BHARATHIAR UNIVERSITY, COIMBATORE.

REGULATIONS FOR UNDER GRADUATE DEGREE COURSE IN CHEMISTRY WITH COMPULSORY **DIPLOMA IN TEXTILE CHEMISTRY (**COLLEGES)
(SEMESTER SYSTEM WITH EFFECT FROM 2007-2008)

1. Eligibility for Admission to the Course

The eligibility condition for admission to the B. Sc. Degree course in Chemistry are as follows

The students who have passed Higher Secondary course examination with CHEMSTRY as Subject conducted by government of Tamil Nadu only are eligible for admission.

2. Duration of the Course

The course shall extend over a period of three years comprising of six semesters with two semesters in one academic year. There shall not be less than 90 working days for each semester. Examination shall be conducted at the end of every semester for the respective subjects.

3. Course of Study

The course of study for the UG degree courses of all branches shall consist of the following

a) Part-I

Tamil or any one of the following modern/classical languages i.e. Telugu, Kannada, Malayalam, Hindi, Sanskrit, French, German, Arabic &Urdu.

The subject shall be offered during the first four semesters with one examination at the end of each semester.

b) Part-II

The subject shall be offered during the first four semesters with one examination at the end of each semester. During third semester part II English will be offered as communication skills.

c) Foundation Course

The Foundation course shall comprise of two stages as follows:
Foundation Course A: General Awareness (I &II semesters)
Foundation Course B: Environmental Studies (III &IV semesters)

1. The syllabus and scheme of examination for the foundation course A. General awareness shall be apportioned as follows.

From the printed material supplied by the University	-	75%
Current affairs & who is who?	-	25%

The current affairs cover current developments in all aspects of general knowledge which are not covered in the printed material in this subject issued by the University.

2. The Foundation course B shall comprise of only one paper which shall have Environmental Studies.

d) Part -III

Group A: Core subject – As prescribed in the scheme of examination.
Examination will be conducted in the core subjects at the end of every semester.
Group –B: allied subjects -2 subjects-4 papers
Examination shall be conducted in the allied subjects at the end of first four semesters.
Group-C: application oriented subjects: 2 subjects -4 papers.

The application –oriented subjects shall be offered during the last two semesters of study viz., V and VI semesters. Examination shall be conducted in the subjects at the end of V & VI semesters.

Group-D: field work/institutional training

Every student shall be required to undergo field work/institutional training, related to the application-oriented subject for a period of not less then 2 weeks, conveniently arranged during the course of 3rd year. The principal of the college and the head of the department shall issue a certificate to the effect that the student had satisfactorily undergone the field work/institutional training for the prescribed period.

Diploma Programme:
All the UG programmers shall offer compulsory diploma subjects and it shall be offered in four papers spread over each paper at the end of III, IV, V and VI semesters.

e) Co-Curricular activities: NSS/NCC/physical education

Every student shall participate compulsorily for period of not less than two years (4 semesters) in any one of the above programmes.
The above activities shall be conducted outside the regular working hours of the college. The principal shall furnish a certificate regarding the student's performance in the respective field and shall grade the student in the five point scale as follows.

A-Exemplary
B-very good
C-good
D-fair
E-Satisfactory

This grading shall be incorporated in the mark sheet to be issued at the end of the appropriate semester (4th or 5th or 6th semester).
(Handicapped students who are unable to participate in any of the above activities shall be required to take a test in the theoretical aspects of any one of the above 3 field and be graded and certified accordingly).

4. Requirement to appear for the examinations
   a) a candidate will be permitted to appear for the university examinations for any semester if

      i) He/she secures not less than 75% of attendance in the number of working days during the semester.
      ii) He/she earns a progress certificate form the head of the institution, of having satisfactory completed the course of study prescribed in the subjects as required by these regulations, and
      iii) His/her conduct has been satisfactory.

Provided that it shall be open to the syndicate, or any authority delegated with such power by the syndicate, to grant exemption to a candidate who has failed to earn 75% of the attendance prescribed, for valid reasons, subject to usual conditions.

b) A candidate who has secured less than 65% but 55% and above attendance in any semester has to compensate the shortage in attendance in the subsequent semester besides, earning required percentage of attendance in that semester and appear for both semester papers together at the end of the latter semester.

c) A candidate who has secured less than 55% of attendance in any semester will not be permitted to appear for the regular examinations and to continue the study in the subsequent semester, He/she has to rejoin the semester in which the attendance is less than 55%.

d) A candidate who has secured less than 65% of attendance in the final semester has to compensate his/her attendance shortage in a manner as decided by the concerned head of the department after rejoining the same course.

5. Restriction to appear for the examinations

a) Any candidate having arrear paper(s) shall have the option to appear in any arrear paper along with the regular semester papers.

b) "Candidates who fail in any of the papers in Part I, II & III of UG degree examinations shall complete the paper concerned within 5 years form the date of admission to the said course, and should they fail to do so, they take the examination in the texts/revised syllabus prescribed for the immediate next batch of candidates. If there is no change in the texts/syllabus they shall appear for the examination in that paper with the syllabus in vogue until there is a change in the texts or syllabus. In the event of removal of that paper consequent to change of regulation and /or curriculum after 5 years period, the candidates shall have to take up an equivalent paper in the revised syllabus as suggested by the chairman and fulfill the requirements as per regulation/ curriculum for the award of the degree.

6. Medium of Instruction and examinations

The medium of instruction and examination for the papers of Part I and II shall be the language concerned. For part III subjects other than modern languages, the medium of instruction shall be either Tamil or English and the medium of examinations is in English/Tamil irrespective of the medium of instructions. For modern languages, the medium of instruction and examination will be in the languages concerned.

7. Submission of Record Note Books for practical examinations

Candidates appearing for practical examination should submit their bonafide Record Note Books prescribed forth practical examination otherwise the candidates will not be permitted to appear for the practical examinations only those candidates who have performed seventy five percent of the experiments prescribed in the syllabus are eligible to get their records bonafide However in genuine case where the students who could not subunit their bonafide record note books, they may be permitted to appear for the practical examination provided the concerned Head of the department from the institution of the candidate certifies that the candidate has performed the required number of experiments prescribed in the syllabus-For such candidate who do not submit Record Note, Books Zero (0)marks will be awarded for record note books.

8. Passing Minimum

a) A candidate who secures not less than 40% of the total marks in any subject including the Diploma and Foundation courses (theory or Practical) in the University examination shall be declared to have passed the examination in the subject (theory or Practical).

b) A candidate who passes the examination in all the subjects of Part I, II and III (including the Diploma and Foundation courses) shall be declared to have passed, the whole examination.

9. Improvement of Marks in the subjects already passed

Candidates desirous of improving the marks awarded in a passed subject in their first attempt shall reappear once within a period of subsequent two semesters. The improved marks shall be considered for classification but not for ranking. When there is no improvement, there shall not for any change in the original marks already awarded.

10. Classification of Successful candidates

a) A candidate who passes all the Part all the Part II examination in the First attempt within a period of three years securing 75% and above in the aggregate of Part III marks shall be declared to have passed B.A/ B.Sc./ B.Com./ B.B.M. degree examination in **First Class with Distinctions**

b) (i) A candidate who passes all the examinations in Part I or Part II or Part III or Diploma securing not less than 60 per cent of total marks for concerned part shall be declared to have passed that part in **First Class**

(ii) A candidate who passed all the examination in Part I or Part II or Part III or Diploma securing not less than 50 per cent but below 60 per cent of total marks for concerned part shall be declared to have passed that in **Second Class**

(iii)All other successful candidates shall be declared to have passed the Part I or Part II or Part III or Diploma examination in **Third Class**

11. Conferment of the Degree

No candidate shall be eligible for conferment of the Degree unless he/she

(i) Has undergone the prescribed course of study for a period of not less than six semesters in an institution approved by/a affiliated to the University or has been exempted from in the manner prescribed and has passed the examination as have been prescribed therefore.

(ii) Has satisfactory participates in either NSS or NCC or physical Education as evidenced by a certificate issued by the Principle of the institution.

(iii) Has successfully completed the prescribed Field Work/ Institutional Training as evidenced by certificate issued by the Principal of the College.

12. Ranking

A candidate who qualifies for the UG degree course passing all the examinations in the first attempt, within the minimum period prescribed for the course of study from the date of admission to the course and secures I or II class shall be eligible for ranking and such ranking will be confined to 10% of the total number of candidates qualified in that particular branch of study, subject to a maximum of 10 marks

The improved marks will not be taken into consideration for ranking.

13. Additional Degree

Any candidate who wishes to obtain an additional UG degree not involving any practical shall be permitted to do so and such candidate shall join a college in the III year of the course and he/she will be permitted to appear for par III alone by granting exemption from appearing part I, part II and common allied subject (if any), already passed by the candidate. And a candidate desirous to obtain an additional UG degree involving piratical shall be [permitted to do so and such candidate shall join a college in the II year of the course and he/she be permitted to appear for part III alone by grating exemption from appearing for part I, part II and the common allied subjects. If any, already passed. Such candidate should candidate should obtain exemption from the university by paying a fee of Rs.500/-.

15. Evening College

The above regulations shall be applicable for candidates undergoing the respective courses in Evening College also.

16. Syllabus

The syllabus for various subject shall be clearly demarcated into five viable units in each paper/subject.

Scheme of Examination

Subject Title		Instruction Hours / Week	University Exam	
			Duration in Hours	Max. Marks
Semester :I				
Language :	Language Paper I	6	3	100
Language :	English Paper I	6	3	100
Gr. A Core	Chemistry Paper I	4	3	100
	Chemistry Paper II	4	3	100
	Chemistry Practical I	3	-	-
Gr.B Allied	Allied Theory Paper I Allied Practical	5 2	3 -	100* or 75 ** -
Semester : II				
Language :	Language Paper II	6	3	100
Language :	English Paper II	6	3	100
FC	Foundation Course A General Awareness	2	3	100
Gr. A Core	Chemistry Paper III	4	3	100
	Chemistry Practical I (Inorganic Quality Analysis)	3	3	100
Gr. B Allied	Allied Theory Paper II Allied Practical	6 3	3 3	100* or 75 ** 50
Semester : III				
Language :	Language Paper III	6	3	100
Language :	English Paper IIII	6	3	100
Gr. A Core	Chemistry Paper IV	3	3	100
	Chemistry Paper V (Computer Applications in Chemistry)	3	3	100
	Chemistry Practical II	3	-	-
Diploma	Diploma Paper I	2	3	100
Gr. B Allied	Allied Theory Paper I Allied Practical	5 2	3 -	100* or 75 ** -
Semester :IV				
Language :	Language Paper IV	6	3	100
Language :	English Paper IV	6	3	100
FC	Foundation Course	2	3	100
Gr. A Core	Chemistry Paper VI	4	3	100
	Chemistry Practical II (Volumetric and organic Analysis)	3	6	100
Diploma	Diploma Paper II	2	3	100
Gr. B Allied	Allied Theory Paper II Allied Practical	5 2	3 3	100* or 75 ** 50

Subject Title		Instruction Hours / Week	University Exam	
			Duration in Hours	Max. Marks
Semester : V				
Gr. A Core	Chemistry Paper VII	4	3	100
	Chemistry Paper VIII	4	3	100
	Chemistry Paper IX	4	3	100
	Chemistry Practical	7	-	-
Diploma	Diploma Paper III	2	3	100
Gr. C AOS	AOS Subject A Paper I	3	3	75
	AOS Subject A Paper II	3	3	75
	AOS Practical	3	-	-
Semester : VI				
Gr. A Core	Chemistry Paper X	5	3	100
	Chemistry Paper XI	5	3	100
	Chemistry Practical III (Gravimetric and Chemistry Physical)	7	6	100
Diploma	Diploma Paper IV	2	3	100
Gr. C AOS	AOS Subject B Paper I	4	3	75
	AOS Subject B Paper II	4	3	75
	AOS Practical	3	3	100

* For subjects without practical
** For subjects with Practical

Note : Any two application oriented subjects from Group A may be offered in V Semester and any two application oriented subjects from Group B may be offered in VI Semester.

Group A (V Semester)		Group B (VI Semester)	
1	Analytical Chemistry – I Basic Principles	1	Analytical Chemistry II Lab. Techniques
2	Polymer Chemistry	2	Chemistry of Plant Based Products
3	Agro Industrial Chemistry	3	Dye Chemistry
4	Pharmaceutical Chemistry	4	Leather Chemistry
5	Dairy Chemistry	5	Environmental Chemistry
6	Forensic Science and rime Investigation	6	Textile Chemistry

ALLIED SUBJECTS

1. Mathematics
2. Physics
3. Botany
4. Zoology
5. Biochemistry

CORE CHEMISTRY PAPER I

Teaching hours : 60 hours per semester (4 hours per week)

Subject Description : This paper presents the basic principles of Chemistry.

Goals : To enable the students to learn about the basic principles of Chemistry.

Objective : To understand the important concepts of Chemistry.

CONTENTS

UNIT I

Ionic bonding - ionic crystals, NaCl amd CsCl crystal structure, Lattice energy and its determination using Born-Haber cycle, factors affecting crystal lattice energy, properties of ionic crystals (high melting point, hardness, electrical conductivity in molten condition and in solution) – ion polarization - Fajan's rule-solubility of ionic compounds in polar solvent.

UNIT II

Structure and shape of molecules: VSPER Theory and geometry of molecules. Hybridization and geometry of sp, sp^2, sp^3, dsp^2, dsp^3, d^2sp^3., sp^3d^2 and sp^3d^3. Bonding, shapes and structures of the following molecules: Molecules with Sigma bonds only – $BeCl_2$, $SnCl_2$, BF_3, CH_4, SiF_4, XeF_4, PCl_5, IF_5, SF_6,and IF_7.

UNIT III

Polar effects – inductive effect, mesomeric effect, electromeric effect, hyper conjugation and steric effects.

Classification of reagents: Electrophiles, Nucleophiles and Free radicals.

Types of reaction: Polar reactions involving carbonium ions and carbanions with simple examples.

UNIT IV

Aliphatic Hydrocarbons: Restricted rotation about single bond preferred rotational conformations.

Alkenes: Preparation by Witting reaction – Mechanisms of beta elimination – E1, E2 and cis elimination – Hoffmanns rule and Saytzeff's rule. Addition reactions with hydrogen, halogen, hydrogen halide

(Markownikoff's rule) and hydrogen bromide (Peroxide effect).

UNIT V

1. Dienes: Stability of isolated and conjugated dienes-1, 2 and 1, 4 additions, Diels - Alder reaction. Free Radical addition – Polymerization – synthetic rudder.
2. Cycloalkanes: Preparation by Dickmann ring closure and by reduction of aromatic hydrocarbons – ring opening reactions of cyclopropane with H_2, Br_2 and HI.

CORE CHEMISTRY PAPER II

Teaching hours: 60 hours per semester(4 hours per week)

Subject description:

This paper presents the concept of resonance and wave mechanical treatment of electrons.

Goals:

To enable the students to learn about the basic concept of resonance and wave theory.

Objectives:

To study the resonance in benzene and quantum theory.

Contents

Unit I:

Ozone and hydrogen peroxide – preparation, properties, structure, uses comparison between the two.

Selenium and Tellurium – Extraction, properties and Uses. Oxides and oxyacids of Se and Te. A comparative study of Sulphur, Selenium, Tellurium and their compounds (hydrides, oxides, halides)

Unit II:

Benzene – Resonance and resonance energy, structure – polar effects in Electrophilic substitution in benzene – mechanism of Nitration, Sulphonation, Halogenation, Friedal-Crafts alkylation and acylation-diazo coupling.

Alkynes: Acidity of Alkynes – formation of acetylides-addition of water with $HgSO_4$ catalyst-hydroboration.

Unit III:

Liquid crystals–the concept of mesomorphic state-typical lquid cryatalline substances and their properties.

Properties of liquids like surface tension and viscosity – Review of structural differences between solids, liquids and gases.

Condensed phases-Coefficients of thermal expansion and compressibility of liquids and solids.

Unit IV:

Failiure of classical theory in explaining black body radiation- plancks theory of quantization of energy – Einstein theory of photoelectric effect-compton effect.

De Broglie theory of wave-particle dualism-Heisenberg's uncertainity principle.

Unit V:

An elemantry treatment of Schrodinger wave equation – quantum numbers concept of orbitals-significance of ψ & ψ^2 free particles and particle in a box (one and three dimensional)

The covalent bonds-the hydrogen molecule – the vlance bond method hydrogen molecule ion-molecular orbital method-molecular orbitals for homonuclear and heteronuclear diatomic molecules.

CORE CHEMISTRY PAPER III

Teaching hours: 60 hours per semester (4 hours per week)

Subject description:

This paper presents the concept of coordination chemistry, aromaticity and thermodynamics.

Goals:

To enable the students to learn about aromaticity, thermodynamics and coordination chemistry.

Objectives:

To study the principles of thermodynamics and coordination chemistry.

Contents

Unit I:

Co-ordination compounds – Nomenclature – conductivity and precipitation studies – Werner Co-ordination theory – electronic interpretation of coordinate bond by Sidge Wick. Isomerism: Examples of Geometrical and optical isomerism in square planar and octahedral coordination compounds – magnetic properties of coordination compounds and their interpretation by Pauling's valence bond theory and crystal field theory.

Unit II:

Chemistry of Boron family – Group discussion – Electron acceptor behaviour and electron deficiency of boron hydrides; bonding in diboranes; $NaBH_4$, $LiBH_4$ preparation, properties, structure and uses- borozoels, borides.

Classification of silicate- simple silicates chain silicates and sheet silicates only.

Unit III:

Aromaticity-Huckel's rule Non-benzenoid aromatic compounds like cyclopentadienyl anion. Toluene and Isoprophyl benzene and side chain substitution – polymerization of styrne. Vinyl chloride Relative reactivity of methyl, ethyl and vinyl chlorides. Gringanard reagents and synthetic applications-Nucleophilic substitution reaction – S_N1, S_N2 and S_Ni reactions – Effect of solvent-nucleophile, structure of substrate and neighbouring group participation, elimination versus substitution-Benzene mechanism and intermediate complex mechanism.

Unit IV:

The laws of thermodynamics, generalities and Zeroth law – kinds of energy – Scope of the first and second laws of thermodynamics-thermodynamic terms-definitions – heat – work of expansion – work of compression – maximum and minimum quantities of work – Reversible and irreversible transformations – energy and first law of thermodynamics – properties of energy changes in relation to properties of system is thermal and adiabatic changes – meaning of the thermodynamic state function – properties of exact and inexact differentials – Joule Thomson experiment Relation between E and H, Cp and Cv.

Unit V:

Application of the first law of thermodynamics to chemical reactions. The heat of reaction – conventional value of H. The determination of heats of formation – sequences of reactions – Hess's law – heats of combustions – determination by Bomb Calorimeter – Bond energies – Resonance energies – Heats of solution – integral and differential dilution – Heats of reaction at constant volume – dependence of the heat of reaction one temperature and Kirchoff's equation.

TEXTBOOKS FOR REFERNCE:

1. Principles of Inorganic Chemistry, B.R. Puri L.R. Sharma, Shobanlal Nagin Chand & Co.
2. Inorganic Chemistry, P.L.Soni, Sultan Chand & Sons.
3. Organic Chemistry, Vol. 1, 2, 3, S. M. Mughergee, S.P. Singh, R.P. Kapoor, Wiley Eastern.
4. Advanced Organic Chemistry, B.S. Bahl, Arun bahl, S.Chand & Co.
5. Essentials of Physical Chemistry, B.S. Bahl and G.D. Tuli, S.Chand & Co.
6. Text book of Physical Chemistry, P.L.Soni, D.B. Dharmarke, Sultan Chand & Sons.

CORE CHEMISTRY PRACTICAL I
Inorganic Qualitative Analysis
I & II Semesters (3 hours per week)

Analysis of a mixture containing two cations and two anions of which one will be an interfering ion. Semimicro methods using the conventional scheme with hydrogen sulphide may be adapted.

CATIONS TO BE STUDIED : Lead, Copper, Bismuth, Cadmium, Iron, Aluminum, Zinc, Manganese, Cobalt, Nickel, Barium, Calcium, Strontium, Magnesium and Ammonuim.

ANION TO BE STUDIED : Carbonate, Sulphate, Nitrate, Chloride, Bromide, Fluoride, Borate, Oxalate, and Phosphate.

CORE CHEMISTRY PAPER IV
(INORGANIC AND ORGANIC CHEMISTRY)

Teaching hours: 45 hours per semester (3 hours per week)

Subject description:

This paper presents the principle in the extraction of metals and mechanism of some important organic reactions.

Goals:

To enable the students to learn about the extraction principles and mechanism of some addition reaction.

Objectives:

To understand the mechanism and synthetic uses of important organic reactions.

Contents:

Unit I:

Occurrence, extraction, properties and uses of Gallium, Thallium, Germanium, Titanium and Tin - their important compounds such as $GeCl_4$, GeO_2, TiO_2, $TiCl_4$, and $SnCl_2$.

Unit II:

Occurrence, extraction, properties and uses of Zirconium, Vanadium, Molybdenum and Tungsten -their important compounds such as V_2O_5, $ZrOCl_2$, ammonium molybdate, molybdenum blue, WO_2, and tungsten bronzes.

Unit III:

Chemistry of Carbonyl Compounds – I:

Reaction mechanisms: Nucleophilic addition of Grignard reagent, NH_3, primary amine- Aldol condensation, Cannizzaro reaction, Perkin reaction, Knoevanagel reaction and Claisen-Schmidt reaction.

Unit IV:

Chemistry of Carbonyl Compounds – II

Reaction mechanisms – Reformatsky reaction, benzoin condensation, Wittig reaction, haloform reaction – Reaction with $LiAlH_4$ and $NaBH_4$ – Clemmensen reduction, Wolff Kishner reduction, MPV reduction – reducing properties of Carbonyl compounds.

Unit V:

Malonic ester, acetoacetic ester and cyanoacetic ester-their preparation and synthetic applications Tautomerism of acetoacetic ester.

Geometrical isomerism – Cis & Trans, E & Z notations – Geometrical isomerism in maleic acid and fumaric acid - physical and chemical properties of geometrical isomers.

CORE CHEMISTRY PAPER V
(COMPUTER APPLICATIONS IN CHEMISTRY AND PHYSICAL CHEMISTRY)
Teaching hours: 45 hours per semester (3 hours per week)

Subject description

This paper presents the basic things of compute, C programming and its applications in chemistry. This paper also deals with second and third law of thermodynamics.

Goals

To enable the students to understand computer, its application in chemistry and laws of thermodynamics.

Objectives

To study the applications of computer programming in chemistry and importance of second and third law of thermodynamics.

Contents

UNIT I: Introduction:

The definition of a computer. History of computers. The block diagram of a computer. Types of computers - PC and its components - programming languages - Algorithms and Flow charts.

Hardware components of a computer - Input unit, processing unit.

Input unit devices - Keyboard, Mouse, Track ball, Digitizing tablet, Light pen, Touch screen, Touch pad, Digital camera and Scanner. Memory unit: 1. Primary memory 2. Secondary memory. Output unit: Monitor, Printer and Plotter.

UNIT II C Language (part I)

Introduction - Overview of Compilers and Interpreters. Structure of C program - Programming rules - Executing the program. C keywords, Identifiers, Variables in C - rules for defining variables, Data types, Declaring variables and Initializing variables. Constants in C, Operators in C, Input and Output in C language.

UNIT III some important C programs for Chemistry

Programs: To calculate the P^H of solution and find that it is basic, acidic or neutral. Calculation of p^H of a solution using Henderson equation. To compute the order of a reaction. To compute half-life period of a reaction. To compute the rate constant of a Ist order reaction. To compute the energy of activate of a reaction.

UNIT IV

Introduction to second law of thermodynamics - Carnot cycle - entropy - Definition - entropy changes in isothermal transformation - Trouton's rule. Entropy as function of T and V - Entropy as a function of T and P - Changes of entropy with T, Entropy changes in ideal gas - entropy of mixing of ideal gases.

UNIT V

General conditions of equilibrium and spontaneity - conditions of equilibrium and spontaneity under constants - definition of A and G-physical significance of - dA and dG. Temperature and pressure dependence of G - Gibbs - Helmholtz equation. Chemical equilibrium - The concept of chemical potential - chemical equilibrium in a mixture of ideal gases - Vant Hoff Isotherm and isochore - Third law of thermodynamics statement and applications exception to third law.

Ref:

Computer for Chemists - By PUNDIR BANSAL - Pragati Prakasam Pubs.

CORE CHEMISTRY PAPER VI

Teaching hours : 60 Hours per semester (4 hours per week)

Subject description

This paper presents the chemistry of phenols, amines and phase rule.

Goals

To enable the students to learn about the reactions of phenol and amines .

Objectives

To study the reaction of phenol and amines and applications of phase rule.

Contents

UNIT I :

General methods of Extraction: Concentration – Gravity separation, Froth Floatations magnetic separation, Extraction – Chemical and Electrolytic methods of refining, Zone refining, Van Arkel refining and Electrolytic refining.

UNIT II :

Monohydric phenols; - preparation & properties –Reaction of monohydric phenols with mechanism – alkylation, esterification, nitration, sulphonation, halogenation coupling with diazonium salts – Kolbe, Reimer – Tiemann, Schotten – Bauman , Gattermann Reaction.

UNIT III :

Amine: Amines preparation & reaction- primary secondary and tertiary amines – their separation, comparision of their basicity – ring substitution, diazotiazation and coupling reaction of aromatic amines.

Diazomethaneand diazoacetic ester – preparation, structure and their synthetic applications.

UNIT IV :

Phase rule and phase equilibria –the equilibrium condition. Stability of phase of a pure substance. Pressure dependene of U and T curves. The claperyron and clapeyron-Clausius equations. Derivation of Gibbs phase rule. Phase equilibria in one component system. Phase diagram for suplhur, water, carbondioxide system, phase diagram for two component system – construction of the phase diagram/Thermal analysis method Bi-Cd; Zn-Mg and Na-K system.

UNIT V :

Solutions: ideal and non ideal – Raoult's law, Henry's law – Nernst distribution law and its applications.

Colligative properties- relative lowering of vapour pressure, elevation of boiling point depression of freezing point and osmotic pressure- their applications.

CORE CHEMISTRY PAPER VII
(INORGANIC CHEMISTRY)

Teaching hours : 60 hours per semester (4 hours per week)

Subject description

This paper presents the principle of radio activity, acids and bases and solvents.

Goals

To enable the students to know about the radio activity, acid and bases, the role of solvent in chemical reactions.

Objectives

To understand the principles of radio activity.

Contents

UNIT I :

Principle of Gravimetric analysis – Precipitation methods – conditions of precipitation – factors influencing the precipitation and solubility – Co precipitation and Post precipitation, digestion, washing and drying and ignition of the precipitate.

UNIT II :

Artificial radio activity. Artificial transmutation of new elements, synthesis of radio isotopes and. Nuclear fission and fusion. Nuclear reactors – principles of working – production of electrical energy – atomic projects in India – Safety measures; dispostal of reactor wastes – pollution. Nuclear reactions, mechanisms and different types of stellar energy.

UNIT III :

Nature of isotopes and isobars – detection and isolation of isotopes – various methods – importance of discovery of istopes – uses of isotopes in various fields. Nuclear stability n/p ratio, magic numbers C-12 atomic weight scale C-14 dating mass defect and nuclear binding energies. Radio active disintergration series.

UNIT IV :

Acids and bases; Definitions- different approaches to protonic acid – base systems – strengths of Lewis Acids and Bases-Solvolytic reactions-Hard and Soft Acids and Bases. Acid and base strength of HSABS- Applications of HSAB concept Basis of hardness and softness, Pi-bonding contribution Electro negativities of hard-soft species, limitations of HSAB concept.

UNIT V :

The solvents- solubility of compounds – effect of temperature on solubility- Role of water as solvent- chemical structure and solubility. Classifications of solvents-general behavior- properties of ionizing solvents. Types of reactions in solvents. Specific Non aqueous solvents-protonic solvents ammonia, hydrogen fluoride. Non Protonic solvents-SO_2 - BrF_3 Moltent salt. Organic solvents C_2H_5OH, Ether.

CORE CHEMISTRY PAPER VIII
(ORGANIC CHEMISTRY)

Teaching hours : 60 hours per square (4 hours per week)

Subject description

This paper presents the chemistry of carbohydrate, molecular rearrangements, amino acids and hetero cyclic compound.

Goals

To enable the students to learn about carbohydrates, amino acids and hetero cyclic compounds.

Objectives

To understand the importance of carbohydrate, amino acids in chemistry.

Contents

UNIT I :

Optical activity of compounds with asymmetric carbon- racemisation – resolution – asymmetric synthesis- configuration D,L and R,S. nomenclature.

UNIT II :

Mechanism of molecular rearrangement reaction: Pinacol Pinacolone, Beck mann, Hoff. Maan, Curtius,-Benzilic acid, Schmidt, Lossen, Cope, Benzidine and Claisen rearrangements.

UNIT III :

Carbohydrates: Chemistry and structure of Glucose, Fructose, Sucrose and Maltose (cyclic structure as well;). Starch andCellulose. An elementary account. (Elucidation of structure not necessary)

Inter conversion of sugars-mutarotaion – Epemerisation.

UNIT IV :

Aminoacids and proteins

Amino acids-Classiffication –Preparation and properties peptides and poly peptides-proteins classification based on physical properties and biological functions-primary secondary and tertiary structure – properties and uses.

UNIT V :

Heterocyclic compounds

Chemistry of Furan, Pyrrole, Thiophene, Quinoline, IsoQuinoline, Benzofuran, Indole, Isatin and Indigo.

CORE CHEMISTRY PAPER IX
(ELECTRO CHEMISTRY)

Teaching hours : 60 hours per semester (4 hours per week)

Subject description

This paper presents the principles of conduction Electro Motive Force, fuel cells.

Goals

To enable the students to know about electro chemistry.

Objectives

To study EMF, pH and their applications.

Contents

UNIT I :

Electrical conduction, conduction in metals and in electrolytic solutions. Measurement of conductivity in electrolytic solutions. Migration of ions-Kohlrausch's law. Arrhenius theory of electrolytic dissociation-Oswald's dilution law. Theory of strong electrolytes-Debye-Huckel-Onsagar theory (elementary account only) verification \-Debye-Falkenhagen effect-Wien effect-Transport numbers-Determination conductometric titrations.

UNIT II :

Ionic Equilibria-Solubility and solubility product-determination of solubility product-Applications of solubility product principles. Dissociation of weak acids and bases-

Dissociation constants-pH scale-commonion effect-buffersolutions- Determination of pH values of Buffer mixtures-Henderson's equation-Hydrolysis of salts-Degree of hydrolysis.

UNIT III :

Electrochemicalcells. Electrode potentials-The standard hydrogen electrode kinds of electrodes and their potentials-Nernst equation. EMF-computation and measurement of cell EMF single electrode potential-Determination and significance of electrode potentials-electro chemical series- temperature dependence of the cell EMF- Thermodynamic quantities of cell reactions.

UNIT IV :

Reference electrodes-Electrodes for measurement of pH-concentration cells with and without transport-liquid junction potential-applications of EMF measurements. Redox potential-Redox indicators-uses. Potentiometric titrations.

UNIT V :

Fuel cells: Hydrogen- oxygen cell and hydrocarbon oxygen cell. Storage cells. Lead storage cell and Nickel cadmium cell. Decomposition voltage-over voltage-Depositions and discharge potential.

CORE CHEMISTRY PAPER X
(SPECTROSCOPY AND NATURAL PRODUCTS)

Teaching hours : 75 Hours per semester (5 hours per week)

Subject description

This paper represents the principles of spectroscopy and The chemistry of natural products.

Goals

To enable the students to know about terpenoids, vitamins, alkaloids and harmones.

Objectives

To study the spectroscopy and natural products

Contents

UNIT I :

Spectroscopy absorption spectra – fundamental concepts electromagnetic Spectrum-the various regions of the spectrum and the relative energies of the radiation in each region-type of changes induced by the interaction of radiation with matter. Theory of rotations spectra-Molecular rotation-diatomic molecule as rigid rotor-diatomic molecule as non-rigid rotor-intensities of spectral lines. Applications of rotation spectra bond length-isotopic substitution.

Theories of IR spectra-simple harmonic oscillator model-An harmonic oscillator model of diatomic molecules information on molecular constitution from IR spectra; Application of IR spectra.

NMR SPECTRA- Basic principles – chemical shift-NMR spectra of simple molecules (high resolution details not expected)

UNIT II :

Theory of Raman spectra-comparison of IR and Raman spectra Theory of UV and visible spectra-Frank Condon principle-Pre dissociation-determination of dissociation energies –Applications of UV spectra to simple molecules.

UNIT III :

Terpenoids; Introduction-Classification-General methods of isolation-isoprene rule-structural elucidation and synthesis of gernaiol, terpineol, dipentene and alpha pinene.

Vitamins-introduction-importance of vitamins-structural elucidation and synthesis of Retionl, Thiamine, Riboflavin, Ascorbic acid.

UNIT IV :

Alkaloids – introduction – classification – General characterstics – general methods of determining structures- Hoffmann's exhaustive methylation structural elucidation and synthesis of Nicotine, conine, piperine and papaverin.

Harmones; Introduction-Structural elucidation and synthesis of adrenaline and thyroxine.

UNIT V :

Chemotheraphy; Introduction-Classification of drugs-applications of sulpha drugs, anti malerials Ambecidal, Antiseptics, Antiseptics, Analgesics and Antibiotics (Pencilin, Streptomycin, Chloromycetin, tetracycline-structure and uses only).

CORE CHEMISTRY PAPER XI
(PHYSICAL PROPERTIES AND CHEMICAL KINETICS)

Teaching hours : 75 Hours per semesters (5 hours per week)

Subject description

This paper presents magnetic properties of molecules and kinetics of chemical reaction.

Goals

To enable the students to learn about the kinetic of reaction.

Objectives

To study the magnetic properties of molecules, chemical kinetics and photo chemistry.

Contents

UNIT I :

Electrical properties of molecules: Molar polarization, Orientation polatization and Distortion polarization polar and non polar molecules. Determinationof dipolemoments of polar gases, liquids and solids-Applications of dipole moment in the study of simple molecules.

UNIT II :

Magnetic properties of molecules; Meaning of the terms magnetic susceptibility, magnetic moment, diamagnetism, paramagnetism and ferromagnetism, Determination of

magnetic susceptibility by Gouy's method. Application of magnetic properties in solving structural problems involving simple and complex inos.

UNIT III :

Empirical laws and experimental aspects.Rate laws, Stoichiometry, order and molecularity of reactions setting up and solving simple differential equation for first order, second order, third order and zero order reactions. Characterstics of I,II,III and Zero order reactions . Determination of order of reactions.

UNIT IV :

Experimental techniques involved in the following kinetics of reaction. Volumetry, manometry, polarimetry and colorimetry, typical examples for each of the techniques.

Theoretical aspects. Effects of temperature on the rate constant. The activation energy. The collision theory of reaction rates and its limitation. Lindemann theory of unimolecular reactions. The theory of Absolute reaction rates. Comparision of the collision theory with the Absolute reaction rate theory.

UNIT V :

Thermal chain reaction H2/Br2 reaction.

Kinetics of photochemical reactions. Absorption of light and photochemical process. The stark-Einstein law of photochemical equivalence. Phtochemical chain reaction H2/B2 reaction. Quantum yield of photochemical ractions. Comparision of thermal & photochemical kinetics of H2/B2 reaction. Photosensitized reactions. Fluoresence, phosphorescence and chemiluminesence.

TEXT BOOKS AND REFERENCES

Inorganic Chemistry

1. Principles of inorganic chemistry, B.R.Puri & L.R. Sharma, Shobanlal Nagin Chand & Co.,
2. Inorganic chemistry, P.L.Soni, Sultan Chand & Sons
3. Concepts of Inorganic Chemistry, F.A.Cotton
4. Text book of inorganic chemistry – a new approach, S.Sundaram and V.S. Srinivasan, Margham publications.
5. A text book of inorganic chemistry, A.K.De, Wiley
6. Concise inorganic chemistry,J.D.Lee.
7. Inorganic chemistry, Shriver and Atkins
8. Theoretical principles of inorganic chemistryManku, Teta McGraw Hill edition.

Organic chemistry

1. Organic chemistry, Vol. 1,2,3 S.M. Mughergee, S.P.Sigh, R.P.Kapoor, Wiley Eastern
2. Advanced Organic Chemistry, B.S.Bahl, Arun bahl, S.Chand & Co.,
3. Text book Organic Chemistry, P.L. Soni, S.M. Chawla, Sultan Chand & Sons
4. Steroisomerism of carbon compounds, RaviBhusanm, CBS Publishers
5. Sterochemistry, Conformation and mechanisms, Kalsi, Wiley- Eastern Ltd.,
6. Stereochemistry of Organic compounds, D. Nasipuri, Wiley-Eastern ltd.,
7. Organic chemistry, Vol 1 and 2,I.L. Finar, Addison-Wesly Longman

8. Organic chemistry, R.T.Morrison and R.W. Boyd, Prentice –Hall.
9. Organic chemistry, P.H.Pine, McGrawHill.
10. Fundamentals of Organic Chemistry, T.W.Graham Solomen, John-Wiley & Sons
11. Introduction to Organic Chemistry. Andrew Streit wisher, Jr.C.H.Heathcock
12. Stereochemistry of Carbon compound- Eliel, Tata Mc Graw Hill.
13. Organic chemistry- Stanley H pine Fifth edition - Tata Mc Graw – Hill Publishing House, New Delhi.
14. Soultion Manual for organic chemistry –Robert C.Alkins and Francis carey fifth edition - Tata Mc Graw – Hill Publishing House, New Delhi.
15. Organic reaction Mechanism - Dr.Raj Bansal third Edition Tata Mc Graw – Hill Publishing House, New Delhi.
16. Spectroscopic methods in organic chemistry – williamms & Fleming fifth edition Tata Mc Graw – Hill Publishing House, New Delhi.
17. Organic chemistry –schaum series. 300- solved problems 2003 edition. Tata Mc Graw – Hill Publishing House, New Delhi.
18. Biochemistry –SC Rastogi 2nd edition . Tata Mc Graw – Hill Publishing House, New Delhi.

Physical Chemistry

1. Essentials of Physical Chemistry, B.S.bahl and G.D. Tuli,S. Chand & Co.,
2. Text book of physical Chemistry, P.L.Soni, Dharmarke; Sultan Chand & Sons
3. Principles of Physical Chemistry, B.R.Puri, L.R.Sharma and M.S.Phathania, Shobanlal Nagin Chand & Co.,
4. Principles of Physical Chemistry, S.M.Maron and C.F.Brutton, Oxford IBH
5. Physical Chemistry, R.a.alberty, John-Wiley &Sons
6. Elements of physical Chemistry, s.Glasstone and D.Lewis, McMillan
7. Physical chemistry, G.W.Castelan, Narosa publishers
8. Physical Chemistry,P.W.Atkins, Oxford.
9. physical Chemistry – Barrow Tata McGraw H.U. editor
10. Fundamentals of molecular spectroscopy-Ban welt – Taba McGraw Hill edition.
11. Introductory Quantum chemistry A.K.Chandra fourth edition. Tata Mc Graw – Hill Publishing House, New Delhi.
12. Atomic structure and the chemical Manas Chanda fourth edition. Tata Mc Graw – Hill Publishing House, New Delhi.

Computer Application

1. Gottfried.B.G., Theory and Problems of Progamming with Basic McGraw hill Co., New York (1987)
2. Rajaraman. V., Computer programming I Fortran 77 Prentice hall of India, New Delhi(1996)
3. Isenhiur, T.L.P.C. Jurs, Wilkins C.L.Kloppemstein B.E., Introduction to computer Programming for chemists Basic version Allyn & Baco London (1981)
4. Raman K.V.Computers in Chemistry Tata McGraw-Hill Co New Delhi(1993)
5. Unique features of Basic, Pascal and Raman K.V.Chemistry Education june 1996
6. P.C.Software made simple R.K.Taxali
7. V.Balsgurusamy basic programming TMH Company New Delhi (1980)

8. Ramkumar Programming in Fortran tmh company (1985)
9. Computer and their applications to chemistry- Ramesh kumari –Narosa Publishing house
10. Computer networks – Andrews Janenbaum.

APPLICATION ORIENTED SUBJECTS
Group A-V Semester
1. ANALYTICAL CHEMISTRY I : BASIC PRINCIPLES

Teaching hours : 45 Hours per semester (3 hours per week)

UNIT I :

Basic principles and applications of Analytical techniques : Such as Precipitation, filteration, sample drying, transfer of precipitates. Distillation, vacuum distillation fractional distillation and steam distillation. Sublimation, crystallization, fractional crystallization M.P., B.P., and Refractive Indices.

UNIT II :

Evaluation of Analytical date : Accuracy and precision, methods for their expression, classification of errors, detection and correction of determination and intermediate errors. The normal law of Distribution of Intermediate errors.

UNIT III :

Statistical texts and date : The F test and the T test, rejection of data the method of least squares, propagation of errors in computation, significant figures.

UNIT IV :

Theory of Quantitative Analysis ; Applications of Chemical equilibrium to analytical separations and estimations : The equilibrium constants, activity co-efficients. Acid-Base equilibria, solubility equilibria, distribution equilibria, Complex ion equilibria and stability constant Separations and estimations : illustrated with examples.

UNIT V :

Gravimetric methods : Theory of indicators, Theory of precipitation, Co-precipitation, Post-precipitation, theory of purifying the precipitates, Acid-Base, redox, Complexometeric and precipitation Titrations, Volumetric analysis.

BOOKS FOR REFERENCE :

1. Quantitative Chemical Analysis, A.I. Vogel.
2. Instrumental Methods of Analysis, Skoog.
3. Instrumental Methods of Analysis, Willard, Dean, Merrit and Settle, CBS.

2. POLYMER CHEMISTRY

Teaching hours : 45 Hours per semester (3 hours per week)

UNIT I :

Classification of polymers-natural polymers and synthetic polymers. Synthetic polymers-Addition polymers, condensation polymers-Mechanism of polymerization, step reaction polymerization, chain reaction polymerization, -ionic, radical and coordination polymerization-one example each.

UNIT II :

Molecular weight of polymers-Number average and weight average molecule weight methods.

1. Osmometry (membrane)
2. Cryoscopy & ebulloscopy
3. Osmometry (Vapour pressure)
4. Viscometry
5. End Group Analysis-mumber average

Weight average Mw (i) Light scattering (ii) Ultra centrifugation Molecular weight distribution.

UNIT III :

Primary and secondary bond forces in polymers-coherence energy-structure property relationship

(i) Mechanical properties (ii) Thermal stability-glass transition temperature
(iii) Flame resistance (iv) Chemical resistance
(v) Degradability (vi) Electrical Conductivity

UNIT IV :

Important industrial polymers, preparation and applications

(i) Polyethylene, polypropylene (ii) Polyamides
(iii) Polyvinyl chloride, polymethylmethacrylate
(iv) Polyesters, polycarbonates (v) Polyurethaes
(vi) Phenol-formaldehyde, melamine-formaldehyde
(vii) Polysilanes, polysiloxanes (viii) Polyaniline

UNIT V :

Rubber, Cellulose, starch, wool, silk, collagen, coal, nucleic acids, general structure-importance-applications.

Reference

1. Polymer chemistry an introduction-M.P.Stevens, Oxford-1990
2. Textbook of polymer Science-FW Billmeyer, Wiley-1984.

3. AGRO INDUSTRIAL CHEMISTRY

Teaching hours : 45 Hours per semester (3 hours per week)

UNIT I :

Water source for agriculture- Water Treatment & Water Analysis

Sources of water supply for agriculture.Hard and soft water. Water softening methods: lime soda process, phosphate conditioning, permutit and ion-exchenge processes. Water analysis; determination of hardness of water, acidity, alkalinity,pH value, amount of free CO_2, fluoride content, chloride content and their estimation. Biological oxygen demand (BOD), chemical oxygen demand (COD), chlorine demand and their determinations. Recycling of water.

UNIT II :

Chemistry of soil-soil classification and soil analysis

Definition of soils. Classification of soils. Properties of soils-physical properties and mechanical analysis. Structure and Texture. Soil water, soils air and soil temperature. Chemical properties- soil mineral matter-soil colloids, ino-exchenge reactions. Soil fertility and its evaluation. Soil organic matter and their influence on soil properties –N ratio effects. Soil reactions. Soil pH, acidity, alkalinity, buffering of soils and its effects on the availability of N, P, K, Ca, Mg, I, AI,Mn & sulphuric acid. soils salinity, acid & alkaline soils- their formation and reclamation.

UNIT III :

Fertilizers

1. Effect of N,P,K, secondary nutrients and micro nutrients on plant growth and development.
2. Importance of nitrogenous fertilizers. Nitrogen cycle and fixation of atmospheric nitrogen. principle and manufacture of ammonium nitrate, ammonium sulphate, and urea
3. Phosphate fertilizers. preparation and uses of mono and diammonium phosphates, super phosphate and triple super phosphate.
4. potassium fertilizers-potassium nitrate, potassium chloride, potassium sulphate. Mixed fertilizers. Methods of compost in green manuring, concentrated organic manures and their chemical composition. Oil cakes, horn and hoof metal.

Pesticides

Classification-Insecticides, fungicides and herbicides. general methods of preparation, application and toxicity. Insect attractants and repellants-fluorine compounds, boron compounds, arsenic compounds, organomercuric compounds, DDT, BHC,2,4 –D compounds, pyridine compounds.

UNIT IV :

Chemistry of sugar and fermentation

1. Details of manufacture of sucrose from cane sugar-extraction of juice, purification, concentration, crystallization, separation and refining of crystals, recovery of sucrose from molasses. Manufacture of sucrose from beetroot. Estimation of sucrose and inversion sugar by polarimetry.
2. Manufacture of alcohol from molasses and starch by fermentation process.

UNIT V :

OILS, fats and Waxes

Classification of oils fats and waxes: distinction between oil, fats and waxes Hydrogenation of oils-principle and manufacturing details. Definition and determination of soapanification value, acid value, iodine value RM value and Hehner value and their signification. Elaidin test for oils. Some common waxes like spermaceti, Bees wax, baybeery wax and their uses. Soap and its manufacture; toilet and transparent soaps. Cleansing action of soap. Detergent.

References

1. Nature and properties of soils-Harry, O Buckman N Yle C. Brandy
2. Soils Sceince-A.Sankara
3. Insecticides, Pesticides and Agro based Industries – R.C.Palful, K.Goel, R.K.Gupta
4. Applied Chemistry- Theory and Practise- O.P.Vermani & A.K.Narula
5. Industrial Chemistry-B.N Chakrabarty
6. Industrial Chemistry-B.K.Sharma.

4. PHARMACEUTICAL CHEMISTRY

Teaching hours : 45 Hours per semester (3 hours per week)

UNIT I :

1. Important terminologies used in pharmaceutical chemistry-Definition of the following terms-drug, pharmacology, pharmacognosy, pharmacy, therapeutics, toxicology, chemotherapy, pharmacopoeia (BP, IP, USP), National formulary, pharmaeophore, bacteria, virus, vaccines, toxoids, primary immunization, additive effect, synergism, antagoinism, plaubo, LD_{50}, ed_{50} and therapeutic index
2. Routes of drug administration-local, enema, oral or external, parental-advantages and disadvantages oral and parental routes-inhalation, intradermal, subcutaneous, intramuscular, intravenous-intrathecal-intraarticular-transcutaneous-transmuscusal.
3. Clinical chemistry-A Diagnostic test and one method of estimation bilirubin and cholesterol in serum or plasma or urine. Biuret test for urea.
4. First aid to prevent bleeding and maintain breathing
5. Causes and symptoms of food poisoning, botulism-mushroom and plant poisoning-first aid.
6. Causes, symptoms and treatment of anemia, diabetis, tuberclosis, asthma, jaundice, piles, leprosy, typhoid, malaria, cholera and filarial.
7. Indian medicinal plants and their importance. Spices and their medicinal uses.

UNIT II :

1. Alkaloids- definition-general methods of isolation-colour tests for identification-source, isolation, structure and use of atropine-source, extraction, structure, SAR and uses of morphine and quinine.
2. Analgessics-definition different types of pain (superficial, deep non visceral, visceral, referred and pshycogeneic), classification – morphine and its derivatives. Synthesis assay and uses of pethidine and methadone-antipyretic

analgesics-salicylic acid derivatives-paracetamol, phenacetin-propanoic acid derivative-Ibuprofen.

3. Antibiotics: definition –microbial synthesis structure, assay and uses of chloramphenicol and pencilin-structure and use of streptomycin and tetracyclines.
4. Sulphanonamides: Definition-mechanism of action-classification-SAR-synthesis and use of sulpha acetamide, sulpnathiazole, phthalyl sulphathiazole- sulphadiazine and sulpha pyridine-assay.

UNIT III :

1. Antiseptics and disinfectants: Definition and distinction- phenol coefficient-examples-phenolic compounds, dyes, cationic surfacts and chloro compounds. Tranquilizers-definition and examples. Psychodelic drugs LSD and marijuana.
2. Anaesthetics – Definition –Classification –volatile anaesthetics(N2O, ethers, halohydrocarbons, chloroform, haloethane)-ferguson principle –intravenous anaesthetics- structure of thiopental sodium-local anaesthetic cocaine-source and structure – preparation and uses of procaine orthocaine and benzocaine.
3. Vitamins-Definition-classification, sources and deficiency diseases of vitamins A,B,C,D,E and K.Importance of vitamin A in vision (rhodopsin cycle).
4. Definition of cancer and antineoplastic drugs-examples antimetabolite, natural substances harmones, alkylating agents, inorganic complexes and other compounds-definition of hypoglycemic drugs-types and cause for diabetics-examples (Sulphonyl ureas and biguanides)

UNIT IV :

1. Medicinally important compounds of Al_2P_2As, Hg and Fe. Uses of the following $MgSO_4$ $7H_2O$, milk of magnesia, magnesium trisilicate-Aluminium hydroxide gel, dihydroxy aluminium amino acetate, Aluminium acetate and aluminium monostearate-paroxon-phosphorine, cyclophosphosphomide-tricyclophos-preparation and use of thiotepa-sodium and copper cacodylates-preparation and uses of aromatic aresericals (carbosone, triparasomide, acetarsonide, neoarsphenamine, oxophenarisince)- $HgCl_2$, Hgl_2 and $Hg(CN)_2$ as disinfectations-importance of organic mercury compounds-structure and uses of thiomersal, netromersal merbromine and mersalyl acid-Ferous gluconate, $FeSO_4$, scale preparation (ferric ammonium acetate), ferrous fumarate, ferrous succinate and ferrous chlorinate.
2. Organic pharmaceutical aids-Definition-agents for kidney function (aminophippuric acid)-liver function (sulphobrophthalein sodium, rose Bengal)-corneal ulcer detection (Fluoescein sodium)-Blood volume determination (Evans Blue) pituitary function (metyrapone)-ointment bases-preservatives-antioxidants-sequeshants, colouring, sweetening, flavouring, emulsifying and stabilizing agents.
3. AIDS-cause HIV-prepagation-prevention and treatment.

UNIT V :

1. Blood-composition-grouping-Rh factor-buffers in blood-Functions of plasma proteins-clotting mechanism-blood pressure.
2. Coagulants and anticoagulants-definitions and examples.
3. Antianemic drugs (iron, vitamin B_{12}, folic acid).

4. Cardiovascular drugs : definition and names of to drugs for each of the following-carduitibue agents-antiarrythmic drugs-antihypertensive drugs-antianginal agents-vasodilators-lipid lowering agents-scelrosing agents.

Text and References

1. Pharmaceutical Chemistry by S. Lakshmi, Sultan Chand & Sons, 2nd ed (1998).
2. Pharmacolgy and pharmatherapeutics, Vol.1 & 2, R.S. Satoskar and S.D. Bhandarkar 11th Ed, Popular prakashan, Mumbai, 1989.
3. Bentleys, Text book of pharmacutics, 8th Ed. E.A. Raubins, 1992, All India traveler book sellers, Delhi.
4. Medicinal Chemistry, Ashutosh kar, New Age International, 1992.
5. A text book of pharmaceutical chemistry, Jayashree ghosh, S. Chand, 1997.

5. DAIRY CHEMISTRY

Teaching hours : 45 Hours per semester (3 hours per week)

UNIT I :

Milk: Definition-General composition of milk-physical properties of milk- colour, odour, acidity-natural and developed, specific gravity-Recknagel effect viscosity and conductivity, factors affecting the gross competition of milk, physico-Chemical change taking place in milk due to processing parameters-boiling pasteurization- sterlilzation and homogenization. Adulterants, preservatives and neutralizers-example and their detection. Estimation of fat, specific gravity, acidy and total solids in milk.

UNIT II :

1. Milk lipids-terminology and definitions classification – saponifiable (triglycerodes) and unsaponifiable matters (sterols and cholesterol) phospholipids-structure and properties (Lecithin and Cephalin) Milk fat constants-refractive index-saponification number, Iodine number, R.M.number, R.M number and polenske number.
2. Milk proteins-Chemistry of proteins in general structure-N-terminal and C-terminal, hydrogen bond, disulphide bond and salt linkages, outlines of primary, secondary and tertiary structure of proteins. Physical properties of milk proteins-Electrical properties and hydration, solubility. Reaction of milk properties with formaldehyde and ninhydrin. Non-protein nitrogen constituents of milk, effect of heat on milk protein, milk enzyme and functions.
3. Milk carbohydrate-Lactose-Its structure, solubility, hydrolysis, Oxidation and reduction, Estimation of lactose in milk.
4. Milk vitamins-water and soluble vitamins, effect of heat and light on vitamins.
5. Ash and mineral matters in milk.

UNIT III :

1. Creams : Definition-composition-chemistry of creaming process-gravitational and centrifugal methods of separation of cream-Factors influencing cream separation (Mention the factors only)-Cream neutralization. Estimation of fat in cream.

2. Butter : Definition-% composition-manufacture-Estimation of fat, acidity, salt and moisture content-Desi butter.
3. Ghee : Major constituents-common adulterants added to ghee and their detection-rancidity-definition-types (hydrolytic, oxidative and ketonic) prevention-antioxidants and synergists (natural and synthetic)-Measurements.

UNIT IV :

1. Fermented milk products : Fermentation of milk-definition, conditions, cultured milk-definition of culture-examples, conditions, types-cultured cream-cultured butter milk-Bulgaricus milk-acidophillus milk-yogurt. Racteriophage-definition and its function.
2. Indigenous products : Definition percentage composition-preparation-physico-chemical changes take place during khoa-making-khoa sweet-Gulabjamum, chana sweet-Rossogolla-ingredients and preparation.
3. Ice cream : Definition-percentage composition-types-iungredients needed-manufacture of ice-cream stabilizers-emulsifiers and their role.

UNIT V :

1. Milk powder : Definition-need for making powder-drying process-spray drying, drum drying, jet drying and foam drying-principles involved in each. Manufacture of whole milk powder by spray drying process-keeping quality of milk powder.
2. Dairy Detergents : Definition-characteristics-classification-washing procedure (modern method) sterilization-chloramin-T and hypochlorite solution.

Reference Books

1. Outlines of Diary Technology-Sukumar De
2. Principles of Dairy Chemistry-Robert Jenness & S.Patorn.
3. Indian Diary products-K.S. Rangappa and K.T. Achaya.
4. Modern Diary Products-L.M. Lampert.
5. Principles of Dairy processing-Warner.

6. FORENSIC SCIENCE AND CRIME INVESTIGATION

Teaching hours : 45 Hours per semester (3 hours per week)

UNIT I :

Criminology-Definition-nature and scope-types of crimes-penology-Indian penal code-Indian Evidence Act-Indian Criminal Procedure Code.

UNIT II :

1. Forensic Science-Definition, principles and uses in crime investigation.
2. Fingerprints-Patters-classification-Uses of finger prints in crime investigation direct and latent prints-development by powders-chemistry of powders-other methods of development transfer methods for finger prints.
3. Tracks and Traces-Foot Prints-casting of foot prints-Residue Prints-Walking pattern-tier marks-miscellaneous tracks and traces-glass fracture-Tool marks-paints-Fibers.
4. Biological substances-Blood, Semen, Saliva, Sweat, Urine and Hair.

UNIT III :

1. Arson-Natural fires and arson-Nature of action of fire-drifts and air supply-burning characteristics and chemistry of combustible material-Nature of combustion.
2. Explosives-Definition-Classification-Compostion and mechanism of explosion-bombs.
3. Balistics-Classification-Internal external and terminal balistics and overall view. Small arms-Classification and characteristics. Laboratory examination of the barrel washing and detection of powder residues by chemical tests.

UNIT IV :

Documents-Chemistry of paper and ink-Writing paper-carbon paper-safety paper. Ink-various writing inks. Chalk-coloured chalk-adhesives-sealing waxes. Different types of forged signatures-simulated and traced forgeries-inherent signs of forgery models-writing deliberately modified-uses of ultraviolet rays-comparision of typewritten letters-Counterfeit currency and coins.

UNIT V :

Poisons-Types and classification-Diagnosis of poisoning in the living and in the dead-clinical symptoms-post-mortem appearances –treatment in cases of poisoning-use of antidotes.

Reference

1. Criminalistics and introduction to forensic science-Richard Saferstein, Prentice Hall of India-1978.
2. Forensic Science –T.H.James-Stanley Thornes ltd.1987.

APPLICATION ORIENTED SUBJECTS
GROUP-B-VI SEMESTER
1. ANALYTICAL CHEMISTRY II-LAB TECHNIQUES

Teaching hours : 60 Hours per semester (4 hours per week)

UNIT I :

Chromatography: Classification of the chromatographic methods, principles of differential migration, Adsorption phenomenon, nature of the adsorbent, solvent systems. Rf. values column Chromatogrphy. Partition chromatography, paper chromatography, TLC, Electrophores-theory and techniques.

UNIT II :

Spectroscopy: theory, Instrumentation and application of

(i) UV and visible spectrophotometry (ii) IR spectrophotometry
(iii) Flame Photometry (iv) NMR spectroscopy

UNIT III :

Polarimetry: Theory Instrumentation, experimental procedure and application.

UNIT IV :

Electro chemical methods of Analysis, polarogrphy, cyclic voltametry, differential pulse polarography, calorimetry: Theory, techniques and applications.

UNIT V :

Preparation and purification of organic and inorganic conpounds like;

(i) Aspirin from salicylic acid
(ii) Acetanilide from aniline
(iii) Benzanilide from aniline
(iv) iodoform from ethanol/and acetone
(v) Meta di nitro benzene
(vi) Methyl orange/methyl red
(vii)preparation of Nylon 666
(viii) Caffine from tea leaves
(ix) Caesin and lactose from milk
(x) Nicotine and Nicotine sulphate From tobacco waste
(xi) Bakelite from phenol and formaldehyde
(xii)$As_2 O_3$ Sol, Fe $(OH)_3$ Sol
(xiii) Tetramine-copper sulphate
(xiv) Tetra mine Cobalt carbonate
(xv) Sodium thiosulphate and dithionate
(xvi) Cuprous chloride

Books for Reference

1. Physical methods of chemistry-R.S.Drago
2. Spectroscopy in Inorganic chemistry-C.N.R Rao and JR Ferraro
3. Analytical Chemistry-R.V.Dills
4. Fundamentals of Analytical Chemistry-D.A.Skoag and D.M.West
5. Instrumental methods of Chemical Analysis-Ewing
6. Quantitative Chemical Analysis-A.I.Vogel.

2. CHEMISTRY OF PLANT BASED PRODUCTS (STARCH, CELLULOSE, PROTEINS)

Teaching hours : 60 Hours per semester (4 hours per week)

UNIT I :

Chemistry of starch : Structure, physical and chemical properties. Manufacture and uses of unmodified and modified starch, dextrin, sugar syrup, hydrolysis of starch to edible and industrial glucose applications of starch in textile sizing and in fermentation industries.

UNIT II :

Chemistry of cellulose : Structure physical and chemical properties general reactions, major sources and uses of cellulose, chemical and enzymatic hydrolysis of cellulose. Statistics and economics and cellulose. Chemistry of minor products of wood like lignin, pentosans, resins etc, laboratory preparation, manufacture and uses of chemical cellulose.

UNIT III :

Chemistry of proteins : Structure, Properties, Major sources, technological uses, hydrolysis of proteins and protein isolates. Manufacture, Properties and uses of gelatin, casein, collagen, protein isolates.

UNIT IV :

Cellulose derivatives like cellulose nitrate, cellulose acetate, ethyl and methyl cellulose, sodium cellulose sulphate, sodium, carboxy, hydroxyl, methyl, cellulose, regenerated cellulose, major cellulose-platics-sodium carboxy methyl cellulose.

UNIT V :

Different methods of pulping, manufacture and uses of different quality of paper products like card-board, newsprint, writing paper, tissue piper and filter paper. A short

discussion of the pollution problems and by-products utilization of industries based on starch cellulose and proteins.

Reference

1. Textbook of Biochemistry-K. Ranganatha rao, Prentice Hall (1975).
2. Biochemistry-S.K. Dasgupta, Macmillan (1977).

3. DYE CHEMISTRY

Teaching hours : 60 Hours per semester (4 hours per week)

UNIT I :

Colour and constitution-Relationship of colour observed-to wave length of light absorbed-Terms used in colour chemistry-Chromophores, Auxochromes, Bathochromic shift, Hypsochromic shift. Colour of a substance-Quinonoid theory molecular orbital approach.

UNIT II :

Classification of Dyes-chemical classifications-classification according to their applications-Acid dyes-Basic dyes. Azoic dyes, mordant dyes, vat dyes, Sulphur dyes, Disperse dyes, Nitro dyes-and Nitroso dyes process of dyeing (simple treatment).

Azo dyes-Principles governing azo coupling-mechanism of diazotization-Coupling with amines, coupling with phenols Classification according to the number of azo group & application-Tauthmerism in azo dyes.

UNIT III :

Synthesis, reactions and applications of Di and Triphenyl methane dyes-phthalein dyes-Xanthen dyes-acridine dyes-sulphur dyes. Phthalocyanines-Cyanine dyes. Malachite green, Para-rosaniline, crystal violet.

UNIT IV :

Azine, Oxazine and Triazine Dyes.Synthesis and applications of quinonoid dyes including vat dyes based on anthraquinone.

UNIT V :

Pigments-requirements of a pigment: Typical Organic and Inorganic pigments-application and their uses in paints. Reaction of dyes with fibres and water-Fluorescent Brightening agents. Application of dyes in other areas-medicine, chemical analysis, cosmetics, colouring agents, food and beverages.

Reference

1. Dyes and their intermediates-E.N.Abraha, Bergamon Press, 1969.
2. The chemistry of synthetic dyes and pigments-H.A.Lubs,ACS Publication, Halner, 1970.
3. The chemistry of synthetic dyes Vol, I, II, III & IV-K.Venkataraman, Academic Press N.Y., 1949.
4. Physical and Chemistry applications of dyestuffs-F.P.Schafer, Springer-Veriag N.Y.1976.
5. Organic chemistry Vol.I-I.L.Finar, ELBS.
6. Modern paint pigment and Varnish –S.K.Jain & S.K.Mailk, Industries Small business Publication, New Delhi.

4. LEATHER CHEMISTRY

Teaching hours : 60 Hours per semester (4 hours per week)

UNIT I :

1. Hides, Skins,Leather-An elementary knowledge of the structure and composition of hides and skins. proteins and their characteristics, Anatomy and histology of protein constituents of leather (an elementary concept).
2. Basic principle involved in pre-taning such as soaking, liming, deliming, bating , pickling involved in pre-tanning such as soaking, liming, deliming, bating, pickling and depickling.

UNIT II :

1. Types of tanning-vegetable and mineral tanning, Different types of vegetable tanning-materials classification and chemistry of vegetable tanning. Factros and Physio-chemical principle involved in vegetable tanning, Fixation of vegetable tanning.
2. Synthetic tannings-their classifications, general methods of manufacture and use.

UNIT III :

1. The preparation and chemistry of chrome tanning liquids, Olation, Oxolation and hydrolysis of chrome liquids. Effect of adding tanning agents-Role of pH in the reaction of chromium complexes with hide proteins. Factors governing chrome tanning-chemistry of neutralization process. A brief survey of chemistry of other tanning like Al, Zr and Te salts and their relative merit in contrast with chrome tanning
2. Chemistry of combination of tannages involving vegetable tanning aldehydes, chrome and other mineral tanning agents.

UNIT IV :

1. Chemical methods of curing and preservation of hides and skins in acid and alkaline solution.
2. Principles of analytical methods employed in curing, liming, deliming, bating, pickling. Analysis of vegetable tanning materials and extract.
3. process of dyeing leather-Use of mordants, dyeing auxillaries such as leveling, wetting and dispersing agents-Dye fixations.

UNIT V :

1. Animal bye-products-their collection, handing and preservation methods (such as hair, blood, bones, glands, Kerationus materials and their utilization).
2. Tannery effluents and treatment: Types of water pollution-phsical, chemical, physiological and biological. Different types of tannery effluents and wastes-beam-house waste-liquors-tanning and finishing yard waste liquors, solid waste-origin and disposal.

Books for Reference

1. Chemical technology of Leather (ISI).
2. Fundamentals of Leather Science-Woodroffe.
3. Tanning processes-Crthmann.
4. Chemistry of Leather manufacture-Mchanghlils.
5. Vegetable tanning materials-Howes.
6. Publications of CLRI-Madras.

5. ENVIRONMENTAL CHEMISTRY

Teaching hours : 60 Hours per semester (4 hours per week)

UNIT I :

1. Concept and scope of environmental chemistry-Nomenclature: Pollutant, contaminant, receptor, sink, pathways of a pollutant, speciation, dissolved oxygen, chemical oxygen demand (COD), biochemical oxygen demand (BOD)-Environmental segments.
2. Composition of the atmosphere-atmospheric structure-earth's radiation balance – particles, ions and radicals in the atmosphere-formation of inorganic particulate matter- formation of organic particulate matter-ions and radicals-photochemical reactions in the atmosphere-formation of NO_2,SO_2, organic compounds, green house effect.

UNIT II :

Biological cycles & their significance-Gaseous and sedimentary cycles.

(a) Oxygen cycle and ozone chemistry (b) Carbon cycle
(c) Nitrogen cycle (d) Sulphur cycle
(e) Phosphours cycle

UNIT III :

1. Water pollution: Hydrological cycle –aquatic environment-classification of water pollution – organic pollutants, inorganic pollutants, sediments, radioactive materials, thermal pollution, BOD & COD –signification-experimandal determination. Trace elements in water.Chemical speciation of copper, lead and mercury.
2. Eutrophication-sewag treatment-primary and secondary treatments. Industrial waste water treatment by 1) activated charcoal/synthetic resins 2) membrane techniques.

UNIT IV :

1. Air pollution: Air pollutants-primary pollutants-sources of carbon monoxide, nitrogen oxides, sulphur dioxide; sink and control. Hydrocarbons, photochemical smog, acid rain.
2. Particulates: sources-inorganic and organic particulate matters-effects on a human beings, materials, climate control of particulate emission- of atmospheric pollution, corrosion of metals-indoor reactions of air pollutants-sinks of atmospheric gases.
3. Air quality standards: Monitoring –Analysis of carbon monoxide-nitrogen oxides-sulphur dioxides-hydrocarbons.

UNIT V :

1. Thermal pollution-definition, sources-environmental effects-control and prevention. Solar energy as alternative source of energy, strategies for energy conservation.
2. Noise pollution: Sources and effects of noise pollution-control and prevention-solutions to abuse. Supersonic jets and its effects.

3. Radioactive pollution: Sources of radioactive pollution-environmental threat of nuclear reactors-breeder reactors-environmental conflicts between nuclear powers Methods of control and prevention.

Reference

1. Environmental Chemistry-AK De, Wiley eastern Ltd., New Delhi (1993).
2. A text book of Environmental Chemistry-Krishnan & Kannan, Anmol Publications, New Delhi (1992).
3. Environmental chemistry & pollution control – Dhar, S.Chand &Co., New Delhi (1995).

6. TEXTILE CHEMISTRY

Teaching hours : 60 Hours per semester (4 hours per week)

UNIT I :

1. Fibre theory –polymers and polymerization-Morphology of fibres – Molecular arrangements in fibres.
2. General classification of fibres-chemical structure, production, properties and uses of the following natural fibres (a)natural cellulosic fibres (cotton and jute) (b) natural protein fibre (wool and silk).

UNIT II :

Chemical structure, production, properties and uses of the following synthetic fibres. (i) Man made cellulosic fibres (Rayon, modified cellulosic fibres) (ii) Man made protein fibres (Azions) (iii) Poly amide fibres (different types of nylons) (iv) Poly ester fibres (v) Acrylic fibres and (vi) Olefin fibres.

UNIT III :

Impurities in raw cotton and grey cloth, wool and silk- general principles of the removal – Scouring – bleaching – Desizing – Kierboiling- Chemicking –Chemical and machinery use- Degumming and Bleaching of silk Scouring and Bleaching of wool.

UNIT IV :

Dyeing – Classification of dyes and their properties- applications – direct, basic, sulphur and azoic dyes on cotton. Application of Vat and solubilised vat dyes on cotton and viscose. Mordant mineral colours and black. Application of vegetable and other colour to cotton.

UNIT V :

1. Dyeing of wool and silk –Fastnerss properties of dyed materials – dyeing of nylon, terylene and other synthetics.
2. Finishes given to fabrics- Mechanical finishes on cotton, wool and silk, method used process of mercerizing –Anti-crease and Anti-shrink finishes – Water proofing.

Reference

1. Chemical Technology of fibrous Materials – F.sadov, M.Horchagin and A.Matetshy, Mir Publishers.
2. The Identification of Textile Fibres – Bruno Nuntak.
3. Introduction to Textile Science -3rd edition, Maryory L.Joseph.

4. Textile Chemistry –Vol.II R.H.Peters, Elserier, Avesterdam.
5. Dyeing and chemical Technology of Textile fibres-5th Edition, E.R.Trotman, Charles Griffin & Co Ltd
6. Chemistry of dyes & Principles of Dyeing -V.A.Shenai, Sevak Publications.
7. Scouring and Bleaching E.R.Trotman, Charles Griffin & Co Ltd.
8. Text Book of Applied Chemistry- K.Kapur.
9. A Students Text Book of Textile Science- A.J.Hall.

CORE CHEMISTRY PRACTICAL II
Volumetric and Organic Analysis
III & IV TH SEMESTERS (3hours per week)

I. EXPERIMENTS IN VOLUMETRIC ANALYSIS:

A. Acidimetry & Alkalimetry: Estimation of Na_2Co_3

B.Permanganametry:

1. Estimation of Ferrous sulphate & Oxalic acid
2. Determination of Iron in Ferric Alum.
3. Estimation of Calcium-Direct method.

C. Dichrometry: Estimation of Ferrous iron using internal indicator.

D. Iodimetry:

1. Esdimation of $k_2cr_2o_7$.
2. Esdimation of Copper.
3. Esdimation of As_2O_3.

E.Argentometry: (Demonstration experiments)

Estimation of chloride- Fajan's and Volhards method.

II. ORGANIC ANALYSIS

Systematic analysis of an organic compound Preliminary tests, detection of elements present, Aromatic or Aliphatic, Saturated or unsaturated, nature of the functional group, confirmatory tests and preparation of derivaties - AIdehydes, Ketones, Amines, Amides, Diamide, Carbohydrates, Phenols, Acids, Esters & Nitro compounds.

CORE CHEMISTRY PRACTICAL III
GRAVIMETRIC ANALYSIS AND CHEMISTRY PHYSICAL
V & VI TH SEMESTERS (7hours per week)

I. GRAVIMETRIC ANALYSIS :

1. Estimation of Sulphate as Barium Sulphate.
2. Estimation of Barium as Barium Chromate.
3. Estimation of Lead as Lead Chromate.
4. Estimation of Calcium as Calcium Oxalate.
5. Estimation of Nickel as Nickel Dimethylglyoxime.

II. PHYSICAL CHEMISTRY EXPERIMENTS :

1. Determination of partition coefficient of Iodine between Benzene and Water.
2. Determination of rate constant of acid-catalysed hydrolysis of an ester (Methyl acetate or Ethyl acetate).
3. Determination of Kf / molecular weight by Rasts method-Naphthalene, Diphenyl.
4. Determination of critical solution temperature of Phenol-Water system.
5. Determination of concentration of an electrolyte (Nacl/Kcl/succinic acid).
6. Phase Diagram – Simple Eutectic system.
7. Determination of cell constant, specific conductivity and equivalent conductivity of strong electrolyte.
8. Determination of dissociation constant of a weak acid (acetic acid).
9. Conductometric titrations, strong-acid-strong base.
10. Potentiometric titrations, Acid-base HCl Vs NaOH.

APPLICATION ORIENTED PRACTICALS
V AND VITH SEMESTERS (3hours per week)

1. Determination of Melting point/Boiling point of an organic substance.
2. Preparation of inorganic complexes.
   (a) Tetramine copper (II) sulphate (b) Potassium Trioxalato chromate (III)
   (c) Prussian Blue (d) Hexamine Cobalt (II) chloride
   (e) Potassium Trioxalato Ferrate(III) (f) Sodium Cuprous Thiosulphate.
3. Preparation involving Acetylation,Hydrolysis, Oxidation, Halogenation, Nitration and Benzoylation.
4. Estimation of Hardness of Water using EDTA.
5. Calorimetric experiments involving Nessler's tubes.
   (a) Extimation of Fe+++ with Ammonium thiocyanate.
   (b) Extimation of Ni as Nickel Dimethyl glyoxime.
   (c) Estimation of Mn++ in Potassium permanganate
6. Paper Chromatography-Chromatographic separation of components present in commercial inks (i.e. Green ink, Red ink, Black ink etc) and in flowers like Rose, Hybiscus etc.

B. Sc. CHEMISTRY MAJOR STUDENTS WHO JOINED THE FROM THE YEAR 2007-2008
SYLLABUS FOR DIPLOMA IN TEXTILE CHEMISTRY-

DIPLOMA IN TEXTILE CHEMISTRY PAPER – I
(CHEMISTRY OF NATURAL AND SYNTHETHIC FIBERS)
Teaching Hours : 30 Hrs. Per Semester (2 Hrs per week)

UNIT: I

Natural Textile Fibers: Definition, Classification of Natural Textile Fibers - Vegetable fibers, Animal fibers. Properties, Uses and Features of Cotton, Wool, Silk and Jute fibers. Genetically Modified Cotton : its merits and demitits.

UNIT : II

Viscose Fibre: Chemical structure ,chemistry of regenarated cellulose.Production of Viscose Fibre : a simple flow chart, wet spinning of viscose filaments.Properties and uses of Viscose Fibre.

UNIT :III

Synthetic Fibers: Definition of monomers, polymers and polymerization.Simple examples of Condensation and Addition Polymerization reactions.Criteria for fibre forming polymers.Acrylic fibers : Synthesis of Acrylonitrile from propylene (Sohio Process), solution polymerization of acrylonitrile.Properties and uses of acrylic fibers.

UNIT :IV

Nylon Fibres: Synthesis of caprolactum from aniline, adipic acid from cyclohexane and hexamethylene diamine from adiponitrile.Polycondensation reactions leading to the formation of Nylon 6 and Nylon 6,6.Properties and uses of Nylon fibers.Structure and uses of Kevlar fibers.

UNIT :V

Polyester Fibers : Synthesis of Dimethyl Terephthalate (DMT) from p – xylene, terephthalic acid from benzoic acid (Henkel-II process) and synthesis of ethylene glycol.Chemical reactions of Poly Ethylene Terephthalate (PET) preparation. Properties and uses of Polyester fibers.

Reference:

1. Moses, J. Jeyakodi, and M. Ramasamy. "Quality Improvement on Jute and Jute Cotton Materials Using Enzyme Treatment and Natural Dyeing". *Man-Made Textiles in India*. Vol. 47, no. 7 (Jul. 2004): 252–255. (AN 14075527)
2. "cotton". The Columbia Encyclopedia, Sixth Edition. 2001-07.
3. Stephen Yafa (2004). *Cotton: The Biography of a Revolutionary Fiber*. Penguin (Non-Classics), 16. ISBN 0-14-303722-6 .
4. Kadolph, Sara J., ed.: *Textiles*, 10th edition, Pearson/Prentice-Hall, 2007, ISBN 0-13-118769-4
5. A.A.Vidya,. ed.:Production of Synthetic Fibers, Prentice-Hall of India, 1988, New-Delhi..

B.Sc. CHEMISTRY MAJOR STUDENTS ADMITTED FROM 2007-2008

DIPLOMA IN TEXTILE CHEMISTRY PAPER – II
(TECHNOLOGY OF DYEING OF NATURAL FIBRES)

Teaching hours : 30 Hours per semester (2 hours per week)

UNIT I :

Introduction to dyeing : Theory of Colour, chromophore, auxochrome, chromogen. Primary and Secondary colour. Chromatic and Achromatic Colours – Classification of dyes. Definition – Affinity, Substantivity, Exhaustion, % Shade, Adsorption, Diffusion, Aggregation, Migration – Effects of M:L ratio, salt, time and temp. of dyeing. Properties of direct dyes – Application of direct dyes of Cotton : Mechanism of dyeing. Stripping and Redyeing. After treatment with $CuSO_4$,$K_2Cr_2O_7$ and dye fixing agents.

UNIT II :

Reactive dyes – properties, Cold Brand, Hot Brand, Vinyl sulphone dyes, LS dyes, HE dyes, bifuctional dyes, Mechanism of dyeing. Exhaust dyeing, pad-batch, pad-steam, pad-cure, pad-silicate Methode. Stripping and redyeing.

UNIT III :

Naphthols and Fast Bases : properties, application – Diazotisation and coupling. Brief study on dissolution (classification of naphthols, cold and hot dissolution methods). Bases – direct and indirect method of diazotization. Application procedure of any one naphthols and base using Jigger and pad-dry-develop method. Stripping and Redyeing.

UNIT IV :

Types of Vat dyes. Details of vatting, dyeing, oxidation and soaping. Application procedure : Leuco vat, vat acid – pigment padding – pad steam process. Mertis and demerits of above methods. Dyeing of yarn with vat dyes by conventional method.

UNIT V :

Brief study – solubilised vat dyes – properties – advantages and disadvantages over vat dyes – application – exhaust dyeing method. Sulphur dyes – Properties of Sulphur dyes – application. Jigger and continuous dyeing defects. Bronziness and acid tendering – Stripping and redyeing. Use of hydros. Properties of basic dyes mordants used for cotton. Dyeing wool & silk with basic dyes. Eco-friendly sulphur dyeing. Acid dyes – Properties, classification of dyes – leveling acid dyes, milling acid dyes – supermilling acid dyes – application to wool and silk. Mechanism of dyeing – Dyeing of nylon with acid dyes.

Reference

1. Shenai V.A., Technology of Textile Processing Vol. 2, Chemistry of Dyes and Principle of Dyeing Ed. 3, 1983, Sevak Publication, 306, Sri Hanuman Industrial Estate, GC Ambedkar Road, Wadala, Bombay 400 031.
2. Shenai V.A., Technology of Textile Processing Vol. 1, Technology of Dyeing, 1980 and Sevak Publication, 306, Sri Hanuman Industrial Estate, GC Ambedkar Road, Wadala, Bombay 400 031.

3. Trotman E.R, Dyeing and Chemical Technology of Textile Fibre, Charles Griffin & Co, 42, Dhury lane, Londan WC2.
4. Chakravarthy RR and Trivedi S.S., Technology of Bleaching and Dyeing of Textile Fibre Vol 1, Part 1, 1979, Mahajan Book Publi shres, Supermarket Basement, Near Nataraj Cinema, Ashram Road, Ahmedabad 380 009.
5. Gokhle S.V. and Shah.R.C., Cotton Piece dyeing, 1981, Ahmedabad Textile Industrial Research Assn. (ATIRA), PO Polytechnic, Ahmedabad 380 015.
6. Storey (Joyce), Manual of Dyes and Fabrics, 1981, Thames and Hindson, Londan.
7. Srivastava SB, Recent Process of Textile Bleaching, Dyeing and Finishig, 1981, SB Srivastava, S B P Board Consultant, S B P Buildings, 4/45 Roopnagar, Delhi 110 007.
8. Prayag R.S., The bleaching and deying of Cotton material 1983, Weaver's Service Cent., 15A, Mamparamanand Marg, Near Roxy Cinema, Bombay 400 004.
9. Achwal, Dixit Joshi and Teli, Orientation Programme in Chemical processing for Senior Executives 1991, Textile Association (India), Bombay.
10. D.M. Lewis, Wool Dyeing, SDC Publications, UK.
11. J.K.Aspland, Textile Dyeing and Colouration, AATCC Publications, USA.
12. Mc Donald, Colour Physics for Industry, SDC Publications, UK.
13. Precsten, Cellulosic Dyeing, Dyer Company Publications Ltd., Londan.
14. Parish et. Al., Cellulosic Dyeing, SDC Publications, UK.
15. Wilfred Ingamells, Colour for Textiles, SDC Publications, UK.

DIPLOMA IN TEXTILE CHEMISTRY PAPER – III
(WATER & EFFLUENT TREATMENT AND POLLUTION CONTROL)

Teaching hours : 30 Hours per semester (2 hours per week)

UNIT I :

Impact of man on the Environment – an over view of Urbanization and Biodiversity. Environmental pollution – classification of pollution – Effect of industrial effluents – a detailed study of effluents discharged by Soap and detergent manufacture industry and Textile processing industry (study includes origin of effluent, important characteristic and general mode of treatment). Constituents of water and their effect on Textile wet processing – Water pollution – Harmful effects of water pollution and source of water pollution.

UNIT II :

WHO, ISO standards for raw water criteria – A general study on raw water pollution and consequence of River water pollution – Effluent discharge standards for inland surface water public sewers, on land for irrigation, marine coastal areas and drinking water parameters- Ageneral study on Boiler water requirements which includes problem caused by water and effect and feed water requirements for low and medium pressure voilers and at a pressure of 450 – 500 psi. Water softening – study includes Cation Exchenge softening, lime soda softening, softening by Sequestering agents and De-mineralization with schematic diagram of removal of carbon di oxide and silica.

UNIT III :

Removal of colour and turbitity (simple Coagulation, Flocculation and Filtration methods). General study on removal of Iron and Manganes by Aeration, setting and filtration method- Water analysis – colour, pH value, dissolved solids, suspended solids, total hartness

(Calcium + Magnessium). EDTA Titrimetric method, total iron- thiocyanate method, Determenation of Alkalinity by Titrimetric method – thiocyanate method, Determination of Alkalinity by Titrimetric method- Datermination of chlorides by silver nitrate method- Determination of dissolved oxygen by iodimetry – Determination of BOD,COD TDS and Toxicity.

UNIT IV :

Effect of effluents – General treatment procedure parameters to be determined at Sizing, Desizing, Kier boiling, Bleaching, Mercerizing, Dyeing, Printing, Combined effluent treatment of industrial of wastes- Brief study on Screening, Sedimentation, Equalisation, Neutralisation, Coagulation, Secondary treatment – Tricking filtration Activated sludge process, oxidation ponds, Anaerobic Digestin, Tertiary treatment- Evaporation (solar & steam). Reverse osmosis, ion exchange, chemical precipitation and removal by Algae and activated carbon treatment.

UNIT V :

Model schematic diagram for –Waste water treatment plant for textile mills-Primary & secondary units –Effects of air pollution –Effects of Sulphur oxide on human health – Ambient air quality standards- Noise pollution –ill effects of noise-Noise level in decibels. brief study on modern methods for pollution analysis like molecular luminescene, BOD incubator,iron chromatography and HPLC.

Reference

1. Environment Pollution control Engineering by C.S.Rao. New age International Ltd & Publishers.
2. Industrial safety & Pollution control Hand Book by National safety council and Associate Data Publisher Pvt Ltd.
3. Industrial Effluents by N.Manivasakam, Sakthi Publications, Coimbatore.
4. Water used in Textile Processing by N. Manivaskam, Sakthi Publications, Coimbatore.
5. I.S.O Hand Book.
6. Tamilnadu state publications and Hand book of pollution control –Central Board of pollution control.
7. Textile Effluents by Padma Varkar, NCUTE Publications, IIT,Delhi.
8. Environmental Chemistry and pollution Control, S.S.Dhara, S.Chand & Co., Delhi.
9. Pollution in Textile Industry, K.B.Krishnakumar, SSMITT Students Cooperative Stores, Komarapalayam.

DIPLOMA IN TEXTILE CHEMISTRY PAPER – IV
TEXTILE CHEMISTRY – PRACTICAL

Lab- hours : 30 Hours per semester (2 hours per week)

LIST OF EXPERIMENTS

1. Identification of textile fibres by burning test
2. Identification of textile fibres by solubility test
3. Estimation of pH- paper, digital pH meter, pH solution
4. Volumetric analysis of Sodium bi Sulphite
5. Volumetric analysis of Sodium Nitrite

6. Volumetric analysis of Sodium Hydro Sulphite
7. Volumetric analysis of Hydrogen Peroxide (permanganametry)
8. Volumetric analysis of Sodium Hypochlorite.
9. Estimation of available Chlorine in Sodium Hypochlorite.

PREPARATION OF DYES

1. Methyl Red
2. Malachite Green
3. Methyl Orange
4. Pare nitro benzene azo beta napthol
5. Azo Amino Benzene.

MODEL QUESTION PAPERS
(Core Chemistry paper I)

Time : Three hours **Maximum : 100 marks**

Answer All questions in each section

Section A (10x1=10 Marks)

Fill in the blanks

1. The coordination number of Caesium in Caesium Chloride is ……..
2. Water is…….solvent
3. The hybridization of carbon in methane is ……..
4. Predict the product the following reaction
   $H_3CCH = CH_2+HBr$…….
5. The E_2 reaction is …….molecular
6. Define lattice energy
7. What is an electrophile?
8. What is a free radical?
9. Write Markownikoff's rule
10. What are the orbitals involved in the hybridization in SP^3d^2

SECTION B (6x5=30 Marks)

11. (a) Explain the crystal structure of sodium chloride
    (or)
    (b) Explain the crystal structure of calcium chloride.

12. (a) Explain the Hybridization and geometry of XeF_4
    (or)
    (b) Explain the Hybridization and geometry of PCl_5
13. (a) Explain the hyper conjugation effect in organic molecule with an example.
    (or)
    (b) Explain Electrophiles, Nuclephiles with an example.
14. (a) State and explain Sayt Zeff's rule with an example.
    (or)
    (b) State and explain Hoffman's rule with an example.
15. (a) Explain polymerization with an example.
    (or)

(b)Explain Dickmann ring closure reaction with an example.

SECTION C (5x12=60 Marks)

16. (a) Explain the process of determination of lattice energy using Born Haber cycle with an example.

(or)

(b) State VSEPR theory and uses in the determination of geometry of molecules with two examples.

17. (a) Explain the following with examples
    1. Inductive effect
    2. Mesomeric effect
    3. Electromeric effect.

(or)

(b) Write briefly the polar reaction involving carbonium ions and carbanions.

18. (a) Write a short note on wittig reaction with an example.

(or)

(b) Write a note on the conformation of ethane.

19. (a) Discuss the following evidences of E2 elimination mechanism in the preparation of alkenes
    (i) Kinetic evidence
    (ii) lsotope effect
    (iii) Stereochemical effect.

(or)

(b) predict the product and mechanism of the following reactions

i) 1,3 – Butadiene + Ethene $\xrightarrow{\Delta}$

ii) 1,3 – Butadiene + HBr $\longrightarrow$

20. (a) write notes on the following:
    (i) Peroxide effect
    (ii) Steric effect
    (iii) Synthetic rubber

(or)

(b) Write a essay on the Free Radical addition polymerization?

(Core Chemistry paper II)

Time: Three hours **Maximum:100 marks**

ANSWER ALL QUESTIONS IN EACH SECTION

SECTION A (10X1=10 MARKS)

Fill in the blanks

1. Ozone is used in……..
2. ……. Is a Friedel craft catalyst
3. …….is an example of liquid crystal
4. The energy of a photon is ……..

5. O_2 molecules is paramagnetic because…….
6. Write the structure of hydrogen peroxide.
7. Define resonance energy.
8. What is the transition point in liquid crystals?
9. Define Heisenberg uncertainty principle?
10. Explain degenerate state in the energy of electron.

SECTION B (6x5=30 Marks)

11. (a) Discuss any three oxidizing property of hydrogen peroxide.

(or)

(b) Give the uses of Tellurium.

12. (a) Discuss the mechanism of Friedel craft acylation.

(or)

(b) Write short notes on hydroboration.

13. (a) Enumerate the differences between solids, liquids and gases.

(or)

(b) Write short notes on

(i) Coefficient of thermal expansion.

(ii) Compressibility factor in liquids and solids.

14. (a) Explain the theory of Photoelectric effects.

(or)

(b) Discuss the debroglie theory of wave particles duality.

15. (a) Give the significance of Ψ and Ψ^2

(or)

(b) Explain molecular orbital diagram for nitrogen molecules. Calculate the Bond order for it.

SECTION C (5x12=60 Marks)

16. (a) Explain the preparation and structure of hydrogen peroxide.

(or)

(b) Give the comparative study of hydroxides, oxides and halides of sulphur selenium and Tellurium

17. (a) (i) Discuss the inductive effect?

(ii) How does inductive effect affect the properties of organic compound?

(iii) What are the rules of reasonance?

(or)

(b) (i) Explain the reasons for the acidic nature of alkynes

(ii) Discus the mechanism of addition of water with HgSO4 Catalyst in alkynes.

18. (a) Discuss the classification and properties of liquid crystals.

(or)

(b) Write short notes on

(i) Surface Tension and

(ii) Viscosity of liquids.

19. (a) Write short notes on Black Body radiation

(or)

(b) (i) Planck's theory of quantization of energy

(ii) Compton effect.

20. (a) Derive Schrodinger wave equation for a particle in one dimensional box.
    (b) Discuss salient feature of
    (i) Valence Bond theory.
    (ii) Molecular orbital theory.

MODEL QUESTION PAPER
(Core Chemistry paper III)

Time: Three hours **Maximum:100 marks**

ANSWER ALL QUESTIONS IN EACH SECTION

SECTION - A (10X1=10 MARKS)

Fill in the blanks

1. The formula if chloropentammine Cobalt III ion is…….
2. NaBH4 is a good…….
3. Polymeri sation of styrene gives……
4. The heat change in chemical reaction at constant volume is ……..
5. The hear change accompanying the burning of one mole of carbon is called as……..
6. Give the IUPAC name of the complex $K_4[Fe(N)_6$
7. Write the structure of Di Borane.
8. State Huckels's Rule
9. State First Law of Thermo dynamics.
10. what is bond energy?

SECTION B (6x5=30 Marks)

11. (a)What are the postulates of werner's Co-ordination theory
    (or)
    (b) Explain Sidgwick concept of EAN with example.
12. (a) Give an Account of a ionization energy and metallic character of Boron Family
    (or)
    (b) Discuss the classification of silicates with example
13. (a) Discuss SN^i mechanism with example.
    (or)
    (b) Discuss the effect of solvent and structure of substrate on nucleophilic subshtution reaction.
14. (a) Derive the relation ship between Cp and Cv
    (or)
    (b) Discuss Joule Thomson's effect
15. (a) Write a note on Bomb calorimeter.
    (or)

    b) The heat of formation of methane at 298K as constant pressure is –17.890 K.Cals Calculate is heat of formation at Constant Volume.

SECTION C (5x12=60 Marks)

16. (a)Discuss with examples geometrical Isomerism present in square planar and Tetahedral complexes

(or)

(b) Explain with examples spin paired complexes and spin free complexes.

17. (a) Discuss the preparation, properties and structure of Borozole

(or)

(b) (Write notes on

(i) Sheet silicates (ii) Chain silicates

18. (a) Discuss SN^1 and SN^2 mechanism with example

(or)

(b) What are Grignard reagents? Explain three of their syntheric uses

19. (a) Derive Kirchoff's equation and explain how it may be used to calculate of values from heat capacity data.

(or)

(b) Derive an expression for the work done during issothermal adiabatic reversible processes of an ldealgas. In which case work done is maximum?

20. (a) calculate the bond energy of C=C from Lk1 following reaction.

$H_2C=CH_{2\,(g)}$, $+H_{2\,(g)}$, $\longrightarrow$ $CH_3\text{-}CH_3$ H=12.5 5KJ

The bond energies of C-C, C-H, H-H, are 347. 3, 414.2 and 435.1KJ $mole^{-1}$ respectively.

(or)

(b) Calculate the enthalphy of formation of ethane from the following data.

(i) C_O,$+O_{2\,(g)}$, $\longrightarrow$ $CO_{2\,(g)}$, H =-393.40KJ

(ii) $H_{2\,(g)}$, + ½ $O_{2\,(g)}$ $\longrightarrow$ $H_2O_{\,(l)}$, H—284.6KJ

(iii) $C_2H_{6\,(g)}$+ 3½O_2 $\longrightarrow$ $2CO_{2\,(g)}$, + $3H_20$ H, H=-1516.00KJ

MODEL QUESTION PAPER
(Core Chemistry paper IV)
(INORGANIC AND ORGANIC CHEMISTRY)

Time: 3 hours Max marks: 100

Section A **10X1=10**

Answer all questions

1. Germanium reacts with _____ to form germanates.
2. Thallium is present in the mineral _____
3. _____ is the important reagent used for the detection and determination of phosphates and arsenates.
4. When _____ is reduced with hydrogen at red heat a chemically inert bronze-like substance is formed.
5. In cannizzaro reaction the attacking species is _____
6. The base used in knoevanagel reaction is _____
7. The essential condition for the haloform reaction is the presence of _____ group.
8. The electron donor in clemmensen reduction is _____
9. The structure of enol form of acetoacetic ester is _____
10. Give the structures of cis and trans isomers of 2-butene.

Section – B **5X6=30**

Answer all questions choosing either 'a' or 'b'

11.a) How Ti is extracted from its ore?OR
b) Explain the extraction of Ge from its ore?
12.a) Explain the extraction and uses of Mo.OR
b) Give an account of the preparation, properties and uses of V_2O_5.

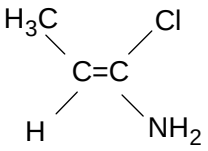
13. a) Write the mechanism of Crossed aldol condensation.OR
b) Explain the mechanism of Perkin reaction
14a) Write the mechanism of Reformatsky reaction. OR
b) Explain MPV reduction
15a) Explain the tautomerism of acetoacetic ester OR
b) Write a note on E and Z isomerism with an example.

Section C **5X12=60**

Answer all questions choosing either 'a' or 'b'

16a) Give the preparation and properties of $TiCl_4$ and TiO_2OR
b) i) How is Tin extracted from its ore.
ii) Give the preparation of $SnCl_2$ and its reactions with (1) $HgCl_2$ and (2) acidified $KMnO_4$.
17a) Explain the extraction and uses of W OR
b) i) Describe the preparation and properties of $ZrOCl_2$ and WO_2
ii) Write a note on tungsten bronze and molybdenum blue.
18a) Discuss the nucleophilic addition reactions of Grignard reagents to different carbonyl compounds. OR
b) i) Explain in detail the reaction of ammonia with (1) formaldehyde
(2) acetone (3) acetaldehyde
ii) Give the mechanism of Claisen – Schmidt reaction.
19a) Explain the mechanism of i) Wittig reaction and
ii) benzoin condensation OR
b) i) Discuss the reducing properties of carbonyl compounds.
ii) Explain the mechanism of MPV reduction.
20a) Discuss the preparation and synthetic applications of cyanoacetic ester. OR
b) i) How will your distinguish cis-trans isomers?
ii) Classify the following as E and Z isomers.

1)



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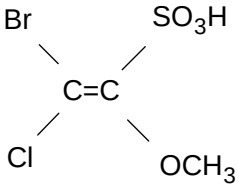

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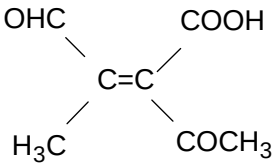

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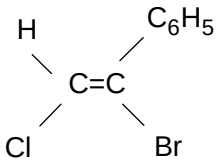


B.Sc. CORE CHEMISTRY PAPER V.
COMPUTER APPLICATIONS IN CHEMISTRY AND PHYSICAL CHEMISTRY

Time: Three hours Maximum: 100 marks

Answer ALL the questions.

Section-A (10 x 1= 10 marks)

1. What do you mean by RAM?
2. Write one use of OCR
3. The storage range of unsigned character is -------.
4. Print f( ) is an output function present in the standard library header file-------.
5. The expression for the rate constant of a first order reaction is ----------.
6. -------- function gets a character from the keyboard and so directs the program to wait for a key press.
7. Define entropy.
8. State Trouten's rule.
9. The function A is termed as the --------.
10. The sign of ΔG for a spontaneous reaction is --------.

Section –B (5 x 6 = 30 marks)

11. a) Draw the block diagram of a computer. (or)
    b) Write a note on Read Only Memory.

12. a) Explain the hierarchy of operators in C language. (or)
    b) Write a note on key words in C language.

13. a) Write a C program to compute the order of a reaction. (or)
    b) Write a C program to compute the half-life period of a first order reaction.

14.a) Calculate the entropy change in the evaporation of 1 mole of water at 100 ^{0}C.Latent heat of evaporation of 1 mole of water is 9650 cal/mol.

(or)

b)One mole of an ideal monoatomic gas expands reversibly from a temperature of 25 ^{0}C and a pressure of 1 atm to a temperature of 0 ^{0}C and a pressure of 500 mm Hg.Calculate ΔS for the process($C_V = 3/2$ R).

15 a) Derive the Gibbs –Helmholtz equation.

(or)

b) State and explain the third law of thermodynamics.

Section –C(5 x 12 = 60 marks)

16 a) Explain in detail the fixed head system and the movable head system of a hard disk.

(or)

b) i.Explain the symbols used in flow charts.

ii.Write any five advantages of flow charts.

17 a) Discuss the different types of constants used in a C program.
(or)
b) Write notes on the following: i.Data types in C language.
ii.Increment and decrement operatorsn in C language.
18 a) Write a C program to calculate the P^H of a solution using Henderson equation
(or)
b) Write a C program to calculate the energy of activation of a reaction.

19.a)i. Explain Carnot theorem.
ii.Calculate ΔS accompanying the isothermal expansion of 5 moles of an ideal gas at 330K until its volume has increased six times.
(or)
b)i. Discuss the effect of pressure and temperature on entropy.
ii.Calculate ΔS when 4 moles of hydrogen and 1 mole of oxygen are mixed together at 300 K and 1 atmosphere pressure.

20. a)i. Derive the Van't Hoff isotherm equation.
ii.Show that $(dA)_{V,T} \leq 0$ for the reversible and irreversible processes, respectively.
(or)
b) i)Explain the effect of temperature and pressure on Gibbs free energy.
ii)Using the third law of thermodynamics show that
$Lt_{T\to 0} \left(\partial P/\partial T\right)_V = 0$.

MODEL QUESTION PAPER

(Core Chemistry paper VI)

Time: Three hours **Maximum:100 marks**

ANSWER ALL QUESTIONS IN EACH SECTION

SECTION A (10X1=10 MARKS)

Fill in the blanks

1. The unwanted impurities present in the ore is called……
2. Phenol on treatment with sulphuric acid at 100^0C gives the product……..
3. NN^1 Dimethyl aniline is……amine
4. Reduced phase rule is ……
5. Colligative properties depend on ……
6. Explain the term "Concentration of the ore"
7. Give an example for dihydric phenol
8. What is the structure of Diazomethane
9. How many eutectic points are present in Bi-Cd – phase Diagram
10. State Raoults Law

SECTION B (5X6=30)

11. a) Write a short note on Froth Floatation process

(or)

b) Write a short note on Electro magnetic concentration of the ore

12. a) Explain the mechanism of Riemen Tiemann reaction

(or)

b) Explain the mechanism of nitration of phenol.

13. a) How is Diagomethane prepared? Explain its structure

(or)

b) Explain diazotization and coupling reactions of aromatic amines.

14. a) Explain the phase Diagram of Carbon dioxide system.

(or)

b) Derive Gibb's phase rule

15. a) (i) What are ideal and non ideal solutions?

(ii) Discuss the reasons for deviation from ideal behavior

(or)

b) State and explain Henry's Law
What are its limitations.

SECTION B (5X12=60)

16. a) Explain the terms : mineral, ore, roasting, gravity separation, manetic separation

(or)

b) Write a note on the following

(i) Van Arkel refining
(ii) Zone, refining
(iii) Electorlytic refining

17. (a) Explain the following reaction

(i) Kolbe reaction
(ii) Gattermann Reaction
(iii) Reimer Tiemann reaction

(or)

(b) Compare the acidity of phenols with aliphatic alcohols and carboxylic acids.

18. (a) Explain any four synthetic applications of Diaz0 acetic ester.

(or)

(b) What are primary, secondary and tertiary amines? How are they separated from a mixture.

19. (a) Derive the clausius – claperon equation.

(or)

(b) Explain the phase Diagram of Zn-Mg. diagram with a neat sketeh.

20. (a) Calculate the osmatic pressure of 5% solution of sucrose in water at 300k.

(or)

(b) 0.001 Kg of a solute dissolved in 0.1 Kg of water gave depresson of freezing point 0.2K. Calculate the molecular mass of the solute.

(Core Chemistry paper VII)

(Inorganic chemistry)

Time: Three hours **Maximum:100 marks**

ANSWER ALL QUESTIONS IN EACH SECTION

SECTION A (10X1=10 MARKS)

Fill in the blanks

1. Barium is estimated gravimetrically form its solution by precipitating it as ……by adding potassium chromate solution.
2. Enriched uranium is …….
3. Atoms having same mass numbers but differ from atomic number is known as ……
4. The Basicity of phosphoric acid is ……
5. Ammonia is a ……. Solvent.
6. Explain the term digestion ……..
7. Name the place of atomic energy project in Tamil Nadu.
8. Define as isotope.
9. What is Lewis acid?
10. Give an example non-protonic solvent.

SECTION B (5X6=30)

11. (a) Explain the term post precipitation.
    (or)
    (b) Explain the Co-precipitation.
12. (a) Explain the principle of working nuclear Reactor.
    (or)
    (b) Explain the terms with example:
    Nuclear fission and nuclear fusion.
13. (a) Write a note on "magic Numbers".
    (or)
    (b) What is nuclear binding energy? How is it related to nuclear stability?

14. (a) What are limitations of hard and soft acid and base concept?
    (or)
    (b) Explain the role of π bonding in Hard and soft Acids.
15. (a) What are Ionising and non-lonising solvents?
    Give two example for each.
    (or)
    (b) What are the advantages of using liquid Ammonia as solvent.

SECTION C (5X12=60)

16. (a) What an essay on the principles of gravimetric analysis
    (or)
    (b) Write a note on the factors influencing the precipitation and solubility in gravimetric Analysts.

17. (a) Give a brief account of Artificial radioactivity.

(or)

(b) Write a note on

(i) Disposal of reactor wastes

(ii) Radio active pollution

18. (a)Discuss the methods of separation of isotopes by various methods.

(or)

(b) Write a note on Radio Active disintegration series.

19. (a) Explain hardness and softness on the bases of electronegativity

(or)

(b) Write a note on solvolytic reactions

20. (a) Discuss the properties of liquid sulphur dioxide as a solvent

(or)

(b) Discuss the typical reaction of liquid Hydrogen fluoride acts as a solvent

MODEL QUESTION PAPER

(Core Chemistry paper VIII)

(Organic Chemistry)

Time: Three hours **Maximum:100 marks**

ANSWER ALL QUESTIONS IN EACH SECTION

SECTION A (10X1=10 MARKS)

Fill in the blanks

1. Optical activity of mesotartaric acid is due to the presence of ……..
2. An oxide becomes amide in …….rearrangement
3. Glucose and mannose pair is termed as……
4. Protein on complete hydrolysis gives ……..
5. Pyridine on treatment with NaNH2 gives……pyridine
6. Define an asymmetric carbon.
7. What is the starting compound for curtius rearrangement.
8. Give an example for Disaccharide.
9. What is zwitter ion?
10. Write the structure of pyridine?

SECTION B (5X6=30 MARKS)

11. (a) With illustration define the following terms?
    (i) Enantiomer (ii)Diastereomer

    (or)

    (b) What is meant by asymmetric synthesis?
    Explain-with-example
12. (a) Explain the mechanism of Schmidt rearrangement

    (or)

    (b) Explain the mechanism of Beck mann rearrangement

13. (a) Explain Mutarotation with mechanism ?

(or)

(b) Deduce the structure of glucose

14. (a) Explain the classification of proteins based on their functions?

(or)

(b) Give the product obtained when alainine treated with

(1) Barium hydroxide (2) Nitrous Acid (3) Hydrochloric acid

15. (a) Pryridine shows aromatic character-Explain this fact with molecular orbital picture?

(or)

(b) Give the synthesis of iso quinoline?

SECTION -C (5X12=60 MARKS)

16. (a) Define the terms Recemization and Resolution and give one method for each process

(or)

(b) (i) With illustrations explain assymmetric synthesis

(iii) Discuss the optical activity – exhibited by Allenes

17. (a) Write short note on

(i) Hoffmann rearangement (ii) Curtius Rearrangement

(or)

(b) Explain the mechanism in

(i) Cope rearrangement (ii) Claisen rearrangement

18. (a) compare and contrast the structure and function of starch and cellulose

(or)

(b) Effect the following conversions

(i) Ketose $\longrightarrow$ Aldose

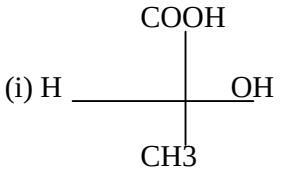
(ii) Aldo hexose $\longrightarrow$ Aldo pentose.

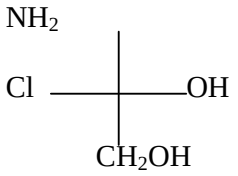
19. (a) Discuss the general properties of proteins

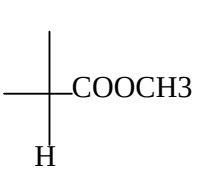
(or)

(b) Write down the synthesis of Istain and Indigo

20. (a) Assign R.S Configuration for the following

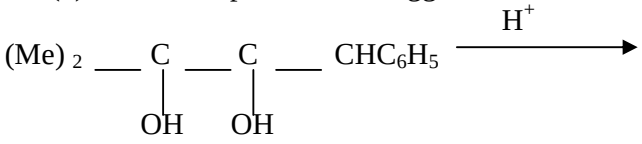
(i) 

(ii) 

(iii) 

(or)

(b) Predict the product and suggest the mechanism



MODEL QUESTION PAPER

(Core Chemistry paper IX)

(Electro Chemistry)

Time: Three hours **Maximum: 100 marks**

ANSWER ALL QUESTIONS IN EACH SECTION

SECTION A (10X1=10 MARKS)

Fill in the blanks

1. The specific conductance of electrolyte on dilution ……
2. The P^H of o.ooIN sodium Hydroxide solution is……..
3. The relation between and EMF of a cell and the frequency change of cell reaction is …….
4. The value of liquid junction potential maybe…….
5. The reduction potential of Hydrogen electrode at 25^0C is……...
6. Define the term specific conductance
7. Define p^H
8. What is the oxidation potential of standard hydrogen electrode?
9. Give an example of Redox indicator?
10. What is the voltage of lead storage cell?

SECTION B (5X6=30 MARKS)

11.(a) What is the principle of conductomotric titration?

(i) Draw and explain The conductomotric titration Curve of

(HCL + CH_3 COOH) X NaoH

(or)

(b) Explain to any two Applications of Kohlrausch Law.

12. (a) Explain the application of solubility product principle in qualitative analysis?

(or)

(b) How is dissocation constant of weak base determined by conductance measurements?

13. (a) Derive Nerst equation . Mention is application

(or)

(b) What is Weston cadmium cell? How is it useful in the determination of EMF of a given Cell.

14. (a) Describe the potentiometric titration of HClx NaoH

(or)

(b) Derive an expression for EMF of a concentration cell without transference

15. (a) Explain the working of nickel cadmum cell

(or)

(b) Write a short note on Decomposition voltage and over voltage.

SECTION C (5X12=60 MARKS)

16. (a) (i) Give a datailed account of Debye – Huckel onsagar theory How it is verified?
    (ii) Write a note on Debye- Falken hagen effect.
    (or)
    (b) Sketch and explain conductometric titration curve for HClxNaoH
17. (a) (i)How is the solubility product of sparingly solubility salt is determined by EMF measurements?
    (ii) Give an account of Redox indicators?
    (iii) Give an account of Redox indicators?
    (or)
    (b) (i) Derive Henderson equation
    (ii) Explain the role of common ion effect in qualitative analysis
18. (a) Write an essay an various types of electrods.
    (or)
    (b) (i) Derive the Nernst equation .
    (ii) Give an account of electrodes chemical series
    What is its significance?
19. (a) How is the p^H of a solution is determined by using a hydrogen gass electrode and Quin-hydrone electrode?
    (b) (i)What is liquid function potenrial ?
    (ii) Derive an expression for EMF of a concentration cell with transference.
20. (a) (i) The lonic conductance of Na^+ and cl $^-$Ion at infinite dilution are 50.11.5 $cm^2\ eq^{-1}$ and 76.325 $cm^2\ eq^{-1}$ respechvely. Calculate the transportnumbers of Na^+ and cl

(ii) the transport number of Ag+ ion in $AgNO_3$ at 0482 the equivalence conductance of $AgNO_3$ solution a^2 infinite dilution is 120 s $cm^2\ eq^{-1}$ Calculate the lonic mobility of NO_3^{-1} ion.

(or)

(b) (i) A solution containing 0.05M Benzoic acid and 0.1M sodium Benzoate has apH 4.5. Find the dissolution constant of benzoic acid
(iii) The emt of the cell

Sn | sn^{2r} | | pb^{2+} |Pb

A2 25^0C is 0.014 volt. Calculate the equilibrium constant of the cell reaction at 25^0C

MODEL QUESTION PAPER
(Core Chemistry paper X)
(Spectroscopy and natural product)

Time: Three hours **Maximum:100 marks**

ANSWER ALL QUESTIONS IN EACH SECTION

SECTION A (10X1=10 MARKS)

Fill in the blanks

1. The radiation of wave length 250nm lies on the ……..region.
2. Raman spectra may be obtained in region of ……..
3. Geraniol and Nerol are……..isomers
4. All alkaloid are……in nature
5. The antimalarial drug is…….
6. Give the selection rule for rotational spectra
7. What is the source of Raman spectra?
8. Write the structure of Ascorbic Acid
9. Define an alkaloid
10. What are sulpha drugs?

SECTION B (5X6=30 MARKS)

11. (a) Describe the changes induced by the electromagnetic radiation in the matter

(or)

(b) Explain the various types vibration of carbon dioxide and water.

12. (a) Discuss the theory of Raman Spectroscopy

(or)

(b)Write short note on Frank conden principle and predissociation.

13. (a) What are terpenes? State isoprene rules and classify terpenes.

(or)

(b) Discuss the importance of vitamins in human health and their difficiency diseases

14. (a) What are allkaloids? Explain their classification with examples?

(or)

(b) Write the synthesis of conine.

15. (a) Write a note of on antimalatrial drug.

(or)

(b) Write a short note on LD50, ED50 and therapcuhc index.

SECTION C (5X12=60 MARKS)

16. (a) Explain the method of determination of bond length in a diatomic molecule using rotational specterscopy.

(or)

(b) Discuss the application of IR spectra's copy.

17. (a) Discuss the principle and Applications of UV spectros copy

(or)

(b)Discuss the principles of NMR spectroscopy

18. (a) (i) How is dipentene prepared?

(ii) How geraniol is convered into &- terpineol

(or)

(b) Write the synthesis of thiamine

19. (a) Discuss the structure elucidation of coniine

(or)

(b) Write the steps involved in Hoff mannexhaustive methylation and mention its uses.

20. (a) The rotation spectrum of HF has lines 41.9 cm^{-1} apart. Calculate the moment of inertia and bond length in HF

(or)

(b) Write a detailed account of supha drugs and their applications.

MODEL QUESTION PAPER

(Core Chemistry paper XI)

(Physical Properties and Chemical Kinetics)

Time: Three hours **Maximum:100 marks**

ANSWER ALL QUESTIONS IN EACH SECTION

SECTION A (10X1=10 MARKS)

Fill in the blanks

1. The unit of dipole moment is ……
2. The unit of molar magnehc susceptibility is ……..
3. The thermal dissociation of N2O5 belongs to ……order kinetics
4. "Inversion of cane sugar" reaction can be studiedby……
5. Plank constant is equal to……..
6. Define Dipole moment ……..
7. What is pramagetism ……..
8. Give an example for first order reaction…….
9. Name the method in which rate is determined by the method change in pressure.
10. What is the quauturm yield of photo chemical reaction.

SECTION B (5X6=30 MARKS)

11. (a) How dipolemoment is determined ?

(or)

(b) Explain the terms: (i) Molar Polarization

(ii) Orientation Polarization

12. (a) Distinguish between paramagnetisim , diamagnetiom and ferrmognetism.

(or)

(b) How magnetic susceptibility is determined by Gouy method

13. (a) Discuss the differenses between order and molecularity of a reaction.

(or)

(b) Write the differential equation for I, II, III and zero order reaction.

14. (a) How polarimety is useful in the study of kinetic of a reaction?

(or)

(b) How calarimotry is useful to follow the kinetic of a reaction?

15. (a) Write short note on photosensitation and chemiluminescence

(or)

(b) State the law of photochemical equivalence and quantum yield of photochemical reaction.

SECTION C (5X12=60 MARKS)

16. (a) Write an essay on the application of Dipolomoment in the elucidation of structure of molecules?

(or)

(b) Distinguish between
(1) orientation polarization and distortion polarization.
(2) O, P, M isomer by dipola moment value?

17. (a) Discuss how magnetic susceptibility measurments are usefull in determining the structure of molecules

(or)

(b) Discuss the photo chemical kineties of H_2/Br2 reaction?

18. (a) Explain the lindemann's theory of unimolecular reaction in detail.

(or)

(b) Explain the Absolute reaction rate theory of unimolecular reaction?

19. (a) How will you determine the order of a reaction by
(1) Diffe rential method
(2) Time for half life method

(or)

(b) What is Quantum yield? Explain the method to determine the Quantum yield of a photochemical reaction?

20. (a) Ethyl Acetate was subjected to hydrolysis in one normal HCl at 298^0C 5ml of the mixture were withdroalwn and titrated against standard NaOH solution at different intervals with the following reruiler

Time in mines	0	20	75	125	x
volume of NaOH (am3)		20.25	21.70	29.65	30.20	43.9r

Show that the reaction is first order and evaluate a average value of reaction rate

(b) (i) The wave number of a certain electro magnetic radiation 3000 $^{cm-1}$. Calculate (1) frequency (2) energy in joules and coloriesper quantitum

(ii) A certain system absorbs $3x10^{16}$ quanta of light per second on irradiation for 10 minutes 0.002 moles of reactants was found to have reacted calculate the Quantium yield of the process.

DIPLOMA IN TEXTILE CHEMISTRY PAPER – I
(CHEMISTRY OF NATURAL AND SYNTHETHIC FIBERS)
MODEL QUESTION PAPER

TIME: 3Hrs. Answer ALL Questions Maximum Marks: 100

SECTION – A (1 X 10 = 10 Marks)

1. Animal fiber generally compose of ---------
2. Glucose is the main linking unit in ------- fibers.
3. Regenerated cellulose is also called as --------.
4. Repeat unit of viscose fiber is ---------.
5. --------- synthetic fiber is called as synthetic wool.
6. An example of a monomer is ---------.

7. Structure of Kevlar fiber is --------.
8. The catalyst used in the preparation of adipic acid from cyclohexane is ------.
9. An ester link is represented as ----------.
10. Structure of Dimethyl Terephthalate is represented as -------.

SECTION – B (6X 5 = 30 Marks)

11.a) Bring out the difference between Animal and Protein fibers. (OR)
b) Write a note of Jute fibers and its cultivation.

12. a) With a flow chart discuss about wet spinning of viscose filaments. (OR)
b) Write a note on the properties and uses of Viscose fibers.

13. a) With an example explain the steps involved in addition polymerization reaction.
(OR)
b) Explain the process of synthesis of acrylonitrile through Sohio Process.

14. a)Write the difference in structures between Nylon 6 and Nylon 6,6. (OR)
b) How hexamethylene diamine is prepared from adiponitrile?

15.a) Explain the properties and uses of Polyester fibers. (OR)
b) How terephthalic acid is prepared from benzoic acid?

SECTION – C (5X 12 = 60 Marks)

16. a) Write the structure,properties and uses of cotton fibers. (OR)
b) Write the structure, properties and uses of wool and silk fibers.

17. a) Explain with a flow chart the production of viscose fibre. (OR)
b) Explain the chemical reactions involved in the production of regenerated cellulose.

18.a) With equations explain the production of poly (acrylonitrile). (OR)
b) Explain the properties and uses of acrylonitrile fibers.

19. a)Explain the synthesis of caprolactum and further reaction leading to Nylon 6. (OR)
b) How Nylon 6,6 is produced industrially?

20. a) Explain the industrial preparation of Poly Ethylene Terephthalate (OR)
b) Discuss the properties and uses of polyester fibers.