

Name of the Faculty **:**Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Rashmi B J ,Manasa A K and Archana (Theory and Practical)

Semester **: 3rd**

Title of the Paper **:** CHEMISTRY (**Paper: III)**

Subject code **:**

Lesson Plan Duration **:** 14 weeks (from August, 2018 to October, 2018)

Total teaching period **: 42 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Metallic bond: Definition, factors favouring the formation of metallic bond, Band theory, explanation of electrical conductance of metals.	1	Introduction to lab – identification of components, chemicals and equipment used in laboratory.
		2	Organic halides: Alkyl halides: isomerism and classification, elimination reaction: dehydrohalogenation. Saytzeff and Hoffmann elimination with mechanism.		
		3	Polymers: Introduction, monomer, repeating units, types (linear, branches and network)		

			with examples.		
1	2	4	Insulators and Superconductors (explanation and applications with suitable examples). Hydrogen bonding: Types of hydrogen bonding, conditions for the formation of H-bond.	2	Systematic semi-micro qualitative analysis of a mixture of two simple salts Ca2+, Mg2+, Cl-, CO3 2-
		5	Nucleophilic substitution reaction. SN 1 and SN 2 with energy profile diagram.		
		6	classification (arrangement and shape) with examples, polymerization reaction (addition and condensation), molar masses of polymers – types (number average and mass average).		
	3	7	Hydrogen bonding in HF, H2O, NH3, alcohols, carboxylic acids and nitrophenols.	3	Salt number 2) Ca2+ , K+, Cl-, NO3 - ,
		8	Effect of nature of alkyl groups, nature of leaving groups, nucleophiles and solvents. [3 Hours.		
		9	determination of molar mass (viscosity and osmotic pressure method) (Numerical problems).		
1	4	10	Appropriate anomalous properties like physical state, boiling point and solubility. Structure of ice. Theories (or nature) of hydrogen bond (electrostatic approach, VBT and MOT treatments) .	4	Salt number 3) Mg2+, CO3 2-, NH4 +, Cl-.
		11	Aryl halides: Relative reactivity of alkyl, allyl halides towards nucleophilic substitution reactions.		
		12	Ionic equilibria: Ionic equilibria in aqueous solutions, strong and weak electrolytes – definition		

			and examples. Ostwald's dilution law (to be derived) and its limitations (numerical problems).		
2	5	13	Metal carbonyls: Definition, classification with examples, nature of M-CO bonding in carbonyls.	5	Salt number 4) Sr 2+, SO4 2-, Zn2+, Cl-.
		14	Aryl halides: Relative reactivity of vinyl and aryl halides towards nucleophilic substitution reactions.		
		15	Activity and activity coefficients – definition and their relation. Mean ionic activity coefficients – ionic strength – determination and its calculation. Debye-Huckel theory of strong electrolytes (relaxation time effect, electrophoretic effect and viscous effect).		
2	6	16	Revision of inorganic chemistry unit -1	6	Salt number 5) Al3 +, NO3 - , Ba2+, Cl-.
		17	Revision of organic chemistry unit -1		
		18	Revision of physical chemistry unit-1		
	7	19	Inorganic chemistry internal test	7	Salt number 6) Al3 +, NO3 - , SO4 2-, Zn2+,
		20	Organic chemistry internal test		
		21	Physical chemistry internal test		
2	8	22	Preparation, properties and structures of mono nuclear and binuclear metal carbonyls- Ni(CO)4, Cr(CO)6, Fe(CO)5, Mn2(CO)10, Co2(CO)8		Salt number 7) CO3 2-, NH4 +, Cl-, Ca2+.

		23	Generation of benzyne-trapping with dienes (furan and anthracene).	8	
		24	Debye-Huckel-Onsagar equation (no derivation), Debye-Huckel Limiting equation for activity coefficients (no derivation). Solvent system concept of acids and bases. Role of solvents in altering strengths of acids and bases.		
3	9	25	Applications of EAN rule to mononuclear metalcarbonyls. Boron: Boron hydrates – diborane, preparation, structure and uses.	9	Practical internals
		26	Organometallic compounds: Definition with example, organo zinc compounds – preparation of diethyl zinc and its applications.		
		27	Solvent system concept of acids and bases. Role of solvents in altering strengths of acids and bases.		
3	10	28	Carbon: Fullerenes – production, structure of C60 and C70. Diamond, graphite – properties and structure. Silicon: Structure of silica. Silicates – types and structure with one example for each type.	10	Salt number 8) Na^+, Ba^{2+}, Br^-, SO_4^{2-}.

		29	Organolithium Compounds: Preparation and synthetic applications.		
		30	Hydrolysis of salts – derivation of hydrolysis constant and degree of hydrolysis of the salt of weak acid and weak base (ammonium acetate), effect of temperature on degree of hydrolysis.		
	11	31	Nitrogen: Preparation, properties, structure and applications of hydrazine, hydroxyl amine and nitrogen trichloride.	11	Salt number 9) Zn^{2+}, Ba^{2+}, Br^{-}, CO_3^{2-}.
		32	Alcohols: Definition and classification. Monohydric alcohols: Preparation of alcohols by hydroboration and oxidation method. Hydration of alkenes.		
		33	Distribution Law: Nernst distribution law in liquid-liquid systems, distribution coefficient		

3	12	34	Sulphur: Preparation, properties, structures and applications of thionyl chloride, sulphuryl chloride and SF6.	12	Give reason and problems related to inorganic analysis.
		35	Distinction tests between 1°, 2°, and 3° alcohols by Victor Meyer oxidation method. Conversion of 1° to 2°, 2° to 3° and 1° to 3° alcohols. Dehydration of 1°, 2°, 3° alcohols and comparison of their rates.		
		36	Nernst distribution law – verification of distribution law taking distribution of I2 in H2O and CCl4 – limitations of the law, conditions for the validity of distribution law.		
	13	37	Halogens: Bleaching powder – preparation, properties and structure. Pseudo halogens: Preparation, properties and structure of cyanogen and thiocyanogen (any one method of preparation and any three properties to be discussed).	13	Practice lab experiments revision.
		38	Dihydric alcohols: Glycol – preparation from vicinal dihalides and uses. Pinacoles – synthesis, mechanism of pinacol-pinacolone rearrangement		
		39	association of the solute in one of the solvents, dissociation of the solute in one of the solvents, application of distribution law with respect to solvent extraction process (numerical problems)		
	14	40	Old question paper revision	14	Internal practical test (IA)
		41	Revision/ doubt discussion section. Assignment submission		
		42	Internal theory test (IA)		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY
B.Sc. Second year

LESSON PLAN FOR THE SESSION 2018-19 (Even Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Rashmi B J ,Manasa A K and Archana (Theory and Practical)

Semester **: 4th**

Title of the Paper **:** CHEMISTRY (**Paper: IV)**

Subject code **:**

Lesson Plan Duration **:** 14 weeks (from December, 2018 to April, 2019)

Total teaching period **: 42 Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Noble gases: Isolation from air by Rayleigh's method, preparation, separation of Noble gases-Dewar's method.	1	Introduction to lab – identification of components, chemicals and equipment used in laboratory.
		2	Ethers: Nomenclature, Williamson ether synthesis, reactions – cleavage and auto-oxidation-Ziesel's method.		
		3	Second law of thermodynamics: Limitations of First Law of Thermodynamics – need for II Law of thermodynamics, spontaneous, non-spontaneous and equilibrium processes (definitions and examples for		

			each).		
1	2	4	Preparation, Structure and applications of compounds of Xenon and Krypton (XeF2, XeOF2, XeO3, KrF2, KrF4, KrO3 XH2O-one method of preparation for each	2	Determination of the density using specific gravity bottle and viscosity of a liquid using Ostwald's viscometer.
		5	Epoxides: Synthesis by Darzen's method. Acid and base catalyzed opening of epoxides.		
		6	different ways of stating II Law, heat engine (example) Carnot cycle, efficiency of Carnot cycle (derivation).		
	3	7	Clathrates (explanation with suitable examples, essential conditions for the formation and uses).	3	Determination of the density using specific gravity bottle and surface tension of a liquid using stalagmometer.
		8	Crown ethers: Introduction with examples.		
		9	concept of entropy – definition and physical significances of entropy – criteria of spontaneity in terms of entropy change, statements of II law in terms of entropy (numerical problems to be worked out on entropy and efficiency of Carnot engine).		
1	4	10	Non-aqueous solvents: Liquid ammonia-reasons for the solvent properties, typical reactions-solubility of alkali metals; acid-base.	4	Determination of molecular mass of a non-volatile solute by Walker-Lumsden method.
		11	Carbonyl Compounds: Distinction between aldehydes and ketones – oxidation and reduction method. Addition of alcohols- formation of hemiacetal and acetal.		
		12	Free energy: Helmholtz and Gibb's free energy – their		

			definitions and their relationship, Gibb's – Helmholtz equation at constant pressure and volume (derivations), thermodynamic criteria of equilibrium and spontaneity, variation of free energy with temperature and pressure, Claussius – Clappeyron equation (differential form to be derived)		
2	5	13	precipitation, ammonolysis, Ionization of weak acids, advantages and disadvantages. Liquid SO2-reasons for the solvent properties, typical reactions-acid-base, solvolysis, precipitation, amphoteric and redox.	5	Determination of rate constant of the decomposition of hydrogen peroxide catalyzed by FeCl3.
		14	Condensation with NH2OH and 2,4-DNP. Mechanism of aldol condensation.		
		15	integrated form of Claussius – Clappeyron equation (to be assumed) and its applications (enthalpy of vapourization, boiling point and freezing point at different temperatures), (numerical problems on these applications), Van't Hoff's reaction isotherms and isochore equations (to be derived).		
2	6	16	Revision of inorganic chemistry unit -1	6	Determination of transition temperature of the salt hydrates.
		17	Revision of organic chemistry unit -1		
		18	Revision of physical chemistry unit-1		
		19	Inorganic chemistry internal test		Determination of percentage composition of sodium chloride
		20	Organic chemistry internaltest		

	7	21	Physical chemistry internal test	7	solution by determining the miscibility temperature of phenol - water system
2	8	22	HSAB: Classification of acids and bases as Hard and Soft. Pearson's HSAB concept, acid-base strength, hardness and softness, symbiosis.	8	Determination of the mass present in the given solution of a strong acid using strong base by thermometric titration method.
		23	Perkins reaction, Cannizzaro reaction, Claisen condensation, Knovenagel reaction.		
		24	Elementary Quantum Mechanics: black body radiation – Planck's Law, Photoelectric effect, Compton effect.		
3	9	25	Nuclear chemistry: Fundamental particles of nucleus- nucleons, isotopes, isobars and isotones (definition with suitable examples), Nuclear forces (brief explanation).	9	Practical internals
		26	Carboxylic acids: Definition, classification with examples. Synthesis by Arndt-Eistert reaction, resonance structure of carboxylate ion and its stability.		

		27	Schrodinger's wave equation (no derivation) and its importance, physical interpretation of wave function.		
3	10	28	Nuclear stability-n/p ratio, Mass defect, Binding energy, Inner structure of nucleus- Liquid drop model, Nuclear fission- (definition with suitable examples).	10	Determination of molecular weight of a polymer material by viscosity measurements (cellulose acetate/methyl acrylate).
		29	Effect of substituents on acidity of aliphatic and aromatic carboxylic acids. Hydroxy acids: Synthesis of lactic, citric and tartaric acids.		
		30	Particle in one dimensional box (no derivation), Hamiltonian operator.		
	11	31	Plutonium as a fissionable material (Plutonium bomb), nuclear fusion and its advantages over nuclear fission reactions, hydrogen bomb, nuclear transmutation-artificial radioactivity.	11	Study of kinetics of reaction between K2S2O8 and KI, second order, determination of rate constant.
		32	Effect of heat on α, β, γ-hydroxy acids. Amines: Definition, classification with example.		
		33	Physical Properties and chemical constitution: Additive and constitutive properties, properties of liquids – viscosity, definition of coefficient of viscosity, factors affecting viscosity – temperature, size,		

		35	Separation of amine mixture by Hinsberg's method using toluene sulphonyl chloride. Distinction tests for 1°, 2°, 3° amines (acetylation and Hoffmann's exhaustive methylation. Action of nitric acid on different amines. Both aliphatic and aromatic 1°, 2°, 3° amines, basicity of amines, effect of substituents on basicity of aliphatic and aromatic amines.		
		36	Parachor: Definition – Sugden equation, calculation of parachor and its application with respect to structural elucidation of benzene and quinone.		
	13	37	Uses of radio isotopes – tracer technique, agriculture, medicine, food preservation and dating (explanation). Separation of uranium isotopes – Laser irradiation method (atomic and molecular routes).	13	Practice lab experiments revision.
		38	Hoffmann-Martius rearrangement. Diazonium Compounds: preparation, mechanism of preparation and synthetic applications of benzene diazonium chloride. Conversion to phenol, halobenzene, phenyl hydrazine and coupling reaction.		
		39	numerical problems based on surface tension, viscosity and parachor applications.		
	14	40	Old question paper revision	14	Internal practical test (IA)
		41	Revision/ doubt discussion section. Assignment submission		
		42	Internal theory test (IA)		
			weight, shape of molecule		

SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2018-19(Even Semester)

Name of the Faculty : Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Rashmi B J ,Manasa A K and Archana (Theory and Practical)

Semester : 6^{th}

Title of the Paper : **Inorganic chemistry(Paper: VIII)**

Subject code :

LessonPlan Duration : 14weeks (from December, 2018 to April, 2019)

Total teaching period : **28Hrs.**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 00

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Inorganic polymers: Definition – examples, general properties, comparison with organic polymers, glass transition temperature		
		2	Silicones: Definition, nomenclature, preparation (linear, cross-linked and cyclic). Factors affecting the nature of silicon polymers, properties (chemical and thermal stabilities, chemical properties)		

1&2	2	3	uses of silicon polymers, silicon fluids/oils – uses, silicon elastomers – rubbers, silicon resins (preparation and uses)		
		4	Phosphazenes: Definition, types, structures, preparation, properties and uses. Crystalline polymetaphosphates – Maddrell's and Kuroll's salts – properties and uses.		
	3	5	Nature of bonding in phosphazenes. Fluorocarbons: Definition, examples, preparation, properties and uses of Freon-12, Freon-22, PTFE and poly per fluorovinyl chloride.		
		6	Abrasives: Definition, classification with examples – hardness, manufacture and applications of carborundum, alundum and tungsten carbide.		
	4	7	Refractories: Definition, properties, classification with examples. Different steps involved in the manufacture of refractories. Applications of refractories.		
		8	Explosives: Definition, classification with examples, characteristics of explosives. Preparation and uses of dynamite, cordite and RDX.		
		9	Paints: Constituents and their functions, manufacture of lithopone and titanium dioxide.		

	5	10	Fuels: Definition, classification with examples – characteristics, calorific value, determination of calorific value of a solid or liquid fuel.		
3&4	6	11	Applications of gaseous fuels. Compressed natural gas, water gas, producer gas and LPG – their production, composition and applications		
		12	Propellants: Definition, characteristics, classification and applications.		
	7	13	Inorganic chemistry internal test		
		14	Inorganic chemistry internal test		
5	8	15	Fertilizers: Definition and classification, manufacture of nitrogeneous fertilizers – CAN and urea. Phosphatic fertilizers – calcium dihydrogen phosphate, NPK type fertilizers.		
		16	Metallurgy: Types of metallurgy: Pyrometallurgy: Extraction of Nickel from sulphide ore – general metallurgy followed by Mond's process (purification).		
		17	manganese from oxide ores – reduction by the Aluminothermite process – refining by electrolytic process.		

	9	18	Hydrometallurgy: Extraction of gold from native ore by cyanide process and refining by quartation process.		
5	10	19	Electrometallurgy: Extraction of lithium by fusion method followed by electrolysis of lithium chloride.		
		20	Powder metallurgy: Importance, metal powder production and applications, production of tungsten powder.		
	11	21	Extraction of (1) Thorium from monazite sand – purification by iodine method, (2) uranium from pitch blende – production of U3O8 by carbonate method.		
		22	U3O8 to UO2 by reduction, UO2 to U by fluoride method.		

6	12	23	Nanotechnology: Definition, uses and nature of nanotechnology, Nanomaterials-definition, properties and applications		
		24	Carbon nanotubes- definition, types, methods of preparation (mention).		
	13	25	properties and industrial applications of carbon nanotubes.		
		26	Nanowires-definition, types.		
	14	27	production of crystalline nanowires by vapour-liquid-solid synthesis method, applications of nanowires.		
		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2018-19(Even Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Rashmi B J ,Manasa A K and Archana (Theory and Practical)

Semester **:** 6th

Title of the Paper **: Organic chemistry(Paper: IX)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from December , 2018 to April, 2019)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Hetrocyclic Compounds: Definition, classification with examples, synthesis of furan, thiophene,	1	Introduction of organic chemistry experiments
		2	pyrrole, pyridine, indole (Fischer method) quinoline (Skrup's synthesis with mechanism), isoquinoline, pyrimidine (one method each),		
		3	Uric acid: Elucidation of structure and synthesis by Fischer's method, conversion of uric acid to		Separation of p- and o-nitroaniline by TLC method (Solvent

1&2	2		purine and caffeine	2	extraction)
		4	Alkaloids: Definition, classification based on heterocyclic rings-isolation		
	3	5	synthesis and structural elucidation of nicotine and morphine, physiological importance of alkaloids.	3	Separation of p- and o-nitroaniline by column chromatography
		6	Vitamins: Definition, classification, structural elucidation and synthesis of Vit-A, Synthesis of Vit-C		
	4	7	structural formulae of Vit B1, B2, B6, calciferol, E and K and their importance.	4	Estimation of glucose by Fehling solution method
		8	Hormones: Definition, classification, synthesis of adrenaline, thyroxine, structural formulae of estradiol, progesterone and testosterone and their importance.		
	5	9	Drugs: Chemotherapy and chemotherapeutic agents, definition of drugs, types of drugs, antipyretics, analgesics, anesthetics.	5	Estimation of Phenol by acetylation method.
		10	sedatives, narcotics, antiseptics, antibacterials, antibiotics, antimalarials and sulpha drugs with examples.		
		11	Synthesis of paracetamol, sulphanilamide, sulphaguanidine.		Estimation of ascorbic acid by iodometric

3&4	6	12	Special techniques in organic synthesis: a) Polymer supported reagents – introduction, properties of polymer support-advantages of polymer support reagents, choice of polymers, types and applications.	6	method.
	7	13	Organic chemistry internal test	7	Determination of Iodine value of oils by chloromine-T.
		14	Organic chemistry internal test		
5	8	15	Phase transfer catalysis – introduction, definition, types, preparation, mechanism and advantages.	8	Isolation of Caffeine from tea powder
		16	c) Microwave induced organic synthesis – introduction, reaction vessel, reaction medium, advantages, limitations, precaution and applications		
	9	17	Sonochemistry – use of ultra sound in organic synthesis, introduction, instrumentation, physical aspects, types and applications.	9	Estimation of neutral amino acids by titrametric method.

		18	Amino acids: Structure of α-amino acids, peptide bond, protecting groups-Boc, Z, F-moc groups, use of HOBt and HOAt.		
5	10	19	Spectroscopy of organic compounds: UV-visible spectroscopy: Introduction, chromophores and auxo chrome, blue shift and red shift.	10	Organic chemistry practical test
		20	representation of spectra of 1,3-butadiene, benzene and lycopene. Influence of conjugation on UV absorption-comparison of UV spectra of acetone and methylvinyl ketone.		
	11	21	IR-Spectroscopy: Introduction, stretching frequency of –OH (free and H-bonded), alkyl –C-H, C=C, C=C, C-C, C=O and C-O groups (by taking suitable examples).	11	Estimation of carboxylic acid by titrametric method.
		22	Graphical representation of IR spectra of benzoic acid and methyl benzoate		

6	12	23	NMR Spectroscopy: Basic principles of proton magnetic resonance , nuclear magnetic spin quantum number I, influence of the magnetic field on the spin of nuclei	12	Estimation of –NH2 group by acetylation method.
		24	spin population, saturation using radio frequency, nuclear magnetic resonance-chemical shift (δ value), uses of TMS reference		
	13	25	Nuclear shielding effects, equivalent and non-equivalent protons, spin-spin splitting and coupling.	13	Determination of saponification value of oils.
		26	Applications of NMR spectroscopy to simple organic molecules (like ethyl alcohol, ethane, propane, ethylene, methylamine.		
	14	27	Aniline, benzene, toluene, acetone, acetophenone, methyl cyanide and other simple molecules.	14	Revision of experiments
		28	Revision of syllabus		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE HOLENARASIPURA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2018-19 (Even Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Rashmi B J ,Manasa A K and Archana (Theory and Practical)

Semester **:** 6th

Title of the Paper **: Physical chemistry(Paper: X)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from December , 2018 to April, 2019)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Electrochemistry-I: Introduction, conductance – specific conductance, equivalent conductance and molar conductance – their definitions and SI units.	1	Introduction of laboratory physical chemistry equipments.
		2	Conductance cell and cell constant. Determination of equivalent conductance by meter – bridge method, ionic mobility, ionic conductance, Kohlrausch's law and its significance – determination of equivalent conductance at infinite dilution for		

1&2			weak electrolyte.		
	2	3	Transport number: Definition and explanation, anomalous transport number – explanation with examples – relationship between ionic conductance and transport number (to be derived)	2	Determination of equivalent conductance of the given electrolyte (strong and weak) by using Meter Bridge.
		4	determination of transport number by moving boundary method – transport number of H+ using CdCl2 as supporting electrolyte (numerical problems on equivalent conductance, transport numbers and kohlrausch's law).		
	3	5	Application of conductance measurements – (a) solubility and solubility product of sparingly soluble salt, (b) ionic product of water.	3	Determination of solubility of sparingly soluble salt (like BaSO4) by conductometric method
		6	degree of ionization of weak electrolyte. Numerical problems for the applications of a, b and c to be worked out.		
	4	7	Conductometric titration: strong acid vs strong base, weak acid vs strong base, strong acid vs weak base, weak acid vs weak base, with suitable examples for each.	4	Determination of solubility of sparingly soluble salt (like BaSO4) by conductometric

		8	Electromotive force-I: Electrolytic and electrochemical cells, electrode reaction of Daniel cell, single electrode potential.		method.
	5	9	sign of electrode potential-convention (reduction potential to be adopted), convention of representing a cell, EMF and standard EMF of a cell, cell reaction, reversible and irreversible cells,	5	Determination of rate constant of saponification of ethyl acetate by conductivity measurements
		10	Nernst equation (to be derived) and calculation of electrode potential, standard hydrogen gas electrode, reference electrodes-calomel.		
3&4	6	11	Ag-AgCl electrode-construction and working, electrochemical series and its significance, equilibrium constant and free energy of cell reaction, spontaneity of a cell reaction.	6	Conductometric titration of strong acid and strong base and weak acid and strong base.
		12	EMF of concentration cells: Definition with explanation – with transference and without transference, concentration cells – with examples.		
	7	13	Physical chemistry internal test	7	Determination of percentage composition of a given mixture containing two miscible liquids by Abbe's refractometer.
		14	Physical chemistry internal test		
		15	Liquid junction potential and salt bridge. (Numerical problems on Nernst equation and EMF		pH titration of strong acid against strong base (by observing

5	8		calculations).	8	change in pH).
		16	Fuel cells: Working of H2-O2 fuel cell and its importance.		
	9	17	Electromotive force-II Application of EMF measurements: (a) Determination of pH of a solution using quinhydrone electrode.	9	Laboratory internals
		18	Glass electrode (using dip type Calomel electrode) – Explanation with principle and procedure.		
5	10	19	Potentiometric titration – principle, location of end points in - (1) Neutralization reactions [NaOHVsHCl] (2) Oxidation-reduction reactions [K2Cr2O7 Vs FAS]		
		20	Precipitation reaction [KClVs AgNO3] and (4) Complexometric reactions (ZnSO4 Vs K3[Fe(CN)6])		
	11	21	Chemical Kinetics: Introduction – differential and integrated rate equations for second order kinetics, derivation of second order rate equation when a=b and a≠b.	10	Potentiometric titration of mixture of HCl and CH3COOH using NaOH solution.
		22	unit of rate constant, half-life period, experimental verification of second order reactions – study of kinetics of saponificaiton of an ester.		

6	12	23	Determination of the order of reaction – differential, time for half-change method and isolation method. Experimental methods of chemical kinetics.	11	Colorimeteric estimation of Fe3+ ion using ammonium thiocyanate as complexing agent.
		24	conductometric – example - saponification of esters. Potentiometric - example – kinetics of bromination of N,N-di-methyl aniline and spectrophotometric – example – colorimetric study of kinetics of oxidation of Indigocarmine by chloramine-T.		
	13	25	Application of kinetic studies: Arriving at the mechanism of urea formation from ammonium cyanate.	12	Colorimeteric estimation of Cu2+ ion using NH4OH as complexing agent.
		26	Phase equilibria: Gibb's phase rule – definition of the terms with examples, application to one component system (water system).		
	14	27	Reduced phase rule – statement, reduced systems, two component system – simple eutectic type KI-water system, freezing mixtures, Pb-Ag system (desilverization of argentiferrous lead)	13	Revision of experiments
		28	Revision of syllabus		

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SRI ADICHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2018-19(Odd Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Rashmi B J ,Manasa A K and Archana (Theory and Practical)

Semester **:** 5th

Title of the Paper **: Inorganic chemistry(Paper: V)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2018 to October, 2019)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Chemistry of transition elements: Position in the periodic table, electronic configuration, general characteristics- atomic and ionic radii.	1	Introduction of laboratory equipments.
		2	ionization energy, variable oxidation states, spectral properties, redox potentials, colour and magnetic properties,		
		3	catalytic activity, complex formation and interstitial		Gravimetric estimation of barium

1&2	2		compounds formation (3d, 4d and 5d series). Chemistry of inner transition elements: Electronic configuration and position in the periodic table,	2	as barium sulphate.
		4	oxidation states, spectral properties, colour and magnetic properties, complex formation sand ionic radii.		
	3	5	lanthanide contraction – cause and its consequences. General survey of actinides – comparison with lanthanides, transuranic elements.	3	Gravimetric estimation of iron as iron (III) oxide
		6	Ion-exchange: Introduction, action of ion exchange resins – cation exchange and anion exchange resins.		
	4	7	Exchange of inorganic ions, ion exchange capacity, separation of lanthanides by ion- exchange method.	4	Gravimetric estimation of copper as copper (I) thiocyanate.
		8	Gravimetry: Introduction to gravimetric analysis – precipitation methods (various steps involved to be discussed), advantages of gravimetric analysis		
	5	9	purity of the precipitates, co-precipitation and postprecipitation, conditions of precipitation, precipitation from homogeneous solution (hydroxides and sulphates)	5	Gravimetric estimation of nickel as nickel dimethylglyoximate

		10	washing and ignition of precipitate (general discussion only). Electro-gravimetric analysis estimation of copper.		
3&4	6	11	Organic precipitants: Advantages of organic precipitants over inorganic precipitants, DMG, 8-hydroxy quinoline (Oxine)	6	Gravimetric estimation of magnesium as magnesium -8-hydroxy oxinate.
		12	1,10-phenanthroline and EDTA. Structure of Ni2+ -DMG and Mg2+ -oxine complexes.		
	7	13	Inorganic chemistry internal test	7	Gravimetric estimation of sulphate as barium sulphate
		14	Inorganic chemistry internal test		
5	8	15	Coordination Chemistry: Ligands, classification of ligands and chelation, nomenclature of co-ordination compounds.	8	Gravimetric estimation of aluminum as aluminum oxide.
		16	physical methods in the study of complexes – change in conductance, colour and pH.		
		17	Stability of complexes – stability constant, a brief outline of thermodynamic stability of metal complexes.		Laboratory internals

	9	18	Factors affecting the stability of complexes. Polynuclear complexes, inner metallic complexes.	9	
5	10	19	Isomerism in co-ordination complexes: Stereo-isomerism – Geometrical and optical isomerism exhibited by co-ordination compounds of co-ordination number 4 and 6.		
		20	Metal-ligand bonding in transition metal complexes: Valence bond theory: Salient features, formation of octahedral complexes on the basis of VBT, outer and inner orbital octahedral complexes- [Fe(CN)6] 4- .		
	11	21	Formation of octahedral complexes on the basis of VBT [Fe(CN)6] 3- , [Co(CN)6] 3- , [CoF6] 3- [Cr(H2O)6] 3+ and [Fe(H2O)6] 2+	10	Gravimetric estimation of zinc as zinc oxide
		22	Formation of tetrahedral and square planner complexes on the basis of VBT – [Ni(CN)4] 2- , [Cu(NH3)]2+, [Zn(NH3)4] 2+and [Ni(CO)4], limitations of VBT.		

6	12	23	Crystal field theory: Important features of crystal field theory, crystal field splitting of d-orbitals in tetrahedral, octahedral and square planar complexes,	11	Gravimetric estimation of calcium as calcium oxide.
		24	crystal field stabilization energy (CFSE), factors affecting the magnitude of Δo, (nature of ligand, oxidation state of the metal ion, size of the orbitals, geometry of the complex), high spin (HS) and low spin (LS) complexes		
	13	25	magnetic properties of metal complexes based on crystal field theory-[Co(NH3)6] 3+, [CoF6] 3- , [Fe(CN)6] 4- , [Fe(CN)6] 3- and [Ni(CN)4] 2- .	12	Paper chromatographic separation of Fe3+ and Ni2+ ions
		26	Magnetic susceptibility, measurement of magnetic moment by Gouy's method. Limitations of CFT. Ligand field theory: Evidences for metal ligand covalent bonding in complexes.		
	14	27	Bio-inorganic chemistry: Essential and trace elements in biological process, metalloporphyrins with special reference to haemoglobin and myoglobin, biological role of alkali and alkaline earth metal ions with respect to Na+ and Ca2+ ions.	13	Revision of experiments
		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE ,CHANNARAYAPATNA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2018-19(Odd Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Rashmi B J ,Manasa A K and Archana (Theory and Practical)

Semester **:** 5th

Title of the Paper **: Organic chemistry(Paper: VI)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2018 to October, 2019)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 03

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
	1	1	Carbohydrates: Definition and importance, classification based on composition with examples-reducing and non-reducing sugars.	1	Introduction of laboratory equipments.
		2	Monosaccharides: Glucose: reactions of glucose (with H2N-OH, HCN, C6H5NHNH2, Br2 water, Conc. HNO3, reductions with HI/red P , methanols, (dry HCl), acetic anhydride and reduction reactions.		
		3	Structural elucidation of glucose: Open chain structure,		Gravimetric estimation of barium

1&2	2		configuration, drawbacks of open chain structure, ring structure – Fisher and Haworth structure. Determination of ring size by methylation method. Fischer and Haworth structures of fructose, galactose and mannose.	2	as barium sulphate.
		4	Conversion reactions – 1. Ascending (Kiliani's synthesis) 2. Descending (Wohl's degradation) 3. Aldose to ketose 4. Ketose to Aldose 5. Epimerisation		
	3	5	Disaccharides: Structural elucidation of sucrose, structural formulae of maltose and lactose (Haworth structure). Polysaccharides: Partial structural formulae of starch, cellulose, glycogen and their uses.	3	Gravimetric estimation of iron as iron (III) oxide
		6	Stereochemistry: Introduction, definition, elements of symmetry (plane, centre, simple axes and alternative axes), asymmetry and dissymmetry, Chirality		
	4	7	Designation of configuration – R-S notation. Optical activity – explanation – cause of optical activity (non-super impossibility). Enantiomers and diastereomers optical isomerism in tartaric acid and biphenyls.	4	Gravimetric estimation of copper as copper (I) thiocyanate.
		8	Racemisation, resolution, methods of resolution (Chemical and biochemical methods) Walden inversion, asymmetric synthesis (partial and absolute).		
		9	Geometrical isomerism: Definition with example,		Gravimetric estimation of nickel as

	5		designation of cis-trans and E-Z notations with examples. Geometrical isomerization of aldoximes and ketoximes, Beckmann rearrangement	5	nickel dimethylglyoximate
		10	Green Chemistry: Purpose, principles to be followed for green chemistry. Synthesis of acetamide, ibuprofen.		
3&4	6	11	Green Chemistry: Purpose, principles to be followed for green chemistry. Synthesis of acetamide, ibuprofen.	6	Gravimetric estimation of magnesium as magnesium -8-hydroxy oxinate.
		12	Synthesis of benzoin, benzylic acid and para-bromo acetanilide.		
	7	13	Organic chemistry internal test	7	Gravimetric estimation of sulphate as barium sulphate
		14	Organic chemistry internal test		
5	8	15	Active methylene compounds: Definition, ethyl acetoacetate, preparation and keto-enoltautomerism in ethyl acetoacetate-its evidence.	8	Gravimetric estimation of aluminum as aluminum oxide.
		16	Synthetic applications: Acid hydrolysis, ketonic hydrolysis, mono carboxylic acids, dicarboxylicacidssuccinic acid		

	9	17	Synthetic applications: adipic acid, antipyrine, uracil, acetyl acetone, crotonic acid and cinnamic acid.	9	Laboratory internals
		18	Synthetic Polymers: Definition, vehicle, fixative, odorous substances. Classification, synthesis of 1. Methyl anthranilate		
5	10	19	synthesis of 2. Phenyl alcohol 3. Linalool 4. Mask ketone 5. α and β-Ionones, Vanillin.	10	Experiments revision
		20	Formation of tetrahedral and square planner complexes on the basis of VBT – [Ni(CN)4] 2-		
	11	21	Formation of octahedral complexes on the basis of VBT [Fe(CN)6] 3- , [Co(CN)6] 3- , [CoF6] 3- [Cr(H2O)6] 3+ and [Fe(H2O)6] 2+	11	Gravimetric estimation of zinc as zinc oxide
		22	Formation of tetrahedral and square planner complexes on the basis of VBT – , [Cu(NH3)]2+, [Zn(NH3)4] 2+and [Ni(CO)4], limitations of VBT.		

6	12	23	Crystal field theory: Important features of crystal field theory, crystal field splitting of d-orbitals in tetrahedral, octahedral and square planar complexes,	12	Gravimetric estimation of calcium as calcium oxide.
		24	crystal field stabilization energy (CFSE), factors affecting the magnitude of Δo, (nature of ligand, oxidation state of the metal ion, size of the orbitals, geometry of the complex), high spin (HS) and low spin (LS) complexes		
	13	25	magnetic properties of metal complexes based on crystal field theory-[Co(NH3)6] 3+, [CoF6] 3- , [Fe(CN)6] 4- , [Fe(CN)6] 3- and [Ni(CN)4] 2- .	13	Paper chromatographic separation of Fe3+ and Ni2+ ions
		26	Magnetic susceptibility, measurement of magnetic moment by Gouy's method. Limitations of CFT. Ligand field theory: Evidences for metal ligand covalent bonding in complexes.		
	14	27	Bio-inorganic chemistry: Essential and trace elements in biological process, metalloporphyrins with special reference to haemoglobin and myoglobin, biological role of alkali and alkaline earth metal ions with respect to Na+ and Ca2+ ions.	14	Revision of experiments
		28	Revision of syllabus		

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SRI ADI CHUNCHANAGIRI FIRST GRADE COLLEGE HOLENARASIPURA
DEPARTMENT OF CHEMISTRY

B.Sc. Final year

LESSON PLAN FOR THE SESSION 2018-19(Odd Semester)

Name of the Faculty **:** Dr. N Shankaresha, Shridhar G B, Hemalatha K M, Rashmi B J ,Manasa A K and Archana (Theory and Practical)

Semester **:** 5th

Title of the Paper **: Physical chemistry(Paper: VII)**

Subject code **:**

Lesson **Plan Duration** **:** 14 weeks (from August , 2018 to October, 2019)

Total teaching period **: 28 Hrs**

Work Load (Lecture/Practical) Per Week (in hours): Lecture - 06, Practical – 00

Unit No.	Week	Theory		Practical	
		Lecture Day	Topic including Assignment/Test	Practical Day	Topic
		1	Crystallography: Elements of symmetry – plane, axis and centre, elements of symmetry in cubic crystals, law of rational indices – Weiss and Miller indices, lattice planes in cubic crystals.		

1&2	1	2	Crystal lattice and unit cell, types of Lattice – Bravais lattices, X-Ray diffraction and Bragg's Law (to be derived).		
	2	3	determination of crystal structure of rock salt by rotating crystal method using Bragg's spectrometer.		
		4	application of X-ray studies – distance between lattice planes, density of crystals, determination of Avogadro Number.		
	3	5	(numerical problems on applications).		
		6	Liquid Crystals: Defination, classification of thermotropic liquid crystals into smectic and nematic with examples-molecular arrangement of these and their uses.		
	4	7	Spectrophotometry and photochemistry: Lambert – Beer's law – statement and mathematical form (to be derived).		
		8	Molar extinction coefficient – definition – spectrophotometer – construction and working, its application.		
		9	Laws of photochemistry – Grotthus-Draper law of photochemical activation and Einstein's law of photochemical		

	5		equivalence.		
		10	quantum efficiency, reasons for low quantum yield (HBr formation as example) and high quantum yield (HCl formation as example).		
3&4	6	11	Aactinometry – Uranyl oxalate actinometer. Photophysical processes: Definition with examples – photosensitization (eg. photosynthesis in plants),		
		12	photo inhibition, fluorescence, phosphorescence, chemiluminescence and bioluminescence with examples.		
	7	13	Organic chemistry internal test		
		14	Organic chemistry internal test		
5	8	15	Determination of absorbed intensity – schematic diagram of apparatus used. Detectors – thermopile, photoelectric cell and actinometer (Uranyl oxalate).		

		16	Radiation Chemistry: Definition, primary and secondary stages in radiochemical reactions, ionic yield, energy yield, comparison with photochemistry.		
	9	17	units of radiation – rad, gray and roentgen, Dosimeter – Fricke dosimeter, theories of radiolysis – Lind's and EHT theories.		
		18	Radiolysis of water vapour, benzene and acetic acid.		
5	10	19	Molecular Spectroscopy: Regions of spectra, types of spectra, microwave spectra – rotational spectra of diatomic molecules, moment of inertia (expression to be derived).		
		20	Expression for rotational energy, selection rule and transition, calculation of bond length.		
	11	21	IR Spectra – vibrational spectra of diatomic molecules – force constant (no derivation), expression for vibrational energy.		

		22	zero point energy, selection rule and transitions. Vibrational modes of polyatomic molecules taking H2O and CO2 molecules as examples. Applications of IR spectroscopy (mention).		

6	12	23	NMR Spectroscopy: Introduction – spin number, chemical shift, instrumentation.		
		24	NMR spectra of ethyl alcohol – low and high resolution, applications (mention).		
	13	25	Raman Spectra: Concept of polarizability, pure rotation, vibration (qualitative study) stoke's and antistoke's lines, selection rule, applications (mention).		

		26	Electronic Spectra: Potential energy curves for bonding and antibonding molecular orbitals, band theory, electronic transitions.		
	14	27	Qualitative description of non-bonding orbitals and transition between them. Selection rule and Franck Condon principle.		
		28	Revision of syllabus		

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