E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(*An Autonomous Institution – Affiliated to Madurai Kamaraj University*)

Re-accredited **(3rd Cycle)** with Grade **A+** & **CGPA 3.51** by NAAC

DEPARTMENT OF CHEMISTRY

CBCS SYLLABUS

BACHELOR OF SCIENCE

PROGRAMME CODE - K

COURSE STRUCTURE

(w.e.f. 2017 – 2018 onwards)

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.
(*An Autonomous Institution – Affiliated to Madurai Kamaraj University*)
Re-accredited **(3rd Cycle)** with Grade **A+** & **CGPA 3.51** by NAAC

CRITERION - I

1.1.3 Details of courses offered by the institution that focus on employability / entrepreneurship / skill development during the year.

Syllabus copies with highlights of contents focusing on Employability / Entrepreneurship / Skill Development

To be Noted:

HIGHLIGHTED COLORS	COURSES
	Employability
	Skill Development
	Entrepreneurship
	Skilled & Employability

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

COURSE STRUCTURE-SEMESTER WISE

Sem	Part	Subject code	Title of the paper	Teach-ing hrs.(Per week)	Dura-tion of exam (hrs)	Marks allotted			Cre dits
						C. A	S.E	Tot al	
1	I	171T1	Part –I Tamil	6	3	25	75	100	3
	II	172E1	Part-II English	6	3	25	75	100	3
	III	17K11	Core – Inorganic, Organic and Physical Chemistry-I	4	3	25	75	100	4
		17K2P	Core - Major Practical – I* Semi micro qualitative analysis and Organic preparations	2	-	-	-	-	-
		17AM1	Allied 1 – Maths -I	6	3	25	75	100	4
	IV	17SEK11	Laboratory Techniques	2	2	-	100	100	2
		17SEK12	Industrial Chemistry	2	2	-	100	100	2
		17NMK1	Dairy Science	2	2	-	100	100	2
2	I	171T2	Part –I Tamil	6	3	25	75	100	3
	II	172E2	Part-II English	6	3	25	75	100	3
	III	17K21	Core – Inorganic, Organic and Physical Chemistry-II	4	3	25	75	100	4
		17K2P	Core - Major Practical – I* Semi micro qualitative analysis and organic preparations	2	6	40	60	100	4
		17AM2	Allied 1- Maths – II	6	3	25	75	100	5

Annexure 15

	IV	17SEK21	Medicinal Chemistry	2	2	-	100	100	2
		17SEK22	Forensic Chemistry	2	2	-	100	100	2
		17NMK2	Chemistry in Everyday Life	2	2	-	100	100	2
3		171T3	Part-I Tamil	6	3	25	75	100	3
	II	172E3	Part-II English	6	3	25	75	100	3
	III	17K31	Core – Organic and Inorganic Chemistry		3	25	75	100	4
		17K4P	Core - Major Practical – II* Gravimetric & Volumetric analysis	2	-	-	-	-	-
		17AM3	Allied 1 - Maths–III	6	3	25	75	100	4
		17AP1	Allied 2- Physics-Mechanics and Properties of Matter and Sound	4	3	25	75	100	4
		17AP2P	Allied 2- Physics Practical –I*	2	-	-	-	-	-
4	I	171T4	Part-I Tamil	6	3	25	75	100	3
	II	172E4	Part-II English	6	3	25	75	100	3
	III	17K41	Core – Organic & Physical Chemistry- National	4	3	25	75	100	4
		17K4P	Core - Major Practical – II* Gravimetric &Volumetric Analysis	2	6	40	60	100	5
		17AM4	Allied 1 - Maths – IV	6	3	25	75	100	5
		17AP2	Allied 2- Physics- Thermal Physics	4	3	25	75	100	4
		17AP2P	Allied 2-Physics Practical-I*	2	3	40	60	100	1
	III	17K51	Core – Organic Chemistry	4	3	25	75	100	4
	III	17K52	Core – Physical Chemistry-I	4	3	25	75	100	4
	III		**Core - Elective I**	4	3	25	75	100	4

Annexure 15

5		17K61P	Core – Major Practical – III* Organic analysis & Estimation	4	-	-	-	-	-
		17K62P	Core - Major Practical – IV* Physical Chemistry	4	-	-	-	-	-
		17AP3	Allied 2 –Physics-Electricity & Electronics	4	3	25	75	100	4
		17AP4P	Allied 2-Physics Practical-II*	2	-	-	-	-	-
	IV	17SEK51	Chemistry of bio molecules-Global	2	2	-	100	100	2
		17EV5	Environmental Studies	2	2	-	100	100	2
6	III	17K61	Core – Organic Chemistry and Spectroscopy	4	3	25	75	100	4
	III	17K62	Core – Physical Chemistry-II	4	3	25	75	100	4
	III		**Core - Elective II**	4	3	25	75	100	4
		17K61P	Core – Major Practical – III* Organic analysis & Estimation	4	6	40	60	100	5
		17K62P	Core – Major Practical –IV* Physical Chemistry	4	6	40	60	100	5
		17AP4	Allied 2 – Physics - Optics	4	3	25	75	100	4
		17AP4P	Allied 2- Physics Practical-II*	2	3	40	60	100	1
	IV	17SEK61	Green and Nano Chemistry	2	2	-	100	100	2
		174VE6	Value Education	2	2	-	100	100	2
	V	175NS4/ 175PE4	Extension Activities NSS/ Phy. Education	-	2	-	-	100	1
			Total	180					140

Annexure 15

Electives

Semester V (Elective I- Choose any one)

1 Inorganic and Analytical Chemistry - 17KE5A

2. Chemistry of materials - 17KE5B

Electives

Semester VI (Elective II- Choose any one)

1. Inorganic and applications of computer in chemistry -17KE6A

2. Diffraction Methods and Applications -17KE6B

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ALLIED CHEMISTRY (for B.Sc. Nutrition & Dietetics)

COURSE STRUCTURE - SEMESTER WISE

Sem	Sub code	Title of the paper	Teach-ing hrs. (Per week)	Dura-tion of exam (hrs)	Marks allotted			Credits
					C.A	S.E	Total	
III	17AKN3	Bio Chemistry	4	3	25	75	100	4
		Allied Practical I* –Qualitative Analysis	2	-	-	-	-	
IV	17AKN4	Environmental and Organic Chemistry	4	3	25	75	100	4
	17AKN4P	Allied Practical I* –Qualitative Analysis	2	3	40	60	100	1
V	17AKN5	Applied Chemistry	4	3	25	75	100	4
		Allied Practical II* –Volumetric Analysis	2	-	-	-	-	-
VI	17AKN6	Applied and Medicinal Chemistry	4	3	25	75	100	4
	17AKN6P	Allied Practical II* –Volumetric Analysis	2	3	40	60	100	1

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ALLIED CHEMISTRY (for B.Sc. Physics)

COURSE STRUCTURE - SEMESTER WISE

Sem	Sub code	Title of the paper	Teach-ing hrs. (Per week)	Dura-tion of exam (hrs)	Marks allotted			Credits
					C.A	S.E	Tot al	
III	17AKP3	Physical Chemistry	4	3	25	75	100	4
		Allied Practical I* –Qualitative Analysis	2	-	-	-	-	
IV	17AKP4	Organic and Physical Chemistry	4	3	25	75	100	4
	17AKP4P	Allied Practical I* –Qualitative Analysis	2	3	40	60	100	1
V	17AKP5	Inorganic, Physical and Medicinal Chemistry	4	3	25	75	100	4
		Allied Practical II* –Volumetric Analysis	2	-	-	-	-	-
VI	17AKP6	Analytical and Inorganic Chemistry	4	3	25	75	100	4
	17AKP6P	Allied Practical II* –Volumetric Analysis	2	3	40	60	100	1

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 onwards)

Title of the paper: Core- Inorganic, Organic and Physical Chemistry -I
Semester : I **Contact hours: 4**
Sub code : 17K11 **Credits : 4**

Objectives:

1. To acquire knowledge and understanding of atomic structure and periodic properties, chemical bonding.
2. To gain about fundamental concepts of organic chemistry, reaction mechanism hybridizations and gaseous state.

Unit: I ATOMIC STRUCTURE AND PERIODIC PROPERTIES :Atomic structure: Pauli exclusion principle, Hund's rule, Aufbau principle and electronic configurations of elements – stability of half filled and completely filled orbital – shapes of orbitals, s, p, d and f block elements – classification and characteristic properties. Periodic properties: covalent radius- periodic trends in covalent radii; ionic radius- periodic trends in ionic radii; ionization energy, electron affinity- factors determining ionization energies in the periodic table, electron affinity- factors determining electron affinity in the periodic table, electro negativity- factors determining electro negativity, applications of electro negativity.

Unit: II CHEMICAL BONDING: Ionic bond: Formations and general properties-Radius ratio rule and its limitations-Hydration energy and lattice energy and their applications-Born-Haber cycle-Fajan's rule. Covalent bond: Valence bond theory-Formation and general properties, Orbital overlap-hybridization-sigma and pi bonds - VSEPR theory-postulates- geometries of BF_3, CH_4, H_2O, NH_3 PCl_5, SF_6, IF_7 molecules.

Molecular orbital theory: Linear combination of atomic orbital-bonding and antibonding molecular orbitals-Bond order- MO diagram of molecules like H_2, He_2, O_2, F_2, NO, CO-Comparison between VBT and MOT.

Unit: III FUNDAMENTALS OF ORGANIC CHEMISTRY: Introduction–characteristics of organic compounds- differences between organic and inorganic compounds- sources and importance of organic compounds- classification of organic compounds- homologous series- functional groups-detection of carbon, hydrogen, nitrogen and oxygen. Electron displacement effect: Inductive effect, Electromeric effect, Resonance, Hyperconjugation. Reaction intermediate: Formation and stability of carbocation, carbanion, Free radical. Breaking of C-C bond: Homolytic and heterolytic cleavage. Attacking reagents- Nucleophiles and electrophiles.

Unit: IV REACTION MECHANISM AND HYBRIDISATION: Types of reaction and their mechanism: Substitution reaction- mechanism of S_N1 and S_N2 reactions – elimination reactions- mechanism of E1 and E2 reactions, Addition reaction-electrophilic and nucleophilic, Polymerisation reaction-addition and condensation polymerization, Rearrangement reaction - Intra and inter molecular rearrangement reaction. Concept of hybridization: Definition-types-sp^3(methane, ethane), sp^2(Ethylene, Formaldehyde), sp (Acetylene).

Unit: V GASEOUS STATE: Ideal gases: Kinetic theory of ideal gases - gas laws (no derivation) – Maxwell distribution of molecular velocities(no derivation)-Definition of Most probable velocity , Average velocity, RMS velocity - Collision number- collision frequency -Mean free path. Real gases: Deviation from ideal behaviour - Derivation of Vanderwaal's equation – inter molecular forces-Types (dipole-dipole, dipole-induced dipole and induced dipole-induced dipole interaction)-Methods of liquefaction of gases - Joule Thomson effect - Inversion temperature (Definition only).

Text Books:

1. Bahl B.S. & Arun Bahl, "*Advanced Organic Chemistry*", S.Chand & Co., New Delhi , 2004.
2. Bahl B.S. Tuli G.D. & Arun Bahl, "*Essentials of Physical Chemistry,*" S.Chand & Company Ltd., New Delhi, 2004.
3. Madan R.D., "*Modern Inorganic Chemistry*", S.Chand & Co, New Delhi, 2004.
4. Puri B.R. and Sharma L.R., "*A Text Book of Physical Chemistry*", Vallabha Publications, New Delhi, 2005.

Reference Books:

1. Finar I. L., "*Organic Chemistry*" Volume I, Pearson Education (Singapore) Pvt. Ltd, Indian Branch, Delhi, 2011.
2. Lee J. D., "*Concise Inorganic Chemistry*:, Fifth Edition, Blackwell Science, USA, 2003.
3. Morrision R.T. & Boyd R.N., "*Organic Chemistry*", 7th Edition, Dorling Kindersley (India) Pvt. Ltd., New Delhi, 2011.
4 .Soni P.L. & Dharmarha O.P., "*Text Book of Physical Chemistry*", Sultan Chand & Sons, New Delhi, 2001.
5. Tewari K.S., Vishnoi N. K. & Mehotra S.N., "*A Text Book of Organic Chemistry*", 1st Edition, Vikas Publishing House Pvt. Ltd., New Delhi, 2001.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 onwards)
Skill Based Elective Paper-I

Title of the paper: Laboratory Techniques

Semester	**: I**	**Contact hours: 2**	
Sub code	**: 17SEK11**	**Credits**	**: 2**

Objectives:

1. To acquire basic knowledge in the field of laboratory hygiene and safety.
2. To understand principles and techniques of semi-micro methods, volumetric methods of analysis, gravimetric methods of analysis, general purification techniques.

Unit: I LABORATORY HYGIENE AND SAFETY: Storage and handl ing of chemicals – carcinogenic chemicals – Toxic and poisonous chemicals – Waste disposal – Fume disposal – General precautions for avoiding accidents – First aid te chniques – Hazards in laboratory - poisoning – methods to avoid poisoning – Treatment for specific poison – laboratory safety measures.

Unit: II PRINCIPLES AND TECHNIQUES OF SEMI-MICRO METHODS: Aims of semi micro qualitative analysis – Types of reactions involved in qualitative analysis – Dry reactions – precipitation reactions – Applications of solubilit y product principle in qualitative analysis – Complexation reaction – Oxidation and redu ction reactions – Spot tests – preparation of solution for cation t esting on semi micro scale – Removal of interfering ions in the analysis of cations – oxalate, borate, fluoride, chromate, phosphate and arsenite.

Unit: III VOLUMETRIC METHODS OF ANALYSI S: General principle- Requirements for volumetric analysis-Concentration systems: Molarity, molality, normality, weight percentage composition and ppm -problems. Primary and secondary

standards- criteria for primary standards, preparation of standard solutions, standardization of solutions. Limitation of volumetric analysis, endpoint and equivalence point.

Unit: IV GRAVIMETRIC METHODS OF ANALYSIS: Introduction- contamination of precipitates-Co-precipitation-types, post precipitation- differences between Co precipitation and post precipitation-precipitation from homogeneous solution-theory of precipitation-properties of a precipitate-general rules of precipitation-specific and selective precipitants-choice of precipitants.

Unit: V GENERAL PURIFICATION TECHNIQUES: Purification of solid organic compounds- recrystallisation, use of miscible solvents, use of drying agents and their properties, sublimation. Purification of liquids. Experimental techniques of distillation, fractional distillation, distillation under reduced pressure.

Text Books:

1. Gopalan R. Subramanian & P.S., Rengarajan. K., "*Elements of Analytical Chemistry*", S.Chand & Sons New Delhi, 2005.
2. Skoog D.A. West D.M. & Holler F.J,"Analytical Chemistry" 5th edition Saunders College Publishing, Philadelphia, 1990.
3. Mendham J., *Vogel's Quantitative Chemical Analysis*, Pearson, 2009.

Reference Books:

1. U.N. Dash, *Analytical Chemistry: Theory and Practice*, Sultan Chand and sons Educational Publishers, New Delhi, 1995.
2. Svehla, G. *Vogel's Qualitative Inorganic Analysis*, Pearson Education, 2012.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 onwards)

Skill Based Elective Paper-II

Title of the paper: Industrial Chemistry

Semester	**: I**	**Contact hours: 2**	
Sub code	**: 17SEK12**	**Credits**	**: 2**

Objective:

1. To gain knowledge about the chemistry of important manufacturing process.

Unit: I MATCH INDUSTRY AND EXPLOSIVES: Match industry: Introduction - composition-types of matches-raw materials need for safety matches- manufacturing process. Pyrotechny: Introduction-composition of fireworks- colored smokes. Explosives: Introduction- classification- characteristics of explosives- preparation and uses of TNT, picric acid, dynamite, cordite and RDX.

Unit: II SILICATE INDUSTRY: Cement: Introduction-composition of cement-raw materials need for manufacturing of Portland cement-manufacture of Portland cement by wet process and dry process-role of gypsum in the setting of cement. Glass: Introduction-characteristics of glass- physical and chemical properties- manufacture of glass (tank furnace method)-annealing- characteristics of Borosilicate glass, optical glass, colored glass, safety glass, fibre glass, flint glass and Bottle glass.

Unit: III AGRICULTURAL CHEMISTRY: Fertilizer: Introduction-classification- role of various elements in plant growth-requirements of a good fertilizer-Manufacturing methods and applications of following fertilizers: ammonium sulphate, ammonium chloride, urea, super phosphate of lime, calcium cyanamide, calcium ammonium nitrate and NPK fertilizer.

Unit: IV POLYMER CHEMISTRY: Rubber: Introduction-composition of natural rubber-occurrence and isolation of natural rubber - draw backs of raw rubber - vulcanization-properties of vulcanized rub ber- synthetic rubber- preparation and applications of SBR rubber, neoprene rubber, butyl rubber and Thiokol-Distinction between natural rubber and synthetic rubber.

Unit: V P LASTICS AND PAPER INDUSTRY: Plastics: Introduction-characteristics of plastics-classification of plastics- differences between thermo setting and t hermo plastics- preparation and applications of Bakelite, P olythene, PVC, Polypropylene, Poly Styrene and Urea f ormaldehyde resin. Differences between plas tics and resins. Paper industry: Introduction- raw materials and manufacturing process of paper- types of paper- paper industry in India.

Text Books:

1. Arora M.G. & Singh M., "*Industrial Chemistry*" Anmol Publications, Pvt. Ltd., New Delhi, 1999.
2. Chakravarthy B.N, "*Industrial Chemistry*" Oxford & IBH Publishing & Co. Pvt. Ltd., New Delhi, 1998.

Reference Books:

1. Jain & Monika Jain, "*Engineering Chemistry*" Fifth Edition, Dhanpat Rai & Sons, Delhi, 1990.
2. Mahapatra G., "*Elements of Industrial Chemistry*", Kalyani Publishers, New Delhi, 2001.
3. Sharma B.K., "*Industrial Chemistry*", Krishna Prakashan Media (P) Ltd., Meerut, Tenth Edition, 1999.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 onwards)
Non-Major Elective Paper-I

Title of the paper: Dairy Science

Semester	**: I**	**Contact hours: 2**	
Sub code	**: 17NMK1**	**Credits**	**: 2**

Objectives:

1. To understand the chemistry of milk and milk products.
2. To get appointment in dairy units of both private and Government and also enable them to start dairy units.

Unit: I INTRODUCTION: Composition of milk- physical properties- Chemical properties-functional properties-effect of heat on milk-check for purity of milk-detection of adulteration in milk.

Unit: II MILK PROCESSING: Milk processing: Introduction- different methods of processing of milk -clarification-pasteurization- UHT (Ultra High Temperature) milk- HTST (High Temperature short time) milk- homogenized milk- Whole milk. Chemical analysis: Butter fat, Protein, Lactose

Unit: III MILK POWDER PROCESSING: Introduction- skimmed milk powder - whole dry milk powder-manufacture of whole dry milk powder-butter milk powder.

Unit: IV MILK PRODUCTS- I: Butter: Introduction- preparation process-chemical nature of buffer fat-detection of adulteration in butter. Cheese: Introduction- preparation-composition- un-ripened cheese- ripened cheese-processed cheese.

Unit: V MILK PRODUCTS II: Ghee: Introduction-manufacturing process-detection of adulteration in ghee. Ice-Cream: Composition-milk fat-milk solid- non fat- sweeteners-stabilizers- emulsifiers.

Field work: Visit to a Dairy unit/farm and submission of report-10 marks.

Text Books:

1. Bagavathi Sundari K., "*Applied Chemistry*", MJP Publishers, Chennai, 2006.
2. Gopalan R. Subramanian P.S. & Rengarajan K., "*Elements of Analytical Chemistry*", Sultan Chand & Sons, New Delhi, 2003.

Reference Books:

1. Lillian Hoauland Meyer, "*Food Chemistry*" CBS Publishers and Distributors, Delhi, 1987.
2. Robert Jenness and Patom Wiley, "*Principles of Dairy Chemistry*", New York, 2005
3. Wond F.P, "*Fundamentals of Dairy Chemistry*", Springer, Singapore, 2006.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS
DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 onwards)

Title of the paper: Core- Inorganic, Organic and Physical Chemistry -II

Semester	**: II**	**Contact hours:**	**4**
Sub code	**: 17K21**	**Credits**	**: 4**

Objectives:

1. To acquire the knowledge about the basic and detailed aspects of nuclear chemistry, acids and bases.
2. To understand oxidation and reduction, aliphatic and aromatic hydrocarbons.

Unit: I NUCLEAR CHEMISTRY: Composition of the nucleus -stability of nuclei- mass defect-binding energy- nuclear fission-atom bomb- nuclear fusion- hydrogen bomb- Radioactivity- definition – nature of radiations from radioactive substances – comparison of the properties of α, β and γ radiations- detection and measurements of radioactivity – Geiger – Muller counter – radioactive decay –group displacement law – radioactive decay series – artificial radio activity –Half-life period-Average life period- applications of radioactive isotopes-problems using carbon dating.

Unit: II ACIDS, BASES AND OXIDATION AND REDUCTION: Modern concepts of acids and bases: Arrhenius, Bronsted- Lowry, Lewis and Lux-Flood; Relative strengths of acids and bases – amphoteric solvents- differentiating solvents-levelling effects. Hard and soft acids and bases: Pearson's concept –HSAB principle and its applications. Oxidation and reduction: Definitions- oxidation number-differences between oxidation number and valency- rules for calculating oxidation number- solved examples- oxidizing and reducing agents- redox reactions. Balancing of redox equations by oxidation number method.

Unit: III ALIPHATIC HYDROCARBONS: Alkanes: Introduction- nomenclature-methods of preparation- by reduction of alkyl halides- by Wurtz reaction- by using Grignard's reagent.Reactions of Alkanes: Halogenation, nitration and aromatisation [no mechanisms]. Alkenes: Introduction-nomenclature-methods of preparation-by dehydrohalogenation of alkyl halides [Saytzeff's rule] - by heating quaternary ammonium hydroxide [Hofmann rule] - by electrolysis of salts of dicarboxylic acids and by pyrolysis (cracking) of alkanes. Reactions of alkenes: catalytic hydrogenation [Sabatier-Sendersen's reduction], addition of halogen acids, addition to unsymmetrical alkenes [Markovnikov rule] - Anti Markovnikov addition [Kharash Peroxide Effect], ozonolysis [no mechanism].Alkynes: Introduction- nomenclature - methods of preparation: by dehydrohalogenation of 1, 2-dihalides- by electrolysis of salts of unsaturated dicarboxylic acid. Reactions of alkynes: Acidity of alkynes- oxidation reaction with strong alkaline $KMnO_4$, ozonolysis and polymerization reaction.

Unit: IV ARO MATIC HYDROCARBONS: Nomenclature – aromaticity- Huckel's rule- method of preparation from petroleum, from toluene by hydro dealkylation and structural elucidation of benzene. Toluene: Preparation from n-heptane Reactions: - electrophilic substitution reactions [with Cl_2, H_2SO_4, HNO_3] - substitution in CH_3 group (reaction with chlorine) -Styrene: Preparation from benzene Reactions: addition reaction with Br_2 - oxidation with $KMnO_4$ -Xylenes: Isolation of xylenes from naphtha, Oxidation of xylene with alkaline $KMnO_4$ -Polynuclear fused Hydrocarbon: Naphthalene: preparation by Haworth synthesis Reactions: sulphonation- ozonolysis- Friedel-Craft's alkylation- oxidation reactions; uses of naphthalene.

Unit:V SOLID STATE: Forms of solids-Symmetry elements of a crystal- seven crystal systems, Space lattice and unit cells-Bravais lattice types and identification of lattice planes- Laws of Crystallography -Law of rational indices, Miller indices. X–Ray diffraction by crystals, Bragg's equation-derivation. Types of crystal-Molecular crystal(H_2O)-covalent crystal (diamond)-ionic crystal- Characteristic structure of NaCl,

Wurtzite)- Definition of Conductors, Insulators and Semi conductors- Defects in crystals- Schottky defect – Frenkel defect.

Text Books:

1. Madan R.D., "*Modern Inorganic Chemistry*", S.Chand & Co., New Delhi, 2004.
2. Puri B.R. & Sharma L.R., "*A Text Book of Physical Chemistry*", Vallabha Publications, New Delhi, 2005.
3. Soni P.L., "*Text Book of Inorganic Chemistry*", Sultan Chand & Co, New Delhi, 2004.
4. Tewari K.S., Vishnoi N. K. & Mehotra S.N., "*A Text Book of Organic Chemistry*", 1st Edition, Vikas Publishing House Pvt. Ltd., New Delhi, 2001.

Reference Books:

1. Albert Cotton F., "Advanced Inorganic Chemistry", 6th Edition, Wiley India Pvt. Ltd., New Delhi, 2012.
2. Bahl B.S & Arun Bahl, "Advanced Organic Chemistry", S. Chand & Company, New Delhi, 2008.
3. Bahl B.S. Tuli G.D. & Arun Bahl, "Essentials of Physical Chemistry," S.Chand & Company Ltd., New Delhi, 2004.
4. Lee J. D., "*Concise Inorganic Chemistry*", Fifth Edition, Blackwell Science, USA-2003.
5. Wahid U.Malik, G.D Tuli, Madan. R.D "*Selected topics in Inorganic Chemistry*", S.Chand & Co, New Delhi, 2002.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 onwards)

Skill Based Elective Paper-III

Title of the paper: Medicinal Chemistry

Semester	**: II**	**Contact hours: 2**	
Sub-code	**: 17SEK21**	**Credits**	**: 2**

Objectives:

1. To acquire basic knowledge in the field of Medicinal Chemistry.
2. To understand the drugs for various diseases and their mode of action.

Unit: I TERMINOLOGY AND CLASSIFICATION OF DRUG: Drug: Definition-requirements of drugs- history of drugs. Terminology in Drug Chemistry: Medicinal Chemistry-pharmacy -pharmacology- pharmacodynamics – pharmacophore – pharmacokinetics – antimetabolite - bacteria-virus and fungi. Classification of drugs: On the basis of their therapeutic action.

Unit: II ANAES THETICS, ANALGESICS AND ANTIP YRETICS: Anaesthetics: Definition-characteristics-classification-application of nitrousoxi de, chloroform and cocaine. Analgesics: Definition-mode of action-specific applications of antipyrine, aspirin and novalgin. Antipyretics: Definition-mode of action-medicinal uses of salol and paracetamol.

Unit: III SULPHA DRUGS, ANTIBIOTICS AND ANTISEPTICS: Sulpha drugs: Definition-mode of action-applications of sulphanilamide, sulphapyridine and sulphadiazine. Antibiotics: Definition- characteristics- mode of action- structure and uses of the f ollowing antibiotics- penicillins, streptomycin, chloramphenicol, erythromycin and tetracyclins. Antiseptics: Definition-types of antiseptics-difference between antiseptic and disinfectant.

Unit: IV HY PNOTICS, SEDATIVES AND TRANQUILIZERS: Hypnotics and Sedatives: Definition - types (alcohols-aldehydes, ketones and sulphones- urethans-amides and urea-barbiturates) - applications of chloral, pa raldehyde, sulphonal and barbituric acid. Tranquilizer: Definition-characteristics-classification-applications of piperadol and hydroxyzine.

Unit:V ANTINEOPLASTIC AND HYPOGLYCAEMIC DRUGS: Cancer: Introduction-causes for cancer (poly-cyclic aromatics, nitroaromatics, chloroethylene and halogenated olefins)-treatment (Radiation, Chemotheraphy, Surgical treatment)-cancer chemotheraphy- mustards- antimetabolites- hormones AIDS and HIV: Introduction-transmission and treatment of HIV prevention of HIV.

Text Books:

1. Ashotosh Kaur, "*Medicinal Chemistry*", 3rd Edition, New Age International Pvt. Limited, New Delhi, 2006.
2. Bagavathi Sundari. K., "*Applied Chemistry*", MJP Publishers, Chennai, 2006.

Reference Books:

1. Bhalerao Marry, Giragon*," Pharmaceutical Chemistry*", Himalaya Publishing House, Ramdoot, 2001.
2. Gurdeep R. & Chatwal, "*Synthetic Organic Chemistry*", Himalaya Publishing House, Ramdoot , 2001.
3. Kadam S., "*Principles of Medicinal Chemistry*", Nirali Prakashan, New Delhi, 2006.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 onwards)

Skill Based Elective Paper-IV

Title of the paper: Forensic Chemistry

Semester	**: II**	**Contact hours: 2**	
Sub code	**: 17SEK22**	**Credits**	**: 2**

Objectives:

1. To acquire knowledge about the concept of Chemistry as related to forensic Science
2. To understand the use of chemicals in criminal investigation.

Unit: I COLLECTION AND PRE SERVATION OF E VIDENCES: Introduction- historical development of forensic science; t ypes of physical evidence- importance of physical evidence- collection and pr eservation of physical evidence- identification of physical evidence- Forensic characteristics of glass and soil - Forensic examination of hair, fibre and paints

Unit: II EXAMINATION AND IDENTIFICATION OF DRUGS, ALCOHOL AND POISONS: Drug abuse- effects of marijuana and LSD- Alcohol-effect of the amount of alcohol co nsumed-analysis of alcohol by breathalyzer -a detailed study. - Poisons- types and classification of poison - diagnosis of poisons in the li ving and the dead- clinical symptoms- identification of phenol, ch loral, HCN, alkaloids and arsenic poisons.

Unit: III FINGER PRINT AND FORENSIC SEROLOGY: Finger prints- principles- detection and preser vation of developed finger prints- Forensic Serology-blood types- characterization of blood strains- preservation of blood eviden ce - Analysis of seminal stains.

Unit: IV CRIME DETECTION: Document and voice examination-hand writing comparison- collection of hand writing exe mplars- typewriting comparisons- voice examination-sound spectrograph- Human bombs- possible explosives (gelatin sticks and RDX) – metal detector devices

Unit: V FORGERY AND COUNTERFEITING: Detecting forgery in bank cheques/drafts and educational records like mark sheet, certificate using UV light. Alloy analysis using AAS to detect counterfeit coins - Checking silver line water mark in currency notes - Detecting of gold purity in 22 carat ornaments and detecting gold plated jewels.

Text Book:

1. James T.H., "*Forensic Sciences*", Stanley Thornes Ltd., New York, 2005.

Reference Book:

1. Richard Saferstein, "*Criminalistics- A Introduction to Forensic Science*" , Eighth Edition, Prentice Hall, U.K., 2000.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 onwards)

Non-Major Elective Paper-II

Title of the paper: Chemistry in everyday life.

Semester	**: II**	**Contact hours: 2**	
Sub code	**: 17NMK2**	**Credits**	**: 2**

Objectives:

1. To understand the manufacturing technique of some of the s mall–scale industrial chemicals.
2. To enable them to start small scale manufacturing units.

Unit: I DE TERGENT POWDER AND WASHING POWDER: Detergent powder: Introduction- raw materials – manufacturing method from acid slurry-special features of detergent. Washing powder: Introduction- raw materials- method of manufacturing.

Unit: II SOAPS AND INK: Soaps: Introduction-raw materials-Manufacturing methods-Features in the prepar ation of toilet soaps -Ink: Introduction- different types of inks-methods of preparation of blue blac k liquid ink, f ountain pen ink, red in k and rubber stamp ink- ink remover.

Unit: III CHALK AND CANDLES: Chalk: Introduction- materials for manufacturing-manufacturing processes-Candles: Introduction- raw materials- manufacturing method of candles- manufacturing of fragrant candles and candles that can destroy mosquitoes-method of manufacture of superior candles.

Unit: IV PHENOILS, INCENSE STICK, SAMBIRANI AND NAPTHALENE BALLS: Phenoils: Introduction- raw materials - methods of preparation and uses. Incense stick: Introduction- raw materials- method of manufacturing and uses Sambrani:

Introduction- raw materials- methods of manufacturing and use s-Naphthalene Balls: Introduction- raw materials- methods of manufacturing and uses

Unit: V PLASTER OF PARIS, GUM AND SHOE P OLISH: Plaster of Paris: Introduction- Method of manufacturing and uses- Gum: Introduction- Method of manufacturing and uses- Shoe polish: Introduction- raw materials-Method of manufacturing and uses.

Note: 1. Practical training for the preparation of the above said products will be provided in the Chemistry Laboratoryp

Text Books:

1. Gobala Rao S., "*Outlines of chemical technology*", Affiliated East West press,1998.
2. Kafaro, "*Wasteless chemical processing*", Mir publishers, 1995.
3. Sawyer W., "*Experimental cosmetics*", Dover publishers, New york, 2000.

Reference Books:

1. Kumarappa J.C., "*Preparative materials*", Institute of Rural Technology and Development, T. Kallupatti.
2. Mohan, "*Latest Cottage Industries*", Malhotra etal., 20th Edition, 1980.
3. Sharma B.K., "*Industrial Chemistry*" Goel Publishing House, Meerut, 1999.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 onwards)

Major practical-I

Title of the paper: Semi-micro qualitative analysis and organic preparations.

Semester	**: II**	**Exam hours**	**: 6**
Sub code	**: 17K2P**	**Credits**	**: 4**

(At the end of the **FIRST YEAR**)

Internal-40 marks **External-**60 marks

Note: 1. for Practical Record - 10 Marks

2. for Experiment and Results - 50 Marks

Analysis of a mixture containing two cations and two anions of which one is an interfering ion by semi- micro method.

Cations: Lead, bismuth, copper, cadmium, iron (II &I II), aluminum, zinc, manganese, nickel, barium, strontium, calcium, magnesium and ammonium, cobalt.

Anions: Carbonate, sulphate, nitrate, f luoride, chloride, bro mide, oxalate, borate and phosphate.

Organic preparations: Preparation of the following organic compounds

1. Benzoic acid from methyl benzoate
2. Salicylic acid from methyl/ethyl salicylate
3. Osazone from glucose
4. Benzoic acid from benzaldehyde.

Mark distribution:

Acid radical - 10 marks Basic radical -10 marks

Procedure -10 marks Organic preparation-20 marks

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ANCILLARY CHEMISTRY (for B.Sc. N&D)

Title of the paper: Bio-Chemistry

Semester	**: III**	**Contact hours: 4 hrs**	
Subject code	**: 17AKN3**	**Credits**	**: 4**

Objectives:

To enable the students to understand the fundamental concepts in amino acids and proteins**,** vitamins and hormones**,** nucleic acids**,** enzymes and fats.

UNIT: I AMINO ACIDS AND PROTEINS: a) Amino acids: Definition- classification- synthesis of α-amino acid (Gabriel synthesis, Koop synthesis)- properties of amino acids (isoelectric point, action of heat, peptide formation).b) Proteins: Definition- classification (simple and conjugated proteins)- properties of proteins (colloidal nature, isoelectric point, denaturation, hydrolysis)- color tests for proteins (biuret test, ninhydrin test)- structure of proteins (primary, secondary, tertiary and quaternary).

UNIT: II VITAMINS AND HORMONES: a) Vitamins: Definition-classification- source- function and deficiency disease of vitamins A, B complex, C, D, E and K. b) Hormones: Definition- classification- main functions of following hormones- Adrenaline, Cortisone, Testosterone, Estrone, Insulin, pituitary hormones, and thyroxin. Differences between hormones and vitamins.

UNIT : III NUCLEIC ACIDS: Definition- nucleosides- nucleotides- function of nucleotides- nucleotide as energy carriers- types of nucleic acids- structure of DNA- replication of DNA- functions of DNA-structure and functions of RNA- biological aspects of ageing.

UNIT: IV ENZYMES: Definition – classification- coenzyme- mechanism of enzyme action- factors influencing enzyme activity- enzyme inhibition (competitive inhibitor, non-competitive inhibitor and end product inhibition)- role of enzymes in the digestion of food.

UNIT: V FATS: Introduction- classification-composition of fats - extraction and refining of fats-properties (saponification, hydrogenation, rancidity) -analysis of fats (saponification value, acid value, iodine value, Reichert-Meisel value) - uses of fats.

Text Books:

1. Arun Bahl & Bahl B.S., "*Advanced Organic Chemistry*", S.Chand & Company Ltd., New Delhi, 2007.

2. Soni P.L. & Chawla H.M., *"Text Book of Organic Chemistry*", Sultan Chand & Sons, New Delhi, 2003.

3. Tewari K.S., Mehrotra S.N. & Vishnoi N.K., *"A Text Book of Organic Chemistry",* Vikas Publishing House Private Ltd., New Delhi, 1987.

Reference Books:

1. Bajbhai D.N, "*Advanced Physical Chemistry*", S.Chand & Company, New Delhi, 2010.

2. Bansal K., "*Organic Reaction Mechanisms*", 4th Edition, New Age International Pvt. Ltd., New Delhi, 2012.

3.Soni P.L. & Chawla H.M., "*Text Book of Organic Chemistry*", Sultan & Sons, New Delhi, 2004.

3.Wahid Malik U. Tuli G.D. & Madan R.D., "*Selected Topics in Inorganic Chemistry*", S. Chand & Co., New Delhi, 2002.

Annexure -15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ANCILLARY CHEMISTRY (for B.Sc. Physics)

Title of the paper: Physical Chemistry

Semester : III **Contact hours: 4 hrs**

Subject code : 17AKP3 **Credits : 4**

Objectives:

To impart fundamental knowledge related to Group theory, structure of solids, photochemistry, gaseous state and chemical equilibrium and chemical kinetics

UNIT: I GROUP THEORY: Introduction-symmetry elements and symmetry operations- rules of a group, order of a group - classes and similarity transformation-point group classification (C_1, C_2, C_3, T_d, O_h) – matrix representation of symmetry operation-rotation & reflection– reducible and irreducible representation (definition only)- Orthogonality theorem-construction of character table (C_{2v} only)

UNIT: II STRUCTURE OF SOLIDS: Introduction to solids – Crystalline and amorphous. Unit cell, Bravais lattices and X-ray structure determination (NaCl and KCl only) – powder and single crystal methods. Radius ratio rules – coordination number. Packing arrangement – different structure types in solids – rock salts, zinc blende, wurtzite, spinel and inverse spinel and perovskite structures.

UNIT: III PHOTOCHEMISTRY: i) Definition of photochemical reaction-differences between thermal and photochemical reactions-laws of photochemistry [Lambert, Beer's law and Stark-Einstein's law]-quantum yield-explanation of low and high quantum yield-experimental determination of quantum yield.ii) Jablonski diagram, Non-radiative

transition(IC and ISC) and radioactive transition (Fluorescence and Phosphoresence) – differences between fluorescence and phosphorescence. iii) Photosensitization – chemiluminescence and bioluminescence iv)Kinetics of photochemical reactions-hydrogen-chlorine reaction.

UNIT: IV GASEOUS STATE: a) Ideal gases: Kinetic theory of ideal gases - gas laws - ideal gas equation -Definition of most probable velocity - Mean velocity - RMS velocity - Collision diameter -collision cross section - collision frequency -Mean free path.b) Real gases: Deviation from ideal behaviour - Derivation of vander waal's equation - Methods of liquefaction of gases - Joule Thomson effect - Inversion temperature.

UNIT: V CHEMICAL EQUILIBRIUM AND CHEMICAL KINETICS: a) Chemical equilibrium:Reversible and irreversible reactions- chemical equilibrium- law of mass action- equilibrium constant- applications of law of mass action- relation between Kp and Kc- Le-Chatelier- Braun principle and its applications in i) manufacture of NH_3 by Haber's process ii) manufacture of H_2SO_4 by contact process.b) Chemical kinetics:Rate of the reaction - rate law- rate constant- order and molecularity of reaction- differences between order and molecularity- derivation of rate constant and half life period for first order reaction. Effect of temperature on reaction rate (Arrhenius theory of reaction rate)

Text Books:

1.Bahl B.S. Tuli. G.D. & Arun Bahl, "*Essentials of Physical Chemistry*," S.Chand & Company Ltd., New Delhi, 2004.

2.Puri, Sharma & Pathania, "*Principles of Physical Chemistry*," Vishal Publishing Co, Jalandhar, 2004.

3.Ramakrishnan V. & Gopinathan. M.S., "*Group Theory in Chemistry*", Vishal Publishing Co., 2007.

4.Rohatgi-Mukherjee K.K., "*Fundamentals of Photochemistry",* Willey Eastern Ltd., New York, 1994.

Reference Books:

1.Bajpai D.N., "*Advanced Physical Chemistry*", S.Chand and Company, New Delhi, 2010.

2.Bhattacharya P.K., "*Group Theory and applications*", Himalaya Publishing House, 1996.

3.Shriver D.F. & Atkins P.W., "*Inorganic Chemistry*", Oxford University, Longford 1990.

4.West A.R., "*Solid State Chemistry and its Applications*", John-Wiley and sons, Singapore, 1989.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS
DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ANCILLARY CHEMISTRY (for B.Sc. N &D)

Title of the paper: Environmental & Organic Chemistry

Semester	**: IV**	**Contact hours: 4 hrs**	
Subject code	**: 17AKN4**	**Credits**	**: 4**

Objectives:

To impart fundamental knowledge related to corrosion of metals, chemical and metal toxicology, radioactive pollution and its control, carbohydrates and dyes.

UNIT: I CO RROSION OF ME TALS : Definition – disadvantages of corrosion – theories of corrosion (dry or chemical and wet or electro chemical theories) – prevention of corrosion (methods of preventing corrosion) –painting- coating with other metals (galvanizing, tinning and electroplating) –anodizing- cathodic protection – corrosion inhibitors.

UNIT: II CH EMICAL AND METAL TOXICOLOGY: Introduction – highly toxic solids – dangerously toxic liquids and severe irritants-dangerously toxic gases- enzyme inhibition by toxic metals in man - biochemical effects of toxic metals on man and children- lead, mercury, cadmium, arsenic, vanadium, cyanide, cobalt - diagnostic tests for metal poisoning- lead, mercury- treatment of poisoning –lead, mercury, cadmium, arsenic, vanadium, cyanide – cobalt as antidote to cyanide poisoning – trace metal poisoning- decaying leaves remove toxic metals in water.

UNIT: III RADIOACTIVE POLLUTION, PROTECTION AND CONTROL FROM RADIATIONS: Anthrapogenic soures of radiation – control of occupational radiation exposure – minimizing X-rays hazards – patient protection from radiation – radiography and precautions from radiation risk- minimizing risks of nuclear power - beneficial aspects of radiation.

UNIT:IV CARBOHYDRATES: Definition and classification-detailed study of monosaccharides-glucose and f ructose-mutarotation-epimerisation-structure and configuration of glucose and fructose-comparison between glucose and fructose-methods of ascending and descending in the sugar s eries-interconversion between glucose an d fructose-disaccharides-sucrose-preparation, properties(no structural elucidation).

UNIT : V DYES: Introduction to dyes – color and constitution – classification based on structure and application – preparation and applications of the f ollowing dyes –Nitro Dyes, Azo Dyes- methylorange, congo red, malachite green, phenolphthalein, Indigo.

Text Books:

1. Soni P.L. & Chawla H.M., "*Text Book of Organic Chemistry*", Sultan & Sons, New Delhi, 2004.
2. Soni P.L. & Chawla H.M., *"Text Book of Organic Chemistry*", Sultan Chand & Sons, New Delhi, 2003.
3. Arun Bahl & Bahl B.S., "*Advanced Organic Chemistry*", S.Chand & Company Ltd., New Delhi, 2007.
4. De A.K., "*Environmental Chemistry*", Wiley Eastern limited, New Delhi, 1993
5. Sharma B.K. & Kaur H., *"Environmental Chemistry*", Goel Publishing House, Meerut, 1997.

Reference Books:

1. .Bhupindu Mehta & Manjal Mehta, "*Organic Chemistry*", PHI Learning Private Limited, New Delhi, 2012.

2.Tewari K.S. Mehrotra S.N. & Vishnoi N.K., *"A Text book of Organic Chemistry*", Vikas Publishing House Pvt. Ltd., New Delhi 1987.

3. Bansal K., "*Organic Reaction Mechanisms*", 4th Edition, New Age International Pvt. Ltd., New Delhi, 2012.

4. Dara S.S. & Chand. S., "*A Textbook of Engineering Chemistry*", S.Chand & Company Ltd, New Delhi, 2007.

5. Ignacimuthu S.J., "*Environmental Studies*", MJP Publishers, Chennai, 2012.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS
DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ANCILLARY CHEMISTRY (for B.Sc. Physics)

Title of the paper: Organic and Physical chemistry

Semester	**: IV**	**Contact hours: 4 hrs**	
Subject code	**: 17AKP4**	**Credits**	**: 4**

Objectives:

To gain knowledge about the concept and scope of bio-molecules like amino acids, proteins, carbohydrates, nucleic acids and electro chemistry.

UNIT : I AMINO ACIDS AND PROTEINS: a) Amino acids: Definition- classification- synthesis of α-amino acid (Gabriel synthesis, Koop synthesis)- properties of amino acids (isoelectric point, action of heat, peptide formation).b) Proteins: Definition- classification (simple and conjugated proteins)- properties of proteins (colloidal nature, isoelectric point, denaturation, hydrolysis)- color tests for proteins (biuret test, ninhydrin test)- structure of proteins (primary, secondary, tertiary and quaternary).

UNIT: II CARBOHYDRATES: Definition and classification-detailed study of monosaccharides-glucose and fructose-mutarotation-epimerisation-structure and configuration of glucose and fructose-comparison between glucose and fructose-methods of ascending and descending in the sugar series-interconversion between glucose and fructose-disaccharides-sucrose-preparation, properties and structure elucidation.

UNIT : III NUCLEIC ACIDS: Definition- nucleosides- nucleotides- function of nucleotides- nucleotide as energy carriers- types of nucleic acids- structure of DNA-

replication of DNA- functions of DNA-structure and functions of RNA- biological aspects of ageing.

UNIT: IV ELECTROCHEMISTRY: Conductance – definition - specific conductance - equivalent conductance – molar conductance - effect of dilution on equivalent conductance-cell constant-electrolytic dissociation - degree of dissociation - Kohlrausch's law and its applications – conductometric titrations - Ostwald's dilution law –Ionic product of water- The pH scale- Common ion effect - buffer solutions - theory of buffer action - applications of buffer solutions - Henderson's equation .

UNIT: V ELECTROCHEMICAL CELLS : Electrochemical cells-Galvanic cells and Electrolytic cell-electrode reaction, electrode potential and standard ele ctrode potential -thermodynamics of cells-Nernst equation- EMF and measurement of EMF-representation of electrodes -sign conventions for electrodes- -different types of electrodes (metal-metal ion electrode, gas electrode, calomel electrode, oxidation-reduction electrode)- cells (standard western cadmium cell, le ad storage battery)- fuel cells (hydrogen-oxygen fuel cells) Concentr ation cells (electro de concentration cells, electrolyte concentration cells).

Text Books:

1.Bahl B.S. & Arun Bahl, "*Advanced Organic Chemistry*", S.Chand & Company New Delhi, 2008.

2. Soni P.L. & Chawla H.M., "*Text Book of Organic Chemistry*", Sultan & Sons, New Delhi, 2004.

3. Arun Bahl & Bahl B.S., "*Advanced Organic Chemistry*", S.Chand & Company Ltd., New Delhi, 2007.

4.Puri, Sharma & Pathania, "*Principles of Physical Chemistry*," Vishal Publishing Co, Jalandhar, 2004.

Reference Books:

1.Bansal K., "*Organic Reaction Mechanisms*", 4th Edition, New Age International Pvt. Ltd., New Delhi, 2012.

2.Bhupindu Mehta, Manjal Mehta, "*Organic Chemistry*", PHI Learning Private Limited, New Delhi, 2012.

3. Tewari K.S. Mehrotra S.N. & Vishnoi N.K., *"A Text book of Organic Chemistry*", Vikas Publishing House Pvt. Ltd., New Delhi,1987.

4.Viswanathan B., Venkataraman R. & Rengarajan K., "*Electro Chemistry*", S.Viswanathan Pvt. Ltd., Chennai, 2007.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS
DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ANCILLARY CHEMISTRY (for B.Sc. N&D and Physics)

PRACTICAL –I

Title of the Paper : Qualitative Analysis
Semester : IV **Credits: 1**
Subject Code : 17AKN4P/17AKP4P **Exam hours : 3**

Note: 1. For Practical Record –20 Marks

2. For Experiment and Results -40 Marks

Analysis of a simple salt (By macro method)

Cations: Lead, copper, iron (II &III), alu minium, zinc, manganese, nickel, calciu m, barium, strontium, magnesium and ammonium.

Anions: Carbonate, chloride, fluoride, nitrate, oxalate, borate, phosphate, and sulphate.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

Title of the paper: Core- Organic and Inorganic Chemistry

Semester	**: III**	**Contact Hours: 4**
Subject code	**: 17K31**	**Credits : 4**

Objectives:

1. To understand the basic concepts of Organo halogen compounds, isomerism.
2. To acquire fundamental knowledge related to hydrogen, group I, II, III, IV, V &VI.

UNIT: I ORGANO HALOGEN COMPOUNDS: a) Alkyl halides: General methods of preparation – general properties – detailed mechanisms of nucleophilic substitution and elimination reactions. Fluorocarbons: Westron and Freon - and elementary idea and their impact on environment. b) Aryl halides: Preparation by halogenation, Sandmayer and Hunsdiecker reactions – general properties – an elementary idea about halogenated pesticides and insecticides. c) Aralkyl halides: B enzyl chloride – preparation and properties – comparison between aryl halide and aralkyl halide.

UNIT: II ISOMERISM: a) Geometrical isomerism- Definition- Determination of configuration of geometrical isomers - geometrical isomerism of maleic and fumaric acids – aldoximes and ketoximes- E-Z notations. b)Optical isomerism: Optical activity - definition - condition for optical activity – optical isomerism of lactic and tartaric acids – relative and absolute configuration - R and S system -racemization - resolution of racemic mixture - Walden inversion - asymmetric synthesis. Optical activity of compounds without asymmetric carbon atoms: allenes, spiranes and biphenyl compounds.

UNIT: III HYDROGEN, GROUP I & II ELEMENTS: a) Hydrogen: Ortho and para hydrogen- Hydrides: Ionic or salt like hydrides- covalent hydrides, metallic or interstitial hydrides- intermediate hydrides. b) Group I elements: Alkali metal - electronic structure – general properties- chemical properties – solubility and hydration- stability of carbonates and bicarbonates-halides-Preparation, properties and uses of the following compounds: Sodium

nitrite, Lithium aluminium hydride, Lithium carbonate-Anomalous behavior of Lithium. c) Group II elements: Alkaline earth metals- electronic structure- similarities in physical and chemical properties and gradation in them- Anomalous behavior of Be- Diagonal relationship between Be and Al-Occurrence (Important minerals) of alkaline earth metals-Study of following compounds: Plaster of paris, Gypsum and Barium chromate.

UNIT: IV GROUP III & IV ELEMENTS: a) General characteristics of group III elements - Reactions of elements with acids, alkalis and dioxygen. Compounds of boron-borates, borax and diborane and its structure- qualitative analysis of aluminium. b) General characteristics of group IV elements - Compounds of carbon- Carbides, water gas, producer gas and coal gas - Oxides of silicon-silicates, silicones and their applications.

UNIT: V GROUP V & VI ELE MENTS: Group-V: Electronic structure and oxidation states- metallic and non-metallic character- difference between nitrogen and other elements-Group V elements: Halides, oxides, oxy acids of nitrogen and phosphorus, Sodium bismuthate, tartar emetic. Group- VI : Group discussion of VI group elements: Sulphur: preparation, properties and uses of persulphides, halides and oxy chlorides (thionyl chloride) – structure – preparation, properties, uses and structure of H_2SO_4 and peracids – preparation, properties, structure and uses of chlorosulphonic acid.

Text Books:

1. Bahl B.S & Arun Bahl, "*Advanced Organic Chemistry*", S. Chand & Company, New Delhi, 2012.
2. Jain, M. K. and Sharma, S. C. "*Modern Organic Chemistry*", Vishal Publishing Co, Jalandhar, Delhi, IV Edition, 2013.
3. Madan R.D, "*Modern Inorganic Chemistry*", S.Chand and company Ltd. NewDelhi, 2011.
4. Puri B.R. Sharma L.R. Kalia K.C., "*Principles of Inorganic Chemistry*", Milestone Publishers, Delhi, 2009.
5. Tewari, K. S., Mehrotra, S. N., and Vishnoi, N. K. "*Text book of Organic Chemistry*", Vivas Publishing House Pvt. Ltd., 2006.

Reference Books:

1. Albert Cotton F., "*Advanced Inorganic Chemistry*", 6th Edition, Wiley India Pvt. Ltd., New Delhi, 2012.
2. Bhupindu Mehta Manjal Mehta, "*Organic Chemistry*", PHI Learning Private Limited, New Delhi, 2012.
3. Finar I.L. Vol-I, "*Organic Chemistry*," Pearson Education Pvt. Ltd., Putparganj, 2011
4. Lee J.D., "*Concise Inorganic Chemistry*", Fifth Edition, Blackwell Science Ltd., New Delhi, 2008.
5. Madan R.L & Chand S., "*Simplified Course in Inorganic Chemistry*," S.Chand & Co., New Delhi, 2001.
6. Morrison, R.T., and Boyd, R.N., *Organic Chemistry*, Prentice-Hall of India Pvt. Ltd., New Delhi, VII Edition, 2011.
7. Soni, P.L., "*Text book of Organic Chemistry"*, Sultan Chand and Sons, New Delhi, 1998.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017– 2018 Batch onwards)

Title of the paper: Core- Organic and Physical Chemistry
Semester : IV **Contact hours: 4**
Subject code : 17K41 **Credits : 4**

Objectives:

1. To understand the importance of chemistry in the field of Hydroxy compounds, Aliphatic aldehydes & ketones.
2. To get an insight into Liquid state, Surface chemistry and Chemical kinetics.

UNIT: I ORGANO HYDROXY COMPOUNDS: a) Alcohols: Preparation from alkenes by hydration, hydroboration- oxidation and oxymercuration- demercuration methods – general properties. Ethylene glycols: Preparation and properties- Glycerol: Preparation and properties. b) Phenols: General methods of Preparation – properties- acidity of phenol and effect of substitutents- reactions of analytical importance. c) Aromatic alcohol: Benzyl alcohol- Preparation and properties-comparison with phenols.

UNIT:II ALIPHATIC ALDEHYDES AND KETONES: Methods of preparation of aldehydes and ketones- by direct oxidation of alcohols, Catalytic dehydrogenation of alcohols, oxidation of alkenes with ozone, hydration of alkynes, S tephens reduction of nitriles, Rosenmund reduction of acid chlorides- physical properties – nature of reactions of carbonyl compounds – nucleophilic addition reactions - mechanism of addition of grignard reagents, addition of ammonia -reaction with alcohols, thiols ,ammonia derivatives– Reactions involving alkyl groups - aldol condensation, dehydration of aldols, halogenations -reduction to alcohols – clemmensen reduction- wolf-kishner reduction- reduction to pinacols – oxidation to carboxylic acids –mechanism of haloform reaction , cannizzaro reaction – tests of aldehydes and ketones- Preparation , properties, and uses of acetaldehyde.

UNIT:III LI QUID STATE: Intermolecular forces in liquids – dipole-dipole attractions, London forces and hydrogen bonding - Heat of vapourisation - Trouton's rule and its significance – molar volume and its applications – surface tension - effect of temperature on surface tension – parachor – atomic and structural parachors - their applications- viscosity – effect of temperature on viscosity – measurement of viscosity – Ostwald method - Reynold's number-Liquid Crystals – classification – smectic – nematic - cholesteric - disc shaped and polymer liquid crystals – LCDs and the Seven Segment cell - applications.

UNIT: IV SUR FACE CHEMISTRY: a) Catalysis: Definition – characteristics of catalytic reactions –Homogeneous catalysis: Acid-base catalysis-enzyme catalysis-Michaelis-Menten equation-autocatalysis- Heterogeneous catalysis – surface catalytic reactions – promoters- catalytic poison – theories of catalysis – applications of catalysis. b) Adsorption: Definition – various terms involved in adsorption – types of adsorption: physical and chemical adsorption - factors influencing adsorption – Adsorption Isotherms :Freundlich adsorption isotherm and Langmuir adsorption isotherm-derivation - applications of adsorption.

UNIT: V CH EMICAL KINETICS: Introduction – rate of reaction – rate law and rate constant – order and molecularity – first order reactions – examples – rate equation – derivation - half life period - second order reactions - examples – rate equations – derivation - zero order and third order reactions - examples – rate equations (no derivation required) - determination of order of a reaction. Influence of temperature on the rate of reaction – Arrhenius rate equation and its significance – theory of reaction rates – Bimolecular collision theory – Unimolecular reactions – Lindemann's hypothesis – Absolute Reaction Rate Theory.

Text Books:

1. Bahl B.S. & Arun Bahl, "*Advanced Organic Chemistry*" S.Chand & Co, New Delhi, 2012.
2. Glasstone, S., Text book of Physical Chemistry, McMillan and Company Ltd., London, 1974.
3. Puri B.R., Sharma L.R. & Pathania.S,"*Principles of Physical Chemistry*," Vishal Publishing Co., Jalandhar, 2009.

Reference Books:

1. Finar I.L., "*Organic Chemistry*", Vol-I, Pearson Education, New Delhi, 2003.
2. Gurdeep Raj., "*Advanced Physical Chemistry*", Goel Publications, Meerut, 2014.
3. Samuel Glasstone., "*A Text Book of Physical Chemistry*", Macmillan, 1976.
4. Soni P.L. & Dharmarha O.P., "*Text Book of Physical Chemistry*", Sultan Chand & Sons, New Delhi, 2001.
5. Soni P.L. & Chawla H.M., "*Text Book of Organic Chemistry*", Sultan Chand & Sons, New Delhi, 1990.
6. Tewari K.S., Mehrotra S.N. & Vishnoi N.K., "*A Text Book of Organic Chemistry*" Vikas Publishing House Pvt. Ltd., New Delhi, 2006.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

MAJOR PRACTICAL –II

(At the end of Second Year)

Title of the paper: Gravimetric and Volumetric Analysis

Semester : IV **Exam Hours : 6**

Subject Code : 17K4P **Credits : 5**

Note: 1. For Practical Records-10 Marks
2. For Experiment and Results-50 Marks

Gravimetric Analysis-25 marks, Volumetric Analysis-25 marks

Distribution of marks (both for gravimetric and Volumetric)

Procedure (5marks)

Estimation (20marks)

Error <2% - 20 marks

Error 2-3% -15 marks

Error 3-4% -10 marks

Error >4% -5 marks

I) Gravimetric Analysis:

List of experiments:

1. Estimation of lead as lead chromate
2. Estimation of barium as barium chromate
3. Estimation of calcium as calcium oxalate monohydrate

II) Volumetric analysis:

List of experiments:

I. Acidimetry and alkalimetry: 1. Estimation of NaOH

2. Estimation of Na_2CO_3

3. Estimation of oxalic acid

II. Redox Titrations:

a) Permanganometry: 1. Estimation of ferrous ion

2. Estimation of oxalic acid

b) Dichrometry: 1. Estimation of ferrous ion

III. Iodometry and iodimetry

1. Estimation of potassium dichromate

2. Estimation of potassium permanganate

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS
DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ANCILLARY CHEMISTRY (for B.Sc. N &D)

Title of the paper: Applied Chemistry

Semester	**: V**	**Contact hours: 4**
Subject code	**: 17AKN5**	**Credits : 4**

Objectives:

1. To enable students to understand the fundamental concepts in Water analysis, Polymer chemistry.
2. To learn manufacturing techniques behind Industrial and Agricultural products.

UNIT: I WATER TREATMENT: Chemical and Physical Analysis of water quality parameters – Standard prescribed for water quality by WHO and other Indian Standards – Sea Water as a source of drinking water – Electro dialysis method and Reverse osmosis method for purification of water.

UNIT: II POLYMER CHEMISTRY: a) Rubber: Natural and Synthetic rubbers – Composition of natural rubber, Neoprene, Styrene – Butadiene rubber (SBR).b) Polymer chemistry: Addition and Condensation polymerization –Copolymer – Homopolymer – Definition of natural and synthetic fibres – natural and synthetic resins – Bakelite and Nylon-66.

UNIT: III INDUSTRIAL CHEMISTRY-I: a)Match Industry : Pyrotechnics and explosives – Raw material needed for match industry – Manufacturing process – pyrotechniques –Colored smokes. b)Silicate Industry: Cement and Glass, Raw materials and manufacture of cement and Glass.

UNIT: IV IN DUSTRIAL CHEMISTRY-II: a) Petrochemicals : E lementary study – Definition-Origin-Composition-Chemicals from natural gas, Petroleum, Light Naphtha and Kerosene. b) Paints and Iacquers: Pigments-Paints-Ingredients in Paints-Manufacture-Lacquers-Varnishes.

UNIT: V AGRICULTURAL CHEMISTRY: Fertilizers: Definition-nutrients for plants-role of various elements in plants Growth-natural and chemical fertilizers-classification of chemical fertilizers-Urea and potassium nitrate-Mixed fertilizer.

Text Books:

1. Arora M.G. & Singh M., "*Industrial Chemistry*" Anmol Publications. Pvt. Ltd, New Delhi, 2002.
2. Bagavathi Sundari. K., "*Applied Chemistry*", MJP Publishers, Chennai, 2006.
3. Chakravarthy B.N, "*Industrial Chemistry*" Oxford & IBH Publishing & Co. Pvt. Ltd., New Delhi, 1998.

Reference Books:

1. Jain & Monika Jain, "*Engineering Chemistry*", Fifth Edition, Dhanpat Rai & Sons, Delhi, 1990.
2. Mahapatra G., "*Elements of Industrial Chemistry*", Kalyani Publishers, New Delhi, 2001.
3. Sharma B.K., "*Industrial Chemistry*", Tenth Edition, Krishna Prakashan Media (P) Ltd., Meerut, 1999.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ANCILLARY CHEMISTRY (for B.Sc. N &D)

Title of the Paper: Applied and Medicinal Chemistry

Semester	**: VI**	**Contact hours: 4**
Subject code	**: 17AKN6**	**Credits : 4**

Objectives:

1. To enrich the knowledge in Soap and detergents, plastics and paper industry, leather technology.
2. To become familiar with Colloidal state and Medicinal chemistry.

UNIT: I SOAP AND DETERGENTS: Soap: Saponification –Definition- Types of soap- Manufacture of soap: Hot process, Cold process and Modern continuous process- Cleansing action of soap. Detergent: Definition- Classification with example- Distinction between soaps and detergents.

UNIT: II PLASTICS AND PAPER INDUSTRY: a) Plastics: Introduction-characteristics of plastics-classification of plastics- differences between thermo setting and thermo plastics-preparation and applications of bakelite, polythene, PVC, polypropylene, poly styrene and urea formaldehyde resin. Differences between plastics and resins. b) Paper industry: Introduction- raw materials and manufacturing process of paper- types of paper-paper industry in India

UNIT: III LE ATHER TECHNOLOGY: Preservation and processing of leather : Chemical methods of curing and preservation of hides and skins in acid & alkaline solutions-principles of methods employed in curing, liming, deliming, bating and pickling –process of dyeing leather-use of mordants-dyeing auxilliaries such as leveling,wetting and dispersing agents- dye fixations.

UNIT: IV ANAESTHETICS, ANALGESICS AND ANTIPYRETICS: a)Anaesthetics: Definition- classification- applications of nitrousoxide and chloroform. b)Analgesics: Definition-mode of action-specific applications of antipyrine and aspirin. c)Antipyretics: Definition-mode of action- medicinal uses of salol and paracetamol.

UNIT: V SULPHA DRUGS AND ANTIBIOTICS

a)Sulpha drugs: Definition-mode of action-applications of sulphanilamide and sulphapyridine. b) Antibiotics: Definition- characteristics- mode of action- structure and uses of the following antibiotics- penicillins and tetracyclins.

Text Books:

1. Ashotosh Kaur, "*Medicinal Chemistry*", 3rd Edition, New Age International (Pvt.) Limited, New Delhi, 2006.
2. Madan R.D., "*Modern Inorganic Chemistry*", S.Chand & Co., New Delhi, 2004
3. Puri P.R. Sharma L.R. & Kalia K.C., "*Principles of Inorganic Chemistry*", Milestone Publishers, Delhi, 2008.
4. Wahid U. Malik G.D. Tuli & Madan R.D., "*Selected Topics in Inorganic Chemistry*", S.Chand & Co, New Delhi, 2002.

Reference Books:

1. James Huheey E. Ellen A. & Keiter, "*Inorganic Chemistry*", 4th Edition, Pearson Education, New Delhi, 2013.
2. Kadam S., "*Principles of Medicinal Chemistry*", Nirali Prakashan, New Delhi, 2006.
3. Lee J. D., "*Concise Inorganic Chemistry*", Fifth Edition, Blackwell Science, USA, 2003.
4. Madan R.L. & Tuli G.D., "*Simplified Course in Inorganic Chemistry*" S.Chand & Co., New Delhi, 2001.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS
DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ANCILLARY CHEMISTRY (for B.Sc. Physics)

Title of the Paper: Inorganic, Physical and Medicinal Chemistry

Semester	**: V**	**Contact hours: 4**
Subject code	**: 17AKP5**	**Credits : 4**

Objectives:

1. To enrich the knowledge in periodic properties, chemical bonding, colloidal state.
2. To learn the chemistry of petrochemicals and medicinal products.

UNIT: I PERIODIC TABLE & PERIODIC PROPERTIES: a) Long form of periodic table-classification of elements into s, p, d and f blocks. b) Atomic radii, ionic radii, ionization potential, electron affinity, electro negativity and their periodic variations-interpretation of these variations based upon their electronic configuration.

UNIT : II CHEMI CAL BONDING: Covalent bond - Ionic bond - difference between covalent and ionic bonds - Fajans' rule – coordinate covalent bond - VSEPR theory - Valence bond theory - molecules with regular geometry - hybridisation – sp ($BeCl_2$), sp^2 (BF_3) and sp^3(CH_4). Molecular orbital theory: Bonding and antibonding molecular orbitals. MO diagram or molecules like H_2, He_2, O_2, N_2, CO. Comparison between VBT and MOT.

UNIT: III COLLOIDAL STATE: Introduction: Phases of colloids-classification of colloidal solutions- preparation (Dispersion methods only), purification, properties- optical property-Tyndal effect, Kinetic property- Brownian movement; Electrical properties-Electrical double layer and, Electrophoresis. Applications of colloids: Colloidal medicine, smoke precipitation, artificial kidney machine, sewage disposal, purification of water, artificial rain.

UNIT : IV PET ROLEUM AND PETROCHEMICALS: a) Petroleum:Introduction-occurrence- sources of petroleum in India- composition of petroleum- origin of petroleum-carbide theory- refining of petroleum- cracking- knocking and antiknocking- octane number-

flash point- Synthetic petrol- Fischer-Tropsch process.b) Petrochemicals: Definition –different types of petrochemicals.

UNIT:V MEDICINALCHEMISTRY: Chemotherapy: Introduction a) Anesthetics: Definition-classification with examples. b) Analgesics: Definition- classification with examples. c) Antibiotics-Definition-uses of penicillin, streptomycin, tetracycline and chloramphenicol. d) Antimalarial Drugs-Definition- mode of action- examples.

Text Books:

1.Bahl B.S. Tuli G.D. & Arun Bahl, " *Essentials of Physical Chemistry,"* S.Chand & Company Ltd., New Delhi, 2004.

2. Bahl B.S. & Arun Bahl, "*Advanced Organic Chemistry*", S.Chand & Co., New Delhi, 2004.

3. Puri P.R. Sharma L.R. & Kalia K.C., "*Principles of Inorganic Chemistry*", Milestone Publishers, Delhi, 2008.

4.Soni P.L. & Chawla H.M., "*Text Book of Organic Chemistry*", Sultan & Sons, New Delhi, 2004.

Reference Books:

1. Ashotosh Kaur, "*Medicinal Chemistry*", 3rd Edition, New Age International (Pvt.) Limited, New Delhi, 2006.

2. Bagavathi Sundari. K., "*Applied Chemistry*", MJP Publishers, Chennai, 2006**.**

3. Bhalerao Marry & Giragon, " *Pharmaceutical Chemistry*", Himalaya Publishing House, Ramdoot, 2001.

4. Madan R.L. & Tuli G.D., "*Simplified Course in Inorganic Chemistry*" S.Chand & Co., New Delhi, 2001

5. Soni P.L.,Dharmarha O.P. & Dash U.N., "*Text Book of Physical Chemistry*", Sultan & Sons, New Delhi, 2001.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS
DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ANCILLARY CHEMISTRY (for B.Sc. Physics)

Title of the paper : Analytical and Inorganic Chemistry

Semester	**: VI**	**Contact hours: 4**
Subject code	**: 17AKP6**	**Credits : 4**

Objectives:

1.To enable students to understand the fundamental concepts in Analytical chemistry, Metallurgy.

2.To learn the chemistry of Radio activity, Acids, bases and Oxidation, reduction reactions.

UNIT: I ANALYTICAL CHEMISTRY-I: Volumetric methods of analysis: i) Introduction- principle- terminology: molality, molarity, normality, mole fraction -titration- end point- indicator - types of indicators - Standard solution- types of standard solution- requirements of primary standard solution ii) Acid-base titration:Types- titration curves and choice of indicators- Ostwald's theory-theory of acid- base indicators.

UNIT: II ANALYTICAL CHEMISTRY- II: Chromatography: Definition- principle of chromatography- types of chromatography- experimental techniques and applications of column chromatography- thin layer chromatography and paper chromatography- R_f value and factors affecting R_f value.

UNIT: III PRINCIPLES AND PROCESS OF METALLURGY: a) Ores and minerals: Definition-examples -various steps of metallurgy-crushing, pulverizing -concentration of the ore- calcination and roasting- reduction into metals Alumino-thermic process. b) Refining of metals: Electrolytic refining, Zone refining and Van-Arkel process.

UNIT: IV RA DIO ACTIVITY: Radioactivity- definition – nature of radiations from radioactive substances – comparison of the properties of α, β and γ radiations- detection and

measurements of radioactivity –Geiger Muller counter–group displacement law- nuclear fission- atom bomb- nuclear fusion- hydrogen bomb- applications of radioactive isotopes.

UNIT: V ACIDS, BASES AND OXIDATION AND REDUCTION:

Acids and Bases :Modern concepts of acids and bases- Arrhenius, Bronsted- Lowry, Lewis and Lux-Flood concept -levelling effects. Oxidation and Reduction :Modern concept-oxidation number- Calculation of oxidation number- oxidizing agents- reducing agents- redox reactions- Balancing of redox equations by oxidation number method.

Text Books:

1. Gopalan R. Subramanian P.S. & Rengarajan K., "*Elements of Analytical Chemistry*", S. Chand & Sons, New Delhi, 2005.
2. Madan R.D., "*Modern Inorganic Chemistry*", S.Chand & Co., New Delhi, 2004
3. Puri P.R. Sharma L.R. Kalia K.C., "*Principles of Inorganic Chemistry*", Vishal Publications, Jalandhar, 2001.

Reference Books:

1. James Huheey E. Ellen A. & Keiter, "*Inorganic Chemistry*", 4th Edition, Pearson Education, New Delhi, 2013.
2. Khopkar S.M., "*Basic Concepts of Analytical Chemistry*", New Age International Pvt. Ltd., New Delhi, 2008.
3. Lee J. D., "*Concise Inorganic Chemistry*", Fifth Edition, Blackwell Science, USA, 2003.
4. Usharani. S. "*Analytical Chemistry*", Macmillan India Ltd., New Delhi, 2008.
5. Wahid U. Malik G.D. Tuli & Madan R.D., "*Selected Topics in Inorganic Chemistry*", S.Chand & Co, New Delhi, 2002.& Sons New Delhi, 2005.

Annexure 15

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

ANCILLARY PRACTICAL -II

(At the end of third year)

Title of the Paper: Volumetric Analysis

Semester	**: VI**	**Exam Hours:**	**3**
Subject Code	**: 17AKN6P/17AKP6P**	**Credits**	**: 1**

A double titration involving making up of the solution to be estimated**.**

Distribution of marks

For Record Note – 10 marks

For Procedure -10 marks

Estimation (40 marks)

Error <2% - 40 marks

Error 2-3% - 30 marks

Error 3-4% - 20 marks

Error 4-5% - 10 marks

Error >5% - 5 marks

Annexure 15

LIST OF EXPERIMENTSS

S.NO	Standard solution	Link solution	Solution for estimation
1	Hydrochloric acid	Sodium hydroxide	Oxalic acid
2	Sodium carbonate	Hydrochloric acid	Sodium Hydroxide
3	Sodium hydroxide	Hydrochloric acid	Sodium carbonate
4	Ferrous sulphate	Potassium permanganate	Ferrous ammonium sulphate
5	Oxalic acid	Potassium permanganate	Ferrous ammonium sulphate
6	Sodium hydroxide	Oxalic acid	Potassium permanganate
7	Oxalic acid	Potassium permanganate	Oxalic acid

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

Title of the paper: Core- Organic Chemistry

Semester : V **Contact hours: 4**

Subject code : 17K51 **Credits : 4**

Objectives:

To acquire knowledge related to aromatic substitution, aromatic aldehydes , ketones and carboxylic acids, organic nitrogen compounds, heterocyclic compounds and carbohydrates.

UNIT:I AROMATIC SUBSTITUTION: Isomerism and orientation of benzene derivatives-determination of orientation- rules of orientation-electronic interpretation of directive effects mechanism of aromatic electrophilic s ubstitution – halogenation, nitration and sulphonation, Friedel –Craft's reaction(alkylation, acylation) -influence of substituents – activating and deactivating groups-aromatic nucleophilic substitution– unimolecular, bimolecular substitution and benzyne mechanism.

UNIT:II AROMATIC ALDEHYDES , KETONES AND CARBOXYLIC ACIDS:

a) Preparation and properties of benzaldehyde, and acetophenone-Organic naming reactions: Reimer-Tiemann reaction, benzoin condensation, claisen condensation, knoevenagel reaction, cannizzaro reaction, crossed cannizzaro reaction, claisen-Schmidt reaction, perkin reacti on -α, β - Unsaturated carbonyl compounds: Preparation and properties of crotonaldehyde and cinnamaldehyde. b) Carboxylic acids: Preparation and properties of benzoic, malonic, succinic and o-phthalic acids.

UNIT: III ORGANIC NITROGEN COMPOUNDS : a)Aromatic amines: Inroduction-classification-methods of preparation of primary amines- reduction of nitro compounds

and ammonolysis of aryl halides -methods of preparation of secondary and tertiary amines from aniline, acetanilide-properties: basicity of amines, salt formation, acylation, alkylation and arylation, carbylamine reaction, reaction with aldehyde, CS_2, Grignard reagent, bromination, nitration and sulphonation. b) Aromatic nitro compounds: Preparation, properties of nitrobenzene,conversion of nitrobenzene to ortho, meta, para-dinitrobenzene and its properties. c) Cyanides & Isocyanides:Preparation ,properties of alkyl cyanides & alkyl isocyanides. Differences between alkyl cyanides & alkyl isocyanides.

UNIT: IV HETEROCYCLIC COMPOUNDS: Preparation, and properties of pyrrole, furan, thiophene ,pyridine ,indole, quinoline and isoquinoline.

UNIT: V CARBOHYDRATES: Definition and classification-detailed study of monosaccharides-glucose and fructose-mutarotation-epimerisation-structure and configuration of glucose and fructose-comparison between glucose and fructose-methods of ascending and descending in the sugar series-interconversion between glucose and fructose-disaccharides-sucrose-preparation, properties and structural elucidation.

Text Books:

1. Bahl B.S. & Arun Bahl, "*Advanced Organic Chemistry*", S.Chand & Company, New Delhi, 2008.
2. Jain M.K.& Sharma S.C., "*Modern Organic Chemistry*",Vishal publishing Co, New Delhi, 2017.
3. Soni P.L. & H.M.Chawla, "*Text Book of Organic Chemistry*", Sultan Chand & Sons, New Delhi, 1990.

Annexure-13

Reference Books:

1. Bansal K., "*Organic Reaction Mechanisms*", 4th Edition, New Age International Pvt. Ltd., New Delhi, 2012.
2. Bhupinder Mehta, Manju Mehta, "*Organic Chemistry*", PHI Learning Private Limited, New Delhi, 2012.
3. Finar I.L., "*Organic Chemistry*", Volume-I, Pearson Education, New Delhi, 2003.
4. Morrison, Boyd, Bhattacharjee, "*Organic Chemistry*", Pearson, New Delhi, 2011.
5. Tewari K.S. Mehrotra S.N. & Vishnoi N.K., "*A Text Book of Organic Chemistry*", Vikas Publishing House Pvt. Ltd., New Delhi.

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

Title of the Paper: Core-Physical Chemistry-I

Semester	**: V**	**Contact hours**	**: 4**
Subject code	**: 17K52**	**Credits**	**: 4**

Objectives:

This course covers the basic and detailed aspects of thermodynamics, phase rule and solutions, colligative properties and group theory.

UNIT : I THERMODYNAMICS-I: a) Importance of thermodynamics-concepts of a system, surroundings, energy-state variables-extensive intensive properties-different types of processes-isothermal, adiabatic, isobaric, isochoric, reversible, irrever sible processes and c yclic. First law of thermodynamics-definition-mathematical expression-enthalpy and energy as thermodynamic properties - heat capacity at constant P and V-Relation between C_p and C_v-work done in reversible isothe rmal expansion and compression –maximum work - work done in irreversible isot hermal expansion and adiabatic expansion. The Joule-Thomson effect, Joule Th omson coefficient for real and ideal gas. b) Zeroth law of thermodynamics and its significance.

UNIT : II THERMODYNAMICS-II: a) Second law of thermodynamics:Need for second law-different ways of stating II law-Carnot cycle-Carnot's theorem-entropy as a thermodynamic property-Clausius inequality-calculation of entropy change of an ideal gas with c hange in P,V and T – Entropy changes of an ideal ga s in different process – Physical significance of entropy – Work and free energy functions – Variation of free energy change with t emperature & pressure – Maxwell's relationships – The Gibbs-Helmholtz equation– The Clapeyron- Clausis equation and its applications. Van't Hoff

isotherm- Van't Hoff isochore.b) Third law of thermodynamics:Nernst heat theorem – Statement of Third law of Thermodynamics, determination of absolute entropy of solid, liquid and gas.

UNIT : III PHASE RULE AND SOLUTIONS: a) Statement and significance of the terms involved. Derivation of phase rule from thermodynamic derivation-application of phase rule to one -component system (water, sulphur system only). b) Two component systems-simple eutectic system (lead-silver system only)-compound formation-congruent melting point (Zn-Mg system only), salt hydrates ($FeCl_3$-H_2O system only).-incongruent melting point (KI-H_2O system only). c) Thermodynamics of ideal solutions-Henry's law, Raoult's law-binary liquid system-partially miscible (phenol-water system), completely miscible and completely immiscible system-theory of fractional distillation and steam distillation.

UNIT :IV COLLIGATIVE PROPERTIES: Colligative properties –lowering of vapour pressure – osmosis and osmotic pressure –elevation of boiling point –depression in freezing point – experimental determination of lowering of vapour pressure and osmotic pressure – Van't Hoff factor – degree of association – degree of dissociation**.**

UNIT:V GROUP THEORY: Introduction-symmetry elements and symmetry operations- rules of a group, order of a group - classes and similarity transformation-point group classification (C_1,C_2,C_3,C_{nv},D_{nh},T_d,O_h) – matrix representation of symmetry operation-rotation & reflection– reducible and irreducible representation (definition only)- Orthogonality theorem **-** construction of character table (C_{2v} only) .

Text Books:

1. Bhattacharya P.K., "*Group Theory and applications*", Himalaya Publishing House, Mumbai, 1996.
2. Puri B.R, Sharma L.R & Pathania S."*Principles of Physical Chemistry*", Vishal Publishing Co., New Delhi, 2010.
3. Ramakrishnan V. & Gopinathan M.S., "*Group Theory in Chemistry*", Vishal Publishing Company, 2007

Annexure-13

Reference Books:

1. Arun Bahl ,Bahl B.S & Tuli G.D "*Essentials of Physical chemistry",* S.Chand & Co. LTD., New Delhi 2009.
2. Gurdeep Raj, "*Advanced Physical Chemistry*", Goel Pulications, Meerut, 1992.
3. Soni P.L. & Dharmarha O.P., "*Text Book of Physical Chemistry*", Sultan Chand & Sons, New Delhi, 2001.

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

Core-Elective-I (Choice-A)

Title of the paper: Inorganic and Analytical Chemistry

Semester	**: V**	**Contact hours:**	**4**
Sub code	**: 17KE5A**	**Credits**	**: 4**

Objectives:

1. To acquire knowledge and understanding of Halogen compounds.
2. To gain about fundamental concepts of d, f block ele ments, non-aqueous solvents, inorganic polymers and data analysis.

UNIT-I HALOGEN COMPOUNDS a) Halogen compounds: Electronic configuration, diatomic nature, oxidizing property, electronegativity and electron affinity –Difficulties in the di scovery and isolation of fluorine – peculiarities of fluorine – electropositive character of Iodine b) Interhalogen Compounds: Interhalogen compounds: preparation, properties of ClF, ICl, ClF_3, BrF_3, ICl_3, ClF_5, BrF_5 ,IF_5, IF_7 – structure of ICl, ClF_3, IF_5, IF_7- poly halides and pseudo halogens.

UNIT-II TRANSITION ELEMENTS: a) Transition elements –position in the periodic table –general characteristics of d-block elements. b) Occurrence, extraction, properties and uses of titanium, vanadium, molybdenum and tungsten. c) Chemistry of titanium dioxide,titanium tetrachloride ,vanadium pentoxide-ammonium vanadate,ammonium molybdate,molybdenum blue,tungsten oxide,tungsten bronze,zirconium halide.

UNIT-III LANTHANIDES AND ACTINIDES: Position of lanthanides ,actinides in the periodic table –general characteristics of lanthanides a nd actinides –lanthanide contraction-actinide contraction.occurence and general methods of extraction of lanthanides by reducing the trihalides ,ion exchange and valence exchange

methods.Isolation of thorium from monazite –preparation ,properties and uses of oxides ,sulphates and halides of lanthanum and u ranium .Applications of lanthanides and actinides.

UNIT-IV NON-AQUEOUS SOLVENTS & INORGANIC POLYMERS

a)Non-aqeous solvents:Classification of solvents-general properties of ionizing solvents-chemical reactions-liquid ammonia as solvents-liquid sulphur dioxide as solvents-liquid hydrogen fluoride as solvents. b) Inorganic polymers: Introduction-general properties of inorganic polymers -silicon based polymers-polysilaxane gums and silicon rubber.

UNIT-V DATA ANALYSIS AND THERMOANALYTICAL METHODS: a)Data analysis:Introduction-mean –median-precision-accuracy-confidence limits- definition – determinate errors- indeterminate errors-rules for types improving accuracy of data-significant figure-method of least squares. b)Thermoanalytical methods:Introduction-Thermogravimetric analysis (TGA) –principle –thermal analysis of silver nitrate -derivative thermogravimetry(DGA)-factors which influence the thermogram- application of thermogravimetry.

Text books:

1.Gopalan R. Subramanian P.S. & Rengarajan K., "E*lements of Analytical Chemistry"*, Sultanchand & Sons , NewDelhi, 2003.

2. Madan R.D, "*Modern Inorganic Chemistry*", S.Chand and company Ltd., NewDelhi, 2011.

3. Puri B.R. Sharma L.R. Kalia K.C., "*Principles of Inorganic Chemistry*", Milestone Publishers, Delhi, 2016.

Reference books:

1. Gurdeep R. Chatwal & Sham K. Anand."Instrumental methods of chemical analysis". Himalaya publishing house, Mumbai, 2002.

2. Lee J.D., "*Concise Inorganic Chemistry*", Fifth Edition, Blackwell Science Ltd., New Delhi, 2003.

3. Malik U. Tuli G.D. & Madan R.L. "*Selected Topics in Inorganic Chemistry*," S.Chand & Company, New Delhi, 2004

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

Core-Elective –I (Choice B)

Title of the paper: Chemistry of Materials
Semester : V **Contact hours: 4**
Subject code :17KE5B **Credits : 4**

Objectives: To introduce and give an insi ght into the f ascinating area of solid state chemistry and material science. This will enable the students to pursue higher studies.

UNIT : I STRUCTURES OF SOLIDS : Introduction to sol ids – Crystalline and amorphous. Unit cell, Bravais lattices and X -ray structure determination (Nacl and Kcl only) – powder and si ngle crystal methods. Radius ratio rules – coordination number. Packing arrangement – different structure types in solids – rock salts, zinc blonde, wurtzite, spinel and inverse – spinel and perovskite structures.

UNIT : II PREPARATIVE METHOD AND CHARACTERIZATION: Solid state reactions – ceramic method, sol- gel hydrothermal, high pressure, zone refining, CVD, Czochralski and Br idgman and stockb arger methods. Physical methods – thermogravimetric and differential thermal analysis and scannin g electron microscopy (only introduction and applications)

UNIT : III E LECTRICAL AND OPTICAL PROPERTIES: Defects in solid state – point defects – Frenkel and Schottky defects and non-stoichiometric defects. Conductors – variation of conductivity with temperature – semiconductors – p and n types, pn-junction, photoconduction, photo voltaic cell and photogalvanic cell – solar energy conversion, organic semiconductors. Piezoelectric, pyro-electric and ferroelectrics (introduction and applications) Photolumionescence.

Annexure-13

UNIT : IV MAGNETIC PROPERTIES: Magnetic properties – classification – diamagnetic, paramagnetic, antiferro magnetic, ferro and ferri magnetic – magnetic susceptibility – variation with temperature Curie-Wiess law, Curie temperature and Neel temperature. Permanent and temporary magnets.

UNIT : V SPECIAL MATERIALS: Super conductivity – introduction, Meissner effect – mention of Bardeen, Cooper a nd Schrieffer theory and Cooper pairs – examples of superconducting oxides, Chevrel phases – applications of superconducting materials. Ionicconductors – sodium-b alumina, sodium-sulphur battery. Intercalation-layered compounds – graphitic compounds. Special applications of solid state materials.High energy battery, lithium cells.

Text Books:

1. Meyers H.P., "*Introductory Solid State Physics*", Viva Books Private Limited, New Delhi, 1998.
2. West A.R., "*Solid State Chemistry and its Applications"*, John-Wiley and Sons Singapore, 1989.

Reference Books:

1.Emelius H.J. & Sharpe A.G., "*Modern aspects of Inorganic Chemistry*", Universal Book stall, 1989.
2.Greenwood N.N., "*Ionic crystals, Lattice defects and Nonstoichiometry*", Butterworths, London, 1968.
3.Jolly W.L., "*Modern Inorganic Chemistry*", Mc Graw Hill Book Company New York, 1996.
4.Shriver D.F & Atkins P.W., "*Inorganic Chemistry*", Oxford University, Longford, 1990.

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

Skill Based Elective Paper-V

Title of the paper: Chemistry of Bio-molecules

Semester	**: V**	**Contact hours: 2hrs**	
Subject code	**:17SEK51**	**Credits**	**: 2**

Objective:

To gain knowledge about the concept and scope of bio-molecules like a mino acids and proteins, nucleic acids, vitamins, hormones ,enzymes and oils.

UNIT :I AMINO ACIDS AND PROTEINS:a) Amino acids: Definition- classification- synthesis of α-amino acid (Gabriel synthesis, Koop synthesis)- properties of amino acids (isoelectric point, action of heat, peptide formation).b) Proteins: Definition- classification (simple and conjugated proteins)- structure of proteins (primary, secondary, tertiary and quaternary)-properties of proteins (colloidal nature, isoelectri c point, denaturati on, hydrolysis)- colour tests for proteins (biuret test, ninhydrin test).

UNIT:II NUCLEIC ACIDS: Definition- nucleosides- nucleotides- function of nucleotides- nucleotide as ene rgy carriers- types of nucleic acids- structure of DNA- replication of DNA- functions of DNA-structure and functions of RNA.

UNIT : III VITAMINS AND HORMONES: a) Vitamins: Definition- classification- source- function and deficiency disease of vitamins A, B complex, C, D, E and K.

b)Hormones: Definition- classification- main functions of following hormones- Adrenaline, Cortisone, Testosterone, Estrone, Insulin, pituitary hormones, and thyroxin. Differences between hormones and vitamins.

Annexure-13

UNIT :IV ENZYMES: Definition – classification- coenzyme- mechanism of enzyme action- factors influencing enzyme activity- enzyme inhibition (competitive inhibitor, non-competitive inhibitor and end product inhibition)- role of enzymes in the digestion of food.

UNIT : V OIL: Introduction- classification-composition of oils - extraction and refining of oils-properties (saponification, hydrogenation, rancidity) -analysis of oils and (saponification value, acid value, iodine value, Reichert-Meissel value) - uses of oils.

Text Books:

1. Arun Bahl & Bahl B.S., "*Advanced Organic Chemistry*", S.Chand & Company Ltd., New Delhi, 2007.
2. Soni P.L., & Chawla H.M., "*Text Book of Organic Chemistry*", Sultan Chand & Sons, New Delhi, 2003.

Reference Books:

1. Lehninger, "*Principles of Biochemistry"*, Fourth Edition, David L. Nelson and Michael M. Cox, Worth Publishers, New York, 2005.
2. Lubert Stryer, "*Biochemistry"*, W. H. Freeman and Company, New York, 1975.
3. Tewari K.S., Mehrotra S.N., & Vishnoi N.K., "*A Text Book of Organic Chemistry",* Vikas Publishing House Private Ltd., New Delhi, 1987.
4. Veerakumari. L., "*Biochemistry"*, MJP publishers, Chennai, 2004.

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

Title of the Paper: Core-Organic Chemistry and Spectroscopy

Semester	**: VI**	**Contact hours:**	**4**
Subject code	**:17K61**	**Credits**	**: 4**

Objectives:

1. To enable the students undertake the knowledge of active methylene compounds,dyes and chrmotography.
2. To acquire an indepth knowledge related to alicyclic compounds, molecular rearrangement, tautomerism and their mechanisms.
3. To understand the c hemistry and applica tions of biologically important compounds such as alkaloids and terpenoids.
4. To understand the application of spectroscopy in UV, IR and NMR.

UNIT:I REACTIVE METHYLENE COMPOUNDS,DYES AND CHROMATOGRAPHY:a)Reactive methylene compounds: Introduction- Preparation &synthetic applications of acetoaceticester & malonic ester.b) Dyes:Introduction to dyes – color and constitution – classification based on structure and application – preparation and applications of the f ollowing dyes – methylorange, congored, malachite green, phenolphthalein,indigo.c)Chromatography: Definition-principles of chromatography-types of chromatography-experimental technique and appli cations of column chromatography, thin-layerchromatography,paper chromatography,paper electrophoresis-R_f values and factors affecting R_f values.

Annexure-13

UNIT:II ALICYCLIC COMPOUNDS AND CONFORMATIONAL ANALYSIS

a) Alicyclic compounds: Introduction-nomenclature-preparation: from dihalogen compounds, calcium salts of carboxylic acids, Dieckmann reaction-properties: reactions with halogens, halogen acids, reduction, oxidation, rearrangement reaction- relative stability of cycloalkanes – Bayer's strain theory and its modification.b) Conformational analysis: Definition-differences between conformation and configuration-conformations and stability of ethane, n-butane, 1, 2-dichloroethane, cyclohexane and methyl cyclohexane.

UNIT:III MOLECULAR REARRANGEMENTS AND TAUTOMERISM

a) Molecular Rearrangements: Detailed mechanisms of the following rearrangements: Pinacol-pinacolone, Hofmann, Claisen, Benzidine, Beckmann and Fries rearrangements.b) Tautomerism: Definition-classification of tautomerism-prototropy and anionotropy.A detailed study of i) keto-enol tautomerism ii) nitro-acinitro tautomerism Differences between t automerism and resonance-differences between tauto merism and isomerism.

UNIT : IV ALKALOIDS AND TERPENOIDS: a) Alkaloids: Definition- occurence-classification of alkaloids -extraction of alkaloids-general methods of determ ining the structure of alkaloids- structure and s ynthesis of the f ollowing alkaloids: coniine and nicotine.b) Terpenoids: Definition- occurence- classification- - isolation- isoprene rule-general properties-general methods of determining structure- and structural elucidation of citral and menthol.

UNIT : V MOLECULAR SPECTROSCOPY : a) Ultra violet-visible spectroscopy (Electronic Spectroscopy): Introduction-Franck Condon principle (Electronic transition)-types of transition in organic molecules (n-π*, σ- σ*, n- σ*, π- π*)-basic concepts-batho chromic shift, hypsochromic shift, hyper chromic shift, hypo chromic shift, auxo chrome chromophore, effect of conjucation, Woodward Fieser rules for calculating λ_{max} value-(conjucated dienes, α,β unsaturated carbonyl compounds).

b) IR Spectroscopy: Introduction- principle-selection rules-factors influencing vibration frequencies-finger print region-spectral features of some organic compounds (alkane, alkyl residue, alkenes, alkynes, cycloalkanes, halogens, alcohols and carbonyl compounds). c) NMR Spectroscopy: Introduction-rules (predicting the nuclear spin)-chemical shift, factors influencing chemical shift, shielding and deshielding of protons, spin-spin coupling (NMR spectrum of acidified and pure ethanol) , coupling constant-rules for calculating the number of lines in NMR spectra (Pascal's triangle)-NMR spectra of ethane, propane, toluene, nitrobenzene, acetone, ethylene, paraxylene.

Text Books:

1. Bahl B.S. & ArunBahl, "*Advanced Organic Chemistry*", S.Chand & Co., New Delhi, 2005.
2. Finar I.L., "*Organic Chemistry*" , Vol -II, Pearson Education Ltd., Delhi, 2001.
3. Gurdeep R. Chatwal, "Organic chemistry of natural products" Vol- I & II Himalaya Publishing House, New Delhi, 2008.
4. Sharma Y.R., "*Elementary Organic Spectroscopy*", S.Chand & Company Pvt. Ltd., New Delhi, 2013.
5. Soni P.L. Chawla H.M., "*Text Book of Organic Chemistry*", Sultan Chand & Sons, New Delhi, 2003.

Reference Books:

1. Finar I.L., "*Organic Chemistry*," Vol-I, Pearson Education Ltd., Delhi, 2003.
2. Tewari K.S., Mehrotra S.N. & Vishnoi. N.K., "*A Text Book of Organic Chemistry*", Vikas Publishing House Pvt. Ltd., New Delhi, 1987.
3. William Kemp, "*Organic Spectroscopy*", Third Edition, Palgrave, New York, 2000.

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

Title of the Paper: Core-Physical Chemistry-II

Semester	**: VI**	**Contact hours: 4**	
Subject code	**:17K62**	**Credits**	**: 4**

Objectives:

This course co vers the basic and det ailed aspects of electrochemistry, photochemistry, quantum chemistry and molecular spectroscopy.

UNIT: I ELECTROCHEMISTRY: Electrolytic conductance-Faraday's laws of electrolysis – specific conductance – equivalent conductance – molar conductance – variation of molar conductance with dilution – Ionic mobility -Transport number – determination of transport number : Hittrof's method, moving boundary method – Kohlrausch's law – applications – applications of conductance measurements : determination of solubilities of sparingly soluble salts, conductometric titrations, precipitation titrations. - Ostwald's dilution law - Debye - Huckel Onsager theory of strong electrolytes .

UNIT: II ELECTROCHEMICAL CELLS : Galvanic Cells –half cell reactions and reversible electrodes – single electrode potential – thermodynamics of reversible electrodes and cells - The Nernst equation – standard electrode potentials: electrochemical series – concentration cells: electrode and electrolyte concentration cells – types of concentration cells: concentration cells without and with transference – liquid junction potential –Hydrogen–Oxygen fuel cell – applications of emf measurements : acid – base, redox and potentiometric titrations.

Annexure-13

UNIT :III PHOTOCHEMISTRY: Definition of photochemical reaction-differences between thermal and photochemical reactions-laws of photochemistry :Lambert, Beer's law, Grotthus –Draper, Stark-Einstein's law-quantum yield-explanation of low and high quantum yield-experimental determination of quantum yield -Jablonski diagram, Non-radiative transition:IC and I SC - radiative transition: Fluorescence and Phosphoresence - differences between fluorescence and phosphorescence - kinetics of photochemical reactions- formation of HCl,HBr and decomposition of HI reaction - Photosensitization –chemiluminescence and bioluminescence.

UNIT : IV QUAN TUM CHEMISTRY : Introduction-experimental foundation of quantum theory - black body radiation and planck's theory(no derivation required) – Photoelectric effect and Einstein's theory-Hydrogen atomic spectrum and Bohr's theory of the atom model - dualistic nature of matter –De-broglies equation-Postulates of quantum mechanics - derivation of Schrodinger wave equation – wave function and its significance-probability of finding electrons-operators – differential and in tegral operators only –Application of Schrodinger wave equation – particle in one dimensional box –particle in 3Dbox.

UNIT : V MOLE CULAR SPECTROSCOPY: a) Introduction-characterization of electromagnetic radiation (wavelength, wave number)-regions of the spectrum.

b)Rotational spectra of diatomic molecules: Rigid rotator- selection rule –determination of moment of inertia and bond length- relative intensities of spectral lines – effect of isotopic substitution.c)Vibrational-rotational spectroscopy (Infra-red spectroscopy): Introduction-derivation of force constant of diatomic molecule-vibrational energy levels-selection rules-modes of vibration of atoms in poly atomic molecules-CO_2, H_2O(stretching and bending vibrations)-applications,detection of functional group (OH, COOH, NH_2, NO_2, CO), study of hydrogen bonding and finger print region d) Raman spectroscopy: Introduction-types of scattering-stokes lines-anti stokes lines-quantum

theory of Raman effect-selection rules-advantages of Raman spectroscopy over IR spectroscopy-rule of mutual exclusion-applications (structure of CO_2, H_2O, N_2O)

Text Books:

1.Colin N. Banwell & Elaine M. McCash, "*Fundamentals of Molecular Spectroscopy"*, Tata McGraw-Hill Publishing Company Limited, New Delhi, 1996.

2. Puri, Sharma & Pathania, "*Principles of Physical Chemistry*," Vishal Publishing Co, Jalandhar, 2004.

Reference Books:

1. Bahl B.S., Tuli G.D. & Arun Bahl, " Essentials of Physical Chemistry," S.Chand & Company Ltd., New Delhi, 2004.

2. Gurdeep Chatwal, & Sham K. Anand, " Spectroscopy (atomic and molecular)," Himalaya Publishing House, Mumbai, 2001.

3. Rohatgi-Mukherjee K.K., "*Fundamentals of Photochemistry*", Willey Eastern Ltd., New York, 1994.

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)
Core-Elective Paper II (Choice A)

Title of the paper: Inorganic and Applications of Computer in Chemistry
Semester : VI **Contact hours: 4**
Subject code : 17KE6A **Credits : 4**

Objectives:

Students undergoing this course acquire knowledge and understanding of fundamental concepts of coordination co mpounds, metal carbonyls, nitrosyls and bio-inorganic chemistry. The students also acquire knowledge about programming in C language and introduction to chem informatics.

UNIT : I COORDINATION COMPOUNDS-I: Double salts and coordinatio n compounds – terminology: coordination sphere, coordination number, ligand a nd its types – nomenclature – EAN rule - **Isomerism:** structural isomerism and stereo isomerism **Chelates**: classification – chelate effect and applicati on of the f ormation of chelated complexes in analytical chemistry.

UNIT :II COORDINATION COMPOUNDS-II: Werner's coordination theory: postulates and ex periment evidence - Sidgwick's concept: EAN rule – applications and limitations - Valence Bond Theor y: assumptions and illu stration to 4 - and 6-coordination ions - hybridization and geo metry - limitations - Crystal Field Theo ry: salient features - orbital splitting a s applied to octahedral, tetrahedral and square planar complexes - CFSE and its calculation –factors influencing the magnitude of CF splitting: nature of central cation, spectrochemical series- magnetic moments and color of transition metal complexes- Comparion of VBT and CFT - Molecular orbital theory :

σ bonding in octa hedral complexes $[Co(NH_3)_6]^{3+}$ & $[CoF_6]^{3+}$- π bonding system introduction only.

UNIT : III METAL CARBONYLS, INORGANIC POLYMERS AND BIO-INORGANIC CHEMISTRY : a) Metal Carbonyls: Definition-classification-general methods of preparation and properties of carbonyls-structure and bonding in $Ni(CO)_4$, $Fe(CO)_5$, $Cr(CO)_6$, $Mn_2(CO)_9$, and $Co_2(CO)_8$-EAN rule as applied to carbonyls.b) Metal nitrosyls:Nitrosyls-types-nitrosyls compounds.preparation, properties and struc ture – sodiumnitroprusside-nitroferrous sulphate-EAN as applied to nitrosyls.

c) Bio-Inorganic Chemistry: Role of metal ions (Fe, Co, Zn, Mg, Na, Ca &K) in biological systems- structure of metallo porphyrins- structure and f unctions of heamoglobin, myoglobin, chlorophyll.

UNIT: IV PROGRAMMING IN C LANGUAGE: a) Advantages- types of the language- keywords- variables and parameters- arrays- data types-structures- funning of C program constants- operators-expressions- input and output - control statements-looping- functions. b) Appl ying C progra mme to Calculation of Inversion temperature-Crms, Cav and Cmp velocity- degrees of freedom on the basis of phase rule- efficiency of a heat engine - half-life period of a reaction - critical constants-ionic strength of any electrolytic solutions .

UNIT : V CHEM INFORMATICS: a)Representation and manipulation of 2d molecular structure: Introduction- computer representation of chemical structure- Graph Theoretic Representations of Chemical Structures– connection tables and linear notations- structure searching – substructure searching (screening methods) –reaction databases.b)Representation and manipulation of 3d molecular structure:Introduction-theoretical 3D databases (structure generation programmes – conformational search & analysis – systematic conformational search – random conformational search).

Annexure-13

Text Books

1.Andrew R. Leach Valerie J. & Gillet, "*An Introduction to Chemoinformatics",* Springer International Edition, 2007.

2.James E.Huheey, Ellen A..Keiter, Richard L.Keiter, Okhil K.Medhi,*"Inorganic chemistry principles of structure and reactivity",* IVth Edition, Pearson Education, New Delhi, 2016.

3.Madan R.D., "*Modern Inorganic Chemistry*", S.Chand and Company Ltd., New Delhi, 2008.

4.Puri B.R., Sharma L.R. & Kalia K.C., "*Principles of Inorganic Chemistry*", Milestone Publishers, Delhi, 2008.

5.Raman K.V., "*Computers in Chemistry*", Tata McGraw-Hill Publising Company, New Delhi, 1996.

Reference Books:

1. Balagurusamy, "*Programming in ANSI C"*,Third Edition, Tata McGraw-Hill Publising Company, 2004.

2. Chatwal G.R. & Bhagi A.K., "*Bio-Inorganic Chemistry*," First Edition, Himalaya Publishing House, Mumbai, 1996.

3. Kettle S.F, "*Coordination Chemistry*", ELBS and Nelson, 1986.

4. Lee J.D., "*Concise Inorganic Chemistry*," Fifth Edition, Blackwell Science Ltd., New Delhi, 2003.

5. Malik U., Tuli G.D. & Madan R.L. "*Selected Topics in Inorganic Chemistry*," S.Chand & Company, New Delhi, 2004.

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

Core- Elective Paper II (Choice -B)

Title of the paper: Diffraction methods and applications

Semester	**: VI**	**Contact hours: 4**	
Subject code	**: 17KE6B**	**Credits**	**: 4**

Course Objectives:

This paper aims at enriching the knowledge of the students in the area of diffraction methods and their applications.

UNIT : I

Diffraction phenomenon – introduction – principles of Diffraction X-rays and crystal-diffraction of particle beams. Single crystal X-rays: X-ray crystallography – single crystals – diffraction from lattices – atoms in lattices – extension of phasing-refinement.

UNIT : II

Particle structure determination – Production of X rays – determining the unit cell and space group – intensity data – data reduction – elucidating the structure – crystallographic results.

UNIT : III

Structure analysis – Growth of X-ray crystallography – inorganic chemistry and mineralogy – metal complexes and covalent molecule – organometallic compounds – metal and semiconductors – organic compounds – biological structures – single crystals work in perspective.

Annexure-13

UNIT : IV

Specialized applications of X-ray diffraction – Powder method X-ray diffraction and high polymers degree of crystallinity – orientation – micro and macro structure in polymers – other applications of X-ray diffraction.

UNIT : V

Neutron Diffraction – Diffraction of thermal neutron – elastically scattered neutrons – magnetic scattering of neutrons – inelastic neutron scattering – Electron diffraction – Diffraction from gases and vapours – high energy electron diffraction from solids – low energy diffraction.

Text book:

1.Wormald J., "*Diffraction Methods*", Oxford series, U.K.,1973.

Reference Book:

1. Ebsworth E.A.V., David W.H. & Rankin Stephen Cradock, "*Structural Methods in Inorganic Chemistry"*, ELBS, Oxford, U.K., 1987.

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

SKILL BASED ELECTIVE PAPER-VI

Title of the paper: Green and Nano Chemistry

Semester	**: VI**	**Contact hours: 2**	
Subject code	**:17SEK61**	**Credits**	**: 2**

Objectives:

This course enables the students to acquire a basic knowledge of Green Chemistry and Nano technology. An in-depth study of synthesis of nanomaterials is also dealt.

UNIT : I GREEN CHEMISTRY-I

Need for Green chemistry-Goals of Green chemistry-Limitations/Obstacles-The progress of Green chemistry-Twelve principles of Green chemistry-Concept of Atom economy (Rearrangement reactions, Addition reactions, Substitution reactions and Elimination reactions)-Concept of selectivity (Chemoselectivity, Regioselectivity, Enantioselectivity and Diastereoselectivity)

UNIT : II GREEN CHEMISTRY-II

Green solvents-Definition- Various types of Green solvents (Supercritical carbon dioxide, Ionic liquids, water and organic synthesis in solid state) -Mode of supplying energy to a reaction (Use of microwaves and Use of sonication)-Basic concepts in designing a Green synthesis (Choice of starting materials, reagents, catalysts and solvents).Synthesis of Adipic acid, Catechol, Methyl methacrylate, Urethane, Benzyl bromide, Acetaldehyde, Citral, Furfural and Paracetamol.

UNIT : III GREEN CHEMISTRY-III

Microwave assisted reactions in water (Hydrolysis of benzyl chloride, Hydrolysis of

benzamide, Hydrolysis of methylbenzoate, Oxidation of toluene , Oxidation of alcohols) - Microwave assisted reactions in Organic solvents (Esterification, Fries rearrangement, Diels Alder reaction)-Microwave assisted solvent-free reactions (Deprotection, Saponification, Synthesis of Benzimidazoles)-Ultrasound assisted reactions (Esterification, Saponification, Oxidations, Coupling reactions)- Future trends in Green Chemistry.

UNIT : IV NANO CHEMISTRY-I Characterisation of Nanomaterials-Stability of Colloidal solutions-Synthesis of metal Nanoparticles by physical methods (Laser Ablation, Physical Vapour Deposition (Evaporation and Sputterring) -Synthesis by chemical methods (Thermolysis, Sonochemical Approach, Reduction by hydrogen, and Alkali metal reductions)-Biosynthesis of Nanoparticles.

UNIT : V NANO CHEMISTRY-II Synthesis of Nanosized semiconductors (Precipitation methods and Thermal decomposition of complex precursors)-Synthesis of ceramics by physical methods (Gas condensation method and Laser method) and chemical method (Sol-Gel synthesis)-Preparation of Carbides-Properties of Nanostructured materials (Size effects, , Magnetic propertie s)-Applications of nanomaterials.

Text Books:

1. Kumar V., "*An Introduction to Green Chemistry*", First Edition, Vishal Publishing Co., New Delhi, 2007.
2. Ownes F.J., "*Introduction to Nanotechnology*", Academic Press, Santiago, 2000.

Reference books:

1. Ahulwalia V.K. & Kidwai M., "*New Trends in Green Chemistry*", Second Edition, Anamaya Publishers, New Delhi, 2004.
2. Kenneth & Klabunde J. ,"*Nanoscale Materials in Chemistry*", Wiley Interscience, 2001.
3. Sanghi. R. & Srivastava M.M., "*Green Chemistry*", Narosa Publishing House, New Delhi, 2003.

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

MAJOR PRACTICAL-III

(At the end of the THIRD YEAR)

Title of the Paper: Organic Analysis and Estimation
Semester : V & VI **Exam hours: 6**
Subject Code:17K61P **Credits : 5**

Note: 1. For Practical Record - 10 marks

2. For Experiment and Results - 50 marks

Organic Analysis 25 marks, Organic estimation 25 marks

Distribution of marks for Estimation

Procedure -5 marks

Estimation -20 marks

Error <2% - 20 marks

Error 2-3% - 15 marks

Error3-4% - 10 marks

Error > 4% - 7 marks

I. Organic Analysis (25 marks)

i) Analysis of the following functional group (any one) containing organic substance (aliphatic or aromatic) stating saturation or unsaturation and confirmation by the preparation of a solid derivative

Acids, phenols, aldehydes, ketones, esters, nitrocompounds, amines (primary amines only), amides, anilides and monosaccharide – glucose only.

II. Organic estimation (25 marks)

1. Estimation of phenol
2. Estimation of aniline

Annexure-13

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI -14

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
(Re-accredited (3rd Cycle) with Grade A+ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF CHEMISTRY-UG

(w.e.f. 2017 – 2018 Batch onwards)

MAJOR PRACTICAL-IV

(At the end of the THIRD YEAR)

Title of the Paper: Physical Chemistry Practical
Semester : V&VI **Exam hours: 6**
Subjectcode : 17K62P **Credits : 5**

Note: 1. For Practical Record - 10 marks

2. For Experiment and Results - 50 marks

1. Determination of molecular weights by

a) Transition temperature method: sodium thiosulphate pentahydrate,
b) Cryoscopic method: Rast's macro method- naphthalene

2. Phase diagram involving

a)Simple eutectic and
b)Compound formation

3. Critical solution temperature:

Estimation of sodium chloride by studying the impurity on CST of phenol-water system

4. Thermochemistry:

Heat of solution- Ammonium oxalate.

5. Viscosity:

Determination of the composition of an unknown mixture.

6. Kinectics:

Determination of relative strength of acids by acid catalysed hydrolysis of ester

7. Conductometric Titration:

a) Acid-base Titration :HCl Vs NaOH
b)Precipitation titration:$BaCl_2$ Vs $MgSO_4$

Annexure-13

8. Potentiometric Titration:

a) Titration between ferrous ammonium sulphate and potassium permanganate

b) Titration between ferrous ammonium sulphate and potassium dichromate.

9.Distribution coefficient

Iodine- Carbon tetrachloride, Iodine – Benzene system

10. **Colorimetric titration:**

a) Colorimetric estimation of Nickel.

b) Colorimetric estimation of Iron.

11.**pH titration:**

a) Preparation of various B uffer mixtures and co mparing their pH valu es with theoretical values using pH meter.

b) Base pH titration - Strong Acid vs Strong Base.

c) pH titration - Weak Acid vs Strong Base.