



MADURAI KAMARAJ UNIVERSITY

(University with Potential for Excellence)

Re-accredited by NAAC with 'A' Grade in the 3rd Cycle



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Ref./B-1/BoS/M.Sc. Chemistry/2018

09.10.2018

To

The Principals of all non-autonomous Colleges
Affiliated to Madurai Kamaraj University [offering M.Sc. Chemistry (Semester) Course]

Sir / Madam,

Sub.: M.Sc. Chemistry (Semester) Course under CBCS Pattern – Revised Syllabus as approved by the Academic Council at its meeting held on 26.03.2018 (Vide Appendix CK; Page No.2788 & 2790) – Modification in the scheme of examination & Syllabus – intimated – reg.

Ref.: Letter received from the Chairman, BoS in Chemistry (PG) Dt. 5.10.2018.

I am to inform you that the Chairman, Board of Studies in Chemistry (PG) has intimated the following changes are to be made in the revised Syllabus for M.Sc. Chemistry [vide Appendix-CK) with immediate effect from the academic year 2018-2019.

In Page No.	Details of changes
2788	Modification in Scheme of Examination (with a change in Marks [internal marks 25 & external marks 75] for NME paper Semester III; Year 2)
2790	Unit I: Electron Displacement & Unit II: Introduction to Reaction Mechanism are to be merged as Unit I
	Unit III: Aliphatic nucleophilic substitution is to be changed as Unit II with same title.
	Correction to be carried out in subtitle Aliphatic Electrophilic substitution: 'caron' is to be replaced with 'Carbon'

It is further informed that the Practical examinations are to be conducted **in the even Semesters (II & IV) only** and therefore the codes allotted by the Controller of Examinations for the Practical Papers in the odd Semesters (I & III) may be deleted.

Therefore, I request you to kindly bring this to the notice of the concerned staff and students of your College.

Yours faithfully,

REGISTRAR

dm
09/10/18
10/10/18

Encl.: as above

Copy to

1. The Controller of Examinations
2. The Senior Deputy Registrar, Strong Room
3. The Assistant Registrar & Supdt. P.G. Semester Section
4. The Assistant Registrar & Supdt. Confidential Section

Modified Scheme of Examination of the Syllabus for M.Sc. Chemistry

Vide Appendix CK in Page No. 2788

Year	Semester	Paper						External	
			Credit	Hr / week	Internal	External	Total	Duration	Total
I	I	Introduction to Organic Reactions	5	5	25	75	100	3 Hrs.	75
		Chemical Bonding, Solid state Metallurgy and inorganic polymer	4	5	25	75	100	3 Hrs.	75
		Thermodynamics, Chemical Equilibrium and Electrochemistry	4	5	25	75	100	3 Hrs.	75
		Major Elective:		5					
		1 Medicinal Chemistry	5		25	75	100	3 Hrs.	75
		2 Biochemistry							
		Inorganic Qualitative and quantitative analyses and preparations-Practical		5		-	-	-	-
Organic preparation and Qualitative and Quantitative analyses-Practical		5		-	-	-	-	-	
I	II	Stereochemistry and Organic Reactions	4	5	25	75	100	3 Hrs.	75
		Coordination, Organometallic and Bioinorganic Chemistry	5	5	25	75	100	3 Hrs.	75
		Group Theory and Spectroscopy	4	5	25	75	100	3 Hrs.	75
		Major C:		5					
		1 Computer Applications in Chemistry	5		25	75	100	3 Hrs.	75
		2 Industrial Chemistry							
		Inorganic Qualitative and quantitative analyses and preparations-Practical	5	5	40	60	100	6 Hrs.	60
Organic preparation and Qualitative and Quantitative analyses-Practical	5	5	40	60	100	6 Hrs.	60		
II	III	Organic Spectroscopy and Natural Products	4	5	25	75	100	3 Hrs.	75
		Inorganic spectroscopy, Nanochemistry and f-block elements	4	5	25	75	100	3 Hrs.	75
		Quantum, Nano and Macromolecular Chemistry	5	5	25	75	100	3 Hrs.	75
		Non-Major Elective (any one):							
		1 Chemistry for competitive examination	5	5	25	75	100	3 Hrs.	75
		2 Environmental Science							
		Conductometric and Potentiometric Titrations and, Kinetic, Adsorption and Spectral Measurements-Practical		5		-	-	-	-
Project/Review of recent aspects of chemistry Project Viva-voce		5		-	-	-	-	-	
II	IV	Biomolecules, Rearrangements and Synthetic methods	4	5	25	75	100	3 Hrs.	75
		Nuclear Chemistry, Electroanalytical and Thermal Methods	4	5	25	75	100	3 Hrs.	75
		Chemical Kinetics, Surface, Biophysical and Photochemistry	4	5	25	75	100	3 Hrs.	75
		Major Elective:		5					
		1 Polymer Chemistry	5		25	75	100	3 Hrs.	75
		2 Introduction to Nanoscience							
		Conductometric and Potentiometric Titrations and, Kinetic, Adsorption and Spectral Measurements-Practical	5	5	40	60	100	6 Hrs.	60
Project/Review of recent aspects of chemistry Project Viva-voce	4	5	40	40	80	3 Hrs.	80		
				20	20		20		
		Total	90			2000			

Semester I

Paper I - Introduction to Organic Reactions

Unit I : Electron Displacement

Inductive and field effects – bond distances – bond energies – delocalized bonds – cross conjugation – rules of resonance – resonance energy – resonance effect – steric inhibition of resonance – Hyper conjugation – hydrogen bonding – additional compounds – EDA complexes – Crown ether complexes – inclusion compounds – effect of structure on the association constants of acids and bases – concept of hard and Soft acids and bases.

Introduction to Reaction Mechanism :

Reaction intermediates – free radicals, carbenes, nitrenes, carbanions, carbocations formation and stability of reaction intermediates – methods of determination of reaction mechanism – kinetic and thermodynamic control of chemical reactions. Kinetic and non kinetic methods for determining organic reaction mechanism. Principle of microscopic reversibility – Energy profile diagram – Hammond postulate.

Unit II : Aliphatic nucleophilic substitution :

Nucleophilicity and basicity – S_N1 and S_N2 mechanisms – effect of substrate structure – effect of the attacking nucleophile – effect of the leaving group – effect of the reaction medium – ambident nucleophiles – ambident substrates – neighbouring group participation of n , π and σ electrons. S_{Ni} mechanism – nucleophilic substitution at an aliphatic trigonal carbon – nucleophilic substitution at an allylic carbon – nucleophilic substitution at a vinyl carbon.

Aliphatic Electrophilic substitution : Electrophilic substitution at saturated Carbon – S_{E1} and S_{E2} mechanisms.

Unit III : Stereochemistry I :

Symmetry elements and point group classification – Concept of chirality necessary and sufficient conditions for chirality – Relationship between substrate symmetry and chirality. Projection formulae – Wedge, Fischer, Sawhorse and Newmann. Optical isomerism due to centre of chirality. Molecules with one stereogenic centre (chiral centre) and molecules with more than one chiral centre. Properties of enantiomers and diastereoisomers. Erythro and threo nomenclature. Configuration – determination of configuration. Cahn, Ingold and Prelog system of designation of configuration.

Symmetrical Isomerism : E – Z nomenclature – determination of configuration of symmetrical isomers using physical and chemical methods – stereoisomerism in monocyclic compounds (upto six membered ring).

Unit IV : Aromatic Character

Aromatic character in benzene, six-membered rings, five, seven and eight membered rings – other systems with aromatic sextets – Huckel's rule- Craigs rule concept of homoaromatically and antiaromatically – systems with 2,4,8 and 10 electromagnetic systems with more than 10 electron – Alternant and nonalternant hydrocarbons, Chemicals of cyclopentadienyl anion – Fulvene, Azulene, Tropolones, Syndnones and Annulenes

Novel ring systems : Nomenclature of bicyclic and tricyclic systems – chemist adamantane, diamantine (congressane), cubane and catenanes.

Unit V : Oxidation and Reduction : Elimination of hydrogen and aromatization reactions - catalytic dehydrogenation – mechanism, applications and stereochemical aspects of the following oxidation – reduction reactions: Oxidation reactions involving CrO₃, ScO₂ lead tetraacetate, periodic acid, N- bormosuccinimide, H₂O₂ - Oppenauer oxidation.

Catalytic hydrogenation – reactions involving lithium aluminium by trilsobutyl aluminohydride, DIBAL and sodium borohydride – Birch reduction Meerweion – pondorf-Verley reduction – Wolff-Kishnet reduction – Huang- Minlon modification – hydroboration – selectivity in oxidation and reduction.

Reagents in Organic Synthesis : Gilman's reagent (lithium, dimethylcuprate, diisopropylamide (LDA), dicyclohexylcarbodiimide, 1,3- dithiane, trimethylsilyl tri-n-butyltin hydride, Woodward and Prvost hydroxylation, DDQ, Merrifield phase transfer catalysts, Peteson's Synsthesis, baker Yeast.

Suggested readings :

1. P. Sykes, Guidebook to Mechanism in Organic Chemistry, Orient Longman.
2. Jerry march, Advanced Organic Chemisty, John Wiley & Sons, 4thedn., 2000.
3. E.S. Gould, Mechanism and Structure in-Organic Chemistry, Henry Holt &Co., New york 1959.
4. J. Shorter, Correlation Analysis in Organic Chemistry, Clarendon Press, Oxford, 1973.
5. R.T. Morrison and R.N. Boyd, Organic Chemistry prntice Hall, 6thedn., 2001.
6. I.L. Finar, Organic Chemistry, Vol. I and II, 5thedn.ELBS, 1975.
7. T.H. Lowry and K.S. Richardson, Mechanism and Theory in Organic Chemistry.
8. ReinhardBrukner, Advanced Organic Chemistry, Reaction Mechanisms, Academic Press, 2002.
9. F.A. Carey and F.J. Sundberg, Advanced Organic Chemist, Part B, 4thedn., Plenum Publishers, 2001.
10. R.O.C Norman, Organic Synthesis 3rd edn.1993.
11. W. Carruthers, Some Modern Methods of Organic Synthesis, Cambridge University Press, 2ndedn., 1982.
12. H.O. House, Modern Synthetic reactions, W.A. benkajamin Inc., California edn., 1972.
13. P.S. Kalsi, Spectroscopy of Organic compounds, 6thedn., New Age International (P) Limited, 2004.
14. P. Ramesh, Basic Principles of Organic Stereochemistyr, Meenu Publications, Madurai, 2005.