PERIYAR UNIVERSITY

SALEM – 11.

B.Sc., DEGREE

BRANCH IV-CHEMISTRY

(Semester Pattern)

REGULATIONS AND SYLLABUS

(Under Choice Based Credit System)
CBCS

FOR

Students admitted during

2008-2009 and onwards

CONTENTS

NON-MAJOR ELECTIVE COURSES

B.Sc. DEGREE

BRANCH IV-CHEMISTRY

REGULATIONS

1. Preamble and objectives of the Course :

Chemistry is central to the current revolutions in Science. No educated person today can understand the modern world without a basic knowledge of Chemistry. The existence of a large number of chemical factories ,mines and related industries in the catchments of the University necessiates Chemistry education.

The major objectives of B.Sc. Chemistry course are

1. To impart knowledge in fundamental aspects of all branches of Chemistry.
2. To acquire basic knowledge in the specialized areas like Polymer Chemistry, Environmental Chemistry, Dye Chemistry, Pharmaceutical Chemistry etc.
3. To create manpower in Chemical industries and help their growth.
4. To prepare candidates for a career in Chemical industries.

2. Condition for Admission

A candidate who has passed the Higher Secondary Examination of Tamilnadu Higher Secondary Board or an examination of some other board accepted by the syndicate as equivalent there to with Chemistry and Physics and any one of the following subjects namely Maths, Botany, Zoology or Biology shall be eligible for admission into B.Sc., course in Chemistry.

3. Duration of the Course:

The course for the degree of Bachelor of Science shall consist of three academic years divided into six semesters.

4. Course of study:

The course of study for the B.Sc. Degree in the BranchIV-Chemistry shall comprise of the following subjects according to the syllabus and books prescribed from time to time.

i) Foundation Courses (Languages and English)

ii) Core Courses: (Major and Allied and skilled based elective course and non major elective course subjects)

Major : Chemistry

Allied I- Physics (Compulsory)

Allied II- Mathematics or Botany or Zoology

The two allied subjects may be chosen by the respective colleges and the same must be communicated to the University.

Non major elective course subjects may be chosen by the respective colleges and the same must be communicated to the University.

The college may also choose the allied subject of their choice in the first and second year.

I- SEMESTER:

1. Language -Paper I
2. English - Paper I
3. Major Core -Paper I
4. Major practical –I
5. Allied I - Paper I
6. Allied –I Practical
7. Environmental studies
8. Value Education

II-SEMESTER

9. Language – Paper II
10. English - Paper II
11. Major Core -Paper II
12. Allied I - Paper II
13. Major- practical –I
14. Allied –I Practical
15. Environmental studies
16. Skilled based Elective Course I

III-SEMESTER

17. Language – Paper III
18. English- Paper III
19. Major Core -Paper III
20. Major- Practical II
21. Allied II - Paper I
22. Allied II-Practical
23. Skilled Based Elective course II
24. Non Major Elective course I

IV-SEMESTER

25. Language – Paper IV
26. English – Paper IV
27. Major Core -Paper IV
28. Allied II-Paper II
29. Major- Practical II
30. Allied II-Practical
31. Skilled Based Elective course II
32. Non Major Elective course II

V-SEMESTER

33. Major Core Paper -V
34. Major Core Paper -VI
35. Elective Paper -I
36. Elective Paper -II
37. Skilled Based Elective course III
38. Skilled Based Elective course IV
39. Major practical-III
40. Major practical- IV.

VI-SEMESTER

41. Major Core Paper- VII
42. Major Core Paper -VIII
43. Major Core Paper -IX
44. Elective Paper -III
45. Skilled Based Elective course V

46. Skilled Based Elective course VI

47. Major Practicals – III

48. Major Practicals –IV

5. Examinations

There shall be six examinations- two in the first year, two in the second year and two in the third year. Candidates failing in any subject / subjects will be permitted to appear for such failed subject / subjects at subsequent examinations.

The Syllabus has been divided into six semesters. Examinations for I, III and V semesters will be held in November/ December and for II, IV and VI semesters will be held in April / May.

The practical examination I will be held at the end of I year. II will be held at the end of II year. III and IV will be held at the end of III year.

6. Passing Minimum

A candidate shall be declared to have passed the examination if he /she secures not less than 40% of the marks in each paper / practical. Candidates who do not secure the required minimum marks for a pass in a paper / practical shall be required to appear for and pass the same at a subsequent appearance. For practical,the minimum for a pass includes the record notebook marks also. There is no passing minimum for the record notebook. However submission of a record notebook is a must.

7. Classification of Successful Candidates

Candidates who secure not less than 60% of the aggregate marks in the whole examination shall be declared to have passed the examination in **First Class.**

All other successful candidates shall be declared to have passed in the **Second Class.**

Candidates who obtain 75% of the marks in the aggregate shall be declared to have passed the examination in **First Class with**

Distinction provided they pass all the examinations prescribed for the course at the first appearance.

8. Ranking

Candidates who pass all the examinations prescribed for the course in the first instance and within a period of three academic years from the year of admission to the course only are eligible for **University Ranking.**

9. Maximum Duration for the completion of the UG Programme:

The maximum duration for completion of the UG Programme shall not exceed twelve semesters.

10. Commencement of this Regulation:

These regulations shall take effect from the academic year 2008 –2009, i.e. for students who are to be admitted to the first year of the course during the academic year 2008-2009 and thereafter.

11. Transitory Provision

Candidates who were admitted to the UG course of study before 2006–2007 shall be permitted to appear for the examinations under those regulations for a period of three years i.e. up to and inclusive of the Examination of April/May 2013. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

12. Pattern of Question Paper (For Both Major & Allied)

Time : 3 Hours Maximum.-75 Marks

Part A : 10x 2 =20

(Answer all questions)

(Two questions from each unit)

Part B : 5 x 5 = 25

(Answer all questions)

(One question from each unit with internal choice)

Part C : 3 x 10 = 30

(One question from each unit-

any three Questions out of five)

B.Sc.Chemistry Major(CBCS)
For students admitted from 2008-2009 onwards

PART	COURSE	No of Hours per week	Exam Hours	Credit	Marks		
					Internal	External	Total
I SEMESTER							
I	Tamil or Other Language	6	3	3	25	75	100
II	English	6	3	3	25	75	100
III	Core Chemistry Major	5	3	5	25	75	100
III	Core Chem Major Practical	3	-	-	-	-	-
III	Allied I Maths (or)	7	3	5	25	75	100
III	Allied I Botany (or) Zoology or physics	4	3	3	25	75	100
III	Allied I Botany (or) Zoology or physics Practical	3	-	-	-	-	-
IV	Value Education	2	3	2	25	75	100
IV	Environmental studies	1	-	-	-	-	-
II SEMESTER							
I	Tamil or Other Language	6	3	3	25	75	100
II	English	6	3	3	25	75	100
III	Core Chemistry Major	5	3	5	25	75	100
III	Core Chemistry Major Practical	3	3	4	40	60	100
III	Allied I Maths (or)	6	3	5	25	75	100
III	Allied I Botany (or) Zoology or physics	4	3	3	25	75	100
III	Allied I Botany (or) Zoology or physics Practical	3	3	4	40	60	100
IV	Environmental studies	1	3	2	25	75	100
IV	Skill Based Elective course I (SBEC I)	2	3	2	25	75	100

Total Credit for I & II Semester = 42 credits

B.Sc.Chemistry Major(CBCS)
For students admitted from 2008-2009 onwards

PART	COURSE	No of Hours per week	Exam Hours	Credit	Marks		
					Internal	External	Total
III SEMESTER							
I	Tamil or Other Language	6	3	3	25	75	100
II	English	6	3	3	25	75	100
III	Core Chem Major	5	3	5	25	75	100
III	Core Chem Major Practical	3	-	-	-	-	-
III	Allied II Mathematics (or)	7	3	5	25	75	100
III	Allied II Physics or Bot or Zoology	4	3	3	25	75	100
III	Allied II Phy or Botany or Zoology Practical	3	-	-	-	-	-
IV	SBEC II	1	-	-	-	-	-
IV	Non Major Elective Course	2	3	2	25	75	100
IV SEMESTER							
I	Tamil or Other Language	6	3	3	25	75	100
II	English	6	3	3	25	75	100
III	Core ChemMajor	5	3	5	25	75	100
III	Core Chem Major Practical	3	3	4	40	60	100
III	Allied II Maths (or)	7	3	5	25	75	100
III	Allied II Physics or Bot or zoology	3	3	3	25	75	100
III	Allied II Phy or Bot or Zoology Practical	3	3	4	40	60	100
IV	SBEC II	1	3	2	25	75	100
IV	Non Major Elective Course	2	3	2	25	75	100

Total Credits for III & IV Semesters = 42 Credits

PART	COURSE	No of Hours per week	Exam Hours	Credit	Marks		
					Internal	External	Total
V SEMESTER							
III	Core Chem major(inorganic chemistry)	4	3	4	25	75	100
III	Core Chem major(organic chemistry)	4	3	4	25	75	100
III	Elective paper (Physical Chemistry)	5	3	5	25	75	100
III	Elective paper (Analytical Chemistry	5	3	5	25	75	100
III	Core Chem Major Prac (physical)	3	-	-	-	-	-
III	Core Chem Major Prac (organic & Gravimetric)	5	-	-	-	-	-
IV	SBEC III	2	3	2	25	75	100
IV	SBEC IV	2	3	2	25	75	100

Total credits for V semester = 22 credits

VI SEMESTER							
III	Core Chem major(inorganic chemistry)	4	3	4	25	75	100
III	Core Chem major(organic chemistry)	4	3	4	25	75	100
III	Core Chem major (Physical Chemistry)	4	3	4	25	75	100
III	Elective paper Pharmaceuti-cal chemistry)	5	3	5	25	75	100
III	Core Chem Major Practical(phys-ical)	3	3	4	40	60	100
III	Core Chem Major Practical (organic & Gravimetric)	6	6	8	40	60	100
IV	SBEC V (SpectroscopyI)	2	3	2	25	75	100
IV	SBEC VI (SpectroscopyII)	2	3	2	25	75	100
V	External activities			1			

Total Credits for VI Semester = 34 Credits

Total Credits for 3 years = 140 Credits

B.Sc.CHEMISTRY-FIRST SEMESTER

Major Core Paper –I

Paper Code : 08UCH01

Internal assessment marks: 25 External Marks :75

GENERAL CHEMISTRY – I (75 Hours)

UNIT-I Atomic Structure

1.1.Fundamental particles of matter – their composition – Comparison between Rutherford's model of atom and Bohr's model-Outline of the Bohr-Sommerfeld model-its limitations - de Broglie theory-Heisenberg's uncertainty principle- Quantum numbers.

Wave mechanical concept of atom – Schrodinger's wave equation (derivation not needed)-significance of $\Psi$and Ψ^2 – Eigen functions and Eigen values-shapes of different orbitals – Differences between an orbit and orbital.

UNIT- II Electronic structure

2.1. Pauli's Exclusion principle and its application-Hund's rule-its basis and applications - stability of half-filled and fully - filled orbitals-Aufbau principle and its limitations.

2.2. Periodic properties: Atomic and ionic radii, Ionization Energy, Electron affinity and Electro negativity – Definition, Variation of the periodic properties along periods and groups-theoretical explanation for the variations.

2.3. s, p, d and f block elements-classification and characteristic properties.

UNIT - III Structure and Bonding

3.1.Electron displacement effects :

3.1.1. Inductive, inductomeric and steric effects-their effect on properties of compounds

3.1.2.Mesomeric, resonance, hyperconjugation-localised and delocalised chemical bond

3.2.Intermolecular interactions-Dipole-Dipole interaction, vander Waals forces, hydrogen bond and its types-effect of intermolecular forces on physical properties-melting point, boiling point and solubility.

3.3 . Reaction mechanism I

3.3.1.Reactive intermediates -carbocations, carbanions, free radicals, with examples.

UNIT – IV The Gaseous State

4.1. Behaviour of ideal gases.

Kinetic molecular theory of gases-the kinetic gas equation-Derivation of the gas laws-kinetic theory and temperature-Boltzmann constant-Maxwell's distribution of molecular velocities-types of molecular velocities-Expansivity and compressibility-collision diameter-collision frequency-mean free path

4.2. Behaviour of Real gases

Deviations from ideal behaviour- -Explanation of deviations - Boyle point. The virial equation of state-derivation of the principle of corresponding states.

UNIT – V Qualitative and Volumetric Analysis

5.1. Principles of Qualitative analysis: Basic principles of Inorganic semi micro analysis-semi micro techniques-principles involved in Na_2CO_3 extract preparation-common ion effect and solubility product and their applications in qualitative analysis.

5.2. Principles of Volumetric analysis- Definition of molarity, molality, normality and mole fraction-Definition and examples for Primary and Secondary standards. Theories of acid-base, redox, iodometric and iodimetric titrations.

MODEL QUESTION PAPER

Periyar University Salem

SEMESTER-I
B.Sc. Chemistry – Major core paper – I

General Chemistry –I Code : 08UCHO1

Time: 3 Hrs Max.Marks:75

Section A (10 x 2 = 20)
Answer all questions.

1. What are the four quantum numbers?
2. Write the Schrödinger's wave equation.
3. Write Aufbau principle.
4. Define electro negativity and what is its variation along the period ?
5. Boiling points of alcohols are more compared to their corresponding alkanes. Why?
6. What are carbanion and carbonium ion ?
7. Define collision diameter.
8. What is root mean square velocity?
9. What is a primary standard? Give 2 examples.
10. What is the colour of phenolphthalein in acidic and alkaline medium? Why?

Section-B (5 x 5 =25)
Answer all questions.

11. a) Derive de Broglie equation and give its significance.
(or)
b) What is the Significance of Ψ and Ψ^2 in Schrödinger wave equation?

12. a) How are atomic and ionic radii varies along the period and group in a periodic table ?
(or)
b) Write the characteristic properties of 's' block elements.

13. a) Compare the acidity of CCl_3COOH, $CH_2ClCOOH$, CH_3COOH and explain.
(or)

b) why is Aniline less basic than aliphatic amines?

14. a) What are most probable and Average Velocity ?

(or)

b) How is kinetic energy related with temperature?

15. a) How is solubility product principle helpful in qualitative analysis?

(or)

b) i) How many moles of NaOH is there in 40g of it ?

ii) Calculate the normality of NaOH when 20g of it is dissolved in one lit. of water.

Section C (3x10=30)

Answer any three questions:

16. a) Explain Bohr's atom model.

b) Explain Heisenberg's Uncertainty principle.

17. a) Write the characteristic principles of 'd' block elements.

b) What is Pauli's exclusion principle ?

18. a) Write note on hyperconjucation.

b) Write the formation and stabilities of free radical intermediates.

19. a) Write note on Boyle temperature.

b) Derive the relation between coefficient of expansion and compressibility.

20. a) Write the theory behind acid-base titration.

b) How chloride is detected with Sodium Carbonate extract ?

B.Sc.CHEMISTRY-SECOND SEMESTER

Major Core Paper –II

Paper Code : 08UCH02

Internal assessment marks: 25 External Marks :75

GENERAL CHEMISTRY – II (75 Hours)

UNIT – I Chemical Bond

1.1. Ionic bond-mode of formation – properties of ionic compounds-inert pair effect-Born-Haber cycle-polarisation of ions-factors affecting polarisation-importance of polarisation of ions-Fajan's rules and applications.

1.2. Covalent Bond-mode of formation-properties of covalent compounds-Valence Bond theory-Postulates of Pauling-Slater's theory-Different types of overlapping. Molecular orbital theory-Postulates-Bonding and antibonding molecular orbitals-Tabulation of various M.Os formed from atomic orbitals-Energy level diagrams for M.Os-Bond order-Electronic configuration of Hetero nuclear diatomic molecules - CO, NO and HF. A comparative study of V.B and M.O. Methods.

UNIT-II

2.1. Hydrides-Classification-Types of Hydrides and periodic Table -Ionic Hydrides-LiH and NaH-Preparation, properties, uses and structure.

Covalent Hydrides – silanes - General study - Chemistry of monosilanes and disilanes-Differences between silanes and alkanes.

Metallic Hydrides-Preparation, properties, structure and uses (A brief study.) Complex Hydrides-$NaBH_4$ and $LiAlH_4$-preparation, properties, uses and structure.

2.2. Carbides-Preparation, properties and technical applications.

UNIT-III

3.1.Cycloalkanes-Nomenclature-methods of formation-Wurtz reaction, Dieckmann ring closure & reduction of aromatic hydrocarbons-Chemical reactions-.Baeyer's strain theory and its limitations.

3.2. Alkenes

3.2.1. Reaction mechanism II:

Elimination reactions-mechanisms of E_1 and E_2 reactions-cis and trans eliminations-Hofmann and Saytzeff rule.

Electrophilic and free redical mechanism of addition in alkenes-Markownikoff's rule-peroxide effect-mechanism of Hydroboration, Ozonolysis and allylic substitution by NBS-polymerisation.

3.2.2. Nomenclature and classification of dienes-isolated, conjugated and cumulated dienes-butadiene-1,2 and 1,4 additions-thermodynamic and kinetic controlled products-Diels - Alder reaction-synthesis of dienes- 1,3-butadiene, isoprene & chloroprene.

UNIT-IV

4.1. Alkynes- Acidity of alkynes-formation of acetylides-oxidation - ozonolysis and hydroboration, addition of water with $HgSO_4$ catalyst.

4.1.1 Reaction mechanism III

Aliphatic nucleophilic substitution- S_N1, S_N2 and S_Ni reactions – Reactivity-effects of structure of substrate, attacking nucleophile, leaving group and reaction medium-Relative reactivity of ethyl, isopropyl,tertiary butyl, vinyl and benzyl halides-competition between substitution and elimination.

4.2. Aromatic hydrocarbons and aromaticity-reasonance in benzene-delocalised cloud in benzene-aromaticity-Huckel's (4n+2) rule and its simple applications.

4.2.1. Reaction mechanism IV

Electrophilic substitution reactions in aromatic compounds-general mechanism –Nitration, Halogenation, Sulphonation, Friedel-Crafts acylation and alkylation-directive influence – Orientation-ortho/para ratio-nuclear and side chain halogenation.

4.2.2. Polynuclear aromatic hydrocarbons- naphthalene, anthracene -isolation, synthesis ,properties, and uses.

UNIT-V

5.1. The liquid state:

Structure of liquids-Vapour-pressure-Trouton's rule-surface tension-surface energy-some effects of surface tension-viscosity-effect of temperature on viscosity (Experimental determination of surface tension and viscosity not necessary)-Refractive index-specific refraction-molar refraction. Physical properties and chemical constitution-Molar volume and chemical constitution-Parachor and chemical constitution-Viscosity and chemical constitution-Molar refraction and chemical constitution-optical exaltation-optical activity.

5.2. Liquid crystals (The mesomorphic state)

Thermography-classification of Thermotropic liquid crystals-Smectic liquid crystals-Nematic liquid crystals-Cholesteric liquid Crystals .

MODEL QUESTION PAPER

Periyar University, Salem-11

B.Sc. Degree- Branch IV- CHEMISTRY.

SECOND SEMESTER – MAJOR CORE PAPER – II

General Chemistry II – 08UCH02

Time: Three Hours Maximum Marks :75

PART – A – (10 X 2 = 20)

Answer All Questions

1. Sodium chloride is ionic while Aluminium chloride is covalent. Explain.
2. Hydrogen sulphide is a gas while water is a liquid. Give reason.
3. Give the preparation and uses of Li AlH_4.
4. Mention two differences between silanes and alkanes.
5. State Markownikoff's rule. Give an example .
6. State and explain Wurtz reaction.
7. Give the products of ozonolysis of propane.
8. Explain Friedel –Craft's acylation.
9. What is parachor?
10. State and explain Trouton's rule.

PART – B – (5x5=25)

Answer all questions

11. a) How is ionic bond-formed? Mention two properties of ionic bond.

(or)

b) Give the postulates of molecular orbital theory.

12. a) Give the preparation and uses of sodium borohydride.

(or)

b) Give the preparation of any two carbides.

13. a) Explain Dieckmann ring closure with an example.

(or)

b) Explain allylic substitution by N-Bromosuccinimide.

14. a) Explain ortho-para orientation with two examples.

(or)

b) Give two methods of preparation of Naphthalene.

15. a) Write a short note on viscosity and chemical constitution.

(or)

b) Write a short note on sinectic crystals.

PART C – (3 x 10 = 30)

Answer any three of the following

16. a) Explain the molecular orbital picture of CO.

b) Give a comparative study of Valence bond and M.O. theory.

17. Write a note on preparation, properties and applications of carbides.

18. Write notes on i) Diel's Alder reaction; (ii) Synthesis and uses 1:3 –Butadiene.

19. Write a brief account on isolation, synthesis, properties and uses of anthrancene.

20. Write a brief account on liquid crystals.

B.Sc.CHEMISTRY-SECOND SEMESTER

SKILL BASED ELECTIVE COURSE -I

PAPER CODE -08UCHS 01

FOOD and NUTRITION (30 Hours)

UNIT-I FOOD ADULTERATION

1.1. Sources of foods, types, advantages and disadvantages, constituents of foods, carbohydrate, protein, fats, oils, colours, flavours,natural toxicants.

UNIT-II FOOD POISONING

2.1. Sources, causes and remedy- Causes and remedies for acidity, gastritis,indigestion and constipation

UNIT-III FOOD PRESERVATION AND PROCESSING

3.1. Food spoilage , courses of food spoilage,types of Food spoilage, food preservation ,preservation and processing by heating- sterilisation, pasterusation

UNIT-IV VITAMINS

4.1. Sources , requirement deficiency diseases of A, C, K, E_1 and B_6

UNIT-V MINERALS

5.1.Mineral elements in food-Principal mineral elements-source. Function-Deficiency and daily requirements-Na, K, Mg, Fe, S and P

REFERENCE BOOKS:

1.Seema Yadav : “Food Chemistry” ,Anmol publishing (P) Ltd,New Delhi

2.Car H. Synder : “ The Extraordinary Chemistry for ordinary things” ,John Wiley & sons inc..,New York,1992.

MODEL QUESTION PAPER

Periyar University, Salem-11

B.Sc. Degree- Branch IV- CHEMISTRY.

SECOND SEMESTER – SKILL BASED ELECTIVE COURSE – I

FOOD and NUTRITION PAPER CODE -08UCHS 01

Time : Three hours. Maximum : 75 Marks

PART – A – (10 X 2 = 20)

Answer All Questions

1. Define food.
2. Mention any two sources of food.
3. Mention any two toxicants in pulses.
4. Mention any four metals that cause food poisoning.
5. Mention any two methods of food preservation.
6. Mention any two causes of food spoilage.
7. Mention the sources of Vitamin A.
8. What is the name of the deficiency disease caused by the lack of Vitamin C?
9. Mention any two minerals which are micronutrients.
10. What is the name of the disease caused by IRON deficiency ?

PART – B – (5x5=25)

Answer all questions

11. a) Write an account on carbohydrates.

(or)

b) Write an account on oils and fats.

12. a) Mention the causes and remedy for acidity.

(or)

b) What is the cause and make a note on the remedy for constipation ?

13. a) Mention the types of food spoilage.

(or)

b) Describe any one method of food preservation.

14. a) Mention the source and deficiency disease of Vitamin C.

(or)

b) Write an account on Vitamin B6.

15. a) Write an account of mineral elements in food.

(or)

b) What is the source, function and deficiency effect of potassium?

PART C – (3 x 10 = 30)

Answer any three of the following

16. Write notes on (i) flavours and (ii) natural toxicants.

17. Write an account on (i) gastritis and (ii) indigestion.

18. Write a brief account on food preservation and food spoilage.

19. Write a brief account on sources, requirements and deficiency diseases of A, K, & E.

20. Write a brief account on micronutrients.

B.Sc.CHEMISTRY-THIRD SEMESTER

Major Core Paper –III

Paper code : 08UCH03

Internal assessment marks: 25 External Marks :75

GENERAL CHEMISTRY – III (75 Hours)

UNIT-I Transition Elements

1.1 Transition Elements – position in the Periodic Table-General characteristics of d-block elements – an objective study of the properties expected.

1.2.Occurrence, extraction, properties and uses of Titanium, Zirconium, Molybdenum, Tungsten and Platinum.

1.3.Chemistry of Titanium dioxide, Titanium tetrachloride, Vanadium pentoxide, Ammonium Vanadate, Zirconium dioxide, Zirconium halides, Ammonium molybdate, Molybdenum blue, Tungsten trioxide, Tungsten Bronzes, Chloroplatinic acid and Barium Platinocyanide.

UNIT-II Reaction Mechanism

2.1.Mechanism of -Kolbe's reaction-Reimer-Tiemann reaction-Gattermann, Lederer- Manasse and Houben-Hoesch reactions.

2.2.Addition to Carbon –heteromultiple bond - Addition of HCN, NH_20H, 2,4-dinitrophenyl hydrazine, semicarbazide & Grignard reagent .

2.3.Mechanisms of Mannich, Stobbe, Darzen, Wittig and Reformatsky reactions.

2.4.Mechanism of reduction of carbonyl group by $NaBH_4$, $LiAlH_4$ –Wolf-Kishner, Clemmensen and MPV reductions.

2.5.Carbonyl polarization-Reactivity of carbonyl group-acidity of carbonyl group-Haloform reaction-mechanism.

UNIT III Carboxylic acids and Esters

3.1. Carboxylic acids

3.1.1. Unsaturated acids-preparation and properties of acrylic, crotonic, oleic and cinnamic acids

3.1.2. Hydroxy acids-classification – preparation and reactions of Glycolic acid , Malic acid and Citric acid-Action of heat on α,β,γ and δ acids.

3.2. Dicarboxylic acids-preparation and properties of oxalic, malonic, succinic, glutaric and adipic acids.

3.3.**Reaction Mechanism**

3.3.1.Mechanism of conversion of acids into acid derivatives-esterification including trans esterification.

3.3.2.Hydrolysis of esters-mechanism - effect of substituents-structural and steric factors.

3.4. Tautomerism-definition-keto-enol, amido-imido and nitro-acinitro tautomerisms-acid-base inter conversion mechanism.

3.5. Malonic, and Acetoacetic esters - characteristic reactions of active methylene group -synthetic uses.

UNIT IV

4.1. The Solid State - Difference between crystalline and amorphous solids-isotropy and anisotropy-interfacial angles-symmetry in crystal systems-elements of symmetry-space lattice and unit cell-Bravis lattices- Law of rational indices-Miller indices-X ray diffraction-Bragg's equation-Experimental methods.

4.2. The colloidal State

Definition of colloids-Classification of colloids - solids in liquids (sols) - properties-Kinetic, optical and electrical-stability of colloids, protective action-Hardy-Schulze law, gold number.

Liquids in liquids (emulsions): Types of emulsions-preparation, emulsifier

Liquids in solids (gels): classification, preparation and properties, inhibition-general applications of colloids.

UNIT V

5.1. The first law of thermodynamics and thermochemistry

5.1.1 Terminology of Thermodynamics-Thermodynamic equilibrium-Nature of work and heat-Law of conservation of energy-first law of thermodynamics-Internal energy-Enthalpy of a system-Heat capacity of a system-Expansion of an ideal gas-work done in reversible isothermal expansion-work done in reversible isothermal compression-work done in reversible adiabatic expansion – Joule-Thomson effect, Joule-Thomson coefficient-Inversion temperature-zeroth law of thermodynamics-Absolute temperature scale.- Kirchoff's equation..

MODEL QUESTION PAPER

Periyar University Salem

SEMESTER-III

B.Sc. Chemistry – Major core paper – III

General Chemistry – III Code : 08UCHO3

Time: 3 Hrs Max.Marks:75

Section- A

Answer all Questions: 10 x 2 = 20Marks

1. Why most of the transition metals are paramagnetic?
2. Give a reaction to prove the reducing nature of TiO.How will you convert Benzaldehyde to Mandelic acid through HCN addition?
3. Why Carbonyl group is acidic in nature?
4. How will you prepare Crotonic acid from Ethanal by Knoevenagel reaction?
5. What is Trans esterification?
6. Define gold number.
7. Define space lattice and unit cell.
8. What is inversion temperature?
9. Give the statement of First law of Thermodynamics.

Section –B

Answer all Questions 5x5=25 Marks

1. Give one preparation and two properties for $TiCl_4$.

   (or)

   How V_2O_5 reacts with HCl and NaOH?

2. Explain the mechanism of Reimer-Tiemann reaction.

   (or)

   Give the mechanism of Haloform reaction.

3. Explain the action of heat on α,β,γ and δ Hydroxy acids.

   (or)

Explain the keto-enol Tautomerism in ethylacetoacetate.

4. List out the symmetry elements in NaCl Crystal.

(or)

Explain the Tyndall effect and Brownian movement.

5. Derive Kirchoff's equation.

(or)

Explain Hess's Law of constant heat of summation with an example.

Section – C

Answer Any Three questions (3 x 10 = 30 Marks)

1) Explain the extraction, Properties and uses of Molybdenum.
2) Explain the Nucleophitic addition reactions of the following across carbonyl group in Aldehydes and Ketones.

   a) HCN b) $NH_2CONHNH_2$ C) NH_2OH D) Grignard reagent

3) Give the Synthetic uses of Ethyl aceto acetate.
4) a) Differentiate Isotropy and Anisotropy.

   b) Explain the electrical stability of colloids.

5) a) Prove PV^{γ}= constant for adiabatic expansion of an Ideal gas.

   b) Explain Joule- Thomson effect and Joule- Thomson coefficient.

B.Sc.CHEMISTRY

THIRD and FOURTH SEMESTERS

SKILL BASED ELECTIVE COURSE II

PAPER CODE -08UCHS 02

Internal assessment marks :25 External Marks :75

(Note: The paper will be taught in third and fourth semesters,but the examination will be at the end of fourth semester)

POLYMER CHEMISTRY (30 Hours)

UNIT-I

1.1. Basic concepts : An introduction to polymers and macro molecules.

Natural and synthetic polymers. Classification of Polymers-addition and condensation polymers.

1.2. General methods of preparation of polymers. Polymerization through functional groups, multiple bonds and ring opening. Coordination polymerization.

UNIT-II

2.1. Structure of polymers- linear,branched and cross linked Stereochemistry of polymers-Isotactic ,Sydiotactic and Atactic

2.2. properties of polymers : The crystalline melting point. The glassy state and glass transition temperature

UNIT-III

3.1. Copolymerisation – Definitions – homo and copolymers.Block copolymers and Graft copolymers.

3.2.Molecular weight of polymers

Number average molecular weight and weight average molecular weight. Determination of molecular weight by Viscosity and Osmometry methods.

UNIT-IV

4.1. Poly olefins-polythene , PTFE , Freons ,PVC ,polypropylene and polystyrene.

4.2. Natural and synthetic rubbers.-Constitution of natural rubber. Butyl, Buna, Buna-S , Buna-N, Neoprene , SBR, Thiocol, Polyurethane and silicone rubbers.

UNIT-V

5.1. Plastics and Resins

Definitions. Thermoplastic and thermo setting resins. Constituents of plastic-fillers, dyes, pigments, plasticizers, Lubricants and catalysts.Uses of thermoplastic resins and thermo setting resins.

REFERENCES:

1.V. R. Gowrikar ,N.V.Viswanathan : Polymer Science- Wiley Eastern Limited ,New Delhi. 1986

2. R.B.Seymour, Introduction to Polymer Chemistry, MC Craw Hill, New York 1971.

3.S.S.Dara , A Text Book in Engineering Chemistry, S.Chand & Company Ltd, New Delhi. Third Edition ,!992.

MODEL QUESTION PAPER

Periyar University Salem

SEMESTER-IV

B.Sc. Chemistry

Skill based elective course – II

Polymer Chemistry Code :08UCHS02

Time: 3 Hrs Max.Marks:75

Section – A (10 x 2 = 20)

Answer all questions:

1. What is high polymer? Give two examples.
2. Give two examples for natural and addition polymer.
3. How can you distinguish linear and cross linked polymers?
4. What is glass transition temperature of a polymer?
5. Define copolymerization.
6. What is number average molecular weight of a polymer?
7. What are the monomers used in the preparation of polystyrene and PVC and give their structural formula ?
8. What is the special feature of polyurethane ?
9. What is the function of fillers in plastics?
10. Mention any four uses of thermoplastic resins.

Section B (5 X 5 = 25)

Answer all questions:

11. a) Write a note on co-ordination polymerization.

(or)

b) How is Nylon-6, 6 synthesised? Write any two uses of it.

12. a) Classify the polymers on the basis of their stereochemistry.

(or)

b) Explain how the crystallinity affects the properties of a polymer.

13. a) Distinguish Block and Graft copolymers.

(or)

b) Distinguish homo and hetero polymers.

14. a) Write the preparation, properties (any two) and uses of polypropylene.

(or)

b) Write note on silicone rubbers.

15. a) Differentiate thermosetting and thermoplastic resins.

(or)

b) Write a short note on pigments used as constituent in plastics.

Section – C (10 x 3 = 30)

Answer any three questions.

16. Write any one method of preparation of a condensation polymer and addition polymer. Mention some of their uses.

17. How is Molecular weight of a polymer is determined by viscosity method ?

18. a) Write the preparation, properties and uses of polyethylene.

b) Write note on Buna- S rubber.

19. Write note on the following

i) Dyes ii) Plasticizers iii) Lubricants iv) catalysts

20. How glass transition temperature of a polymer is determined and how it affects the various properties of a polymer ?

B.Sc.CHEMISTRY-FOURTH SEMESTER

Major Core Paper –IV

Paper code : 08UCH04

Internal assessment :25 marks External Marks :75

GENERAL CHEMISTRY – IV (75 Hours)

UNIT-I Nuclear Chemistry

1.1. Nuclear stability-n/p ratio- nuclear forces-Exchange theory and nuclear fluid theory.

1.2. Natural radioactivity – modes of decay-Geiger – Nuttal rule. Units of radioactivity – Kinetics of radioactive disintegration-Half life and average life-Radioactive equilibrium – Numerical problems.

1.3. Mass defect and binding energy - Artificial transmutation and artificial radioactivity.

1.4. Nuclear fission and nuclear fusion-mechanisms-applications-differences – Stellar Energy.

1.5. Application of radioactive isotopes-C-14 dating, rock dating –Numerical problems - isotopes as tracers-study of reaction mechanism (e.g. ester hydrolysis), radiodiagnosis and radiotherapy.

1.6. Nuclear reactors-types-common features like fuels, moderators, coolant control materials, reactor shielding- uses-Nuclear reactors in India. –Nuclear fuels.

UNIT II - Heterocyclic Compounds

2.1. General classification-aromatic and non-aromatic heterocylics.

2.2. Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine.

2.3. Preparation, properties and uses of furan, pyrrole & thiophene.

2.4. Synthesis and reactions of pyridine and piperidine-comparative study of basicity of pyrrole, pyridine and piperidine with amines.

UNIT III

3.1. Aliphatic amines-separation of amines by Hinsberg's & Hofmann methods - preparation and properties of dimethyl amine, trimethyl amine, ethylene diamine and hexamethylene diamine.

3.2. Derivatives of aniline-acetanilide, N-methyl aniline & N, N – dimethylaniline – preparation and properties.

3.3. Diazonium compounds-diazotisation mechanism-diazonium ion as a weak electrophile-preparation and synthetic uses of diazoacetic ester & diazomethane.

UNIT IV

4. Second law of thermodynamics-I

4.1. Limitations of the first law-need for second law-spontaneous processes-cyclic process-Carnot cycle –efficiency-Carnot theorem-Thermodynamic scale of temperature.

4.2. Concept of entropy-Entropy-a state function-Entropy change in isothermal expansion of an ideal gas-entropy change in reversible and irreversible processes-Clausius inequality-Entropy change accompanying change of phase-–Entropy of mixture of ideal gases-entropy of mixing-physical significance of entropy.

UNIT V

5. Second law of thermodynamics-II

5.1. Work and free energy functions-Maxwell's relationships criteria for reversible and irreversible processes -Gibbs-Helmholtz

equation-Partial molar free energy . Concept of chemical potential-Gibb's Duhem equation-Chemical potential in a system of ideal gases-Duhem-Margulus equation .Clapeyron equation-Clapeyron- Clausius equation-Applications of Clapeyron-Clausius equation.

5.2. Third law of thermodynamics

Nernst heat theorem-statement of III law-Evaluation of absolute entropy from heat capacity measurements-Test for the validity of the law..

MODEL QUESTION PAPER

Periyar University Salem

SEMESTER-IV

B.Sc. Chemistry – Major core paper – IV

General Chemistry – IV Code : 08UCHO4

Time: 3 Hrs Max.Marks:75

Section A (10 x 2 = 20)

Answer all the question:-

1. Why is $_{92}U^{238}$ not suitable for chain reaction?
2. What is mass defect?
3. Why Furan is least aromatic when compared with Thiophene and pyrrole?
4. Give any two nucleophilic substitution reactions of pyridine.
5. Why is Benzenediazonium ion a weak electrophile?
6. Give one preparation each for ethylenediamine and hexamethylenediamine.
7. Calculate the efficiency of a Carnot engine operating between the temperatures 100^{o} C and 0^{o}C?
8. What is the need for Second Law of Thermodynamics ?
9. What are work and free energy functions? Give their relations?
10. State Nernst heat theorem.

Section-B (5 x 5 =25)

Answer all questions

11. Explain Geiger-Nuttal rule with examples?

(or)

Explain nuclear stability with respect to n/p ratio?

12. Give one synthesis each for pyridine and piperidine?

(or)

Compare the aromatic nature and basic nature of pyrrole, furan, thiophene and pyridine?

13. How are aliphatic amines separated by Hofmann's and Heinsberg's methods ?

(or)

Explain the mechanism of diazotization.

14. Explain Clausius inequality principle?

(or)

Derive an expression for the entropy of mixing of Ideal gases?

15. Derive Duhem-Margulus equation?

(or)

How is absolute entropy evaluated from heat capacity measurements?

Section C (3x10=30)

Answer any three questions:

16. Write note on:
    a) Nuclear fusion
    b) Nuclear fission
    c) Stellar Energy

17. Give the electrophilic substitution reactions of
    a) Pyrrole b) Pyridine

18. Give the synthetic uses of
    a) Diazomethane b) Diazo aceticester

19. Discuss carnot cycle and derive an expression for the efficiency of a carnot engine?

20. Derive
    a) Gibbs – Helmholtz equation
    b) Clausius – Clapeyron equation

B.Sc.CHEMISTRY-FIFTH SEMESTER
Core Chemistry Major Paper –V

Paper code : 08UCH05

Internal assessment :25 marks External Marks :75

INORGANIC CHEMISTRY - (60 Hours)

UNIT-I Concept of acids, bases and Non aqueous solvents

1.1. Acids and Bases: Arrhenius, Bronsted-Lowry, the Lux-Flood, Solvent system and Lewis concepts of acids and bases.Relative strength of acids and bases-Effect of solvent-Levelling effect-Usanovich concept.

1.2. Hard and Soft Acids and Bases-classification of acids and bases as hard and soft – examples-Pearson's HSAB concept, acid-base strength and hardness and softness, Symbiosis, Theoretical basis of hardness and softness, Electronegativity and hard and soft species - Applications of HSAB principle

1.3. Non-aqueous solvents-physical properties of a solvent, types of solvents and their general characteristics. Reactions in non-aqueous solvents with reference to liq. NH_3 and liq SO_2- Comparison.

UNIT II Chemistry of f-block elements

2.1. Position in the Periodic Table-General characteristics of Lanthanides and Actinides-Lanthanide contraction and its consequences.

2.2. Isolation of Lanthanides from Monazite including the Ion exchange resin method.

2.3. Actinides-occurrence and preparation

2.4. Chemistry of Thorium and Uranium -Important compounds-preparation, properties and uses of Uranyl nitrate, Uranium hexafluoride, Thorium dioxide and Thorium nitrate.

2.5. Comparison of Lanthanides and Actinides-comparison of d-block and f-block elements.

UNIT III Coordination Chemistry

3.1. Definition of the terms-Classification of ligands-Nomenclature of mononuclear and polynuclear complexes-chelating ligands and chelates-Examples-chelate effect-explanation. Co-ordination Number and stereochemistry of complexes.

3.2. Werner's theory-conductivity and precipitation studies -Sidgwick's theory-Effective Atomic Number concept.

3.3. Isomerism in complexes-Structural Isomerism—types. Stereoisomerism-Geometrical isomerism in 4 and 6 coordinated complexes. Optical isomerism in 4-and 6-coordinated complexes-

3.4. Stability of complexes-thermodynamic and kinetic stability-definition-Stepwise and overall stability constants –Factors affecting the stability of complexes.

UNIT-IV

4.1. Theories of bonding in complexes-Valence Bond Theory-Postulates –Hybridisation and geometries of complexes-Outer orbital and inner orbital octahedral complexes. Square planar and tetrahedral complexes-V.B. Theory and magnetic properties of complexes-limitations of V.B. Theory.

4.2. Crystal Field Theory-postulates-d-orbital splitting in octahedral, tetrahedral and square planar complexes-strong and weak ligands-Spectrochemical series-High spin and low spin complexes-C.F. Theory and magnetic properties of complexes-Crystal Field Stabilisation Energy (CFSE) and its uses-Calculation of CFSE values

of d^1 to d^{10} Octahedral and Tetrahedral complexes- C.F theory and colour of complexes-limitations of C.F. theory-comparison between VBT and CFT.

UNIT-V Reaction Mechanism and Application of Complexes

5.1. Substitution reactions in square planar complexes-Trans Effect-Trans effect series-uses of Trans effect-Theories of Trans effect-polarisation theory and π-bonding theory.

5.2. Application of coordination compounds in Qualitative and Quantitative analysis-separation of Copper and Cadmium ions, Cobalt and Nickel ions- Identification of Cu, Fe, and Ni. .

Complexometric Titrations-Principles and Types of titrations using EDTA.

5.3. EDTA and its applications –estimation of metals,hardness of water and sequesterisation.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Degree Examination

Fifth Semester

B.Sc. Chemistry – Major core paper – V

Inorganic Chemistry Code : 08UCH05

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Compare the acidity of CH_3COOH and HCN.
2. What is a hard acid? Give two examples.
3. What are 4 f and 5 f block elements ?
4. How is monazite mineral concentrated to obtain thorium.
5. What is a chelating ligand? Give one example.
6. What is the geometry of the following complexes (a) $[Cu(CN)_4]^{2-}$
   (b) $[Cu(CN)_2]^-$
7. What is the hybridization involved and geometry of the following Complexes ?
   (i) $[Co(NH_3)_6]^{3+}$ (ii) $[Cr(CN)_6]^{3-}$
8. What is 'Spin only' formula and its use?
9. What is EDTA? What is the metal ion indicator used when it is used as titrant?
10. Define labile complexes.

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Explain leveling effect of a solvent.
    (or)
    b) Mention any two applications of HSAB principle.

12. a) Write the characteristic properties of Lanthanides.
    (or)

b) How is Uranium extracted from its mineral ?

13.a) Explain EAN rule by taking [$Fe(CO)_5$] as an example.

(or)

b) Explain geometrical isomerism exhibited by 4 and 6 coordinated complexes with monodentate ligands by giving one example each.

14.a) What are the postulates of valence Bond Theory of complexes?

(or)

b) [CoF_6]$^{3-}$ is an outer orbital complex-Explain it and also its magnetic property.

(or)

15.a) Explain Trans effect based on polarization theory.

(or)

b) Write a brief procedure for the estimation of Hardness by EDTA method.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16.a) Explain the Usanovich concept of acid- base.

b) Why is liquid NH_3 used as solvent ?

17.a) What is lanthanide contraction and its consequences ?

b) How are the following prepared ?

(i) Thorium dioxide (ii)Thorium nitrate

18.What are the various factors that affect the stability of complexes.?

19.Explain CFT and some of its applications.

20. a) Write briefly about Trans effect .

b) How is copper and cadmium separated by complexing them.

B.Sc.CHEMISTRY-FIFTH SEMESTER
Core Chemistry Major Paper –VI

Paper code : 08UCH06

Internal assessment :25 marks External Marks :75

ORGANIC CHEMISTRY - (60 Hours)

UNIT I

1.1.Definition-Classification - Optical and Geometrical isomerism.

1.2. Optical isomerism – Optical activity-Optical and Specific rotations-conditions for optical activity-asymmetric centre-Chirality-achiral molecules-meaning of (+) and (-) and D and L notations-Elements of symmetry.

1.3 Projection formulae-Fischer, Flying Wedge, Sawhorse and Newmann projection formulae-Notation of optical isomers- Cahn-Ingold –Prelog rules-R-S. notations for optical isomers with one and two asymmetric Carbon atoms-erythro and threo representations.

1.4. Racemisation-methods of racemisation (by substitution and tautomerism)-Resolution-methods of resolution (mechanical, seeding, biochemical and conversion to diastereoisomers)-Asymmetric synthesis (partial and absolute synthesis) Walden inversion.

1.4. Optical activity of allenes , spiranes and biphenyls. Optical activity of molecules containing nitrogen.

UNIT II

2.1. Geometrical isomerism- cis-trans, syn-anti and E-Z notations-geometrical isomerism in maleic and fumaric acids and unsymmetrical ketoximes-methods of distinguishing geometrical isomers using melting point, dipole moment, dehydration, cyclisation and heat of hydrogenation.

2.2. Conformational Analysis-introduction of terms-conformers-dihedral angle, torsional strain, conformational analysis of ethane,

ethylene glycol, chlorohydrin and n-butane including energy diagrams-conformers of cyclohexane (chair, boat and skew boat forms)-axial and equatorial bonds-ring flipping showing axial equatorial interconversions-conformers of mono and disubstituted cyclohexanes-1:2 and 1:3 interactions-Conformation and stereochemistry of Cis and Trans decalins.

UNIT III Amino acids and proteins

3.1. Amino acids-classification-essential and non essential amino acids-preparation of alpha amino acids-glycine, alanine and tryptophan-General properties of amino acids-Zwitter ions, isoelectric point

3.2. Peptides-synthesis - Bergmann method-structure determination of polypeptides-end group analysis.

3.3. Proteins-classification based on physical and chemical properties and on physiological functions-primary and secondary structure of proteins-helical and sheet structures (elementary treatment only) – Denaturation of proteins.

UNIT- IV

4.1.Heterocyclic Compounds-II

Condensed five and six membered heterocyclics-preparation of indole, benzofuran, quinoline and isoquinoline-Fischer indole synthesis, Skraup synthesis and Bischer-Napieralski synthesis-Electrophilic substitution reactions.

4.2. Ureides and Nucleic acids

4.2.1. Ureides-classification-pyrimidines-thymine, uracil and cytosine-purines-adenine and guanine – synthesis (structural elucidation not necessary)

4.2.2. Nucleic acids-structures of ribose and 2-deoxyribose-DNA and RNA – their components – Biological functions of nucleic acids-Elementary ideas on replication and protein synthesis.

UNIT V

5. Chemistry of natural products

5.1. Alkaloids -classification- isolation– general methods of determination of structure of alkaloids-synthesis and structural elucidation of piperine, atropine and nicotine.

5.2. Terpenes-classification-isolation- isoprene rule-synthesis and structural elucidation of citral, geraniol, alpha terpeneol, alpha pinene and camphor.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Degree Examination

Fifth Semester

B.Sc. Chemistry – Major core paper – VI

Organic Chemistry Code : 08UCH06

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. What are diastereoisomers? Give examples.
2. What is a meso compound?
3. What is meant by 1,3 – diaxial interaction?
4. Differentiate between configuration and conformation.
5. Describe the effect of heat on alpha, beta and gamma aminoacids.
6. What is denaturation of proteins?
7. What happens when quinoline is treated with nitrating mixture?
8. What are Ureides? How are they classified?
9. Define isoprene rule.
10. What is zeisel method?

Section B (5 x 5 = 25 Marks)

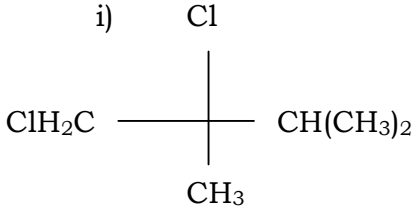
Answer All Questions

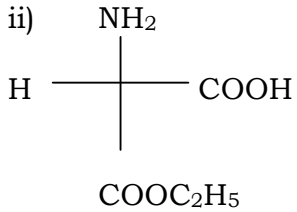
11.a) What do you understand by the term optical activity? Explain it with reference to lactic acid.

(or)

b) Designate as R or S

i)



ii) 

12.a) Explain important conformations exhibited by ethane.

(or)

b) Write the Newmann Projection formula of n-butane. Which of them is the preferred conformation.?

13.a) Write an account of the general properties of proteins.

(or)

b) What methods would you suggest for the preparation of glycine?

14.a) Explain the Skraup synthesis of Quinoline.

(or)

b) What is DNA? Write short notes on replication.

15.a) What are terpenoids? How are they classified?

(or)

b) How is nicotine isolated from tobacco leaves?

Section C (3 x 10 = 30 Marks)

Answer any three questions

16.Explain:

i) Racemisation ii) Resolution iii)Walden inversion

17.) How are the configurations of maleic and fumaric acids determined? Give any three methods.

b) Discuss the different conformations exhibited by 1, 4-dimethylcyclohexane .

18.a) Write the Bergmann method of synthesis of peptides.

b) Discuss about the classification of proteins according to functions.

19.a) Give the preparation of

i) Indole ii) Isoquinoline

b) What are the differences between DNA and RNA.

20. Isolate, synthesize and elucidate the structure of piperine.

B.Sc.CHEMISTRY-FIFTH SEMESTER
Elective Paper –I

Paper code : 08UCHE01

Internal assessment :25 marks External Marks :75

PHYSICAL CHEMISTRY - (75 Hours)

UNIT-I Solutions

1.1. Solutions of gases in liquids – Henry's law- solutions of liquids in liquids-Raoult's law-Binary liquid mixture-ideal solution-deviation from ideal behaviour-Thermodynamics of ideal solutions-V.P-Composition curves, V-P-temperature curves-Azeotropic distillation.

1.2. Nernst's Distribution law-Thermodynamic derivations-applications. Solvent extraction.

1.3. Thermodynamic derivation of elevation of boiling point and depression of freezing point-van't Hoff factor-Abnormal molecular mass-Degree of dissociation and association.

UNIT-II Chemical Equilibrium

2.1. Thermodynamic derivation of equilibrium constants-Kp, Kc and Kx-Relations between Kp, Kc and Kx-Standard free energy change-Derivation of van't Hoff reaction isotherm

De-Donder's treatment of chemical equilibria-concept of chemical affinity (no derivation)-Temperature dependance of equilibrium constant-van't Hoff isochore-Pressure dependance of equilibrium constant.

2.2. Adsorption- Physical and chemical adsorption-Types of adsorption isotherms-Freundlich adsorption isotherm-Derivation of Langmuir adsorption isotherm-BET isotherm (postulates only) BET

equation (statement). Determination of surface area-Applications of adsorption.

UNIT-III Chemical Kinetics-I

3.1. Derivation of rate constant of a second order reaction-when the reactants are taken at different initial concentrations-when the reactants are taken at the same initial concentrations-Determination of the rate constant of a II order reaction-Derivation of rate constant of a third order reaction-when the reactants are taken at the same initial concentrations. Derivation of half-life periods for second and third order reactions having equal initial concentration of reactants.

3.2. Methods of determining the order of a reaction-Experimental methods in the study of kinetics-volumetry, manometry, polarimetry and colorimetry.

3.3 Kinetics of fast reactions by temperature jump method(no derivation) Effect of temperature on reaction rates-Derivation of Arrhenius equation-concept of activation energy-determination of Arrhenius frequency factor and energy of activation.

UNIT-IV Chemical Kinetics-II

4.1. Collision theory of reaction rates-Derivation of rate constant of a bimolecular reaction from collision theory-Failures of CT.

4.2. Lindemann theory of Unimolecular reactions.

4.3. Theory of Absolute Reaction Rates-Thermodynamic derivation of rate constant for a bimolecular reaction based on ARRT-comparison between ARRT and CT. Significance of free energy of activation and entropy of activation.

4.4. Kinetics of complex reactions of first order opposing, consecutive and parallel reactions-examples with mechanism (no derivation)

UNIT-V

5. Photochemistry

5.1. Consequences of light absorption-The Jablonski diagram-non radiative transitions-radiative transitions-Grotthus-Draper law-The Stark Einstein law of photochemical equivalence-Quantum efficiency (quantum yield).

5.2. Energy transfer in photochemical reactions-photosensitisaiton-Photosynthesis in plants-Chemiluminescence - fluorescence and phosphorescence-lasers-uses of lasers.

5.3. Photochemical reactions-Kinetics of hydrogen-bromine reaction-decomposition of HI – Photolysis of aldehydes and ketones (Mechanism only)

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Degree Examination

Fifth Semester

B.Sc. Chemistry – Elective paper – I

Physical Chemistry Code : 08UCHE01

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer All Questions

1. Under what conditions Henry's law is obeyed by solution of gases in liquids?
2. The vanthoff factor "i" for a very dilute aqueous solution of HCN is 1.00002. Calculate the percentage of degree of dissociation of HCN?
3. When K_p becomes equal to Kx?
4. Give the statement of Freundlich adsorption isotherm.
5. Give the units of rate constants for second and third order reactions.
6. How does Arrhenius relation $k=A\ e^{-Ea/RT}$ changes when Ea becomes zero?
7. Give an example each for consecutive and parallel reaction.
8. Give the failures of collision theory.
9. State Stark-Einstein's law of photochemical equivalence?
10. What is Grotthus-Draper law?

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Derive Thermodynamically Nernst distribution law?

(or)

b) With an example discuss Azeotropic distillation of maximum boiling point Azeotrope.

12.a) Discuss De-Donder's treatment of chemical equilibria.

(or)

b) How will you determine surface area of solid adsorbents?

13.a) Derive the rate constant for the reaction $2A \rightarrow$ products?

(or)

b) How will you experimentally determine the rate constant for the acidic hydrolysis of sucrose?

14.a) Compare collision theory with ARRT?

(or)

b) Discuss the significance of free energy of activation and entropy of activation?

15.a) Explain Jablonski diagram for Radiative and Non-radiative Transitions.

(or)

b) What are Lasers? Give the uses of Lasers.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. Derive thermodynamically an expression connecting molality of a dilute solution with its freezing point depression?

17.a) Derive Vant hoff reaction Isotherm?

B) The equilibrium constant of a reaction doubles on raising the temperature from 25^oC to 35^oC. Calculate ΔH^o for the reaction?

18.a) Derive the rate constant for the reaction $A+B \rightarrow$ products?

b) Explain the significance of energy of activation?

19.a) Thermodynamically derive the rate constant for a bimolecular reaction based on ARRT?

b) What is temperature coefficient?

20.a) Discuss the kinetics of reaction between H_2 and Br_2?

b) Write notes on photo sensitization.

B.Sc.CHEMISTRY-FIFTH SEMESTER
Elective Paper –II

Paper code : 08UCHE02

Internal assessment :25 marks External Marks :75

ANALYTICAL CHEMISTRY (75 Hours)

UNIT – I

1. The Role of Analytical Chemistry

1.1 Importance of analytical methods in Qualitative and Quantitative analysis- Chemical and instrumental methods- advantages and limitations of chemical and instrumental methods- methods of analysis- steps in analysis.

1.2 Safety Measures: Handling reagents and solutions-acids, alkali, bromine water, phenol, inflammable substances etc.,-Disposal of wastes, waste chemicals and fumes

1.3 Data analysis- idea of significant figures- its importance- accuracy- methods of expressing accuracy- error analysis- types of errors- minimizing errors- precision- methods of expressing precision-mean, median, mean deviation, standard deviation and confidence limits.

1.4 Chemical and single pan balance- precautions in using balance- sources of error in weighing-correction for buoyancy, temperature effects - calibration of weights.

UNIT – II Gravimetric Analysis

2.1. Principle- theories of precipitation- solubility product and precipitation - factors affecting solubility. Conditions of precipitation- co-precipitation & post precipitation, reduction of errors. Precipitation from homogeneous solution- washing and drying of precipitate.

2.2. Choice of the precipitant- Specific and Selective precipitants-, Anthranilicacid, Cupferon, Dimethylglyoxime,

Ethylenediamine, 8-Hydroxyquinoline, Salicylaldoxime, - Use of masking agent.

2.3. Crucibles- types, care and uses. Calculations in gravimetric analysis- use of gravimetric factor.

UNIT - III

Chromatographic Techniques

3.1 Column Chromatography- principle, types of adsorbents, preparation of the column, elution, recovery of substances and applications.

3.2 TLC- principle, choice of adsorbent and solvent, preparation of chromatoplates, R_f -values, factors affecting the R_f-values. Significance of R_f-values.

3.3 Paper Chromatography- principle, solvents used, development of chromatogram, ascending, descending and radial paper chromatography. Paper electrophoresis- separation of amino acids and other applications.

3.4 Ion-exchange chromatography- principle- types of resins- requirements of a good resin- action of resins- experimental techniques- separation of Na-K, Ca-Mg, Co-Ni, and Chloride-Bromide. Analysis of milk and apple juice.

3.5 Gas Chromatography (GC)- principle- experimental techniques- instrumentation and applications.

3.6 High Pressure Liquid Chromatography (HPLC)- principle- experimental techniques- instrumentation and advantages.

UNIT IV

4.1. Thermoanalytical Methods

Principle - thermogravimetric analysis and differential thermal analysis-discussion of various components with block diagram-TGA & DTA curves of $CuSO_4.5H_20$, $MgC_20_4.\ H_20$ and $Ca\ (OOCCH_3)_2.H_20$-

Simultaneous DTA-TGA curves of $SrCO_3$ in air and $CaC_2O_4.H_2O$ in air and in CO_2- factors affecting TGA & DTA curves.

Thermometric titrations-principle- apparatus- applications.

UNIT- V

Electro Analytical Method

5.1 Polarography- principle, concentration polarization, dropping mercury electrode (DME)- advantages and disadvantages- migration, residual, limiting and diffusion currents- Use of supporting electrolytes-Ilkovic equation (derivation not required) and significance- experimental assembly- current voltage curve- oxygen wave-influence of temperature and agitation on diffusion layer. Half wave potential ($E_{1/2}$)- Polarography as an analytical tool in quantitative and qualitative analysis.

5.2 Amperometric titrations – Basic principle – titrations- advantages, disadvantages – applications.

MODEL QUESTION PAPER

Periyar University

B.Sc. Chemistry

Fifth Semester

Elective paper – II

Analytical chemistry: 08UCHE02

Time : Three hours. Maximum:75 marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Define significant numbers and give one example.
2. What are safety measures in handling acids and alkalies?
3. Define gravimetric factor and give one example.
4. What are the types of crucibles?
5. What is adsorption chromatography?
6. What is Rf-value?
7. What are the factors that influence thermogram?
8. What are the principles of TGA?
9. Define migration current?
10. Write Ilkovic equation.

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Explain single pan balance.

(or)

b) Write methods of disposal of chemical wastes.

12. a) Write application of solubility product principle in gravimetric analysis.

(or)

b) What are conditions of precipitation?

13. a) Write the principle of TLC?

(or)

b) Write the importance of solvents in chromatography techniques.

14. a) What are applications of TGA?

(or)

b) Draw and explain TG-curve for calcium oxalate monohydrate.

15. a) What are the advantages of DME?

(or)

b) Explain concentration polarisation.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. a) Write the importance of analytical methods in qualitative and quantitative analysis.

b) What are the types of errors in analytical measurements ?

17. a) Discuss the choice of precipitant in gravimetric analysis.

b) Give the conditions for precipitation.

18. a)Explain the separation technique in Ion-exchange chromatography

b) Discuss the principles and experimental details of HPLC.

19. Explain Thermometric Titrations and its applications.

20. A) Discuss applications of polarography in qualitative and quantitative analysis.

b) What are the advantages of Amperometric titrations?

B.Sc.CHEMISTRY-FIFTH SEMESTER

SKILL BASED ELECTIVE COURSE -III

PAPER CODE -08UCHS 03

Internal assessment marks :25 External Marks :75

AGRICULTURAL CHEMISTRY (30 Hours)

UNIT – I

Fertilizers : Effect of Nitrogen, potassium and phosphorous on plant growth – commercial method of preparation of urea, triple superphosphate. Complex fertilizers and mixed fertilizers – their manufacture and composition. Secondary nutrients – micronutrients – their function in plants.

UNIT – II

Manures : Bulky organic manures – Farm yard manure – handling and storage-oil cakes- blood meal – fish manures.

UNIT – III

Pesticides and Insectides :

Pesticides – classification of Insecticides, fungicides, herbicides as organic and inorganic – general methods of application and toxicity. Safety measures when using pesticides.

Insecticides : Plant products – Nicotine, pyrethrin – Inorganic pesticides – borates. Organic pesticides – D.D.T. and BHC.

UNIT – IV

Fungicides and Herbicides :

Fungicide : Sulphur compounds, Copper compounds, Bordeaux mixture.

Herbicides : Acaricides – Rodenticides. Attractants – Repellants. Preservation of seeds.

UNIT – V

SOILS -Classification and properties of soils –soil water,soil temperature,soil minerals, soil acidity and soil testing.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Chemistry

Fifth Semester

SBEC-III Code : 08UCHS03

Agricultural Chemistry

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Give any two properties of soil.
2. How the acidity of the soil can be tested?
3. What are fertilizers?
4. Mention any four nitrogen fertilizers.
5. Mention any four micro nutrients in plant growth.
6. What are blood meal & fish manures?
7. Define pesticides?
8. Mention any two herbicides.
9. Give the structure of nicotine.
10. Define acaricides: give one example.

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Give the properties of soil.
    (or)
    b) Write a note on soil testing.

12. a) Explain the effect of nitrogen on plant growth.
    (or)
    b) Give the preparation of urea.

13. a) Write a note on bulky organic manure.
    (or)
    b) What are the functions of micro nutrients in plants?

14. a) Give the differences between fertilizers and manures.
    (or)

b) Describe the handling practices of manures.

15. a) Write a note on toxicity.

(or)

b) Give the preparation of Bordeaux mixture.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. Give a brief account on characteristics and properties of soil.

17. a) Write notes on primary and secondary nutrients.

b) Give the preparation of triple superphosphate.

18. a) How are insecticides and fungicides useful in plant growth.

b) Give the preparation of DDT and mention its uses.

19. a) What are the safety measures in handling pesticides?

b) Give the preparation of BHC and mention its uses.

20. Discuss various methods of preservation of seeds.

B.Sc.CHEMISTRY-FIFTH SEMESTER

SKILL BASED ELECTIVE COURSE -IV

PAPER CODE -08UCHS 04

Internal assessment marks :25 External Marks :75

DYE STUFFS AND TREATMENT OF EFFLUENTS (30 Hours)

UNIT-I

1.1.Quinonoid Dyes-Examples and structure-Anthroquinone and Mordant Dyes-Synthesis and Applications of Alizarin-Phthalocyanin dyes-Copper Phthalocyanin-Synthesis and Applications.

UNIT-II

2.1. Diphenylmethane Dyes- Auramine-Triphenylmethane Dyes-Malachite Green,Crystal Violet,Pararosaniline-Preparation and applications.

2.2.Indigo Dyes-Preparation and application-Derivatives of Indigo-Synthesis and uses of Indigosol and tetrahaloindigo.

UNIT-III

3.1.Phthalein Dyes-Phenolphthalein- Preparation and applications

3.2.Xanthein Dyes-Rhodamine B,Fluorescein-Eosin- Preparation and applications.

UNIT-IV

4.1.Acridine Dyes-Proflavin,Acriflavin, Acridineviolet- Preparation and applications

4.2.Cyanine,Isocyanine and Carocyanine Dyes- Preparation and uses of Quinoline blue,Ethyl red,Sensitol red.

UNIT-V

5.1.Textile Effluent-Characteristics,effect of untreated effluent,degradability of wastes.Effluent treatment plants-Aerated lagoon,photo oxidation process.

References:

1.B.K.Sharma-“Industrial Chemistry”,Goel Publishing co,1997

2.R.Chatwal “Synthetic Dyes”-Himalayan Publishing House,1995

3.R.S.Prayag-“Dyeing of wool,silk and man made fibres.

4.V.A.Shenai,”Chemistry of Dyes and Principles of Dyeing.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Chemistry

Fifth Semester

SBEC-IV Code : 08UCHS04

Dye stuffs and treatment of Effluents

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. What are quininoid dyes? Give an example.
2. Give the structure of alizarin.
3. Mention the structure of auramine and give its use.
4. Give the structure of crystal violet and mention its use.
5. What is the structure of phenolphthalein? What is its application?
6. What is eosin? Give its structure.
7. What are acridine dyes? Mention one of its application.
8. Give the structure of quinoline blue.
9. What are degradable wastes?
10. How textile effluent can be treated?

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Give the preparation of alizarin and mention its application.

(or)

b) Give any one method of preparation of copper phthalocyanine.

12. a) Give the preparation of malachite green.

(or)

b) How is pararosaniline prepared? What is its use?

13. a) Give the preparation of fluorescein.

(or)

b) Mention the preparation of RhodamineB and give its application.

14. a) How is acridine violet prepared?

(or)

b) Mention the preparation of ethyl red.

15. a) Give the characteristics of textile effluent.

(or)

b) Explain photo oxidation process.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. a) What are mordant dyes?

b) Give any two methods of preparation of copper phthalocyanine.

c) Mention its uses.

17. Give the preparation and uses of Indigo.

18. Give the preparation and uses of phenolphthalein.

19. a) What are carbocyanines?

b)Give the preparation and uses of sensitolred.

20. a) Mention the effects of untreated textile effluents.

b) Write note on degradability of wastes.

B.Sc.CHEMISTRY-SIXTH SEMESTER

Core Chemistry Major Paper –VII

Paper code : 08UCH07

Internal assessment :25 marks External Marks :75

INORGANIC CHEMISTRY - (60 Hours)

UNIT-I

1.1. Bioinorganic Chemistry-Essential and trace elements in Biological processes- Biological role of Haemoglobin and Chlorophyll (elementary idea of structure and mechanism of their action)

1.2. Metal carbonyls-Bonding in carbonyls-Mono and binuclear Carbonyls of Ni, Fe, Cr, Co and Mn-Hybridisation and structure. Preparation, properties and uses.

1.3. Silicates-classification and structure–examples. Composition, properties and uses of beryl, asbestos, talc, mica, feldspar, ultramarines and zeolite.

UNIT II

2. Organometallic compounds

2.1. Definition-classification-ionic, σ-bonded and non classically bonded organometallic compounds-examples- nature of carbon-metal bond.

2.2. General methods of preparation – formation by addition and substitution reactions. General properties of organometallic compounds -physical and chemical characteristics.

2.3. Organometallic compounds of Lithium & Boron-preparation, properties, structure and uses.

2.4. Olefin complexes –Zeise's salt –synthesis and structure

2.5.Cyclopentadienyl complexes -Ferrocene-preparation,properties, structure and uses.

2.6. Uses of organometallic compounds.

UNIT-III

3.1. Solids: Band theory of conductors , semiconductors and insulators

3.2. Bragg's law and application of X-ray diffraction to crystal studies-structure of NaCl, LiCl and ZnS.

3.3. Imperfections in a crystal-Outline of Schottky defects, Frenkel defects, metal excess and metal deficiency defects and line defects.

UNIT IV - Some Special compounds

4.1.Hydrides of Boron- -general methods of preparation of Boranes,properties of Boranes-Structure of Diborane and higher Boranes (B_5H_9,B_5H_{11}, $B_{10}H_{14}$)

4.1.1.Classification and structure of carboranes.

4.1.2.Boron Nitride-Borazole-metal Borides (elementary idea)

4.2.Interhalogen Compounds-Naming of the compounds-Types.Preparation,properties,structure and uses of ICl,BrF_3 IF_5,IF_7.Basic properties of Iodine.

4.3.Pseudohalogens-Definition,similarities and dissimilarities between halogen and pseudohalogen,cyanogens,thiocyanogen-Preparation,properties and uses.

UNIT V

5.1. Symmetry Elements and Symmetry operations – point groups-point groups of simple molecules like H_2, HCl, CO_2, H_2O, BF_3, NH_3,CH_2Cl_2, $[PtCl_4]^{2-}$, PCl_5, Cis and trans isomers of [$Pt(NH_3)_2 Cl_2$]

5.2. Magnetic properties of molecules: Magnetic susceptibility. Types of magnetic behaviour- diamagnetism and paramagnetism, Temperature and magnetic behaviour, Ferromagnetism and antiferromagnetism-Temperature independent paramagnetism-determination of magnetic moment using Guoy Balance-Applications of magnetic measurements

5.3. Nano materials –an elementary study.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Degree Examination

Sixth Semester

B.Sc. Chemistry – Major core paper – VII

Inorganic Chemistry Code : 08UCH07

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Write the structures of Hemoglobin and chlorophyll.
2. Write the hybridisation and structure of $Ni(CO)_4$.
3. What are ionic organometallic compounds?
4. How is organometallic compound prepared by addition method?
5. What is Frenkel defect in crystal?
6. Define and give an example for an insulator.
7. Define symmetry elements.
8. Define magnetic susceptibility.
9. What is Inorganic Benzene ?
10. What are Carboranes?

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Write the preparation, Structure and properties (any two) of $Fe(CO)_5$.

(or)

b) Explain the bonding in Metallic carbonyls.

12. a) How is ferrocene prepared? Mention some of its physical properties.

(or)

b) Write the applications of organometallic compounds.

13. a) Explain the Band theory of conductors.

(or)

b) Deduce the structure of NaCl crystal using x-ray analysis.

14. a) Write the point groups for NH_3 and H_2O.

(or)

b) Distinguish Ferromagnetism and Antiferromagnetism.

15. a) Write the basic property of Iodine.

(or)

b) Write the preparation, properties and structure of IF_5.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. How are silicates classified?Give example and structure for each type.

17. a) Write the preparation, properties, structure and uses of Lithium organometallic compounds.

b) How is zeise salt synthesized ?

18. a) Deduce the ZnS structure.

b) Outline the schottky defects in crystals.

19. a) How is magnetic moment of a material is determined with Guoy Balance?

b) Write a short note on Nano materials.

20. a) Distinguish pseuodo halogen and Interhalogen compounds .

b) How is diborane prepared and explain its structure?

B.SC.CHEMISTRY-SIXTH SEMESTER

Core Chemistry Major Paper –VIII

Paper code : 08UCH08

Internal assessment :25 marks External Marks :75

ORGANIC CHEMISTRY - (60 Hours)

UNIT I

1. Carbohydrates-I

1.1. Classification.

1.2. Monosaccharides-Reactions of Glucose and Fructose-osazone formation.

1.3. Constitution of glucose and fructose-open chain structure-Configuration and ring structure-mutarotation-determination of ring size.

1.4. Haworth's projection formulae and conformation of monosaccharides.

UNIT II

2. Carbohydrates II

2.1. Interconversions of monosaccharides-epimerisation-conversion of pentose to hexose and vice versa-aldose to ketose and vice versa.

2.2. Disaccharides-structural elucidation of sucrose and maltose.

2.3. Polysaccharides-structure of starch and cellulose-properties-derivatives of cellulose.

UNIT III

3. Vitamins and antibiotics

3.1. Vitamins-occurrence and biological importance of Vitamin A, Thiamine, Riboflavin, Pyridoxin and Ascorbic acid. – Synthesis and structural elucidation of thiamine, pyridoxine and ascorbic acid.

3.2. Antibiotics-structural elucidation of penicillin G and chloromycetin.

UNIT IV

4. Molecular rearrangements.

4.1. Classification as anionotropic, cationotropic , intermolecular and intramolecular.

4.2. Mechanisms of pinacol-pinacolone, Beckmann, benzidine, Hofmann, Curtius, Lossen, Schmidt, benzilic acid, Fries and Cope rearrangements.

UNIT V

5. Important reagents and their applications in organic chemistry – $AlCl_3$, BF_3, $LiAlH_4$, $NaBH_4$, PCl_5 ,P_20_5,Na/ethanol, alcoholic KOH, H_2/Ni, H_2/Pd-$BaS0_4$, Zn/Hg-HCl, H_2N-NH_2/C_2H_5ONa, Ag_2O, HIO_4, Lead tetra acetate and Osmium tetroxide.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Degree Examination

Sixth Semester

B.Sc. Chemistry – Major core paper – VIII

Organic Chemistry Code : 08UCH08

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Mention the number of asymmetric carbons in the open chain of glucose.
2. What is mutarotation?
3. Show that sucrose is a non-reducing sugar.
4. What are polysaccharides? Give one example.
5. What are antibiotics? Write any two antibiotics.
6. Write the structures of Thiamine and Penicillin -G.
7. Give any one thermal rearrangement. Mention its type.
8. Give any two rearrangements in which 1:2 shift occurs.
9. What is the use of H_2/Ni in Organic reactions?
10. What happens when naphthalene is heated with sodium and ethanol?

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Write a detailed account on the classification of carbohydrates.

(or)

b) Write any five reactions of fructose.

12. a) What are epimers? Give example with their structure.

(or)

b) What are the important industrial applications of cellulose?

13. a) Give a method of synthesis of ascorbic acid.

(or)

b) i) Why is it that penicillin is not administered orally?

ii) Write the occurrence and biological importance of Riboflavin .

14. a) Write notes on Schmidt rearrangement.

(or)

b) Explain Hofmann rearrangement.

15. a) Write any five reactions with PCl_5 as a reagent.

(or)

b) Explain the mechanism of LiAl H_4 reduction and compare it with $NaBH_4$ reduction.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. a) Discuss the constitution of glucose.

17. a) How is glucose converted to fructose?

b) Discuss the structure of Starch.

18. a) Briefly explain the biological importance of pyridoxine.

b) How is chloromycetin structure established ?

19. a) Discuss the Pinacol – Pinacolone rearrangement.

b) Give the mechanism of Benzidine reanangement.

20. Give the functions of the following reagents and their use in organic chemistry.

1. P_2O_5
2. Zn/Hg-HCl
3. Ethanolic KOH
4. H_2/Pd – $BaSO_4$
5. Osmium tetroxide.

B.Sc.CHEMISTRY-SIXTH SEMESTER
Core Chemistry Major Paper –IX

Paper code : 08UCH09

Internal assessment :25 marks External Marks :75

PHYSICAL CHEMISTRY - (60 Hours)

UNIT-I

Phase Rule

Definition of terms-Derivation of phase rule -One component systems-H_2O system, Sulphur system – explanation using Clausius - Clapeyron equation-supercooling and sublimation.

Two component systems-solid liquid equilibria-reduced phase rule – simple eutectic systems-Ag-Pb only-Compound formation with congruent melting point-Mg-Zn system only.

Peritectic change-$FeCl_3$-H_2O system, KI-H_2O system-effloresence-deliquescence.

C.S.T-phenol water system only. Effect of impurities on CST.

UNIT – II

2.1. Electro chemistry

2.2.1. Metallic and electrolytic conductance –Definitions of specific, equivalent and molar conductances – Relations between them – measurement of conductance and cell constant.

2.2.2. Variation of conductance with dilution – Qualitative explanation – Strong and weak electrolytes.

2.2.3. Migrations of ions – transport number – determination by Hittorf and moving boundary methods – Kohlrausch's law – applications – calculation of equivalent conductance for weak electrolytes and determination of transport number.

2.2.4. Ionic mobilities and Ionic conductances.Diffusion and ionic mobility- molar ionic conductance and viscosity- Walden rule.

2.2.5. Applications of conductance measurements – Degree of dissociation of weak electrolytes – Determination of Ionic product of water – Determination of solubility of sparingly soluble salts – conductometric titrations.

UNIT – III

3.1. Theory of strong electrolytes – Debye – Huckel – Onsager theory – verification of Onsager equation – Wien and Debye – Falkenhagen effect.

3.1.1. Activity and activity co-efficients of strong electrolytes – ionic strength.

3.1.2. Ostwalds dilution law – determination of dissociation constants – Ionic product of water – pH value.

3.2.1. Buffer solution – Henderson's equations – uses of Buffers including living systems – common ion effect – solubility product principle – relation to solubility – Applications in qualitative and quantitative analysis.

3.2.2. Hydrolysis of salts – expression for hydrolysis constant – Degree of hydrolysis and pH of salt solutions for different types of salts – Determination of Degree of hydrolysis – conductance and distribution methods.

UNIT – IV

4.1. Galvanic cells – Reversible and Irreversible cells – EMF and its measurement – Weston Standard cell – types of reversible single electrodes – standard Hydrogen electrode – calomel electrode – Derivation of Nernst equation both for emf of cells and single electrode potentials – Nernst theory for single electrode potential – standard reduction potentials – electro chemical series – significance.

4.2. Application of emf measurements – Application of Gibbs – Helmholtz equation to galvanic cells – calculation of thermodyamic quantities – pH using hydrogen, quinhydrone and glass electrodes – potentiometric titrations.

UNIT - V

5.1. Concentration cells with and without transference – LJP expression – applications of concentrations cells – valency of ions – transport number – solubility product – activity coefficient.

5.2. Storage cells – Lead storage battery – mechanism of charging and discharging fuel cells – hydrogen – oxygen cell – polarization – over voltage- decomposition voltage.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Degree Examination

Sixth Semester

B.Sc. Chemistry – Major core paper –IX

Physical Chemistry Code : 08UCH09

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions:

1. How many components are present in the systems
   a) KCl-NaCl-H_2O
   b) KCl-NaBr-H_2O
2. Give an example each for the substance which can undergo
   a) efflorescence b) deliquescence
3. The resistance of 0.01M solution of an electrolyte was found to be 210 ohm at 25^0C. Calculate molar conductance of the solution at 25^0C? Cell constant is $0.88cm^{-1.}$
4. What is Walden's Rule for the mobility of an ion?
5. Calculate ionic strength of a solution which is 0.1 molal in NaCl and 0.01 molal in $CaCl_2$ assuming complete ionization.
6. Calculate the pH of $3.2x10^{-3}$m $Ba(OH)_2$ in water at 25^oC?
7. Write the cell reaction for the cell Zn, Zn^{2+}(1M)‖ Fe^{2+}(1M) Fe^{3+}(1M): pt.
8. Give an example each for reversible and irreversible cells.
9. Give an example each for concentration cell with and without transference.
10. What is over voltage?

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Explain silver-lead simple eutectic system.

(or)

b) Explain phenol- water system and the effect of impurity on CST.

12. a) How will you measure equivalent conductance of a solution by Wheatstone bridge method?

(or)

b) How will you determine transport number of H^+ in HCl using moving boundary method?

13. Explain a) Wein effect b) Explain Debye -Falkenhagen effect.

(or)

b) Define Henderson's equations for calculating pH for acidic and basic buffer?

14.a) Explain the function of Weston standard cell.

(or)

b) How will you determine pH of a solution using quinhydrone electrode?

15. a) Derive LJP expression at the junction of two electrolytic solution.

(or)

b) Write notes on a) polarization

b) decomposition voltage

Section C (3 x 10 = 30 Marks)

Answer any three questions:

16. Explain sulphur system using clausius clapeyron equation.

17. Explain types of conductometric titrations and draw the corresponding titration curves.

18. Derive the expression for hydrolysis constant, degree of hydrolysis and P^H for salt of weak acid and weak base.

19. a) Derive expressions for ΔG, ΔH and ΔS of a cell reaction thermo dynamically.

b) Derive Nernst equation.

20. Explain the working of a) Lead-storage battery.

b]Hydrogen-oxygen fuel cell.

SIXTH SEMESTER
Elective Paper –III

Paper code : 08UCHE03

Internal assessment :25 marks External Marks :75

PHARMACEUTICAL CHEMISTRY (75 Hours)

UNIT-I

1.1. Definition of the terms-drug, pharmacophore, pharmacodynamics, pharmacopoea, pharmacology, bacteria, virus, fungus, actinomycetes, metabolites, antimetabolites, LD50, ED50.

1.2. Therapeutic index-their use in selecting drugs-Assay of drugs-various methods.

UNIT-II

2.1. Sulphonamides-mechanism and action of sulpha drugs-preparation and uses of sulphadiazine, sulphathiazole, sulphapyridine and sulphafurazole.

2.2. Antibiotics-Definition-classification as broad and narrow spectrum antibiotics-penicillin, ciphalosporin, ampicillin, erythromycin-structure and mode of action only (no structural elucidation, preparation, assay)

UNIT-III

3.1. Analgesics-definition and actions-narcotic and non narcotic-morphine and its derivatives-pethidine and methodone-pharmacological action-uses-Heroin and codeine.

3.2. Antipyretic analgesics-salicylic acid derivatives-methyl salicylate, aspirin, p-aminophenol derivatives-paraacetamol, phenacetin and ibuprofen.

UNIT –IV

4.1. Antiseptics and disinfectants – definition and distinction-phenolic compounds-Dyes - crystal violet, acridine, Chloro compound-chlorhexidine, Cationic surfactants-Benzalkonium chloride, formaldehyde and nitrofurazone.

4.2. Anaesthetics-definition-classification-local and general-volatile, nitrous oxide, ether, chloroform, cyclopropane-uses and disadvantages – nonvolatile – intravenous - thiopental sodium, methohexitone, propanidid-local anaesthetics -cocaine and benzocaine.

4.3. Antianaemic drugs-iron, vitamin B12 and folic acid-mode of action

UNIT-V

5.1. Drugs affecting CNS-definition, examples for tranquilisers, sedatives, hypnotics, psychedelic drugs-chlorpromazine and its derivatives, barbitone.

5.2. Hypoglycemic agents-sulphonyl urea, biguanides.

5.3. Cancer therapy-mode of action of thiotepa, cyclophosphoramide, cisplatin, 5-flurouracil ,use of phytochemicals in cancer therapy-Taxol ,Vincrystin.

5.4. AIDS-causes, prevention and control.

5.5. Indian medicinal plants and uses-tulasi , kilanelli, mango, semparuthi,adadodai and thoothuvalai

Periyar University

B.Sc. Chemistry

Sixth Semester

Elective paper-III

Pharmaceutical chemistry 08UCHEO3

Time : Three hours. Maximum:75 marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Define the term drug and give one example.
2. What are the differences between virus and fungus?
3. Define antibiotics and give one example.
4. What are sulpha drugs?
5. Define analgesics and give one example.
6. Write uses of Heroin.
7. Define antiseptics and give one example.
8. Write the differences between Antiseptics and Disinfectants.
9. Define Transquilisers and give one example.
10. Write the differences between Sedatives and Hypnotics.

Section B (5 x 5 = 25 Marks)

Answer All Question

11. a) Note on 1) Pharmacophore 2) Pharmacopoca

(or)

b) 1) LD 50 2) ED 50

12. a) Write uses of different Sulpha Drugs.

(or)

b) Write about classifications of broad and narrow spectrum antibiotics.

13. a) Write about actions of narcotic and non-narcotic morphines.

(or)

b) Write about action and uses of Heroin and Codinine.

14. a) Write about anaesthetics and its classification.

(or)

b) Write a note on uses and disadvantages of non-volatile anaesthetics.

15. a) Explain: Hypoglycemic agents.

(or)

b) Explain: Cancer Therapy.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. a) Write in detail about therapeutic index and their use in selecting drugs.

17. Note on a) Penicillin.

b) Ampicillin

c) Sulphapyridine.

18. Explain Antipyretic analgesics and its uses.

19. Write a note on a) Antianaemic drugs-iron.

b) Vitamin B I2

c) Folic acid.

20. Note on a) AIDS.

b) Indian Medicinal Plants.

B.Sc.CHEMISTRY

SIXTH SEMESTER

SKILL BASED ELECTIVE COURSE -V

PAPER CODE -08UCHS 05

Internal assessment marks :25 External Marks :75

SPECTROSCOPY-I (30 Hours)

UNIT-I

1.1.Definition of spectrum.Electromagnetic radiation,quantization of different forms of energies in molecules (translational,rotational and electronic) Born Oppenheimer approximation.

1.2.Microwave spectroscopy-theory of microwave spectroscopy, selection rule.Calculation of moment of inertia and bond length of diatomic molecules.

UNIT-II

2.1. U.V-VISIBLE Spectroscopy-Types of electronic transitions.pre-dissociation spectra and dissociation energy.Applications-Beer's-Lambert's law-O.D.,chromophore,oxochrome,bathochromic and hypsochromic shifts-Instrumentation.

UNIT-III

3.1.I.R.Spectroscopy-principles-modes of vibration of diatomic,triatomic linear (CO_2) and non-linear triatomic molecules(H_2O)-stretching and bending vibrations-selection rules.Expression for vibrational frequency(derivation not needed)

UNIT-IV

4.1. I.R.Spectroscopy-instrumentation-sampling techniques. Applications.

UNIT-V

5.1.Raman spectroscopy-condition-Rayleigh and Raman scattering,stokes and antistokes lines.Differences between Raman and I.R.Spectroscopy.Rotational Raman spectra of Non-centrosymmetric molecules(HCl). Mutual exclusion principle (CO_2 and N_2O)

Periyar University Salem

SEMESTER-VI

B.Sc. Chemistry

Skill based elective course – V

SPETROSCOPY-1 Code :08CHS05

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. State Beer Lamberts Law.
2. Define optical Density.
3. Explain stark effect.
4. Why pure rotational spectra studied only in gaseous state of atoms and molecules?
5. What are chromophores and auxochromes?
6. Explain the term bathochromic shift with an example.
7. Draw the vibrational modes of CO_2.Which vibration is IR active?
8. Define Zero point energy.
9. What are stokes and anti stokes lines?
10. Explain the term depolarisation factor.

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Explain the reason for deviation of Beer's law.

(or)

b) List the various criteria for satisfactory colorimetric estimation.

12. a) What are the limitations of micro wave spectroscopy?

(or)

b) Explain the basic principle of microwave spectroscopy.

13. a) Explain various types of electronic transitions possible in a molecule. (or)

b) Explain Franck-Condon principle.

14. a) Explain how hydrogen bond is detected by IR spectroscopy.

(or)

b) Explain any two factors affecting vibrational frequency of a molecule.

15. a) What is LASER? What are its advantages.

(or)

b) Explain 1. Rayleigh Scattering

2. Mutual exclusion principle.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. Explain how Iron is estimated by colorimetric method.

17. Explain how diatomic molecule acts as a rigid rotator.

18. Explain any 2 types of detectors used in UV spectrometry.

19. Explain the instrumentation and operation of a IR spectrometer.

20. List the difference between IR and Raman spectroscopy .

B.Sc.CHEMISTRY

SIXTH SEMESTER

SKILL BASED ELECTIVE COURSE -VI

PAPER CODE -08UCHS 06

Internal assessment marks :25 External Marks :75

SPECTROSCOPY-II(30 Hours)

UNIT I- ^{1}HNMR Spectroscopy

1.1. NMR Spectroscopy-principle of nuclear magnetic resonance – basic instrumentation- number of signals-chemical shift- shielding and deshielding-spin-spin coupling and coupling constants-TMS as NMR standard.

UNIT II

2.1. Interpretation of NMR spectra of simple organic compounds such as Acetone, Anisole, Benzaldehyde, Ethyl acetate, Ethylamine, Ethyl Bromide, Toluene and Isopropyl phenyl ketone.

UNIT III - Mass spectroscopy

3.1.Mass spectroscopy-Basic principles- instrumentation-molecular ion peak, base peak, metastable peak, isotopic peak- their uses. Nitrogen rule- ring rule- fragmentation.

UNIT IV

4.1. Interpretation of mass spectra of simple organic compounds such as Acetone, Anisole, Benzaldehyde, Ethyl acetate, Ethylamine, Ethyl Bromide,Toluene and Isopropyl phenyl ketone.

UNIT V

5.1.E.S.R.Spectroscopy-condition-theory of esr spectra-hyperfine splitting-esr spectra of simple radicals CH_3,CD_3,Naphthalene radical ions only.

Periyar University Salem

SEMESTER-VI

B.Sc. Chemistry

Skill based elective course – VI

SPETROSCOPY-1I Code :08CHS06

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Write the resonating conditions for NMR.
2. Define chemical shift.
3. What are shift reagents?
4. Define coupling constant.
5. What is Base peak?
6. Define Nitrogen rule.
7. What is mass spectrum?
8. Explain Meta Stable ion.
9. Define Bohr magneton .
10. Explain the role of DPPH as internal standard.

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Explain shielding mechanism.
    (or)
    b) Write a note on hydrogen exchange.

12. a) How NMR is useful to detect the isomers of C_3H_6O?
    (or)
    b) What are advantages of TMS as internal standard?

13. a) Write a note on chemical ionization.
    (or)
    b) Explain the basic principle of a mass spectrometer.

14. a) Write a note on Mclafferty rearrangement pattern.
    (or)
    b) Explain the fragmentation in simple alcohols.

15. a) What are the differences between NMR and ESR?

(or)

b) Explain hyperfine splitting.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. Explain the factors affecting chemical shift .

17. Explain the instrumentation of NMR Spectroscopy.

18. How will you determine the molecule formula of a simple organic molecule by mass spectroscopy?

19. Write in detail

a) Molecular Ion

b) Satellite peak

c) Leak detection

d) Fragmented Ion

e) Ring rule

20) a) Explain how ESR study is used for study of methyl radical .

b) Write a note on g value.

B.Sc. DEGREE

BRANCH IV-CHEMISTRY

CORE PRACTICAL-I

PAPER CODE: -08UCHP 01

Internal Assessment Marks:40 External marks :60

PRACTICAL – I VOLUMETRIC ESTIMATIONS

1. **Acidimetry – Alkalimetry :**
   a) Estimation of sodium hydroxide – standard sodium carbonate.
   b) Estimation of Oxalic acid –Std Oxalic acid.
2. **Permanganometry**
   a) Estimation of ferrous iron . Standard Oxalic acid.
3. **Dichrometry**
   a) Estimation of ferrous iron using diphenylamine internal indicator .
4. **Iodometry and iodimetry**
   a) Estimation copper
   b) Estimation of potassium dichromate
   c) Estimation of Arsenious oxide
5. **Argentimetry**
   a) Estimation of chloride in neutral medium.
6. **Complexometric Titrations**
   a) Estimation of Zn and Mg using EDTA.

PERIYAR UNIVERSITY

B.Sc.DEGREE EXAMINATIONS

PRACTICAL MODEL QUESTION PAPER

Name of the Course : B.Sc.Chemistry

Major Core Practical I-08UCHP01

Name of the Title : Volumetric Estimations

Time : 3 hours Maximum Marks : 60

PRACTICALS : 70 Marks
RECORD : 10 Marks

Estimate Volumetrically the amount of _____ present in the whole of the given solution. You are provided with _____ and a suitable link solution. Get the titre values attested by the examiners.

B.Sc. DEGREE

BRANCH IV-CHEMISTRY

CORE PRACTICAL-II

PAPER CODE: -08UCHP 02

Internal Assessment Marks:40 External marks :60

PRACTICAL – II INORGANIC QUALITATIVE ANALYSIS AND INORGANIC PREPARATIONS

1. Inorganic qualitative analysis : 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 adopted.

   Anions to be studied : Carbonate, sulphide, sulphate, nitrate, fluoride, chloride, bromide, borate, oxalate, arsenite, phosphate, Cations to be studied : lead, bismuth, copper, cadmium, antimony, arsenic, iron,manganese, aluminium,cobalt, nickel, zinc, barium, strontium, calcium, magnesium and ammonium.

2. Inorganic preparations :
   a) Sodium thiosulphate
   b) Ferrous ammonium sulphate
   c) Potassium trioxalatochromate (III)
   d) TetrammineCopper (II) sulphate
   e) Microcosmic Salt

PERIYAR UNIVERSITY

B.Sc.DEGREE EXAMINATIONS

PRACTICAL MODEL QUESTION PAPER

Name of the Course :__B.Sc.Chemistry-Major

Core Practical II - 08UCHP 02

Name of the Title : Inorganic Qualitative Analysis & Inorganic preparations

Time : 3 hours Maximum Marks : 60

1.Analyse systematically the given Inorganic mixture containing two acid radicals and two basic radicals,one acid radical being interferring one.

Record your observations and inferences then and there. Exhibit confirmative tests for each radical for evaluation.

2.Prepare the maximum quantity of _____ from the given simple salts. Recrystallise a portion and submit both for evaluation.

B.Sc. DEGREE

BRANCH IV-CHEMISTRY

CORE CHEMISTRY MAJOR PRACTICAL-III

PAPER CODE: -08UCHP 03

Internal Assessment Marks:40 External marks :60

PHYSICAL CHEMISTRY PRACTICALS

1. Distribution Law :
   a) Partition coefficient of iodine between water and carbon tetrachloride.
2. Kinetics
   a) Determination of rate constant – Acid catalysed hydrolysis of an ester (methyl acetate or ethyl acetate)
   b) Determination of rate constant for the reaction between potassium iodide and potassium persulphate.
3. Molecular weight determination –Rast method.
4. Heterogenous Equilibrium
   a) Effect of impurity on CST of phenol – water system and determination of concentration of sodium chloride / succinic acid.
   b) Simple eutectic system- Naphthalene – Diphenyl.
   c] Determination of transition temperature of hydrated salts: sodium thiosulfate, sodium acetate, strontium chloride and manganous chloride.
5. Electrochemistry :

a) Conductivity
   i) Determination of cell constant
   ii) Equivalent conductance of strong and weak electrolytes
   iii) Conductometric titration- acid base titration

Potentiometry – Potentiometric titration – acid-base titration.

PERIYAR UNIVERSITY

B.Sc.DEGREE EXAMINATIONS

PRACTICAL MODEL QUESTION PAPER

Name of the Course:__B.Sc.Chemistry

Major Core Practical III-08UCHP 03

Name of the Title -Physical Chemistry practicals

Time : 3 hours Maximum Marks : 60

Choose any one of the questions given below by lot

1. Determine the rate constant of the acid catalyzed hydrolysis of the given ester at room temperature

2. Determine the molecular weight of the given solute. You are provided with a suitable solvent, whose K_f value is _____

3. Determine the transition temperature of the hydrated salt by thermometric method.

4. Determine the distribution coefficient of Iodine between Carbon tetrachloride and water at room temperature

5. Find out the concentration of the given sodium chloride solution. You are provided with pure phenol and 1% solution of Sodium Chloride.

6. Determine the rate constant of the reaction between Potassium Iodide and Potassium persulphate at room temperature.

7. Determine the molar depression constant K_f of the given solvent. You are provided with a solute of known molecular weight.

8. Determine the strength of the given Hydrochloric acid solution conductometrically using a standard Sodium Hydroxide solution.

9. Find out the cell constant of the given conductivity cell, using 0.1 M and 0.01 M potassium chloride solutions, whose specific conductivities are given. Determine the equivalent conductance of the two solutions of known concentration.

B.Sc. DEGREE
BRANCH IV-CHEMISTRY
CORE CHEMISTRY MAJOR PRACTICAL-IV
PAPER CODE: -08UCHP 04

Internal Assessment Marks:40 External marks :60

GRAVIMETRIC ESTIMATIONS and ORGANIC PRACTICALS

I.GRAVIMETRIC ESTIMATIONS

1.Estimation of Barium as Barium sulphate

2.Estimation of Barium as Barium chromate

3.Estimation of Lead as Lead chromate

4.Estimation of Calcium as Calcium oxalate monohydrate

5.Estimation Chloride as Silver chloride.

6.Estimation of Sulphate as Barium sulphate.

II A. ORGANIC QUALITATIVE ANALYSIS

1. Analysis of organic compounds.

Characterisation of organic compounds by their functional groups and confirmation by preparation of derivative. The following functional groups may be studied.

Aldehydes, Ketones, carboxylic acids, aromatic primary and secondary amines, phenol, aromatic ester, amide, diamide, anilide, nitro compounds and monosaccharides.

b.ORGANIC PREPARATIONS

1.Preparations involving the following :

a) Oxidation of benazldehyde

b) Hydrolysis of Methyl salicylate or ethyl benzoate.

c) Nitration – p-nitroacetanilide and m-dinitrobenzene

d) Bromination – p- bromoacetanilide and tribromophenol

e) Benzoylation — β-naphthylbenzoate

2.Determination of boiling point of liquids]

B.Sc.DEGREE EXAMINATIONS
PRACTICAL MODEL QUESTION PAPER
Name of the Course : B.Sc.Chemistry
Major Core Practical IV-08UCHP 04

Name of the Title : Gravimetric estimations and Organic Practicals

Time : 6hours Maximum Marks : 60

---

1. Estimate Gravimetrically the amount of _____ present in the whole of the given _____solution,by converting it into _____ Get the weighings attested by the Examiners.

2..a) Determine the Boiling Point of the given liquid.

(or)

b) Prepare maximum quantity of _____ from _____. Recrystallise a portion of it and submit the crude and recrystallised sample for evaluation.

3. Analyse the given organic compound and report on the following .

a) Whether aliphatic or aromatic.

b) saturated or unsaturated

c) Special elements present.

d) Functional group present

Submit a colour reaction or derivative in support of functional group present

TEXT BOOKS AND REFERENCE BOOKS

1. Inorganic Chemistry

1) Philips and Williams, Inorganic Chemistry, Oxford University press, Vol I and II.
2) Cotton and Wilkinson, Advanced Inorganic Chemistry Wiley Eastern Private Ltd.
3) Lee Von Nastrand J.D. Concise inorganic Chemistry.
4) Manku.G.S., Inorganic Chemistry Tata Mcgraw Hill.
5) Soni.P.L, Text Book of Inorganic Chemistry, Sultan Chand & Sons.
6) Puri and Sharma, Text book of Inorganic Chemistry-Vishal publishing co.
7) Madan.R.D., Inorganic Chemistry, S. Chand & Co.,
8) Dutta, Inorganic Chemistry, Science Book Association.
9) Dara.S.S, A text book of Environmental Chemistry and Pollution control- S.Chand & Co.,
10) Dr. C.Murthy , A Text book of Environmental Sciences, Sultan Chand & Sons
11) Anil Kumar De, Text Book of Environmental Chemistry, New Age International Ltd.,
12) Starley E. Manahan, Environmental Chemistry Brooks / Cole publishing company, Monterey, California.
13) A.G.Sharpe ,Inorganic Chemistry ,Pearson Education Ltd,Indian branch ,482 F.I.E. Patparganj, Delhi-110092.
14) Gurdeep Chatwaal ,Inorganic Chemistry , Goel Publishing House,New Delhi.

II. Organic Chemistry

1. Finar 1.L. Organic Chemistry, Vol I and II – ELBS.
2. Morrison and Boyd, Organic Chemistry, Allyn and Bacon Inc.
3. Solomons, T.W.G, Organic Chemistry, John Wiley.

4. Bhal. B.S, and Arun Bhal, A Text book of Organic Chemistry.
5. Soni.P.L., Text Book of Organic Chemistry, Sultan Chand and Sons.
6. Tiwari, Malhotra and Vishoni, Organic chemistry, Vol I and II , Vikas Publishing House.
7. Raj K. Bansal, A Text Book of Organic Chemistry, Wiley Eastern.
8. Singh, Mukarji and Kapoor, Organic Chemistry, Mac Millan.
9. Jain.M.K, Principles of Organic Chemistry-Vishal publishing Co.
10. Agarwal and Manivasagam -Reactions and Reagents- Pragati Prakashan
11. Kalsi.P.S, Stereo Chemistry conformation and mechanism, Wiley Eastern Ltd.,
12. Nasipuri.D, Stereo Chemistry of Organic Compounds, Wiley Eastern Ltd.,

III. Physical Chemistry

1. Glasstone.S, Text Book of Physical Chemistry, Mac Millian.
2. Glasstone and Lewis, Elements of Physical Chemistry, Mac Millan.
3. Maron and Lando, Fundamentals of Physical Chemistry, Collier, Mac Millan.
4. Castellan. G.W, Physical Chemistry, Naropa Publishing House.
5. Walter J. Moore, Physical Chemistry, Orient Longamann.
6. Rakshit.P.C, Physical Chemistry, Science Book Agency.
7. Bajapai. D.N, Advanced Physical Chemistry, S.Chand & Co.,
8. Gurudeep R. Chatwal, Physical Chemistry.
9. Jain. S, and S.P. Jauhar, Physical Chemistry – principles and problems, Tata McGraw Hill.
10. Glasstone, Thermodynamics for Chemists, Van Nostrand and Co.,
11. Rakshit, Thermodynamics, Science Book Agency.
12. Laidler.K.J, Chemical Kinetics, Harpet and Row New York.
13. Banwell, Fundamentals of Molecular spectroscopy Tata McGraw Hill.
14. Kundu and Jain, Physical Chemistry, S. Chand.
15. Text –book of physical chemistry, Vishal publishing Co
16. Nagi and Anand, Physical Chemistry – Wiley Estern.
17. Kapoor. K.L., Physical Chemistry, Mac, Millan.
18. Kuriacose and Rajaram, Chemical Thermodynmics, S. Nagin .
19. Latham.J.L, and Burgess.A.E, Chemical Kinectics, Butler worth.

IV. Analytical Chemistry

1. Bassett.J, Denney.R.C, Jaffery.G.H and Mendhan.J, Vogel's Hand Book of Quantitative Inorganic Analysis ELBS – Longman.
2. Furniss. B.S, Hannaform. A.J, Rogers.V, Smith.P.W.G, and Tatchell.A.R, Vogel's Text Books of Practical Organic Chemistry.
3. Douglas A, Skoog and Donal M. West Hort, Fundamentals of analystical Chemistry Rinechan and Winston Inc., New York.
4. Janarthanam.P.B, Physico – Chemical Techniques of Analysis Vol I & II – Asian Publishing House Bombay.
5. William Kemp, Organic Spectroscopy – ELBS.
6. Venkateswaran.V, Veerasamy.R, and Kulandaivelu.R, Basic Principles of Practical Chemistry.
7. Sharma.Y.R, Elementary Organic Spectroscopy, Principles and applications- S. Chand & Co.,
8. Gopalan.R, Subramaniam.P.S, and Rengarajan.K, Elemants of Analytical Chemistry – Sultan Chand & Sons.
9. Ramachandra Sastry.A, Analytical Chemistry – K.C.S. Desikan & Co.
10. Walter E Harris Brgron Kratochvil-An introduction to Chemical Analysis.

V. Pharmaceutical Chemistry

1. Singh.H and Kapoor.V.K, Vallabh Prakashan Organic Pharmaceutical Chemistry – New Delhi.
2. Bentley and Drivers, Pharmaceutical Chemistry.
3. Allion Chidambaram, Pharmaceutical Chemistry.
4. Chatwal, Organic Pharmaceutical Chemistry.
5. Jayashree Ghosh, S, Pharmaceutical Chemistry – Chand & Co.,
6. Chatwal, Inorganic Pharmaceutical Chemistry.
7. Wealth of India Raw materials (all volumes)- CSIR Publications

VI. Agricultural Chemistry

1. Brady.N.C, The Nature and properties of soils – Eruasia Publishing House (P) Ltd.,
2. Jones.V.S, Fertilizers and soil fertility – Prentice Hall of India, New Delhi.
3. Fracer.D.E.H, Chemistry of Pesticides – D.Van Nostrand Co.,

VII. Polymer Chemistry

1. Polymer Chemisry – M.G.Arora-Anmol Publications.New Delhi.
2. Text-Book of Polymer Science-F.N. Billmeyer-New Age International
3. Polymer Chemistry-an introduction-M.P.Stevens-Oxford.
4. TextBook of Polymer Science, F.W.Billmeyer Jr.Wiley.
5. Polymer Science, V.R.Gowarker, N.V.Viswanathan and J.Sreedhar, Wiley – Eastern.

ALLIED CHEMISTRY

Paper Code : 08UCHA 01

FIRST/ THIRD SEMESTER

PAPER-I

Internal Assessment Marks :25 External Marks-75

INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY-I (60 HOURS)

UNIT-I

1.1. Chemical Bonding

Molecular Orbital Theory-bonding, antibonding and nonbonding orbitals.

M.O. diagrams of Hydrogen, Helium, Nitrogen, Fluorine and Nitric Oxide-discussion of bond order and magnetic properties.

1.2. Hydrides-classification and characteristics - preparation, properties and uses of Borazole, $NaBH_4$ and $LiAlH_4$.

UNIT-II

Nuclear Chemistry

2.1. Natural radioactivity-radioactive series including Neptunium series-Group displacement law.

2.2. Nuclear Binding energy, mass defect-Calculations.

2.3.Nuclear Fission and Nuclear Fusion-differences – Stellar energy.

2.4. Applications of radioistopes-C-14 dating, rock dating, isotopes as tracers, study of Reaction mechanism (ester hydrolysis)

UNIT-III

3.1. Covalent Bond-Orbital Overlap-Hybridisation – Geometry of Organic molecules-Methane, Ethyleneand Acetylene

3.2. Electron displacement Effects: Inductive, Resonance, Hyper conjugative & steric effects. Their effect on the properties of compounds.

3.3. Stereoisomerism: Symmetry-elements of symmetry- cause of optical activity, Tartaric acid. Racemisation. Resolution. Geometrical isomerism of Maleic and Fumaric acids-Keto-enol tautomerism of Acetoacetic ester.

UNIT-IV

4.1. Aromatic compounds-Aromaticity-Huckel's rule

4.2. Electrophilic substitution in Benzene-Mechanism of Nitration, Halogenation-Alkylation, Acylation.

4.3. Isolation, preparation,properties and structure of Naphthalene Haworth's synthesis.

4.4. Heterocyclic compounds:- Preparation, properties and uses of Furan, Thiophene, Pyrrole and Pyridine.

UNIT-V

5.1. Solutions: Liquid in liquid type-Raoult's law for ideal solutions. positive and negative deviation from Raoult's law-Reasons and examples, Fractional distillation and Azeotropic distillation.

5.2. Chromatography: principle and application of column, paper and thin layer chromatography.

Periyar University Salem

B.Sc. Degree Examination

First/ Third Semester

Allied Chemistry Paper – I Code : 08UCHA01

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Define bond order.
2. What is inorganic benzene? How is it prepared?
3. What is radioactivity?
4. What are radioisotopes?
5. What is meant by resonance?
6. What is racemisation?
7. State Huckel's rule.
8. Why is pyridine basic?
9. State Raoult's law.
10. What are the Characteristics of ideal solutions?

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Explain the diamagnetism of nitrogen molecule on the basis of M.O. theory .

(or)

b) What are hydrides? How are they classified? Give one example.

12. a) Define and explain the term man defect.

(or)

b) Write a note on Binding energy.

13. a) How are sigma and pi bonds formed? How many σ and π bonds are there in ethyne and ethylene molecule?

(or)

b) Explain inductive effect with an example.

14. a) Write the mechanism of alkylation of benzene.

(or)

b) How is pyrrole prepared? Indicate two of its chemical properties.

15. a) Describe separation of liquids by fractional distillation.

(or)

b) Why is thin layer chromatography grouped under partition chromatography?

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. a) What do you understand by the terms bonding and non-bonding molecular orbitals?

Why are they so called? Illustrate with one example.

b) Discuss in detail any two methods of preparation of $NaBH_4$ and indicate three of its chemical properties.

17. a) What are the differences between nuclear fission and nuclear fusion ?

b) Discuss the applications of radioactive isotopes.

18. a) Discuss the optical isomerism in tartaric acid.

b) Write notes on keto-enol tautomerism.

19. a) Give one method of preparation of furan and thiophene.

b) How is naphthalene prepared? Write a short note on electrophilic substitution in naphthalene.

20. Give the principle, method and applications of paper chromatography.

ALLIED CHEMISTRY

Paper Code : 08UCHA 02

SECOND/ FOURTH SEMESTER

PAPER-II

Internal Assessment Marks :25 External Marks-75

INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY-II (60 HOURS)

UNIT-I

1.1. Co-ordination chemistry-definition of terms-classification of ligands-Nomenclature- Chelation-Examples. Chelate effect-explanation.

1.2. Werner's theory-conductivity and precipitation studies. Sidgwick's theory-Effective Atomic Number concept.

1.3. Pauling's theory-postulates-Application to octahedral, square planar and tetrahedral complexes. Pauling's theory and magnetic properties of complexes. Merits and demerits of Pauling's theory.

1.4. Biological role of Haemoglobin and Chlorophyll (Elementary idea of structure and mechanism of action).

1.5. Application of coordination compounds in qualitative and quantitative analysis-separation of Copper and Cadmium ions, -identification of metal ions like Cu, Fe and Ni.

1.6. EDTA and its application.

UNIT-II

2.1 Carbohydrates: Classification, preparation and properties of Glucose and Fructose- Properties of Starch, Cellulose and derivatives of Cellulose. Inter conversion of Glucose to Frutose and vice versa.

2.2. Amino Acids-classification, preparation and properties of Glycine. and Alanine. Preparation of peptides (Bergmann method only).

UNIT-III

3.1. Chemotherapy: Preparation, uses and mode of action of sulpha drugs-prontosil, sulphadiazine and sulphafurazole. Uses of penicillin, chloramphenicol and streptomycin, Definition and one example each for-analgesics, antipyretics, tranquilizers, sedatives, hypnotics, local anaesthetics and general anaesthetics

Cause and treatment of-diabetes, cancer and AIDS.

UNIT-IV

4.1. Photochemistry: Grotthus-Draper law and Stark-Einstien's law of photochemical equivalence. Quantum yield. Example for photochemical reactions- Hydrogen-Chlorine reaction (elementary idea only) photosynthesis. Phosphorescence, Fluorescence, Chemiluminescence and Photosensitisation – definition with examples.

4.2. Phase Rule: Phase rule and the definition of terms in it. Application of phase rule to water system. Reduced phase rule and its application to a simple eutetic system (Pb-Ag) Freezing mixtures.

UNIT-V

5.1. Electro Chemistry: Kohlrausch law -measurement of conductance, pH determination. Conductometic titrations.

Galvanic cells-EMF-standard electrode potentials, reference electrodes, electrochemical series and its applications. Principle of electroplating.

5.2.Corrosion: Methods of prevention.

Reference books :

1. Soni.P.L, Text Book of Inorganic Chemistry, Sultan Chand & Sons.

2.Puri and Sharma, Text book of Inorganic Chemistry-Vishal publishing 3.Soni.P.L., Text Book of Organic Chemistry, Sultan Chand and Sons.

4.Jain.M.K, Principles of Organic Chemistry-Vishal publishing Co.

5. Kundu and Jain, Physical Chemistry, S. Chand.

6.Puri,Sharma and Pathania, Text-book of Physical Chemistry, Vishal Publishing co

Periyar University Salem

B.Sc. Degree Examination

Second/ Fourth Semester

Allied Chemistry Paper – II Code : 08UCHA02

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Write the formula of HexammineCobalt (III) Chloride and Potassium hexafluoroferrate (III)
2. What do you mean by chelation?
3. How are carbohydrates classified?
4. How do you prepare glycine by Gabriel's phthalimide synthesis.
5. What are antibiotics? Give examples.
6. What are hypnotics? Give one example.
7. State the law of photochemical equivalence.
8. Define the terms a) phase b) component.
9. What is Kohlrausch's law?
10. Define standard electrode potential.

Section B (5 x 5 = 25 Marks)

Answer All Questions

11.a) Distinguish between co-ordination number and EAN with suitable examples.

(or)

b) Give the structure of EDTA. Mention any four of its applications.

12.a) How is glucose converted to fructose?

(or)

b) Discuss Bergmann's method of synthesis of peptides.

13.a) What are different types of analgesics? Give examples.

(or)

b) Write an account of cause and treatment of diabetes.

14.a) Write a note on Quantum yield.

(or)

b) Discuss the salient features of phase diagram of water.

15.a) Write a note on electroplating.

(or)

b) Define corrosion. Indicate any three methods to prevent it.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16.a) What are the postulates of Werner's theory?

b) What are the biological functions of haemoglobin?

17. Compare the physical and chemical properties of glucose and fructose

18. What are sulpha drugs? Write names and formulae of any two sulpha drugs. Give the preparation of one of these. Discuss the mode of action of sulpha drugs.

19.i) Explain a) Fluorescence b) phosphorescence

ii) Define Phase rule and apply it to a simple eutectic system.

20. i) What is pH ? How would you determine it.

ii) Draw conductometric titration curves between

1) NaOH-CH_3COOH 2) HCl – KOH and explain.

ALLIED CHEMISTRY

SECOND/ FOURTH SEMESTER

ALLIED CHEMISTRY PRACTICAL

PAPER CODE: -08UCHAP 01

VOLUMETRIC and ORGANIC ANALYSIS

Internal Assessment Marks :40 External marks :60

I. TITRIMETRY

1. Estimation of Sodium hydroxide - Standard sodium carbonate.
2. Estimation of Hydrochloric acid-Standard Oxalic acid.
3. Estimation of Borax – Standard Sodium carbonate.
4. Estimation of Ferrous sulphate – Standard Mohr's Salt.
5. Estimation of Oxalic Acid – Standard Ferrous Sulphate.
6. Estimation of Ferrous iron using diphenylamine as internal indicator.

II. Organic Analysis :

1. Detection of elements- nitrogen, sulphur and halogens.
2. Detection of aliphatic or aromatic.
3. Detection of whether saturated or unsatured compounds.
4. Preliminary tests and detection of functional groups :aldehydes, phenols, aromatic amines, aromatic acids, dicarboxylic acids, Urea , benzamide & carbohydrate.

PERIYAR UNIVERSITY

B.Sc.DEGREE EXAMINATIONS

PRACTICAL MODEL QUESTION PAPER

B.Sc.Allied Chemistry Practical

Name of the Title : VOLUMETRIC and ORGANIC ANALYSIS-08UCHAP 01

Time : 3 hours Maximum Marks : 60

1.Estimate the amount of _____ present in the whole of the given solution. You are provided with _____ N solution of _____ and a suitable link solution.

2. Analyse systematically the given organic compound and report on the following :

Whether the compound is

a. Aliphatic or Aromatic

b. Saturated or Unsaturated

c. Special Elements present in the compund

d. Functional Group present in the compound.

Record your observations then and there.

DEPARTMENT OF CHEMISTRY
NON MAJOR ELECTIVE COURSES
(THIRD and FOURTH SEMESTERS)

1.Dairy Chemistry	-**08UCHN01**
2.Textile Chemistry	-**08UCHN02**
3.Medicinal Chemistry	-**08UCHN03**
4.Industrial Chemistry I	-**08UCHN04**
5. Industrial Chemistry II	-**08UCHN05**
6.Food Chemistry	-**08UCHN06**
7. Chemistry in Agriculture	-**08UCHN07**
8. Polymer & Plastics	-**08UCHN08**

NOTE:

Any two papers from the above eight papers may be choosen for all B.A/B.Sc. students except B.Sc.Chemistry major students for NMEC in semester III and IV and the same must be communicated to the University for Examination purpose.

DEPARTMENT OF CHEMISTRY

NON MAJOR ELECTIVE COURSE I

PAPER CODE -08UCHN 01

Internal assessment marks :25 External Marks :75

DAIRY CHEMISTRY (30 Hours)

UNIT I :

Milk: General composition of milk

factors affecting the gross composition of milk, physico-Chemical change taking place in milk due to processing parameters-boiling pasteurization- sterlilzation and homogenization.

UNIT II :

1. Milk lipids-terminology and definitions
2. Milk proteins:. Physical properties of milk proteins-Electrical properties and hydration, solubility. Reaction of milk proteins with formaldehyde and ninhydrin.
3. Milk carbohydrate-Lactose- 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.

UNIT IV :

1. Milk powder : Definition-need for making powder-drying process-spraying, 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. Ice cream : Definition-percentage composition-types- ingredients needed -manufacture of ice-cream stabilizers-emulsifiers and their role.

UNIT V :

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.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Chemistry Non – Major Elective CourseI

Diary Chemistry Code :08UCHNO1

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. What are the sources of milk?
2. What are the composition of milk?
3. Define milk lipids.
4. What are the vitamins present in milk?
5. Define creams.
6. Define Butter.
7. Define milk powder.
8. What are composition of Ice Cream?
9. Define Dairy detergents.
10. Write two examples for dairy detergents.

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) What are factors affecting gross composition of milk?
    (or)
    b) What are physico-chemical changes taking place on boiling milk?

12. a) What are physical properties of milk protein?
    (or)
    b) Write a note on milk carbohydrate.

13. a) Explain composition of creams .
    (or)
    b) Write methods of separation of creams.

14. a) What are principle involved in milk powder preparation?

(or)

b) Write a note on need for milk powder.

15. a) What are characteristics of Dairy detergent?

(or)

b) Write a note on classification of Dairy detergent?

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. a) Write a note on a) Sterlisation b) Homogenization

17. a) Write reaction of milk protein with formaldehyde and ninhydrin.

b) How is milk lactose estimated?

18. What are the composition of butter? How are they estimated?

19. Write in detail about Ice Cream.

20. Write about washing procedure involving dairy detergent.

DEPARTMENT OF CHEMISTRY

NON MAJOR ELECTIVE COURSE II

PAPER CODE -08UCHN 02

Internal assessment marks :25 External Marks :75

TEXTILE CHEMISTRY (30 Hours)

UNIT I :

1. General classification of fibres-chemical structure, production, properties and uses of the following natural fibres (a)natural cellulose 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 cellulose fibres) (ii) Polyamide fibres (different types of nylons) (iii) Poly ester fibres.

UNIT III :

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

UNIT IV :

Dyeing - Dyeing of wool and silk –Fastness properties of dyed materials – dyeing of nylon, terylene and other synthetic fibres.

UNIT V :

Finishing- Finishes given to fabrics- Mechanical finishes on cotton, wool and silk, method used in 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.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Chemistry Non – Major Elective CourseII

Textile Chemistry Code :08UCHNO2

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. What are the sources of Natural fibres?
2. Give examples for protein fibres.
3. What are synthetic fibres?
4. Give example for polyester and polyamide fibre.
5. What are general impurities in raw cotton?
6. What are the principles in removing impurities in cotton?
7. What are the dyes used for dyeing cotton?
8. What are the dyes used for dyeing synthetic fibres ?
9. Define finishing of fabrics.
10. What is mechanical finishing on cotton?

Section- B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Explain the chemical structure of cotton fibres.
    (or)
    b) How is natural fibres produced?

12. a) How is synthetic fibres produced?
    (or)
    b) What are the properties of synthetic fibres?

13. a) Write a note on dyeing of wool and silk
    (or)
    b) Write about the properties of dyed synthetic material

14. a) What are impurities of raw wool and silk?
    (or)
    b) How are the impurities removed from wool and silk?

15. a) Write the mechanical finishes on wool and silk.

(or)

b) What is mercerizing?

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. a) Write a note on Natural cotton fibres.

b) Write a note on Natural protein fibres.

17. a) Write a note on modified cellulose fibres.

b) Write a note on polyester fibres.

18. a Write a note on bleaching.

b) Write a note on Desizing.

19. a) Write a note on Dyeing of nylon.

b) Write a note on Dying of Terylene.

20. a) Write a note on methods of Mercerizing.

b) Write a note on water proofing.

DEPARTMENT OF CHEMISTRY

NON MAJOR ELECTIVE COURSE III

PAPER CODE -08UCHN 03

Internal assessment marks :25 External Marks :75

INDUSTRIAL CHEMISTRY – I(30 Hours)

UNIT I

Fertilizers : Fertilizer industries in India, Manufacture of ammonia, ammonium salts, urea, superphosphate, triple superphosphate and nitrate salts.

UNIT II

Sugar : Cane sugar manufacture, recovery of sugar from molasses, sugar estimation-sugar industries in India.

UNIT III

Chemical Explosives : Preparation and chemistry of lead azide, nitroglycerine, nitrocellulose, TNT, RDX,Dynamite, cordite, picric acid, gunpowder, introduction to rocket propellants.

UNIT IV

Leather Industry : Curing, preservation and tanning of hides and skins, process of dehairing and dyeing. Treatment of tannery effluents.

UNIT V

Water Industry: Pollution of water by fertilizers, detergents, pesticides and industrial wastes, BOD,COD, thermal pollution.

Water Treatment – Ion exchange, electrodialysis, reverse osmosis, softening of hard water.

Model Question Paper

Periyar University Salem

B.Sc. Chemistry Non-Major Elective Course III

Industrial Chemistry-I Code:08UCHN03

Time : Three hours. Maximum: 75 marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Name any two fertilizer industries in India.
2. Mention the names of any two fertilizers containing phosphorous.
3. What do you mean by molasses?
4. What is cane sugar chemically?
5. What is RDX?
6. Give the preparation of picric acid?
7. Which chemical is used in dehairing from hides and skins?
8. Mention the toxic metals present in tannery effluents?
9. Define BOD.
10. What is reverse osmosis?

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Write notes on triple superphosphate.
    (or)
    b) Explain the role of nitrate salts as fertilizers.

12. a) How is sugar recovered from molasses?
    (or)
    b) How is sugar estimated?

13. a) Explain rocket propellants.
    (or)
    b) Write notes on i) cordite
    ii) gun powder

14. a) How are hides and skins of animals preserved in Tanning Industry?

(or)

b) Explain curing of hides and skins of animals in tannery industry.

15. a) Explain thermal pollution of water.

(or)

b) Mention any two methods of softening of hard water.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. Discuss the main feature of
    i) Urea
    ii) Super phosphate

17. How is sugar manufactured from sugar cane?

18. Give the preparation of the following explosives.
    i) TNT
    ii) Dynamite
    iii) Nitroglycerine

19. a) How are the treated tannery hides dyed?

    b) Discuss the effluent treatment of tannery industry.

20. Discuss water treatment by
    a) Ion-exchange
    b) Reverse osmosis
    c) Electro dialysis

DEPARTMENT OF CHEMISTRY

NON MAJOR ELECTIVE COURSE IV

PAPER CODE -08UCHN 04

Internal assessment marks :25 External Marks :75

INDUSTRIAL CHEMISTRY – II(30 HOURS)

UNIT I

Electrochemical Industries: Production of materials like chlorine, caustic soda ,sodium chlorate, perchlorates, Batteries – primary and secondary cells, solar cells, fuel cells.

UNIT II

Agrochemical industries: Important categories of insecticides, fungicides, herbicides, rodenticide, Mode of action and synthesis of common pesticides like gammexane, DDT, aldrin, Parathion, Malathion, Baygon,

UNIT III

Petroleum : Origin, refining, Cracking, reforming ,knocking and octane number, LPG, synthetic gas, synthetic petrol.

Fuel Gases: Large scale production, storage, hazards and uses of coal gas, water gas, producer gas, and oil gas.

UNIT IV

Paints & Varnishes: Primary constituents of paints, Dispersion medium (solvent), binder Pigments, formulation of paints and varnishes. Requirements of a good paint.

Cleansing Agents: Preparation of toilet and washing soaps, synthetic detergents-alkyl aryl sulphonates, ethanolamines, nonionic detergents, builders, additives, corrosion inhibitors.

UNIT V

Cement : Manufacture – Wet Process and Dry process, types, analysis of major constituents, setting of cement, reinforced concrete. Cement industries in India.

Ceramics: Important clays and feldspar, glazing and vitrification.

Glass: Composition and manufacture of glass .Types of glasses- optical glass, coloured glasses and lead glass.

Reference :

1. B.N.Chakrabarty, Industrial Chemistry, Oxford & IBH Publishing Co, New Delhi, 1981.
2. B.K. Sharma, Industrial Chemistry, Goel Publishing House, Meerut.
3. P.P.Singh, T.M.Joesph, R.G.Dhavale, College Industrial Chemistry, Himalaya Publishing House, Bombay, 4th Ed., 1983

Model Question Paper

Periyar University Salem

B.Sc., Chemistry Non – Major Elective Course IV

Industrial Chemistry – II Code : 08UCHN04

Time : Three hours. Maximum: 75 marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. How is impure aluminium refined?
2. Write the uses of caustic soda and sodium perchlorate.
3. How is gammexane prepared?
4. Mention any two fungicide.
5. Define octane number of petrol.
6. What is water gas?
7. Mention some solvents used for making paints.
8. Define a paint.
9. Write the composition of Lead glass.
10. What are the main constituents of cement?

Section B (5 x 5 = 25 Marks)

Answer All Questions

11.a) How is chlorine produced in large scale?

(or)

b) How is caustic soda prepared in large scale?

12.a) How is DDT prepared? Mention its uses.

(or)

b) How is parathio prepared? Mention its uses.

13.a) How is synthetic petrol produced by cracking?

(or)

b) Write note on coal gas.

14.a) Distinguish varnish and paint.

(or)

b) What are the requirements of a good paint?

15.a) How is cement prepared by dry process?

(or)

b) How is optical glass prepared?

Section C (3 x 10 = 30 Marks)

Answer <u>any three</u> questions

16.a) Write note on solar cells.

b) Write note on fuel cells.

17. a) Write note on a) insecticide b) Herbicide c) Baygon

18.Write briefly about a) the storage and hazards of fuel gases

b) knocking of petrol.

19.a) Write the preparation of washing soaps.

b) Write a note on corrosion inhibitors.

20. Explain the setting of cement with equation.

DEPARTMENT OF CHEMISTRY

NON MAJOR ELECTIVE COURSE V

PAPER CODE -08UCHN 05

Internal assessment marks :25 External Marks :75

MEDICINAL CHEMISTRY (30 Hours)

UNIT I-INTRODUCTION

Common diseases – infective diseases – insect – borne, air – borne and water-borne – hereditary diseases – Terminology – drug, pharmacology, antimetabolites, absorption of drugs – factors affecting absorption –therapeutic index (Basic concepts only)

UNIT II-DRUGS

Various sources of drugs, pharmacologically active constituents in plants, Indian medicinal plants – tulsi, neem, keezhanelli – their importance – Classification of drugs – biological chemical (Structure not required) Drug receptors and biological responses – factors affecting metabolism of drugs. (Basic concepts only)

UNIT III-CHEMOTHERAPY

Drugs based on physiological action, definition and two examples each of anesthetics- General and local – analgesics – narcotic and synthetic – Antipyretics and anti inflammatory agents – antibiotics – Penicillin, Streptomycin, Antivirals, AIDS – symptoms, prevention, treatment – Cancer (Structure not required)

UNIT IV-COMMON BODY AILMENTS

Diabetes – Causes, hyper and hypoglycemic drugs – Blood pressure – Sistolic & Diastolic Hypertensive drugs – Cardiovascular drugs – depressants and stimulants – Lipid

profile – HDL, LDL cholesterol lipid lowering drugs. (Structure not required)

UNIT V-HEALTH PROMOTING DRUGS

Vitamins A,B, C, D, E and K micronutrients – Na, K, Ca, Cu, Zn and I, Medicinally important inorganic compounds of A1, P, As, Hg and Fe, Examples and applications, Agents for kidney function (Aminohippuric acid). Agents for liver function (Sulfo bromophthalein), antioxidants, treatment of ulcer and skin diseases. (Structure not required)

RECOMMENDED TEXT BOOKS:

1. S.Lakshmi Pharmaceutical Chemistry, S.Chand & Sons, New Delhi, 2004
2. V.K. Ahluwalia and Madhu Chopra, “Medicinal Chemistry”, Ane Books, New Delhi, 2008
3. P.Parimoo, “ A Text Book of Medicinal Chemistry”, CBS publishers, New Delhi, 2006

RECOMMENDED REFERENCE BOOKS

1. Ashutosh Kar, “Medicinal Chemistry”, Wiley Eastern Ltd., New Delhi, 1993,
2. David William and Thomas Lemke, Foyes Principles of Medicinal Chemistry, BI Publishers.
3. Romas Nogrady, Medicinal Chemistry, Oxford Univ. Press

Model Question Paper

Periyar University Salem

B.Sc., Chemistry Non – Major Elective Course V

Medicinal Chemistry – II Code : 08UCHN05

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Define antimetabolite. Give example
2. What is therapeutic index ?
3. Write the names of any four Indian medicinal plants.
4. Mention any two factors affecting metabolism of drugs
5. What is an anaesthetic? Give example.
6. What are the uses penicillin?
7. Give the names of any two hypoglycemic drugs.
8. What is normal blood pressure?
9. Give the sources and deficiency disease of Vitamin A.
10. What is the name of the dye used to test liver function?

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Explain the factors affecting absorption of drugs.
    (or)
    b) Write a note on air borne and waterborne diseases.

12. a) Write briefly on the medicinal uses of tulsi and keezhanelli.
    (or)
    b) Write a note on drug receptors and biological responses.

13. a) What are analgesics? How are they classified.
    (or)
    b) What are antibiotics? Mention the uses of streptomycin.

14. a) Write an account on cardiovascular drug.
    (or)
    b) What are LDL & HDL? Explain their function.

15. a) Mention the sources and deficiency disease of any two of the vitamins.

(or)

b) Write an account on antioxidants.

Section C (3 x 10 = 30 Marks)

Answer <u>any three</u> questions

16. Write a detailed account on infective diseases and hereditary diseases.

17. Write a detailed account on sources of drugs, active constituents in plants and classification of drugs.

18. Write notes on symptoms, prevention and treatment of AIDS.

19. Write an account on diabetes and hypoglycemic agents.

20. Write an account on any four medicinally important inorganic compounds (Al, P, As, Hg and Fe)

DEPARTMENT OF CHEMISTRY

NON MAJOR ELECTIVE COURSE VI

PAPER CODE -08UCHN 06

Internal assessment marks :25 External Marks :75

FOOD CHEMISTRY (30 Hours)

UNIT-I FOOD ADULTERATION

Sources of foods, types, advantages and disadvantages, constituents of foods, carbohydrate, protein, fats and, oils, colours, flavours,natural toxicants.

UNIT-II FOOD POISONING

Sources, causes and remedy- Causes and remedies for acidity, gastritis,indigestion and constipation

UNIT-III FOOD PRESERVATION AND PROCESSING

Food spoilage , courses of food spoilage,types of Food spoilage, food preservation ,preservation and processing by heating- sterilisation, pasteurization.

UNIT-IV VITAMINS

Sources , requirement deficiency diseases of A, C, K, E_1 and B_6

UNIT-V MINERALS

Mineral elements in food-Principal mineral elements-source.

Function-Deficiency and daily requirements-Na, K, Mg, Fe, S and P

REFERENCE BOOKS:

1.Seema Yadav : “Food Chemistry” ,Anmol publishing (P) Ltd,New Delhi

2.Car H. Synder : “ The Extraordinary Chemistry for ordinary things” ,John Wiley & sons inc..,New York,1992.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Chemistry Non – Major Elective Course

Food Chemistry Code :08UCHNO6

Time : Three hours. Maximum : 75 Marks

PART – A – (10 X 2 = 20)

Answer All Questions

1. Define food.
2. Mention any two sources of food.
3. Mention any two toxicants in pulses.
4. Mention any four metals that cause food poisoning.
5. Mention any two methods of food preservation.
6. Mention any two causes of food spoilage.
7. Mention the sources of Vitamin A.
8. What is the source and deficiency disease caused by the lack of Vitamin C?
9. Mention any two micronutrients.
10. What the disease caused by IRON deficiency? How can it be rectified?

PART – B – (5x5=25)

Answer all questions

11. a) Write an account of carbohydrates.

(or)

b) Write an account of oils and fats.

12. a) Mention the causes and remedy for acidity.

(or)

b) What is the cause and make a note on the remedy for constipation?

13. a) Mention the types of food spoilage.

(or)

b) Describe any one method of food preservation.

14. a) Mention the source and deficiency disease of Vitamin A.Give the remedy.

(or)

b) Write an account on Vitamin B6.

15. a) Write an account of mineral elements in food.

(or)

b) What is the source, function and deficiency effect of potassium?

PART C – (3 x 10 = 30)

Answer any three questions

16. Write note on (i) flavours and (ii) natural toxicants.

17. Write an account on (i) gastritis and (ii) indigestion.

18. Write a brief account of food preservation and food spoilage.

19. Write briefly on Vitamin K, & Vitamin E.

20. Write briefly on micronutrients.

DEPARTMENT OF CHEMISTRY

NON MAJOR ELECTIVE COURSE VII

PAPER CODE -08UCHN 07

Internal assessment marks :25 External Marks :75

CHEMISTRY IN AGRICULTURE(30 Hours)

UNIT – I

Fertilizers : Effect of Nitrogen, potassium and phosphorous on plant growth – commercial method of preparation of urea, triple superphosphate. Complex fertilizers and mixed fertilizers – their manufacture and composition. Secondary nutrients – micronutrients – their function in plants.

UNIT – II

Manures : Bulky organic manures – Farm yard manure – handling and storage. Oil cakes. Blood meal – fish manures.

UNIT – III

Pesticides and Insectides :

Pesticides – classification of Insecticides, fungicides, herbicides as organic and inorganic – general methods of application and toxicity. Safety measures when using pesticides.

Insecticides : Plant products – Nicotine, pyrethrin – Inorganic pesticides – borates. Organic pesticides – D.D.T. and BHC.

UNIT – IV

Fungicides and Herbicides :

Fungicide : Sulphur compounds, Copper compounds, Bordeaux mixture.

Herbicides : Acaricides – Rodenticides. Attractants – Repellants. Preservation of seeds.

UNIT – V

SOILS -Classification and properties of soils –soil water,soil temperature,soil minerals, soil acidity and soil testing.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Chemistry- Non Major Elective Course

Chemistry in Agriculture Code: 08UCHNO7

Time : Three hours. Maximum : 75 Marks

Section – A (10 x 2 = 20 Marks)

Answer all the questions

1. Give any two properties of soil.
2. How the acidity of the soil can be tested?
3. What are fertilizers?
4. Mention any four nitrogen fertilizers.
5. Mention any four micro nutrients for plant growth
6. What are blood meal & fish manures?
7. Define pesticides.
8. Mention any two herbicides.
9. Give the structure of nicotine.
10. Define acaricides and mention one example.

Section B (5 x 5 = 25 Marks)

Answer All Questions

11. a) Write the properties of soil.
    (or)
    b) Write a note on soil testing.

12. a) Explain the uses of nitrogen on plant growth.
    (or)
    b) Write the preparation of urea.

13. a) Write a note on bulky organic manure.
    (or)
    b) What are the functions of micro nutrients in plants?

14. a) Write the differences between fertilizers and manure.
    (or)
    b) Describe the handling practices of manures.

15. a) Explain briefly about toxicity.

(or)

b) Give the preparation of Bordeaux mixture.

Section C (3 x 10 = 30 Marks)

Answer any three questions

16. Write a brief account on the characteristics of soil.

17. a) Write a detailed account on primary and secondary nutrients.

b) how is of triple superphosphate prepared?

18. a) How are insecticides and fungicides useful in plant growth.

b) Give the preparation of DDT and mention its uses.

19. a) What are the safety measures in handling pesticides?

b) Give the preparation of BHC and mention its uses.

20. Write a detailed account on preservation of seeds.

DEPARTMENT OF CHEMISTRY

NON MAJOR ELECTIVE COURSE VIII

PAPER CODE -08UCHN 08

Internal assessment marks :25 External Marks :75

POLYMER & PLASTICS (30 Hours)

UNIT-I

1.1. Basic concepts : An introduction to polymers and macro molecules.

Natural and synthetic polymers. Classification of Polymers-addition and condensation polymers.

1.2. General methods of preparation of polymers. Polymerization through functional groups, multiple bonds and ring opening. Coordination polymerization.

UNIT-II

2.1. Structure of polymers- linear,branched and cross linked Stereochemistry of polymers-Isotactic ,Sydiotactic and Atactic.

2.2. properties of polymers : The crystalline melting point. The glassy state and glass transition temperature.

UNIT-III

3.1. Copolymerisation – Definitions – homo and copolymers.Block copolymers and Graft copolymers.

3.2.Molecular weight of polymers.

Number average molecular weight and weight average molecular weight. Determination of molecular weight by Viscosity and Osmometry methods.

UNIT-IV

4.1. Poly olefins-polythene , PTFE , Freons ,PVC ,polypropylene and polystyrene.

4.2. Natural and synthetic rubbers.-Constitution of natural rubber. Butyl, Buna, Buna-S , Buna-N, Neoprene , SBR, Thiocol, Polyurethane and silicone rubbers.

UNIT-V

5.1. Plastics and Resins

Definitions. Thermoplastic and thermosetting resins. Constituents of plastic-fillers, dyes, pigments, plasticizers, Lubricants and catalysts.Uses of thermoplastic resins and thermo setting resins.

REFERENCES:

1.V. R. Gowrikar ,N.V.Viswanathan : Polymer Science- Wiley Eastern Limited ,New Delhi. 1986

2. R.B.Seymour, Introduction to Polymer Chemistry, MC Craw Hill, New York 1971.

3.S.S.Dara , A Text Book in Engineering Chemistry, S.Chand & Company Ltd, New Delhi. Third Edition ,!992.

MODEL QUESTION PAPER

Periyar University Salem

B.Sc. Chemistry Non – Major Elective Course

Polymer & Plastics -Code :08UCHNO8

Time: 3 Hrs Max.Marks:75

Section – A (10 x 2 = 20)

Answer all questions:

1. What is high polymer? Give two examples.
2. Give two examples for Natural and addition polymer.
3. How can you distinguish linear and cross linked polymers?
4. What is glass transition temperature of a polymer?
5. Define copolymerization.
6. What is number average molecular weight of a polymer?
7. What are the monomers used in the preparation of polystyrene and PVC and give their structural formula?
8. What is the special feature of polyurethane?
9. What is the function of fillers in plastics?
10. Mention any four uses of thermoplastic resins.

Section B (5 X 5 = 25)

Answer all questions:

11. a) Write a note on co-ordination polymerization.

(or)

b) How is Nylon-6, 6 synthesised? Write any two uses of it.

12. a)Classify the polymers on the basis of their stereochemistry.

(or)

b) Explain how the crystallinity affects the properties of a polymer.

13. a) Distinguish Block and Graft copolymers.

(or)

b) Distinguish homo and hetero polymers.

14. a) Write the preparation, properties (any two) and uses of polypropylene.

(or)

b) Write note on silicone rubbers.

15. a) Differentiate thermosetting and thermoplastic resins.

(or)

b) Write a short note on pigments used as constituent in plastics.

Section – C (10 x 3 = 30)

Answer any three questions.

16. Write any one method of preparation of a condensation polymer and addition polymer. Mention some of their uses.

17. How is Molecular weight of a polymer is determined by viscosity method?

18. a) Write the preparation, properties and uses of polyethylene.

b) Write note on Buna- S rubber.

19. Write note on the following

i) Dyes ii) Plasticizers iii) Lubricants iv) catalysts

20. How glass transition temperature of a polymer is determined and how it affects the various properties of a polymer?

PERIYAR UNIVERSITY

B.Sc.CHEMISTRY (CBCS)-- PAPER CODES

MAJOR (core,elective and SBEC)

SEMESTER	PAPER	CODE
I	Core Chemistry-Major Paper I General Chemistry	**08UCH O1**
II	Core Chemistry-Major Paper II General Chemistry	**08UCH O2**
II	SBEC-I Food and Nutrition	**08UCHS O1**
III	Core Chemistry-Major Paper III General Chemistry	**08UCH O3**
IV	SBEC-II Polymer Chemistry	**08UCHS O2**
IV	Core Chemistry-Major Paper IV General Chemistry	**08UCH O4**
V	Core Chemistry-Major Paper V Inorganic Chemistry	**08UCH O5**
V	Core Chemistry-Major Paper VI Organic Chemistry	**08UCH O6**
V	Elective Paper –I-Physical Chemistry	**08UCHEO1**
V	Elective Paper –II-Analytical Chemistry	**08UCHEO2**
V	SBEC-III Agricultural Chemistry	**08UCHS O3**
V	SBEC-IV Dye Stuffs & Treatment of effluents	**08UCHS O4**
VI	Core Chemistry –Major VII Inorganic Chemistry	**08UCH O7**
VI	Core Chemistry –Major VIII Organic Chemistry	**08UCH O8**
VI	Core Chemistry –Major IX Physical Chemistry	**08UCH O9**
VI	Elective Paper –III- Pharmaceutical Chemistry	**08UCHEO3**
VI	SBEC-V Spectroscopy -I	**08UCHS O5**
VI	SBEC-VI Spectroscopy-II	**08UCHS O6**
	MAJOR PRACTICALS	
II	Core Practical-I- Volumetric estimations	**08UCHP O1**
IV	Core Practical-II -Inorganic qualitative Analysis & preparation	**08UCHP O2**
VI	Core Practical-III- Physical Chemistry practicals	**08UCHP O3**
VI	Core Practical-IV -Gravimetric estimations& Organic practicals	**08UCHP O4**

ALLIED PAPERS

	ALLIED(Theory &Practical)	
I/III	Allied Chemistry Paper I (Inorganic, Organic, Phy-I)	**08UCHA O1**
II/IV	Allied Chemistry Paper II (Inorganic, Organic, Phy-II)	**08UCHA O2**
II/IV	Allied Chemistry **Practical-** Volumetric & Organic Analysis	**08UCHAPO1**

DEPARTMENT OF CHEMISTRY

NON-MAJOR ELECTIVE COURSES-PAPER CODES

SEMESTER	PAPER	CODE
III/IV	Dairy Chemistry	**08UCHNO1**
III/IV	Textile Chemistry	**08UCHNO2**
III/IV	Industrial Chemistry-I	**08UCHNO3**
III/IV	Industrial Chemistry-II	**08UCHNO4**
III/IV	Medicinal Chemistry	**08UCHNO5**
III/IV	Food Chemistry	**08UCHNO6**
III/IV	Chemistry in Agriculture	**08UCHNO7**
III/IV	Polymer & Plastics	**08UCHNO8**

CONTENTS

NON-MAJOR ELECTIVE COURSES