BHARATHIAR UNIVERSITY

M.Sc. CHEMISTRY

SCHEME OF EXAMINATION (CBCS PATTERN)

_For the students admitted during the academic year 2012-2013 Batch onwards

Study Components	Course Title	Ins. hrs / week	Exam				Credit
			Dur. Hrs.	CIA	Uni. exam	Total	
Semester I							
Paper – I	Organic Chemistry – I (Organic reaction mechanisms)	4	3	25	75	100	4
Paper – II	Inorganic Chemistry – I (Nuclear chemistry etc)	4	3	25	75	100	4
Paper – III	Spectroscopy, Group theory and computer in Chemistry	4	3	25	75	100	4
Practical – I	Organic Chemistry – I	5	--	--	--	--	--
Practical – II	Inorganic Chemistry – I	5	--	--	--	--	--
Practical – III	Physical Chemistry – I	5	--	--	--	--	--
Elective I		3	3	25	75	100	4
Semester II							
Paper - IV	Organic Chemistry – II (Organic reaction mechanisms)	4	3	25	75	100	4
Paper – V	Physical Chemistry-I (Quantum chemistry and Spectroscopy)	4	3	25	75	100	4
Paper – VI	Physical Methods in Chemistry	4	3	25	75	100	4
Practical - I	Organic Chemistry – I	5	6	40	60	100	4
Practical – II	Inorganic Chemistry – I	5	6	40	60	100	4
Practical – III	Physical Chemistry – I	5	6	40	60	100	4
Elective II		3	3	25	75	100	4
Semester III							
Paper - VII	Organic Chemistry – III (Chemistry of natural products)	4	3	25	75	100	4
Paper - VIII	Physical Chemistry – II (Thermodynamics)	4	3	25	75	100	4
Paper – IX	Kinetics of polymerization	4	3	25	75	100	4
Practical - IV	Organic Chemistry – II	5	--	--	--	--	--
Practical – V	Inorganic Chemistry – II	5	--	--	--	--	--
Practical - VI	Physical Chemistry – II	5	--	--	--	--	--

Study Components	Course Title	Ins. hrs / week	Exam				Credit
			Dur. Hrs.	CIA	Uni. exam	Total	
Elective III		3	3	25	75	100	4
Semester IV							
Paper - X	Inorganic Chemistry – II (Coordination chemistry)	4	3	25	75	100	4
Paper - XI	Physical Chemistry – III (Reaction kinetics and electro chemistry)	4	3	25	75	100	4
Paper - XII	Polymer technology	4	3	25	75	100	4
Practical - IV	Organic Chemistry - II	5	6	40	60	100	4
Practical – V	Inorganic Chemistry – II	5	6	40	60	100	4
Practical - VI	Physical Chemistry – II	5	6	40	60	100	4
Elective IV		3	3	25	75	100	4
Practical Viva		--	--	50	-	50	2
	Total					2250	90

Electives : **List of Group Elective papers (Colleges can choose any one of the Group papers as electives)**

	GROUP A	GROUP B	GROUP C
Paper I/Sem I	Dye chemistry	Dye chemistry	Organic Synthesis and structure
Paper II/Sem II	Water pollution and Industrial effluent treatment	Water pollution and Industrial effluent treatment	Pharmaceutical Chemistry
Paper III/Sem III	Industrial Chemistry	Applied Electrochemistry	Applied Electrochemistry
Paper IV/Sem IV	Nano Chemistry and Corrosion Chemistry	Advanced Polymeric Materials	Advanced Polymeric Materials

Note :

The revised syllabus for the paper **PAPER III- SPECTROSCOPY, GROUP THEORY AND COMPUTER IN CHEMISTRY** is furnished below. There is no change in remaining papers.

PAPER III- SPECTROSCOPY, GROUP THEORY AND COMPUTER IN CHEMISTRY

No.of hours: 75 hrs

UNIT - I

Infrared Spectroscopy

Principle of infrared spectroscopy-description of double beam IR spectrophotometer-IR spectra of poty atomic molecules-factors affecting the vibrational frequencies-application of IR spectroscopy for organic and inorganic compounds-problems.

UNIT - II

Symmetry elements and symmetry operations: definition of identical and equivalent elements-configurations-symmetry operations and symmetry elements-rotation-axis of symmetry- reflections-symmetry planes-inversion center-improper rotations-rotation-reflection axis-effect of performing successive operations (commutative and non - commutative) - inverse operations.

Groups and their basic Properties: Definition of a group-basic properties of a group-definition of Abelian group-isomorphic group-similarity transformation and classes-group multiplication tables-symmetry classification of molecules into point groups (Schoenflies symbol only) difference between point group and space group.

UNIT-III

Definition of reducible and irreducible representations-irreducible representations as orthogonal vectors-direct product rule-the great orthogonality theorem and its consequences (statement only proof not needed)-determinations of the characters for irreducible representation of C2v and C3v point groups using the orthogonality theorem-calculation of binary co-ordinates in the character tables for C2v and C3v point groups—calculation of character values of reducible representations per unshifted atom for each type of symmetry operation-determination of total Cartesian representation—determination of direct sum from total Cartesian representation.

Group theory and vibrational spectroscopy-vibrational modes as basis for goup representation-symmetry selection rules for IR and Raman spectra (mutual exclusion principle)-classification of vibrational modes.

Application of group theory to chemical bonding

- Hybridization schemes for σ bonding in AB_4 (T_d) type (methane).

- Hybridization schemes for π bonding in AB_3(D_3h) type (boron trichloride).

UN IT - IV

Mossbauer Spectroscopy

Principle-Mossbauer spectrometer-isomer shift-quadrupole interaction-nuclear Zeeman splitting-application.

ESR Spectroscopy - principle – kramers degeneracy – zero field splitting – applications .

UNIT-V

Introduction to computers and computation in chemistry

Basic structure and functioning of computers with a PC as an illustrative example- memory. I/O devices-secondary storage-computer languages-operating systems with DOS as an example-introduction to UNIX and WINDOWS-data processing, principle of programming- algorithms and flow charts.

Data entry devices for sequential processing-data entry devices for direct access processing-data communication concepts: LAN, WAN, e-mail internet concept; computer virus; soft ware packages; lotus 1 2 3 (elementary treatment).

REFERENCES:

1. W.Kemp : Organic spectroscopy
2. R.S.Drago : Physical methods in Inorganic Chemistry
3. Suilverstein Baslei- & Morril : Spectrometric identification of organic compounds
4.F.Sheirmann :An introduction to Spectroscopic methods for identification of organic compounds. Vol. I & II
5. C.N.Flanwell : Fundamentals of Molecular Spectroscopy
6. F.A.Cotton : Chemical applications of Group theory
7. M. Orchin and H.H. Jaffe : Symmetry, Orbital and spectra
8. G. Davidson : Introductory Group theory for Chemists
9. K.V. Raman : Computers in Chemistry
10. E. Balagurusamy and Deenadialu : Introduction to Computer Science
11. E. Balagurusamy : Programming in C