PERIYAR
UNIVERSITYPERIYARPALK
ALAINAGARSALEM–636011

DEGREEOFBACHELOROFSCIENCECHOIC

EBASED CREDIT SYSTEM

SYLLABUSFORBRANCHIV-B.Sc.CHEMISTRY

FORTHESTUDENTSADMITTEDFROMTHEACADEMICYEAR2021-2022ONWARDS

CONTENTS

1. Introduction-REGULATIONS
2. CBCS-CreditTable.
3. PAPERSDetailMAJOR(Core,ElectiveandSBEC)

ALLIEDPAPERS

NON-MAJORELECTIVECOURSES

REGULATIONS

1. PreambleandobjectivesoftheCourse:

Chemistry is central to the current revolutions in Science. No educated person today canunderstand the modern world without a basic knowledge of Chemistry. The existence of a largenumber of chemical factories, mines and related industries in the catchment of the UniversitynecessitatesChemistryeducation.

Theprogramme educationalobjectives(PEOs)of B.Sc.Chemistrycourseare

1. ToimpartknowledgeinfundamentalaspectsofallbranchesofChemistry.
2. ToacquirebasicknowledgeinthespecializedareaslikePolymerChemistry,EnvironmentalChemistry,DyeChemistry,PharmaceuticalChemistry,IndustrialChemistryetc.
3. TocreatemanpowerinChemicalindustriesandhelptheirgrowth.
4. TopreparecandidatesforacareerinChemicalindustries.

ProgrammeSpecificOutcomes(PSOs)

Aftercompletionofthisprogrammethe candidate will

- haveenormousjobopportunitiesatalllevelsofchemical,pharmaceuticalandfoodproductindustries.
- getspecificplacementsinR&Dandsynthetic divisionofpolymerindustries&Allieddivisions.
- appearincompetitiveexams conducted byservicecommission.
- gaincompleteknowledgeaboutall fundamentalaspectsofchemistry
- learnabouttheemergingfieldofgreenchemistry,nanochemistryandpolymerchemistry
- carryoutexperimentsintheareaoforganicanalysis,estimation,inorganicsemi-microanalysis,conductometric &potentiometric equipment.

ProgrammeOutcomes(POs)

Onsuccessfulcompletionofthisprogramme,students willhavetheabilityto

- thinkcriticallyandanalyzechemicalproblems.
- presentscientificandtechnicalinformationresultingfromlaboratoryexperimentationinbothwrittenand oral formats.
- work effectivelyandsafelyina laboratoryenvironment.
- usetechnologiesandinstrumentationtogethertoexplorenewareasofresearch.
- workasa memberofinterdisciplinaryproblemsolvingteam.
- applytheirscientificskill toinnovative studies.

2. ConditionforAdmission

AcandidatewhohaspassedtheHigherSecondaryExaminationofTamilNaduHigherSecondary Boardoranexaminationofsomeotherboardacceptedbythesyndicateasequivalentthere

towithChemistryandPhysicsandanyoneofthefollowingsubjectsnamelyMaths,Botany,ZoologyorBiology shallbeeligible foradmissioninto B.Sc., courseinChemistry.

3. DurationoftheCourse:

ThecourseforthedegreeofBachelorofScienceshallconsistofthreeacademicyearsdividedintosixse mesters.

4. Courseofstudy:

The course of study for the B.Sc. Degree in the Branch IV-Chemistry shall comprise of thefollowing subjects according to the syllabus and books prescribed from time to time. The Syllabus forvarioussubjects shall bedemarcated intofiveunits in each subject

Part-I–Tamil/Otherlanguages

Part-II–English

Part-III –Coresubjects

Alliedsubjects

Project/Electivewiththreecourses

Part–IV

1. NonMajorelectivecomprisingoftwocourses.
2. Skillbasedsubjects(Elective)
3. EnvironmentalStudies
4. ValueEducation
5. ProfessionalEnglish

Part–V–ExtensionActivities

NSS/NCC/Sports/YRCandothercoandextracurricularactivitiesofferedunderpartVoftheprogrammes.

Thetwoalliedsubjectsmaybechosenbytherespectivecollegesandthesamemustbecommunicatedto the University.

Nonmajorelectivecoursesubjectsmaybechosenbytherespectivecollegesandthesamemustbecomm unicated to the University.

Thecollegemayalsochoose thealliedsubject oftheir choicein the firstand secondyear.

I-SEMESTER:

1. Language-PaperI
2. English-PaperI
3. MajorCore-PaperI
4. AlliedI-PaperI
5. ValueEducation
6. ProfessionalEnglish- I[Add–OnCourse]

II-SEMESTER

7. Language–PaperII
8. English-PaperII
9. MajorCore-PaperII
10. AlliedI-PaperII
11. Major-practical–I
12. Allied–IPractical

13. Environmentalstudies
14. SkillbasedElectiveCourseI
15. ProfessionalEnglish- II[Add–OnCourse]

III- SEMESTER

16. Language–PaperIII
17. English-PaperIII
18. MajorCore–PaperIII
19. AlliedII– PaperI
20. SkillBasedElectivecourseII
21. NonMajorElective courseI

IV SEMESTER

22. Language–PaperIV
23. English–PaperIV
24. MajorCore–PaperIV
25. AlliedII-PaperII
26. Major-PracticalII
27. AlliedII-Practical
28. SkillBasedElectivecourseII
29. NonMajorElective courseII

V SEMESTER

30. MajorCorePaper–V
31. MajorCorePaper–VI
32. MajorCorepaper –VII
33. ElectivePaper –I
34. SkillBasedElectivecourseIII
35. SkillBasedElectivecourseIV

VI-SEMESTER

36. MajorCorePaper-VIII
37. Majorcorepaper–IX
38. Majorcorepaper –X
39. ElectivePaper–II
40. SkillBasedElectivecourseV
41. ElectivePaper -III
42. MajorPracticals –III
43. MajorPracticals–IV

5. Examinations

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

The Syllabus has been divided into six semesters. Examinations for I, III and V semesters willbeheldinNovember/ DecemberandforII,IV andVIsemesterswill beheldinApril /May.

The practical examination I will be held at the end of I year. II will beheld at the end of IIyear. IIIandIV willbe heldat theendofIIIyear.

Requirementtoappearfortheexamination

Acandidateshallbepermittedtoappearfortheuniversityexaminationsforanysemester(practical/theory) if He / She secures not less than 75% of attendance in the number of working daysduringthesemester.

6. PassingMinimum

A candidate who secures not less than 40% in the university (external) Examination and 40%marks in the external examination and continuous internal assessment put together in any course ofPart I, II, III & IV shall be declared to have passed the examination in the subject (theory or Practical).For practical, the minimum for a pass includes the record notebook marks also. There is no passingminimumfortherecordnotebook.However submission ofarecordnotebookisamust.

7. ClassificationofSuccessfulCandidates

Candidateswhosecurenotlessthan60%oftheaggregatemarksinthewholeexaminationshallbedeclared to havepassed theexamination in First Class.

Allothersuccessful candidatesshall bedeclared tohavepassedinthe Second

Class.

Candidateswhoobtain 75%ofthemarksintheaggregateshall bedeclaredto havepassedtheexaminationinFirstClasswithDistinctionprovidedtheypassalltheexaminationsprescribedfor thecourse at thefirst appearance.

Grading:

ConversionofmarkstoGradepointsandletter grade(Performanceina course/paper)

Rangeofmarks	**GradePoints**	**LetterGrade**	**Description**
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Excellent
75-79	7.5-7.9	D	Distinction
70-74	7.0-7.4	A+	VeryGood
60-69	6.0-6.9	A	Good
50-59	5.0-5.9	B	Average
40-49	4.0-4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

Ci= Credits earnedforcourse Iin anysemester

Gi =Grade point obtained forcourseIinanysemester

n=refers tothesemester in whichsuch coursewerecredited

Gradepointaverage(foraSemester):

Calculationofgradepointaveragesemester-wise andpart-wiseisasfollows:GRADEPOINTAVERAGE[GPA]=ΣiCi Gi/ΣiCi

Sumofthemultiplicationofgradepointsbythecreditsofthecoursesofferedunder each partGPA=

Sumofthecreditsofthecoursesunder eachpartin asemester

Calculation ofgradepointaverage(CGPA) (fortheentireprogramme):

Acandidatewhohaspassedalltheexaminationsunderdifferentparts(Part-ItoV)iseligibleforthefollowingpartwisecomputed final grades based on the rangeof CGPA.

CUMULATIVE GRADEPOINTAVERAGE[CGPA]=$\Sigma n\Sigma_i Cn_i Gn_i / \Sigma n\Sigma_i Cni$

SumofthemultiplicationofgradepointsbythecreditsoftheentireprogrammeundereachpartCGPA=

Sumof thecredits of the courses of theentireprogrammeunder each part

ClassificationofSuccessfulcandidates

AcandidatewhopassesalltheexaminationsinPartItoPartVsecuringfollowingCGPAandGradesshallbedeclared asfollows forPart Ior PartIIorPartIII:

CGPA	GRADE	ClassificationofFinalResult
9.5-10.0	O+	FirstClass –Exemplary
9.0and abovebutbelow9.5	O	
8.5and abovebutbelow9.0	D++	FirstClasswithDistinction
8.0and abovebutbelow8.5	D+	
7.5and abovebutbelow8.0	D	
7.0and abovebutbelow7.5	A++	FirstClass
6.5and abovebutbelow7.0	A+	
6.0and abovebutbelow6.5	A	
5.5and abovebut below 6.0	B+	SecondClass
5.0and abovebutbelow5.5	B	
4.5and abovebutbelow5.0	C+	ThirdClass
4.0and abovebutbelow4.5	C	

8. Ranking

Candidates who pass all the examinations prescribed for the course in the first instance andwithin a period of three academic years from the year of admission to the course only are eligible forUniversityRanking.

9. MaximumDurationforthecompletion oftheUGProgramme:

ThemaximumdurationforcompletionoftheUGProgrammeshallnotexceedtwelvesemesters.

10. CommencementofthisRegulation:

Theseregulationsshalltakeeffectfromtheacademicyear 2021-2022,i.e.forstudentswhoaretobe admittedto thefirstyear ofthecourseduringtheacademicyear 2021-2022and thereafter.

11. MarksDistributionandQuestionPaperPatternforB.Sc.,(ForBothMajor&Allied)Theory–MarksDistribution

Maximum Marks: 100
MarksExternal :75Marks
Internal :25Marks

(a).Theory-ExternalMarksDistribution

Time:3Hours Maximum:75Marks

PartA:15x 1=15(Answerallquestions)
Choosethecorrect answer
(Threequestionsfromeachunit)

PartB :2 x 5= 10 (Answerany two questions)
(Onequestionfromeach unitwithinternalchoice)

PartC:5 x 10= 50(AnswerAll questions)
(Onequestionfromeach unitwithinternalchoice)

(b).Theory-InternalMarksDistribution

(TotalMarks:25)Attendance : 5 Marks
Assignment : 5
MarksTest : 15Marks

(c) Practical Marks -
Distribution**MaximumMarks:**
100MarksExternal
:60Marks
Internal :40Marks

<u>INTERNSHIP(2weeks)</u>

The students have the option to select any organization – Government / private likeindustry, R & Dorganizations, scientific companies, etc., in consultation with the staff coordinator&Head of theDepartment. The students have to undergo training for a period of two weeks at the end ofsemester IVduring vacation. The students must maintain a work diary and prepare report ofthe training undergoneandsubmit the same.

Part	Course	No.ofHours /week	ExamHours	Credit	Marks		
					Internal	External	Total
I – SEMESTER							
I	Tamilorotherlanguage -I	6	3	3	25	75	100
II	CommunicativeEnglishPaper-I	6	3	3	25	75	100
III	CoreChemistryPaper-I	5	3	5	25	75	100
III	CoreChemistryPractical-I	3	-	-	-	-	-
III	Allied–I(MathsorBotanyor Zoology)(Theory)	4	3	5	25	75	100
III	Allied–I(MathsorBotanyor Zoology)(Practical)	3	-	-	-	-	-
IV	ValueEducation	2	3	2	25	75	100
IV	Professional English- I [Add – OnCourse]	6	3	4	25	75	100
IV	EnvironmentalScience	1	--	-	-	-	-
		36		22			600
II-SEMESTER							
I	TamilorotherlanguagePaper-II	6	3	3	25	75	100
II	CommunicativeEnglishPaper-II	4	3	3	25	75	100
II	Naan Muthalvan courseEffective English (Cambridge)LanguageProficiency for Employability	2	3	2	25	75	100
III	CoreChemistryPaper-II	5	3	5	25	75	100
III	CoreChemistryPractical-I	3	3	4	40	60	100
III	Allied– II (Maths or Botany orZoology)(Theory)	4	3	5	25	75	100
III	Allied Practical-I (Maths orBotanyor Zoology)	3	3	4	40	60	100
IV	Environmentalstudies	1	3		25	75	100
IV	Skillbasedelective course I (SBEC I)- Food andNutrition	2	3	3	25	75	100
IV	Professional English- II [Add – OnCourse]	6	3	4	25	75	100
		36		27			900

Part	Course	No. ofHours perweek	ExamHours	Credit	Marks		
					Internal	External	Total
III-SEMESTER							
I	Tamilorotherlanguage-III	6	3	3	25	75	100
II	English-III	6	3	3	25	75	100
III	CoreChemistryPaper-III	5	3	5	25	75	100
III	CoreChemistryPractical-II	3	-	-	-	-	-
III	AlliedIII PhysicsTheory-I	4	3	3	25	75	100
III	Allied Practical-IIPhysicsPractical -I	3	-	-	-	-	-
IV	SBEC II-PolymerChemistry	1	-	-	-	-	-
IV	Digital Skills for Employability-Microsoft office Essentials	2	2	2	25	75	100
		30		16			500
IV -SEMESTER							
I	Tamilorother language-IV	6	3	3	25	75	100
II	English-IV	6	3	3	25	75	100
III	CoreChemistry Paper-IV	5	3	5	25	75	100
III	CoreChemistry Practical-II	3	3	4	40	60	100
III	AlliedIV– PhysicsTheory-II	4	3	3	25	75	100
III	Allied Practical-IIPhysicsPractical -I	3	3	4	40	60	100
IV	NMSDC-Employability Skills-Microsoft	2	3	2	25	75	100
IV	SBEC II-PolymerChemistry	1	3	3	25	75	100
IV	NonMajorElectivecourse-II	2	3	2	25	75	100
	Internship2 weeksreportshould besubmitted						
		30		27			800

Part	Course	No. ofHoursperweek	ExamHours	Credit	Marks		
					Internal	External	Total
V-SEMESTER							
III	Core Chemistry Paper - V(inorganicchemistry)	5	3	5	25	75	100
III	CoreChemistry Paper-VI (organicchemistry)	5	3	5	25	75	100
III	Core Chemistry Paper-VII(Physical Chemistry)	5	3	5	25	75	100
III	ElectivePaper –I Analytical Chemistry–I	4	3	4	25	75	100
III	CoreChemistry Practical–III (Physical)	3	-	-	-	-	-
III	Core Chemistry Practical-IV(Organic&Gravimetric)	4	-	-	-	-	-
IV	SBEC–III Agricultural Chemistry	2	3	3	25	75	100
IV	Advanced Technology for Employability in Life Science-Good Manufacturing Practices-Quality Assurance	2	3	2	25	75	100
		30		24			600
VI- SEMESTER							
III	Core Chemistry Paper - VIII(inorganicchemistry)	4	3	4	25	75	100
III	CoreChemistry Paper-IX (organicchemistry)	4	3	4	25	75	100
III	Core ChemistryPaper-X (PhysicalChemistry)	4	3	4	25	75	100
III	ElectivePaperII Nano&greenchemistry	4	3	4	25	75	100
III	ElectivePaper-IIIIndustrialChemistry	4	3	4	25	75	100
III	CoreChemistryPractical – III (physical)	3	3	4	40	60	100
III	Core Chemistry Practical – IV(Organic&Gravimetric)	5	6	6	40	60	100
IV	SBEC V–PharmaceuticalChemistry	2	3	3	25	75	100
IV	**Naan Muthalvan –EV Battery Management**	**2**	**-**	**2**	**-**	**-**	**-**
V	Extensionactivities			1			
		30		34			800

Forstudentsadmittedfrom2021-2022onwards
TotalCredit forI& IISemester=49 credits
Forstudentsadmittedfrom2021-2022onwards
TotalCreditfor III&IV Semester=43credits
TotalCreditforVISemester=34 credits
Total Creditsfor3years=150Credits

B.Sc.
CHEMISTRYSEM
ESTER – I
GENERALCHEMISTRYI(75hours)CODE
-21UCH01

InternalAssessmentMarks:25

ExternalMarks:75

UNIT-Is,p-Block elements andVolumetricAnalysis

1.1 s-blockelements–CharacteristicpropertiesofgroupIandIIelements,Diagonalrelationship between LiandMg,BeandAl.

1.2 p-blockelements–Boronfamily:Synthesisandstructureofdiboraneandhigherboranes($B_4H_{10}$and B_5H_9). Boron nitrogen compound ($B_3N_3H_6$) and Lewis acid nature ofBX_3. Carbon family:Carbides – Classifications (ionic, covalent and interstitial). Chemistry of carborundum and boroncarbide.

1.3 Volumetric analysis – Principle, Preparation of standard solutions, types of titration. Theoryofacid−
basetitration,redoxtitrations:Fe^{+2}vs$K_2Cr_2O_7$usinginternalandexternalindicators.Precipitationtitration: $AgNO_3$Vs KCl –Complexometric titration: EDTAVsMg^{+2}.

UNIT–IIChemicalBonding

2.1 Ionic bond-Mode of formation – properties of ionic compounds-inert pair effect-Born Habercycle- polarization of ions- factors affecting polarization-importance of polarization of ions-Fajan'srulesandapplications.

2.2 Covalent Bond-Mode of formation-properties of covalent compounds- Valence Bond theory-PostulatesofPauling-Slater'stheory-Differenttypesofoverlapping.MolecularorbitaltheoryPostulates-Bonding andanti-bonding molecular orbitals-Tabulation of various M.Osformed fromatomic orbitals-Bond order- MO diagrams for Homo and Hetero nuclear diatomic molecules: H_2, He,N_2,O_2, CO, NOand HF.Comparisons betweenVBT and MOT.

UNIT–IIIBasicConcepts inOrganicChemistry

3.1 Hybridisation and geometry of molecules: methane, ethylene, acetylene – Electron displacementeffect:Inductiveeffect–electromericeffect–mesomericeffects–Hyperconjugativeeffect–Illustrationand their effects.

3.2 Homolyticandheterolyticfission:Electrophiles,nucleophilesandfreeradicals.Reactionintermediates: Carbocations, Carbanions and Free radicals – stability. Difference between intermediateandtransitionstate.

UNIT–IVCycloalkanes,AlkenesandAlkynes

4.1 Cycloalkanes: IUPAC Nomenclature, preparation using Dieckmann's ring closure and reduction of aromatic hydrocarbons, Substitution reactions with Cl_2 and Br_2 and ring opening reactions of cycloproane with H_2, Br_2 and HBr, Bayer's strain theory.

4.2 Alkenes: IUPAC nomenclature, mechanisms of addition reactions with hydrogen halogenhydrogenhalide(Markovnikoff'srule),HBr(peroxideeffects),Hydration,Hydroboration,ozonolysis;hydroxylationusing$KMnO_4$and $OsO_4$and allylicsubstitution byNBS.

4.3 Alkynes–Generalmethodsofpreparation,propertiesanduses.

UNIT–V GaseousState

5.1 Behaviour of ideal gases - kinetic molecular theory of gases-the kinetic gas equation. Gas Laws:Boyle's law, Charles law, Avagadro's law, Graham's law of gaseous diffusion and Dalton's law ofpartialpressure-Idealgasequation.Derivationofthegaslaws-kinetictheoryandtemperature-Boltzmann constant-Maxwell's distribution of molecular velocities-types of molecular velocities- Rootmean square, average and most probable velocity. Collision diameter-collision frequency-mean freepath.

5.2 BehaviourofRealgases-Deviationsfromidealbehaviour--Explanationofdeviations–derivation of vander Waal's equation for real gases. PV isotherms of real gases. The virial equation ofstate-derivationoftheprincipleof correspondingstates.

TEXTBOOKSANDREFERENCES:

1. B.R.Puri, L.R.Sharma, K.C.Kalia,principlesofinorganicchemistry
2. Soni.P.L,TextBookofInorganicChemistry,SultanChand&Sons.
3. PuriandSharma,Textbookof InorganicChemistry-Vishalpublishingco.
4. Bhal. B.S,andArun Bhal,ATextbookofOrganicChemistry.
5. MorrisonandBoyd, OrganicChemistry,AllynandBaconInc.
6. Puri,SharmaandPathanaia,PrinciplesofPhysicalChemistry

B.Sc.
CHEMISTRYSEM
ESTER – II
GENERALCHEMISTRYII
(75hours)
CODE-21UCH02

InternalAssessmentMarks:25

ExternalMarks:75

UNIT-Ip-Block Elements:

1.1 Nitrogenfamily:Nitrides–Classifications(ionic,covalentandinterstitial).Reactivity–hydrolysis.Preparationandreactionsofhydrazine,hydroxylamineandphosphines.

1.2 Oxygen family: Oxides – Types of oxides (acidic, basic amphoteric and neutral), oxides and oxyacid of halogens (structure only). Ozone and hydrogen peroxide– Preparation, properties, structureanduses.

UNIT-IIAromaticCompoundsandElectrophilicSubstitution:

2.1 Aromaticity:ResonanceinBenzene –Huckel's (4n+2)ruleanditssimpleapplications.

2.2 Electrophilicsubstitution-Nitration,Halogenation,Sulphonation,FrieldCraftsalkylation,acylationandarylation–MechanismOrientation andreactivityinmonosubstituted benzene.

2.3 Polynuclearhydrocarbons-Napthalene,Anthraceneisolation,synthesis,propertiesanduses.

UNIT-IIIAliphaticNucleophilicSubstitution&Elimination:

3.1 Reactionintermidiates:carbocation,carbanion,freeradicals-formation andstability.

3.2 AliphaticNucleophilicsubstitution:MechanismandstereochemistryofSN1,SN2andSNireactions-Effectof substrate structure, nucleophile,solvent and leavinggroup.

3.3 Eliminationreaction-mechanismofE1andE2reactions-Hofmannandsaytzeff'srule–comparisonbetween substitution and elimination.

3.4 Dienes-IsolatedandConjugateddienes, 1,2and1,4addition.

UNIT-IVTheLiquidState,LiquidCrystals&Colloids

4.1 The Liquid state: structure of liquids- Vapour-pressure-Trouton's rule-surface tension-surfaceenergy-some effects of surface tension-viscosity- effect of temperature on viscosity (Experimentaldetermination of surface tension and viscosity not necessary)-Refractive index-specific refraction-molarrefraction.Physicalpropertiesandchemicalconstitution-Molarvolumeandchemicalconstitution-Parachorandchemicalconstitution.Viscocityandchemicalconstitution-molarrefractionandchemical constitution.

4.2 Liquidcrystals(Themesomorphicstate)Thermography-classificationofThermotropicliquidcrystals-

Smectic liquid crystals- Nematic liquid crystals- Cholesteric liquid crystals- Applications ofliquidcrystals

4.3 Colloids: Types of sols-characteristic of lyophilic and lyophobic sols- optical, kinetic and electricalpropertiesofsols-Applications of colloids.

UNIT-VSolid State

5.1 The solid state- differences between crystalline and amorphous solids- isotropy and anisotropy – interfacial angle-symmetry in crystal systems- Elements of symmetry, space lattice & unit cell-Bravislattices- Law of rationalityofindices-Millerindices.

5.2 Xraydiffraction-Braggs-equationExperimentalmethods,StructureofNaCl,CsCl,ZnS.

5.3 Bandtheoryanddefectsinsolids.

TEXTBOOKSANDREFERENCES:

1. Soni.P.L,TextBookofInorganicChemistry,SultanChand&Sons.
2. MadhanRD,InorganicChemistry
3. PuriandSharma,TextbookofInorganicChemistry-Vishalpublishingco.
4. Bhal. B.S,andArun Bhal,ATextbookofOrganicChemistry.
5. MorrisonandBoyd,OrganicChemistry,AllynandBaconInc.
6. Puri,SharmaandPathanaia,PrinciplesofPhysicalChemistry

B.Sc. CHEMISTRY SEMESTER –
IISKILL BASED ELECTIVE COURSE –
IFOOD AND NUTRITION (30 hours)CODE-21UCHS01

InternalAssessmentMarks:25

ExternalMarks:75

UNIT-I Food Sources

1.1 Sourcesoffoods,types,constituents offoods-carbohydrate,protein,fats,oils andtheirfunctions.

1.2 Foodcolours,flavoursandnaturaltoxicants.

UNIT-IINutrition

2.1 Definitionofnutrition,nutrients,functions.Nutritionalstatus–Definition,signsofgoodandpoornutritionalstatus.

2.2 Malnutrition-Definition,forms,causes andremedy.

2.3 Health–Definition,guidelinesforgoodhealth, Balanceddiet, Foodpyramid.

2.4 BMI(BodyMass Index),Obesity:causescomplications,treatmentand prevention.

UNIT-IIIFoodPoisoning,AdulterationAndFoodPreservation

3.1 Foodpoisoning-Sources,causesandremedy.Causesandremediesforacidity,gastritis,indigestionand constipation

3.2 Food adulteration- Types of adulterants- intentional and incidental, Adulterants in differentfoods-Milkandmilkproducts-vegetableoilsandfats-spices-cereals-pulses,detectionandprevention.

3.3 Foodspoilage,causesoffoodspoilage,typesofFoodspoilage

3.4 Food preservation-preservation and processing by heating - sterilization, pasteurization.Foodpreservation bylow temperaturemethod, fermentation.

UNIT-IVVitaminsAndMinerals

4.1 Sources,requirementanddeficiencydiseasesoffatsolublevitamins-A,D,E,andK,watersolublevitamins-B_1, $B_2$and B_6

4.2 Mineralelementsinfood-source,function,deficiencydiseasesanddailyrequirementsofNa,K,Mg,Fe, S and P.

UNIT-VFoodsInRelationToDisease

5.1 Foodborneillness,bacterialandviralfoodbornedisorder, animalparasites,mycotoxins.

5.2 Deficiency diseases - nutritional anaemia, PEM, IDD, VAD - chemical finding, preventionandtreatment.

TEXTBOOKSANDREFERENCES:

1. SeemaYadav:—FoodChemistry, Anmolpublishing(P) Ltd,NewDelhi
2. CarH.Synder:—
TheExtraordinaryChemistryforordinarything,JohnWiley&sons
inc.,New York,1992.
3. B.Sivasankar - — Food Processing and Preservation – PHI Learning (P) Ltd, New Delhi–11001.
4. B.Srilakshmi-Nutritionscience.Thirdedition,NewageInternational(P)Ltd.NewDelhi,Chennai.

B.Sc. CHEMISTRY SEMESTER –
IIIGENERAL CHEMISTRY –III (75 hours)CODE-21UCH03

InternalAssessmentMarks:25 **ExternalMarks:75**

Unit-I

InorganicQualitativeAnalysisandNuclearChemistry

1.1 Principles of Qualitative analysis: Principles involved in Na_2CO_3extract preparation- Common ioneffectanditsapplication-Solubilityproductprinciple&applicationsinqualitativeanalysis-complexationreactions in qualitative analysis-separationofcation into groups.

1.2 Nuclear chemistry: Nuclear Stability n/p ratio- nuclear forces- Natural radioactivity- modes ofdecay- Geiger-Nuttal rule-Kinetics ofradioactivitydisintegration.

1.3 Massdefectandbindingenergy-Artificialtransmutationandartificialradioactivity.

1.4 Nuclearreactors-types-commonfeatureslikefuels-moderators,coolantcontrolmaterials.

Unit-II

HalogenFamilyandChemistryof RareGases

2.1 Positionofhalogensinperiodictable-OxidesandOxyacidsofhalogens.Interhalogencompounds.Basic properties of halogens.

2.2 Raregases:Positionofraregasesintheperiodictable-Generalproperties-compoundsofXenon – oxides,halidesandoxy-halides.

Unit-III

CarbonylCompounds

3.1 Generalmethodsofpreparationofaldehydesandketone-Additionreactionofcarbonylicgroup.additionofHCN,NH_2OH,NH_2NH_2, phenylhydrazines,semicarbazide, andgrignard reagent.

3.2 Mechanismofreductionofcarbonylgroupby$NaBH_4$,$LiAlH_4$,WolfKishner,ClemmensonandMeerwin-ponndorfverley(MPV)reduction.

3.3 Carbonylpolarization-Reactivityof carbonylgroup-Acidityofcarbonylgroup-Haloformreaction – Mechanism.

3.4 AldolcondensationandCannizzaroreaction - mechanism.

Unit-IV

ThermodynamicsandThermochemistry

4.1 Terminology of Thermodynamics- thermodynamic equilibrium-Nature of work and heat- Law ofconservation of energy- first Law of thermodynamics- internal energy- Enthalpy of a system-Heatcapacityofasystem

4.2 Expansion of an ideal gas- work done in reversible isothermal expansion-work done in

reversibleisothermalcompression-work donein reversible adiabaticexpansion-.

4.3 Joule-Thomsoneffect,Joule-Thomsoncoefficient-Inversiontemperature-ZerothLawofthermodynamics-Absolute temperaturescale -Kirchoff'sequaction.

Unit-V

SecondLawofThermodynamics -I

5.1 Limitations of the first Law- need for second law- Spontaneous process- cyclic process Carnotcycle-Efficiency-Carnottheorem-thermodynamicscaleoftemperature.

5.2 Concept of entropy- Entropy- a state function- Entropy change in isothermal expansion of an idealgas- Entropy change in reversible and irreversible processes- Clausius inequality- Entropy changeaccompanyingchangeofphase-Entropyofmixtureofidealgases-entropyofmixing-physicalsignificanceofentropy.

TEXTBOOKSANDREFERENCES:

1. Soni.P.L,TextBookofInorganicChemistry,SultanChand&Sons.
2. MadhanRD,InorganicChemistry
3. PuriandSharma,Textbookof InorganicChemistry-Vishalpublishingco.
4. Bhal. B.S,andArun Bhal,ATextbookofOrganicChemistry.
5. MorrisonandBoyd,OrganicChemistry,AllynandBaconInc.
6. Puri,SharmaandPathanaia,PrinciplesofPhysicalChemistry

B.Sc. CHEMISTRY SEMESTERS – III and IV
SKILL BASED ELECTIVE COURSE – II (30 hours)
POLYMERCHEMISTRY
CODE-21UCHS02

InternalAssessmentMarks:25 **ExternalMarks:75**

UNIT-I

1.1 Basic concepts: Monomer, polymerization, degree of polymerization, repeat units. Classification ofPolymers-
additionandcondensationpolymers,naturalandsynthetic,inorganicandorganic,thermoplasticand thermosettingresin.

1.2 General methods of preparation of polymers. Polymerization through functional groups, multiplebondsand ringopeningand Coordination polymerization.

UNIT-II

2.1 Structureofpolymers-
linear,branchedandcrosslinked.Homo&hetrocopolymers.Blockcopolymers&graft copolymers.Stereochemistryofpolymers-Isotactic,SyndiotacticandAtactic

2.2 Propertiesofpolymers:Thecrystallinemeltingpoint.Theglassystateandglasstransitiontemperature.Determination ofglass transition temperature.

UNIT-III

3.1 Molecular weight of polymers Number average molecular weight and weight average molecularweight. Determination ofmolecular weight byviscosityand osmometrymethods.

3.2 Polymerprocessing-
calendaring,Diecasting,blowmoulding,injectionmoulding,extrusionmouldingand wet spinning.

UNIT-IV

4.1 Preparation, properties and uses of Poly olefins-polythene, PTFE, Freons, PVC, polypropylene andpolystyrene.

4.2 Natural and synthetic rubbers-Constitution of natural rubber. Butyl, Buna-N, Buna-S, Neoprene,Thiocol,Polyurethaneand siliconerubbers.

UNIT-V

5.1 Plasticsand ResinsDefinitions. Thermoplasticand thermosetting resins.Constituents of plastic-
fillers,dyes,pigments,plasticizers,Lubricantsandcatalysts.Usesofthermoplasticresinsandthermosettingresins.

REFERENCES:

1. V.R.Gowrikar,N.V.Viswanathan:PolymerScience-WileyEasternLimited,NewDelhi.1986.
2. R.B.Seymour,Introduction toPolymerChemistry,MCCrawHill,NewYork1971.

3. S.S.Dara,ATextBookinEngineeringChemistry,S.Chand&CompanyLtd,NewDelhi.ThirdEdition,1992.

B.Sc. CHEMISTRY SEMESTER-IVGENERALCHEMISTRY-IV(75hours)CODE-21UCH04

InternalAssessmentMarks:25 **External Marks :75UNIT-I**

d-Blockelements&PrinciplesofMetallurgy

1.1 Transition elements - position in the periodic table - general characteristics - objective study of thepropertiesexpected.Occurrence,extraction,propertiesandusesofTitanium,Zirconium,Molybdenum.ChemistryofTitaniumdioxide,Titaniumtetrachlorate,Vanadiumpentoxide,Ammoniumvanadate,Zirconium dioxide,Zirconiumhalide,Ammoniummolybdate&Molybdenumblue.

1.2 Principles of Metallurgy: Minerals, ores. Different metallurgical operations employed in extractingmetalsfrom ores.Methods ofconcentration, Reductionofmineral tometal andRefiningofmetals.

UNIT–II

GravimetricAnalysis

2.1 Principle-Theoriesofprecipitation-conditionsofprecipitation-coprecipitation&postprecipitation - Reduction of errors, precipitation from homogeneous solution - Washing &Drying ofprecipitate. Choice of precipitant - Specific & Selective precipitants - Anthranilic acid, Cupferon,Dimethylglyoximeethylenediamide, 8-hydroxyquinoline-use of maskingagent.

2.2 Crucible-Types,care&uses.Calculationingravimetricanalysis.Use ofGravimetric factor.

UNIT–III

CarboxylicAcids

3.1 Unsaturatedacids -preparationandproperties ofacrylic,crotonic,oleicandcinnamicacids.

3.2 Hydroxyacids-classificationpreparationandreactionsofglycolicacid,malicacidandcitricacid - Actionofheat onα,β and γacids.

3.3 Dicarboxylicacids-preparationandpropertiesofoxalic,malonic,succinic,glutaricandadipicacids.

3.4 Mechanismofconversionofacidsintoacidderivatives-esterificationincludingtransesterification.Hydrolysisof esters.

UNIT-IV

ReactionMechanism

4.1 ReactionandMechanismofKolbe'sreaction-Reimer-Tiemannreaction,Gattermann,Lederermanasseand Houben Hoesch reactions.

4.2 ReactionandMechanismofMannich,Stobbe, Darzen,WittigandReformatskyreactions.

UNIT-V

Secondlaw ofthermodynamics -II

5.1 Workandfreeenergyfunctions-Maxwell'srelationshipsforreversibleandirreversible process - GibbsHelmholtzequation–Partialmolarfreeenergy-chemicalpotential-Gibb'sDuhemEquation,.Clapeyron-Clausius equation-Applicationsof Clapeyron -Clausius equation.

5.2 ThirdlawofthermodynamicsNernstheattheorem-statementofIIIlawEvaluationofabsoluteentropyfrom heat capacitymeasurements-Test forthe validityof thelaw.

TEXTBOOKSANDREFERENCES:

1 Soni.P.L,TextBookofInorganicChemistry,SultanChand&Sons.

2 MadhanRD,InorganicChemistry

3 PuriandSharma,Textbookof InorganicChemistry-Vishalpublishingco.

4 KalsiPS,OrganicReactionsandtheirMechanism

5 MorrisonandBoyd, OrganicChemistry,AllynandBaconInc.

6 Puri,Sharmaand Pathanaia,PrinciplesofPhysicalChemistry

7.RajaramandKuriacose,Thermodynamics for StudentsOfChemistry

B.Sc. CHEMISTRY SEMESTER
VINORGANIC CHEMISTRY (75 hours)CODE-21UCH05

InternalAssessmentMarks:25

ExternalMarks:75

Unit I
CoordinationChemistry

1.1 Definitionoftheterms-Classificationofligands-Nomenclatureofmononuclearandpolynuclearcomplexes-chelatingligands and chelates-Examples-chelateeffect-explanation.
1.2 Werner'stheory-conductivityandprecipitationstudies–Sidgwick'stheory-EffectiveAtomicNumberconcept.
1.3 Isomerism in complexes-Structural Isomerism—types. Stereoisomerism- Geometrical isomerism in4and 6 coordinatedcomplexes.Optical isomerism in 4-and6-coordinatedcomplexes.

UnitII
TheoriesofCoordinationCompounds

2.1 Theoriesofbondingincomplexes-ValenceBondTheory-Postulates–Hybridisationandgeometries of complexes-Outer orbital and inner orbital octahedral complexes. Square planar andtetrahedralcomplexes-V.B.Theoryandmagneticpropertiesofcomplexes-limitationsofV.B.Theory.
2.2 Crystal Field Theory (CFT)-postulates-d-orbital splitting in octahedral, tetrahedral and squareplanarcomplexes-strongandweakligands-Spectrochemicalseries-Highspinandlowspincomplexes-C.F.Theoryandmagneticpropertiesofcomplexes-CrystalFieldStabilisationEnergy(CFSE) and its uses-Calculation of CFSE values of d^1 to d^{10} Octahedral and Tetrahedral complexes-CFTandcolourofcomplexes-limitationsof CFT -comparison betweenVBT andCFT.

UnitIII
ReactionsMechanismsandApplicationsofComplexes
3.1 Substitutionreactionsinsquareplanarcomplexes-TransEffect-Transeffectseries-usesof Transeffect-Theoriesof Transeffect-polarisation theoryandπ-bondingtheory.
3.2 ApplicationofcoordinationcompoundsinQualitativeandQuantitativeanalysis-separationofCopperand Cadmium ions,Cobalt and Nickelions-Identification ofCu,Fe, andNi.
3.3 EDTAanditsapplications -estimationofmetals,hardnessofwaterandsequesterisation.

UnitIV
Chemistryoff-blockelements
4.1 PositionintthePeriodicTable-

GeneralcharacteristicsofLanthanidesandActinidesLanthanidecontractionand its consequences.

4.2 Isolationof LanthanidesfromMonaziteincludingtheIonexchangeresinmethod.

4.3 Actinides-occurrenceandpreparation.

4.4 Chemistry ofThorium and Uranium-Important compounds - preparation, properties and uses ofUranylnitrate, Uraniumhexafluoride, Thoriumdioxide.

UnitV

Conceptsofacids,basesandnonaqueoussolvents

5.1 Acids and Bases: Arrhenius, Bronsted-Lowry, the Lewis concepts of acids and bases. Relativestrengthof acids and bases.

5.2 Hard and Soft Acids and Bases-classification of acids and bases as hard and soft– examplesPearson's HSAB concept, acid-base strength and hardness and softness, Theoretical basis of hardnessandsoftness, Applications of HSABprinciple.

5.3 Non-aqueoussolvents-
physicalpropertiesofasolvent,typesofsolventsandtheirgeneralcharacteristics.Reactionsinnon-aqueoussolventswithreferencetoliquidNH_3andliquidSO_2-Comparison.

TEXTBOOKSANDREFERENCES:

1 MadhanRD,InorganicChemistry
2 PuriandSharma,TextbookofInorganicChemistry-Vishalpublishingco.
3 MadhanRD,Tuli GDandWahid UMalik,Selected topic inInorganicChemistry
4 SharpeAG,InorganicChemistry
5 GurdeepChatwaalandM.S.YadavCooridnationChemistry.
6 GurdeepAdvancedInorganicChemistry
7. MadhanRDandSathyaPrakashModern InorganicChemistry

B.Sc. CHEMISTRY SEMESTER
VORGANICCHEMISTRY(60hours)
CODE-21UCH06

InternalAssessmentMarks:25

ExternalMarks:75

UNIT –I

1.1 Stereoisomerism:Definition–classificationintoopticalandgeometricalisomersm.Opticalisomerism– optical activity– specificrotations–condition foroptical activityof stereogenic centre– chirality.

1.2 Elementsofsymmetry– Enantiomers,diastereomersandmesomersandtheirphysicalandchemicalproperties.Recemization– resolution–Asymmetricsynthesis–Waldeninversion.Projection formulae:Fisher andSawhorse,erythroandthreo representations.Configuration– D,L andR,Snotationsforopticalisomerswithoneandtwoasymmetriccarbon.Opticalactivityofbiphenyls,allenes andspiranes.

UNIT–II

2.1 Geometrical isomerism – Alkenes – cis – trans and E-Z notations. Geometrical isomerism inmaleic, fumaric acids and in unsymmetrical oximes – methods of distinguishing geometrical isomers(dipolemoment,dehydration, cyclizationand m.p).cis–transisomerism incyclopropane.

2.2 Conformational analysis – Introduction of terms (conformation, conformer, configuration, dihedralangle, torsional strain, conformational analysis). Conformational analysis of ethane, n- butane andcyclohexane - axial, equatorial bonds and cis – trans – isomers in cyclohexane (chair form only)stabilityof cis and trans decalins-Elementarytreatment.

UNIT–III

3.1 Phenols– Acidityof Phenol, explanation onthebasis oftheresonancestabilization.

3.2 Preparation of phenol: Reaction of monohydric phenol with mechanism – alkylation, acylation.Mechanismof Kolbe,Reimer – Tiemann,Gattermann, Houben-Hoeschreactions.

3.3 Di and trihydric phenols– preparation and properties of catechol, resorcinol, alpha and betanaphthols– Preparation and properties.

UNIT-IV

Molecularrearrangements:

4.1 Mechanism of pinacol – pinacolone (migratory aptitude), Beckmann, Hoffmann, curtius, Schmidt,Benzilic acid, Claisen, Cope and Fries rearrangements. Difference between inter and intramolecularnature.

UNIT–V

Chemistryofnaturalproducts

5.1 Alkaloids-classification-isolation–generalmethodsofdeterminationofstructureofalkaloids.

Structuralelucidationandsynthesis(anyonemethod)ofthefollowingalkaloids,nicotine,papaverineAtropine
.

5.2 Terpenes-classification-isolation-isoprenerule-
synthesisandstructuralelucidationofcitral,geraniol,alpha pinene.

TEXTBOOKSANDREFERENCES:

1. KalsiPS,Stereochemistry, ConformationandMechanism
2. Bhal. B.S,andArun Bhal,ATextbookofOrganicChemistry.
3. MorrisonandBoyd,OrganicChemistry,AllynandBaconInc.
4. TewariKSand VIshoni N K,OrganicChemisty
5. FinarIL,, OrganicChemistryVolI&II
6. P LSoniTextbookofOrganicChemistry
7. NasipuriDStereo ChemistryofOrganic compounds
8. N R KrishnaswamyChemistryofNatural products.
9. OPAgarwalReactionsandReagentsinOrganic Chemistry

B.Sc.
CHEMISTRYSEM
ESTERV
PHYSICALCHEMISTRY(75hours)CO
DE-21UCH07

InternalAssessmentMarks:25

ExternalMarks:75

UNIT-IChemical Equilibrium

1.1 Thermodynamic derivation of equilibrium constants-K_p, and K_c - Relations betweenK_p, and K_c - Standardfreeenergychange-
Derivationofvan'tHoffreactionisothermDeDonder'streatmentofchemicalequilibria-concept of chemical affinity (no derivation)-Temperature dependenceof equilibrium constant-van'tHoffisochore-Pressuredependenceofequilibriumconstant.

1.2 Adsorption- Physical andchemical adsorption-Types of adsorption isotherms-Freundlich adsorptionisotherm-Derivation of Langmuir adsorption isotherm (BET isotherm (postulates only) BET equation (statement).

UNIT-IIChemicalKinetics-I

2.1 Derivationofrateconstantofasecondorderreaction-
whenthereactantsaretakenatdifferentinitialconcentrations-when the reactants are taken at the same initial concentrations Determination of the rateconstantofaIIorderreaction-Derivationofrateconstantof athirdorderreaction-whenthereactantsaretakenatthesameinitialconcentrations.Derivationofhalf-lifeperiodsforsecondandthird order reactionshavingequalinitialconcentrationofreactants.

2.2 Methods of determining the order of reaction-Experimental methodsin the study of kinetics-volumetry,manometry,polarimetryandcolorimetry.

2.3 Effect of temperature on reaction rates-Derivation of Arrhenius equation-concept of activation energy-determinationofArrheniusfrequencyfactorandenergyofactivation.

UNIT-IIIChemicalKinetics-II

3.1 Collision theory (CT) of reaction rates-Derivation of rate constant of a bimolecular reaction fromcollisiontheory-Failures of collision theory.

3.2 Lindemanntheoryof Unimolecularreactions.

3.3 Theory of Absolute Reaction Rates (ARRT) -Thermodynamic derivation of rate constant for abimolecular reaction based on ARRT- comparison between ARRT and CT. Significance of free energy ofactivationandentropyofactivation.

UNIT-IVElectrochemistry–I

4.1 Metallicandelectrolyticconductance –Definitionsofspecific,equivalentandmolarconductance

– Relationsbetweenthem –measurementof conductance andcellconstant.

4.2 Variation of conductance with dilution – Qualitative explanation – Strong and weak electrolytes- Migrations of ions – transport number – determination by Hittorf and moving boundary methods – Kohlrausch'slaw–applications–calculationofequivalentconductanceforweakelectrolytesand

determinationoftransportnumber.

4.3 Ionic mobilities and Ionicconductance. Diffusion and ionic mobility-molarionicconductanceandviscosity-Waldenrule.

4.4 Applications of conductance measurements –Degree of dissociation ofweak electrolytes – Determinationofionicproductofwater–Determinationofsolubilityofsparinglysolublesalts– conductometrictitrations.

UNIT–VTheoryofstrongelectrolytes

5.1 Debye–Huckel–Onsagertheory–verificationofOnsagerequation–Wein andDebye–Falkenhageneffect.

5.2 Activityandactivityco-efficientsofstrongelectrolytes–ionicstrength.Ostwald'sdilutionlaw– determinationofdissociationconstants–Ionicproductofwater–pHvalue.

5.3 Buffersolution–Hendersonequations–usesofBuffersincludinglivingsystems–commonioneffect – solubilityproductprinciple–relationtosolubility–Applicationsin qualitativeandquantitativeanalysis.

5.4 Hydrolysisofsalts–expressionfor hydrolysisconstant–DegreeofhydrolysisandpHofsalt solutionsfordifferenttypesofsalts–DeterminationofDegreeofhydrolysis–conductanceanddistributionmethods.

TEXTBOOKSANDREFERENCES:

1. Puri,SharmaandPathanaia,PrinciplesofPhysicalChemistry
2. GlasstoneS,An IntroductiontoElectrochemistry
3. KunduandJain,PhysicalChemistry
4. YadhavMS,Electrochemistry
5. GurdeepRajAdvancedPhysicalChemistry
6. J RajaramandKuriacose KineticsandmechanismsofChemicalTransformation
7. LaidlerKJ ChemicalKinetics.

B.Sc.CHEMISTRYSEMESTERV
Elective Paper-
ICODE-21UCHE01
ANALYTICALCHEMISTRY(60hours)

InternalAssessmentMarks:25

ExternalMarks:75

UNIT–I Chromatography

1.1 ColumnChromatography-principle, typesof adsorbents,preparationof the column,elution,recoveryof substances and applications.

1.2 TLC-principle,choiceofadsorbentandsolvent,preparationofchromatoplates,R_f-values,factorsaffectingtheRf-values-Significanceof Rf-values.

1.3 PaperChromatography-principle,solventsused,developmentofchromatogram,ascending, descendingand radialpaperchromatography.

UNIT–IIThermoanalytical method

2.1 Principle - Thermogravimetric analysis and differential thermal analysis-discussion of variouscomponentswithblockdiagram-TGA&DTAcurvesof$CuSO_4.5H_2O$,$MgC_2O_4.H_2O$and$Ca(OOCCH_3)_2H_2O$-SimultaneousDTA-TGAcurvesof$SrCO_3$inairand$CaC_2O_4.H_2O$inairand$inCO_2$-factors affectingTGA&DTA curves.

2.2 Thermometrictitrations-principle-apparatus- applications.

UNIT–IIIElectroanalytical method

3.1 Polarography-Principle,droppingmercuryelectrode(DME)-advantagesanddisadvantages-Migration, residual, limiting and diffusion currents- Use of supporting electrolytes-Ilkovic equation(derivation not required) and significance- experimental assembly- Current voltage curve-oxygenwave. Half wave potential (**E½**)- Polarography as an analytical tool in quantitative and qualitativeanalysis.

3.2 Amperometrictitrations:Basicprinciple–typesoftitrations-advantages,disadvantages–applications.

UNIT-IVUV-Visible&IRspectroscopy

4.1 UV-VisibleSpectroscopy-TypesofElectronictransition-Beer-Lambert'slawInstrumentation-ApplicationsofUV.

4.2 I.R. Spectroscopy-Principles-modes of vibration of diatomic, triatomic linear (CO_2) andnonlineartriatomic molecules(H_2O)-Stretching and bending vibrations-selection rules.Expression for vibrationalfrequency(derivation notneeded)-Instrumentation-Applications.

UNIT-VNMR&Mass spectroscopy

5.1 NMRSpectroscopy-principleofnuclearmagneticresonance,instrumentation-chemicalshift-shieldinganddeshielding-spin-spincouplingandcouplingconstants-InterpretationofAnisole,Benzaldehyde,Ethylacetate, EthylamineandEthyl Bromide.

5.2 Mass spectroscopy- Basic principles- instrumentation- molecular ion peak, base peak, metastablepeak, isotopic peak-Interpretation of Anisole, Benzaldehyde, Ethyl acetate, Ethylamine andEthylBromide.

TEXTBOOKSANDREFERENCES:

1. GopalanR,SubramaniamP S,RengarajanK,ElementsofAnalyticalChemistry
2. GurdeepRChatwal,InstrumentalmethodsofChemicalanalysis
3. SharmaY R, ElementaryOrganicChemistry
4. SharmaBK,AnalyticalChemistry
5. Bassett,Denney,RCJefferyandJ Vogel'sHand bookofquantitativeInorganicAnalysis
6. Douglas A Skoog and Donald M West Fundamentals of Analytical Chemistry.

B.Sc.CHEMISTRYSEMESTERV
Skill Based Elective Course –
IIICODE-21UCHS03
AGRICULTURALCHEMISTRY(30hours)

InternalAssessmentMarks:25

ExternalMarks:75

UNIT–IFertilizers

1.1 Fertilizers-Primary,Secondaryandmicronutrientsonplantgrowthanddevelopment. CommercialmethodofNitrogenousfertilizers-
preparationandusesofurea,ammoniumnitrateandammoniumsulphate.

1.2 PhosphateFertilizers-
Preparationandusesofmonoanddiammoniumphosphate,superphosphateandtriplesuperphosphate.

1.3 PotassiumFertilizers–
Preparationandusesofpotassiumnitrate,potassiumchlorideandpotassiumsulphate.Complex fertilizersand mixedfertilizers–theirmanufacture andcomposition.

UNIT–IIManures

2.1 Manures:Organicmanures-Bulkyorganicmanures–Farmyardmanure–
Differencebetweenfertilizersand manures–

2.2 Handlingandstoragepractices-freshmanure,fermentationandliquidtreatment–AerobicandAnaerobic-Enriched organic manures-oil cakes,bloodmeal and fishmanures.

UNIT–IIIPesticidesAndInsectides

3.1 Pesticides:classificationofInsecticides,fungicides,herbicidesasorganicandinorganic–
generalmethodsof application and toxicity. Safetymeasures when usingpesticides.

3.2 Insecticides:Plantproducts–Nicotine,pyrethrin–Inorganicpesticides–borates.Organicpesticides–
D.D.T. andBHC.

UNIT–IVFungicidesAnd Herbicides

4.1 Fungicide:Sulphurcompounds,Coppercompounds,Bordeauxmixture.

4.2 Herbicides:Acaricides –Rodenticides.Attractants–Repellants.Preservationofseeds.

UNIT–V Soils

5.1 Soils-Composition of soil- organic and inorganic constituents-Classification- Properties of soils-physical and chemical-Important functions of water in plant growth-Biological system of the soil-Roleofsoil organisms.

5.2 Soilanalysis –pH,Electricalconductivity, Estimationofmacronutrientsandmicronutrients.

References

1. PlantEcologyandSoilScience,R.S.ShuklaandP.S.Chandel.

2. Shreve'sChemicalProcessIndustries,G.T.Austin
3. AgriculturalChemistry,B.A.Yagodin.

B.Sc.CHEMISTRYSEMESTERVI
Core Chemistry Major Paper –
VIIICODE-21UCH08
INORGANICCHEMISTRY(60hours)

InternalAssessmentMarks:25 **External Marks :75UNITI -**

Organometallic compounds–I

1.1 Definition-Nomenclatureoforganometalliccompounds-classification-ionic,σ-bondedandΠ-bondedorganometalliccompounds-examples-natureof carbon-metal bond.

1.2 Organometalliccompoundsof Lithium&Boron-preparation,properties,structureanduses.

1.3 Olefincomplexes –Zeise'ssalt–synthesisand structure

1.4 Cyclopentadienyl complexes -Ferrocene-preparation,properties,structureanduses.

UNITII-Organometalliccompounds–II

2.1 Metalcarbonyls-EANrule,18electronrule.Structure&bondingin3dtransitionmetalcarbonyls; polynuclear carbonyls, bridging & terminal carbonyls.

2.2 Usesof IRabsorptionspectraforthedeterminationofstructureofmetalliccarbonyls.

2.3 Homogeneous catalysis-
Wilkinson'scatalystandalkenehydrogenation,hydroformylation,Monsantoacetic acidprocess,Wackerprocess,Zeigler-Natta catalystandpolymerizationofolefins.

UNITIII-BioinorganicChemistry

3.1 EssentialandtraceelementsinBiologicalprocesses–
Role of Na^{+}, K^{+}, Mg^{2+} & Ca^{2+} ionsinbiologicalprocess-Sodium and Potassium pump.

3.2 Toxic effects of some metals(Cu, Pb, As, Hg, Cd), Fixation of atmospheric nitrogen.Structure&BiologicalfunctionsofHaemoglobin,Myoglobin,ChlorophyllandVitamin B_{12}.

UNITIV-SomeSpecialcompounds

4.1 Silicones–types,preparation,properties&uses.

4.2 Silicates-classificationandstructure–examples.Composition,propertiesandusesofasbestosandzeolite.

4.3 Boronnitrides- Borazole-metal borides

4.4 Phosphonitriliccompounds-Phosphazenes,Polysulphurnitrogencompounds

UNITV-Magneticpropertiesof molecules:

5.1 Origin - Magnetic susceptibility. Types of magnetic behaviour- diamagnetism and paramagnetism,Temperatureandmagneticbehaviour,Ferromagnetismandantiferromagnetism-Temperatureindependent paramagnetism-determination of magnetic moment using Guoy Balance-Applications ofmagneticmeasurements.

5.2 Magnetic properties of transition metal complexes-Spin orbit coupling and its effect - Magneticbehaviorofsomecomplexes of metals of 3d transition series

TEXTBOOKSANDREFERENCES:

1 PuriandSharma,KaliaPrinciplesofInorganicChemistry.
2 MadhanRD,Tuli GDandWahid UMalik,Selected topic inInorganicChemistry
3 SharpeAG,InorganicChemistry
4 GurdeepRaj,AdvancedInorganicChemistry
5 CottonandWilkinson,Advanced InorganicChemistry
6 G.R.Chatwal,AjayKumarBhagi, M.Arora,Bio-InorganicChemistry.

B.Sc. CHEMISTRY SEMESTER
VIORGANICCHEMISTRY(60hours)C
ODE-21UCH09

InternalAssessmentMarks:25 **ExternalMarks:75**

UNIT–ICarbohydrates

1.1 Classification, constitution of glucose and fructose. Reactions of glucose and fructose, Osazoneformation,mutarotationanditsmechanism.Cyclicstructure– Pyranoseandfuranoseforms.Determinationofringsize– Haworthprojectionformula.Configurationofmonosaccharides–Epimerisation, interconversions – D.Arabinase to D – glucose and vice versa. D – glucose to D –fructoseand viceversa.Epimerisation D– glucoseto D – mannose.

1.2 Disaccharides– chemistryand structureof Sucroseand lactose.

1.3 Polysaccharides – starch and cellulose – derivatives – cellulose nitrate, cellulose acetate, Ethylcellulose.

UNIT–II

Aminoacidsandproteins

2.1 Amino acids-classification-essential and non essential amino acids-preparation of alpha aminoacids-glycine,alanineandtryptophan-Generalproperties of aminoacids-Zwitterions,isoelectricpoint.

2.2 Peptides and proteins-synthesis of peptide- Bergmann method. Proteins-classification based onphysical and chemical properties and on physiological functions-primary and secondary structure ofproteins-helicalandsheetstructures(elementarytreatmentonly)–Denaturation ofproteins.

UNIT–III

Organicphotochemistry

3.1 Principles of photochemistry. Electronic excitations – excited states – modes of dissipation ofenergy–Jablonskydiagram. Energytransfer– quantum efficiency.

3.2 Photochemistry of carbonyl compounds. Photo reduction. Norrish type reaction. Photochemicalreaction of cyclic ketones. The paterno – Buchi reaction. Barton reaction. Photochemistry of α, β–Unsaturatedketones andolefines.

UNIT–IV

Steroids,HormonesandVitamins

4.1 Steroids- definition–CholesteronandErhosterol (structure only). Steroidal Harmones-Androsterones,Testrosterone, Prohestroneand Oestrone(Structureonly).

4.2 Vitamin-Classification-deficiencyof vitamins-Synthesisof Retinol and Ascorbic acid.

UNIT–V

Heterocycliccompounds

5.1 Aromaticity–
preparation,propertiesandusesoffuran,Pyrrole,thiopheneandpyridine.Comparitivestudyof basicityof pyrroleand pyridine with amines.

5.2 Synthesisandreactionsofquinoline,isoquinolineandindolewithspecialreferencetoSkraup's,Bischler and Napieralskiand FischerIndolesynthesis.

TEXTBOOKSANDREFERENCES:

1. Bhal BSandArunBhal,AtextbookofOrganicChemistry
2. Finar IL,Organic ChemistryVol-I&II
3. AgarwalOP,Reactions andReagents
4. K.K.Rohatgi-Mukherjee,FundamentalsofPhotochemistry
5. PLSoni and HMChawlaText book of Organic Chemistry
6. OPAgarwal OrganicChemistry
7. R.GurdeepChatwal OrganicChemistryofNaturalProducts.

B.Sc. CHEMISTRY SEMESTER
VICODE-21UCH10
PHYSICALCHEMISTRY(60hours)

InternalAssessmentMarks:25

ExternalMarks:75

Unit-ISolutions

1.1 Solutions of gases in liquids – Henry's law- solutions of liquids in liquids-Raoult's law Binary liquidmixture- ideal solution- deviation from ideal behaviour-Thermodynamics of ideal solutions- V-P-temperaturecurves,Azeotropicdistillation.

1.2 NernstDistributionlaw-Thermodynamicderivations-applications,Solventextraction.

1.3 Thermodynamic derivation of elevation of boiling point and depression of freezing point vantHofffactor-Abnormalmolecularmass-Degreeofdissociationandassociation.

UNIT–IIPhaseRule

2.1 Definitionofterms-Derivationofphaserule-Onecomponentsystems-H_2Osystem,Sulphursystem–explanation usingClausius -Clapeyronequation-supercoolingandsublimation.

2.2 Twocomponentsystems-solidliquidequilibria-reducedphaserule–simpleeutecticsystems-Ag-Pbonly-Compoundformationwithcongruentmeltingpoint-Mg-Znsystemonly.KI-H_2Osystemefflorescence-deliquescence.

2.3 C.S.T-phenolwatersystem only.Effect ofimpurities onCST.

UNIT–IIIElectrochemistry –II

3.1 Galvaniccells–ReversibleandIrreversiblecells–EMFanditsmeasurement–WestonStandardcell–typesof reversiblesingle electrodes–standardHydrogenelectrode–calomelelectrode

3.2 DerivationofNernst equationbothforemfofcellsandsingleelectrodepotentials–Nernsttheoryforsingleelectrodepotential–standardreductionpotentials–electrochemicalseries–significance.

3.3 Application of emf measurements – Application of Gibbs – Helmholtz equation to galvanic cells – calculation of thermodyamic quantities – pH using hydrogen, quinhydrone andglass electrodes – potentiometrictitrations.

UNIT–IVCellsandBatteries

4.1 Concentrationcellswithandwithouttransference–LJPexpression –applicationsofconcentrationscells–valencyof ions – transport number – solubilityproduct– activitycoefficient.

4.2 Storagecells–Leadstoragebattery–mechanismofchargingandddischargingfuelcells–hydrogen-oxygencell–polarization–overvoltage-decompositionvoltage.

UNIT–VPhotochemistry

5.1 Consequencesoflightabsorption-TheJablonskidiagram-nonradiativetransitions-radiativetransitions-

Grotthus-Draperlaw-TheStarkEinsteinlawofphotochemicalequivalence-Quantumefficiency(quantum

yield).

5.2 Energy transfer in photochemical reactions- photosensitisaiton-Photosynthesis in plantsChemiluminescence-fluorescence and phosphorescence-lasers-uses oflasers.

5.3 Photochemicalreactions-Kineticsofhydrogen-brominereaction-decompositionofHI

TEXTBOOKSANDREFERENCES:

1. Glasstone.S,TextBookofPhysicalChemistry,MacMillian.
2. MaronandLando,FundamentalsofPhysicalChemistry,Collier,MacMillan.
3. GurudeepR.Chatwal,PhysicalChemistry.
4. Puri,SharmaandPathanaia,PrinciplesofPhysicalChemistry
5. AtkinsPhysicalChemistry
6. SamuaelGlasstoneAnIntroductiontoElectroChemsitry

B.Sc. CHEMISTRY SEMESTER
VIELECTIVEPAPER-II
CODE-21UCHE02
NANOAND GREENCHEMISTRY(60hours)

InternalAssessmentMarks:25

ExternalMarks:75

UNITI Introduction To NanoscienceAndNanotechnology

1.1 Introductiontonanoscalematerials–Nanoscale,atomic&molecularsize.Bondinginsolids-Ionicbond-Covalentbond-Metallicbond–IntermolecularBonds-Dispersionbonds-dipolebonds - hydrogenbonds.

1.2 Ahistoricalperspectiveofnanoparticles-Classificationofnanostructures-zero,one,twoandthreedimensional nanostructures. Sizedependencyinnanostructures.

1.3 Definitionanddescriptionofnanomaterialssuchascarbonnanomaterials,Inorganicnanoparticle,nanocrystal,quantum dots, nano composites, nanohybridnanomaterials.

UNITIINanomaterial SynthesisAndCharacterisationTechniques

2.1 Processofnanomaterialsynthesis:topdownandbottomupapproach.

2.2 Method of nanomaterials preparation : Nucleation and growth of nanosystems; self-assembly,mechanicalmilling,sputtering,microwaveplasma,hydrothermal,micelles,sol-gelprocesses,Chemicalvapourdeposition and Microwave.

2.3 Principle and applications of UV-VIS-NIR Spectroscopy, Scanning electron microscopy, Atomicforcemicroscopy, X –raydiffraction and Cyclicvoltammeter.

UNITIIIPropertiesAndApplicationsOfNanostructures

3.1 Newpropertiesofnanomaterials:RoleofPhysicalandchemicalproperties,

3.2 Discussiononpropertiesandapplicationsofnanomaterials:Surface,mechanicalopticalelectricalelectronic and chemicalproperties.

3.3 Ashortdiscussiononcommercialutilizationofnanomaterialsindrugdeliveryandmedications,cosmetics,electronics, energyharvesting,and environmentremediation

3.4 Toxicityofnanomaterials

UNITIVPrinciplesOfGreenChemistry

4.1 Green Chemistry- Definition, need of green chemistry, Twelve basic principles of green chemistry,selectionofstartingmaterials, reagents, catalysts and solvents.

4.2 Synthesis involving basic principles of green chemistry – synthesis of methyl methacrylate andparacetamol.Waterasgreen solvent-reactions inionic-liquid.

UNITVDesiginingAGreenChemicalSynthesis

5.1 Planning a green synthesis in a chemical laboratory- Solvent-less reactions- Solid support

organicsynthesis,Phasetransfercatalyst (PTC).

5.2 Microwaveactivationandheating-Useofmicrowavesinchemicalreactions-microwaveassistedreactions in water – oxidation of toluene to benzoic acid, microwave assisted reactions inorganicsolvent – Diels alder reaction,

5.3 Ultrasoundassistedreactions:Esterification,saponification,substitutionreactions,Cannizaroreaction .

Reference:

1. CharlesP.Poole,Jr., FrankJ. Owens,Introduction to Nanotechnology,WileyInterscience, 2003.
2. T.Pradeep,―NanotheEssentialNanoscienceandNanotechnology‖,TataMcGrawhill,2007
3. V.Rajendran,MaterialScience,TataMcGrawHill,NewDelhi,2011.
4. Rashmi Sanghi,M.M.Srivastava, GreenChemistry, EnvironmentfriendlyAlternatives,narosaPublishinghouse,2007
5. V.Kumar,AnintroductiontoGreenChemistry,VishalPublishingco.Jalandhar,2007

B.Sc.CHEMISTRY-SIXTHSEMESTER
Skill Based Elective Course -
VPaper Code:21UCHS05

PHARMACEUTICAL CHEMISTRY(30Hours)

InternalassessmentMarks:25

ExternalMarks:75

UNIT-I

1.1 Definition of the terms-drug, pharmacophore, pharmacodynamics, pharmacopoea, pharmacology,bacteria, virus ,fungus, actinomycetes, metabolites, antimetabolites, LD_{50}, ED_{50}. Therapeuticindex anditssignificance.

UNIT-II

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

2.2 Antibiotics-Definition-classificationasbroadandnarrowspectrum,Antibiotics-penicillin,ampicillin,structure, modeofaction only(no structuralelucidation)and uses.

UNIT-III

3.1 Analgesics-definitionandactions-narcoticand nonnarcotic-morphine,Heroin.

3.2 Antipyreticanalgesics-salicylicacidderivatives-methylsalicylate,aspirin.Anti-inflammatoryagents.

UNIT–IV

4.1 Anaesthetics-definition-classification-local and general- volatile, nitrous oxide, ether, chloroform,uses and disadvantages – nonvolatile – intravenous - thiopental sodium, -local anaesthetics – cocaineandbenzocaine.

4.2 Antianaemicdrugs-iron,vitaminB_{12} andfolicacid-modeofaction.

UNIT-V

5.1 Diabetics-Hypoglycemicagents-sulphonylurea,biguanides.

5.2 AIDS-causes,preventionandcontrol.

5.3 CardioVascularDrugs–Cardiacglycosides-AntiarrhythmicDrugs-preparation,dosageandtherapeuticuses.

5.4 Indianmedicinalplantsanduses-tulasi,kilanelli,mango,semparuthi,adadodaiandthoothuvalai.

ReferenceBooks

1. Atextbookofpharmaceuticalchemistry,JayashreeGhosh
2. PharmaceuticalChemistry,S.Lakshmi
3. OrganicPharmaceutical Chemistry, HarkishanSinghand V.K.Kapoor.

B.Sc.CHEMISTRY-SIXTHSEMESTER

ElectivePaper–

IIIIndustrialChemistryPaper

Code:21UCHE03

INDUSTRIALCHEMISTRY(60hours)

InternalassessmentMarks:25 External Marks:75

UNIT-1:Industrial fuels

1.1 Classificationoffuels:solid,liquid andgas.Calorificvalueof fuelsanditsdetermination.

1.2 Solidfuels–Coal-types–propertiesanduses–lignite,sub-bituminouscoal,bituminouscoalandanthracite.Cokingand non-cokingcoal.

1.3 Liquidfuels:Refiningofcrudepetroleumandusesoffractions.Hydrodesulphurisation.Cracking:thermal and catalytic(fixed bed and fluidised bedcataylsis).

1.4 GaseousfuelsNaturalgasand gobar gas:production,compositionanduses,Gobar electric cell.

UNIT-2:Watertreatment

2.1 Introduction Sources of water. Hardness of water-temporary or carbonate hardness, permanenthardness or non-carbonate hardness. Disadvantages of hard water in domestic, industry and steamgeneration(boilers).Estimation ofhardness–EDTA method,Estimation oftotal hardness.

2.2 Water softening methods Industrial purpose, Lime – soda process, Zeolite process, Ion-exchange,Demineralisation-deionisation process. Removalofsuspended impurities.

2.3 Removalofmicroorganism–Chlorination,Reverseosmosis,Desalination.

UNIT-3:Industries:

3.1 Sugar Industry: Manufacture of sugar from molasses and beetroot – sugar industries in India.Fermentation:Manufactureofspiritsandwines.Distillation:Manufactureofvinegarandethylalcohol.

3.2 Matchindustries:Manufacture–chemistryof lightingandpyrotechnics.

3.3 Explosives:Definition –Classification–Characteristicsof explosives–Nitrocellulose, T.N.T.Picricacid,GunPowder,CorditeandDynamite.

UNIT-4:Energyresources

4.1 Renewableandnonrenewablesourcesofenergy,conventionalandnonconventionalsourcesofenergy,solarenergy, solartechnology, solar photovoltaiccell– application.

4.2 Windenergy:Natureofthewind–powerinthewind–factorsinfluencingwind,applications.Windenergypotential inIndia.

UNIT-5IndustrialWastestreatment:

5.1 IndustrialWastesandTreatmentProcesses,characteristicsofindustrialwastes,typesofindustrialwastes,solidindustrial wastes, principles ofindustrial waste treatment,wastereductionprocess.

5.2 Treatmentanddisposalofindustrialwastes-mentionofthegeneralmethodsadoptedforthetreatmentof industrialwastes, sanitarychemicalanalysisofindustrialeffluents and sewage.

References

1. B.K.Sharma,Krishnaprakasam(2014),IndustrialChemistryIncluding ChemicalEngineering,Media,Meerut
2. B.K.Sharma––IndustrialChemistry,1stEd.,(1983),GoelPublication,Meerut.
3. B.N.Charabarthy – –Industrial Chemistry, 1st Ed., Oxford and IBh Publishing. NewDelhi.
4. D. A. Spera, Wind Turbine Technology: Fundamental concepts of Wind TurbineEngineering,ASMEPress.
5. Norrisshreve,r.Andjosepha.Brink,jr.Chemicalprocessindustries,4thed.;Mcgraw–hillKogakusha,ltd:1977.

Note:IndustrialVisitfortwodaysisrecommendedundertheguidanceof teachers

B.SCCHEMISTRYBRANCH–IV

COREPRACTICAL– I
VOLUMETRICESTIMATIONSANDORGANICPREPARATIONSC
ODE-21UCHP01

InternalAssessmentMarks:40 **ExternalMarks:60**

I. 1.ACIDIMETRY-ALKALIMETRY

a) EstimationofSodiumHydroxide –StandardSodiumCarbonate
b) Estimationofoxalicacid–StandardOxalicacid

2. Permanganometry:

a) Estimationofferrousiron.StandardOxalicacid
b) EstimationofOxalicacid.StandardOxalicacid

3. Dichrometry:

Estimationofferrous ironusingdiphenylamine internalindicator. Standard $FeSO_4$

4. Iodometryandiodimetry

a) Estimationof potassiumdichromate standard$K_2Cr_2O_7$
b) Estimationof Copperstandard $K_2Cr_2O_7$

5. ComplexometricTitrations

a) EstimationofZn /MgusingEDTA
b) Estimationofhardnessofwater

II. ORGANICPREPARATIONS.

1. Preparationsinvolvingthefollowing:

a) Oxidationofbenzaldehyde.
b) HydrolysisofMethylsalicylateorethylbenzoate.
c) Nitration–p–nitroacetanilideandm–dinitrobenzene
d) Bromination-p–bromoacetanilideandtribromophenol
e) Benzoylation–naphthylbenzoate

TEXTBOOKSANDREFERENCEBOOKS:

1. V.Venkateswaran,R.Veerasamy andA.R.Kulandaivelu,BasicPrinciplesofPracticalChemistry,Sultan Chand&Sons,ISBN:9788180547768, 8180547760, Edition:2012
2. A.O.Thomas, PracticalChemistry
3. RajKBansal,LaboratoraryManualOf OrganicChemistry

BRANCH –IV

COREPRACTICAL– I
VOLUMETRICESTIMATIONSANDORGANICPREPARATIONS

Time:3hours **MaximumMarks:60**

VolumetricEstimations:35

OrganicPreparation:15

Record10

1. EstimateVolumetricallytheamountof _____presentinthewholeofthegivensolution.Youareprovidedwith _____andasuitablelinksolution.Getthetitrevaluesattestedbytheexaminers.
2. Preparemaximumquantityof _____fromthegivensample.Submitthedriedsampleforevaluation.

BRANCH –IV

CORE PRACTICAL –
IICODE-21UCHP02
INORGANICQUALITATIVEANALYSISANDINORGANICPREPARATIONS

InternalAssessmentMarks:40 **ExternalMarks:60**

I. INORGANICQUALITATIVEANALYSIS

1. Analysis of a mixture containing two cations and two anions of which one will be an interferingion.Semimicromethods usingtheconventionalscheme withhydrogen sulphidemaybeadopted.
2. Anions to be studied : Carbonate, sulphate, nitrate, fluoride, chloride, bromide,borate, oxalate,phosphate. Cations to be studied : lead, bismuth, copper, cadmium, iron, manganese, aluminium,cobalt,nickel, zinc barium, strontium,calcium, magnesium andammonium.

II. INORGANICPREPARATIONS:

a) Ferrousammoniumsulphate
b) Tetraamminecopper(II)Sulphate
c) Microcosmicsalt
d) Bis(acetyl acetonato)Nickel(II) orCopper(II)
e) Tris(Thiourea)copper(II) sulphatedihydrate
f) Potassiumtri(oxalato)ferrate –III

TEXTBOOKSANDREFERENCEBOOKS

1. V.Venkateswaran,R.VeerasamyandA.R.Kulandaivelu,BasicPrinciplesofPracticalChemistry,SultanChand &Sons,ISBN: 9788180547768, 8180547760, Edition: 2012
2. A.O.Thomas, PracticalChemistry
3. V.V.Ramanujam,InorganicSemimicroQualitativeAnalysis

BRANCH –

IVCOREPRACTICAL–II

INORGANICQUALITATIVEANALYSISANDINORGANICPREPARATIONS

MaximumMarks:60 **Qualitative Analysis :35InorganicPreparations: 15**

Record:10

1. AnalysesystematicallythegivenInorganicmixturecontainingtwoacidradicalsandtwobasic radicals, oneacid radical beinginterferingone,
Recordyourobservationsandinferencesthenandthere Exhibitconfirmativetestsforeachradicalfor evaluation.
2. Preparemaximumquantityof _____fromthegivensimplesalts.Submitthedriedsampleforevaluation.

BRANCH –

IVCOREPRACTICAL–III

CODE -

21UCHP03PHYSICALCHEMISTRYPRACTICALS

InternalAssessmentMarks:40 **ExternalMarks:60**

1. **Kinetics**
   a) Determinationofrateconstant–Acidcatalysedhydrolysisofanester(methylacetateorethylacetate)
2. **Molecularweightdetermination**–Rastmethod
3. **HeterogenousEquillibrium**
   a) EffectofimpurityonCSTofphenol–watersystemanddeterminationofconcentrationofSodiumChloride
   b) Determinationoftransitiontemperatureofhydratedsalts:sodiumthiosulfate,Sodiumacetate,StrontiumChloride.
4. **Phaserule :**SimpleEutecticsystem–Naphthalene–Biphenyl
5. **Electrochemistry:**

ConductivityExperiment

i) Determinationofcellconstant
ii) Equivalentconductanceofstrongelectrolyte
iii) Conductometrictitration-acidbasetitration

6. **Potentiometry**–Potentiometrictitration–acid-basetitration

TEXTBOOKSANDREFERENCEBOOKS

1. V.Venkateswaran,R.VeerasamyandA.R.Kulandaivelu,BasicPrinciplesofPracticalChemistry,SultanChand&Sons,ISBN:9788180547768,8180547760,Edition: 2012
2. J.P.Yadav,AdvancedPracticalPhysicalChemistry.
3. S. Oolvi, Practical Physical Chemistry.

BRANCH –
IVCOREPRACTICAL–III
PHYSICALCHEMISTRYPRACTICALS

MaximumMarks:60

Chooseanyoneof thequestions givenbelow bylot

1. Determinetherateconstantoftheacidcatalyzedhydrolysisofthegivenesteratroomtemperature.
2. Determinethemolecularweightofthegivensolute.Youareprovidedwithasuitablesolvent.whose$K_f$valueis_____
3. Determinethetransitiontemperatureofthehydratedsaltbythermometricmethod.
4. Findouttheconcentrationofthegivensodiumchloridesolution.Youareprovidedwithpurephenol and 1 % solution ofSodiumChloride.
5. Determinethemolardepressionconstant$K_f$ofthegivensolvent.You areprovidedwithasolute ofknown molecularweight.
6. DeterminethestrengthofthegivenHydrochloricacidsolutionconductometricallyusingastandard SodiumHydroxidesolution.
7. Find out the cell constant of thegiven conductivity cell using 0.1 N and 0.01 Npotassiumchloridesolutions.whosespecificconductivitiesaregiven.Determinetheequivalentconductanceof thetwo solutions of knownconcentration.

TEXTBOOKSANDREFERENCEBOOKS

1. V.Venkateswaran,R.VeerasamyandA.R.Kulandaivelu,BasicPrinciplesofPracticalChemistry,SultanChand& Sons,ISBN:9788180547768,8180547760,Edition: 2012
2. J.P.Yadav,AdvancedPracticalPhysicalChemistry.
3. S. Oolvi, Practical Physical Chemistry.

BRANCH –

IVCOREPRACTICAL–IV

CODE-21UCHP04

GRAVIMETRICESTIMATIONSANDORGANICPRACTICALS

InternalAssessmentMarks:40 **ExternalMarks :60**

I. GRAVIMETRICESTIMATIONS

1. EstimationsofBariumas Bariumsulphate
2. EstimationofBariumasBariumchromate
3. EstimationofLeadasLeadchromate
4. EstimationofCalciumasCalciumoxalatemonohydrate
5. EstimationofSulphateasBariumsulphate
6. EstimationofNickelas NickelDMG

II. ORGANICQUALITATIVEANALYSIS

Analysis of organic compounds.Characterisation of organic compounds by their functionalgroupsandconfirmationby preparation of derivative.The following functionalgroups maybestudied.

Aldehydes, Ketones, Carboxylic acids, Aromatic primary amines, Phenol, Aromatic ester,Amide,Diamide, Anilide, Nitro compounds and monosaccharids.

TEXTBOOKSANDREFERENCEBOOKS

1. V.Venkateswaran,R.VeerasamyandA.R.Kulandaivelu,BasicPrinciplesofPracticalChemistry,Sultan Chand &Sons,ISBN: 9788180547768,8180547760, Edition: 2012
2. Dr.N.S.Gnanapragasam,OrganicChemistry,LaboratoraryManual
3. RajKBansal, LaboratoraryManualofOrganicChemistry.

BRANCH –

IVCOREPRACTICAL–IV

GRAVIMETRICESTIMATIONSANDORGANICPRACTICALS

Time:6Hour **MaximumMarks:60**

Gravimetry:20marks

Organicpracticals:30marks

Record:10

1. EstimateGravimetricallytheamountof _____ present in the whole ofthegiven _____ solutionbyconvertingitinto _____.Getthe weighings attested bytheExaminers.

2. Analysethe givenorganiccompoundandreportonthefollowing
   a) WhetherAliphaticorAromatic
   b) SaturatedorUnsaturated
   c) Specialelementspresent(or)absent
   d) Functionalgrouppresent

Submitacolourreactionorderivativeinsupportoffunctionalgroup present

ALLIEDCHEMISTRY
Paper Code:21UCHA01
FIRST/ THIRD SEMESTER PAPER-
IINORGANIC,ORGANICAND PHYSICALCHEMISTRY-I(60HOURS)

InternalAssessmentMarks:25 ExternalMarks-75

UNIT-IChemicalBonding

1.1 Types of Bonding- Ionic Bond, covalent Bond and coordinate bond Molecular OrbitalTheory-bonding, antibonding and nonbonding orbitals. M.O. diagrams of Hydrogen, Helium,Nitrogen,discussion ofbond order and magnetic properties.

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

UNIT-IINuclearChemistry

2.1 Naturalradioactivity-radioactiveseriesincludingNeptuniumseries-Groupdisplacementlaw.

2.2 Nuclear Bindingenergy, massdefect-Calculations.

2.3 NuclearFissionandNuclearFusion-differences–Stellarenergy.

2.4 Nuclearreactors,Applicationsofradioistopes-C-14dating,rockdating.

UNIT-IIIBasicConceptsof OrganicChemistry

3.1 CovalentBond-OrbitalOverlap-Hybridisation–GeometryofOrganicmolecules-Methane,

3.2 EthyleneandAcetyleneElectrondisplacementEffects:Inductive,Resonance,Hyperconjugative&stericeffects. Theireffect on theproperties ofcompounds.

3.3 Stereoisomerism:Symmetry-elementsofsymmetry-causeofopticalactivity,Tartaricacid.Racemisation.Resolution. Geometricalisomerismof Maleic and Fumaricacids.

UNIT-IVAromaticcompounds

4.1 Aromaticcompounds-Aromaticity-Huckel'srule

4.2 ElectrophilicsubstitutioninBenzene-MechanismofNitration,Halogenation-Alkylation,Acylation.

4.3 Isolation,preparation,propertiesandstructureofNaphthaleneHaworth_ssynthesis.

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

UNIT-V

PolymerChemistry

5.1 Basicconcepts:Monomer,polymerization,degreeofpolymerization,repeatunits.Classification of Polymers-addition and condensation polymers, natural and synthetic, basedonstructure, inorganicandorganic, thermoplasticandthermosettingresin.

5.2.Preparation,propertiesandusesofPolyolefins-polythene,PTFE,Freons,PVC,

polypropyleneandpolystyrene.

5.3 Natural and syntheticrubbers-Constitution ofnaturalrubber,Buna-N,Buna -S, Neoprene,Polyurethaneand siliconerubbers

.**Referencebooks:**

1. Soni.P.L,TextBookof InorganicChemistry,SultanChand&Sons.
2. Bhal.B.S.andArunBhal,AText BookofOrganicChemistry
3. PuriB.R, L.R.SharmaandPathania,PhysicalChemistry
4. V.RGowrikar,N.V.Viswanathan:PolymerScience

ALLIEDCHEMISTRY
Paper Code:21UCHA02
SECOND/ FOURTH SEMESTER PAPER –
IIINORGANIC,ORGANICAND PHYSICALCHEMISTRY-II(60HOURS)

InternalAssessmentMarks:25 **External Marks-**

75UNIT-I

Co-ordinationchemistry

1.1 Definition of terms- classification of ligands-NomenclatureChelation- Examples. Chelateeffect-explanation.Werner'stheory-conductivityandprecipitationstudies.Sidgwick'stheory-EffectiveAtomicNumber concept.

1.2 Pauling'stheory-postulates-Applicationtooctahedral,squareplanarandtetrahedralcomplexes. Pauling's theory and magnetic properties of complexes. Merits and demerits ofPauling'stheory

1.3 BiologicalroleofHaemoglobinandChlorophyll(Elementaryideaofstructureandfunctions).

UNIT-II

Carbohydrates&Aminoacids

2.1 Carbohydrates:Classification,preparationandpropertiesofGlucoseandFructose-Properties of Starch, Cellulose and derivatives of Cellulose. Inter conversion of Glucose toFructose and viceversa.

2.2 AminoAcids-classification,preparationandpropertiesofGlycineandAlanine.

UNIT-III

Pharmaceuticalchemistry

3.1 Chemotherapy:Preparation,usesandmodeofactionofsulphadrugs-prontosil,sulphadiazineandsulphafurazole.Usesofpenicillin,chloramphenicolandstreptomycin, Definitionandoneexampleeachfor-analgesics,antipyretics,tranquilizers,sedatives,hypnotics, local anaesthetics and general anaesthetics .Cause and treatment of diabetes,cancerandAIDS.

UNIT-IV

4.1 Photochemistry:Grotthus-DraperlawandStark-Einstien'slawofphotochemicalequivalence.Quantumyield.Exampleforphotochemicalreactions-Hydrogen-Chlorinereaction(elementaryideaonly)Photosynthesis. Phosphorescenceand Fluorescence.

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

UNIT-V

5.1 Electro Chemistry- Kohlrausch law -measurement of conductance, pH determination.Conductometictitrations.Galvaniccells-EMF-standardelectrodepotentials,referenceelectrodes.

5.2 Corrosion:Methodsofprevention.

Referencebooks:

1. Soni.P.L,TextBookof InorganicChemistry,SultanChand&Sons.
2. PuriandSharma,Textbookof InorganicChemistry-Vishalpublishing
3. Soni.P.L.TextBookofOrganicChemistry,SultanChandandSons.
4. Jain.M.K,PrinciplesofOrganic Chemistry-VishalpublishingCo.
5. KunduandJain,PhysicalChemistry,S.Chand.
6. Puri,SharmaandPathania,Text-bookofPhysical Chemistry,VishalPublishingco

ALLIED CHEMISTRY
PRACTICALSECOND/ FOURTH
SEMESTER PAPERVOLUMETRY and
ORGANIC ANALYSISCODE-21UCHAP01

InternalAssessmentMarks:40 **ExternalMarks:60**

I. TITRIMETRY

a) EstimationofSodiumhydroxide -Standardsodiumcarbonate.
b) EstimationofHydrochloricacid-StandardOxalicacid.
c) EstimationofFerroussulphate–StandardMohr'sSalt.
d) EstimationofOxalicAcid –StandardFerrousSulphate.
e) EstimationofFerrousironusingdiphenylamine asinternalindicator.

II. OrganicAnalysis:

a) Detectionofelements-nitrogen,sulphurandhalogens.
b) Detectionofaliphaticoraromatic.
c) Detectionofwhethersaturatedorunsaturatedcompounds.

Preliminarytestsanddetectionoffunctionalgroups,phenols,aromaticamines,aromaticacids, Urea, benzamide&carbohydrate.

TEXTBOOKSANDREFERENCEBOOKS

1. V.Venkateswaran,R.VeerasamyandA.R.Kulandaivelu,BasicPrinciplesofPracticalChemistry,SultanChand& Sons,ISBN:9788180547768,8180547760,Edition: 2012
2. AO.Thomas, PracticalChemistry
3. Raj K Bansal, Laboratorary Manual Of Organic Chemistry

DEPARTMENT OF CHEMISTRYNON MAJOR ELECTIVE COURSES(THIRDandFOURTHSEMESTERS)

1.	TextileChemistry	-21UCHN02
2.	IndustrialChemistry	-21UCHN03
3.	BiologicalChemistry	-21UCHN04
4.	MedicinalChemistry	-21UCHN05
5.	FoodChemistry	-21UCHN06
6.	AgroChemistry	-21UCHN07
7.	Polymer&Plastics	-21UCHN08

NOTE:

Any two papers from the above eight papers may be choosen for all B.A/B.Sc.students exceptB.Sc.Chemistry major students for NMEC in semester III and IV and the same must becommunicatedtothe Universityfor Examinationpurpose.

DEPARTMENT OF CHEMISTRYNONMAJORELECTIVE COURSEII

PAPER CODE - 21UCHN02TEXTILECHEMISTRY(30 Hours)

Internal Assessment Marks:25External Marks:75Unit1.FibreScience

Definition of textile fibres; Essential and desirable properties of textile fibres; Textile fibreclassifications. Natural fibres: Cotton, Wool, Silk, Flax (Linen), Jute; Physical & chemicalproperties, fine structure, Chemical structure and applications. Brief idea of Regeneratedcellulosic fibres: Viscose, Lyocell, Cuprammonium rayon. Introduction to Manmade fibres:Raw materials, manufacturing process, physical and chemical properties and applications ofpolyester,polyamides, Acrylic&Polyolefins.

Unit2.Chemicalpreparatoryprocess:

Fabric preparatory processes: Grey inspection, Shearing, Cropping, Singeing & its types,Introductionto desizing, technologyof acidand enzymaticdesizingmethods.
Chemistry and technology of hypochlorite, peroxide and chlorite bleaching, Wool scouring,bleaching; silk degumming and bleaching. Introduction to Mercerisation, its chemistry andtechnology;
Textileauxiliariesforscouringandbleaching.

Unit3.Dyes&Colorationof textiles

Introduction to dyeing:Theory of Colour, chromophore, auxochrome, chromogen.Primary andSecondarycolour.
Classification of dyes based on method of application, Properties & Application of differentdyesontextileslikeDirect,Reactive, Vat,Azoic,Sulphur,Acid,Basic dyes,dispersedyes.
Printing Basics: Introduction to printing; Different methods & styles of Printing; Printingpaste ingredients & types of thickeners; Concepts of Ageing, Steaming & Curing. Dyeing andprintingauxiliaries.

Unit4.Finishingof Textiles

IntroductiontoFinishing: Importanceoftextilefinishing,classificationoffinishing,
Concept about different type of softeners-anionic, cationic, non-ionic, amphoteric, reactivesofteners,siliconesofteners.
Functional finishes: Its properties and agents in water repellent and water proof finishes, anti-creasing agents,Soilrelease finish, Antistatic finish, UV protection finish,antimicrobialfinish,flame retardants, anti-odourfinish.
Conceptofenzymaticfinishingin cotton(Biopolishing).

Unit5.TechnicalTextilesandTextileEffluent:

Basicintroductionabouttechnicaltextiles.Fibresthatareusedfortechnicaltextiles.Production of high performance fibres like Kevlar and aramid.Different types of Technicaltextiles;Filtration, Automotive, Home, Packaging&Medical.
Textile Effluent: Characteristics and determination of BOD, COD, TDS, pH and ToxicityModernTextileEffluentTreatmentprocess-Primary,Secondary,Tertiary&Membranetechnology.Concept ofZeroDischargeandits importance.

References:

IndianAuthor

1. Shenai,V.A.,1983. Chemistryofdyesandprinciplesofdyeing.
2. PrayagRS.Textilefinishing.1994.
3. ShenaiVA. Toxicityof dyesand intermediates.1995;
4. MishraSP.Atextbookoffibrescience andtechnology.NewAgeInternational;2000
5. R.S.Bhagwat,HandbookofTextileProcessingMachinery,ColorPublication,1999
6. TextileEffluentsbyPadmaVarkar,NCUTEPublications,IIT,Delhi.
7. EnvironmentalChemistryandpollutionControl,S.S.Dhara,S.Chand&Co.,Delhi.
8. N.Manivasakam,TreatmentofTextileProcessingEffluents,SakhiPublications,1995.

ForeignAuthor

1. HorrocksAR,AnandSC,editors.HandbookofTechnicalTextiles:TechnicalTextileProcesses.Woodhead Publishing; 2015 Dec1.
2. Sadov,F.I.,Korchagin,M.V.andMatetskii,A.I.,1978.Chemicaltechnologyoffibrousmaterials.MIR Publishers,Moscow.
3. TrotmanER.Dyeingand chemicaltechnologyoftextilefibres.Wiley;1984.
4. J.Shore,Cellulosicsdyeing,Firsted.,Society ofDyersandColourists,WestYorkshire,1995
5. Peters RH. 1975 Textile Chemistry: Vol. III. The physical chemistry ofdyeing. Elsevier,NewYork
6. Gohl,ErhardPaulGottlieb,andLeoDavidVilensky.Textilescience.1983.
7. Renfrew AH. Reactivedyesfortextile fibres.Societyof Dyers and Colourists.1999
8. SchindlerWD,HauserPJ.Chemicalfinishingoftextiles.Elsevier; 2004Aug10.

Website:

https://www.cottoninc.com/

DEPARTMENT OF CHEMISTRYNONMAJORELECTIVECOURSE-III

INDUSTRIAL CHEMSITRYCODE-21UCHN03

InternalAssessmentMarks:25 External Marks:75UNITIFuels

Definition, calorific value, requirement of a good fuel, types of fuel, coal gas, producer gas,watergas–composition,preparation,uses;LPG,Gobargas–production,composition,calorificvalue.

UNITIISoapsanddetergents

Definition, classification of soaps, manufacture of soaps – kettle process, hydrolyser process;cleansing action of soap, synthetic detergents, classification- anionic, cationic and non-ionic;additivesusedindetergents,differencesbetweenhardandsoftdetergents,differencesbetween soapsanddetergents.

UNITIIIChemistryof sugarandfermentation

Manufactureofsucrosefromcanesugar-extractionofjuice,purification,concentration,crystallization,separationandrefiningofcrystals,recoveryofsucrosefrommolasses,estimation of sucrose andinversion sugar by polarimetry. Manufacture of alcoholfrommolasses andstarchbyfermentationprocess.

UNIT–IVGlass&CementIndustry

Glass-Typesof glass,composition,manufactureanduses.

Cement- Manufacture wet and dry processes, composition of portland cement, setting ofcement,Concrete and RCC.

UNITVLeather&PaperIndustry

Leather industry - Curing, preservation and tanning of hides and skins, process of dehairinganddyeing.Treatment oftanneryeffluents.

Paper industry - Manufacture of paper production of sulphite pulp and conversion to paper(bleaching,filling, sizingandcalendaring).

References

1. B.K.Sharma,Krishnaprakasam(2014),IndustrialChemistryIncludingChemicalEngineering,Media,Meerut
2. B.K.Sharma––IndustrialChemistry,1stEd.,(1983),GoelPublication,Meerut.
3. B.N.Charabarthy –-Industrial Chemistry, 1st Ed., Oxford and IBh Publishing.New Delhi.

DEPARTMENT OF
CHEMISTRYNON MAJOR
ELECTIVE COURSE IVPAPER
CODE-21UCHN04
BIOLOGICALCHEMISTRY(30HOURS)

InternalAssessmentMarks:25 **External Marks**

:75UNITI Amino acids and Nucleic acids

Aminoacids-classification,essentialandnonessentialaminoacidsandfunctions.Nucleicacids-DNA,RNA-constituents,structureandfunctions.

UNIT IICarbohydrates and
lipidsCarbohydrates-
classificationandfunctions.
Lipids-classification,biologicalfunctionsanddifferencebetweenfatsand oils.

UNITIIIVitamins
Classification,sources,biologicalfunctionanddeficiency diseasesofVitaminsA,C,K,E_1andB_6.

UNITIVMinerals
Sources, biological functions and deficiency disease of macro minerals-Sodium, Potassium,Calcium, Phosphorous and Magnesium. Micro minerals: Selenium, copper, Iron, Zinc andManganese.

UNITVEnzymes and

HormonesEnzymes: Classificationandfunct

ions.
Hormones: ClassificationandbiochemicalfunctionsofAdrenalin,Thyroxine,Oxytocin, InsulinandSex hormones.

Reference:

1. S.JayashreeGhosh,Fundamentalconceptsofappliedchemistry.S.Chand&company1stEdition 2006.
2. U.SatyanarayanaandU.Chakrapani BiochemistryElsevierIndiaPvt.Ltd. 4thEdition.
3. P.Palanivelu,Laboratorymanualforanalyticalbiochemistryandseparationtechniques,Schoolo fBiotechnology,Madurai Kamaraj UniversityPress, Madurai.
4. GurdeepChatwaal,Naturalproducts,GoelPublishingHouse,NewDelhi.

DEPARTMENT OF CHEMISTRYNONMAJORELECTIVE COURSE-V

MEDICINAL CHEMISTRY

(30Hours)PAPER CODE - 21**UCHN05**

InternalAssessmentMarks:25ExternalMarks:75U

NITI-Introduction

Commondiseases–infectivediseases–insect–borne,air–borneandwater-borne–hereditarydiseases–Terminology–drug,pharmacology,antimetabolites,absorptionofdrugs–factorsaffectingabsorption–therapeuticindex(Basicconcepts only)

UNITII-Drugs

Various sources of drugs, pharmacologically active constituents in plants, Indian medicinalplants – tulsi, neem, keezhanelli – their importance – Classification of drugs–biologicalchemical (Structurenotrequired)Drugreceptorsandbiologicalresponses–factorsaffectingmetabolismof drugs. (Basic concepts only)

UNITIII-Chemotherapy

Chemotherapy Drugs based on physiological action, definition and two examples each ofanesthetics-General and local – analgesics – narcotic and synthetic – Antipyretics and antiinflammatory agents – antibiotics – Penicillin, Streptomycin, Antivirals, AIDS – symptoms,prevention,treatment– Cancer(Structurenot required)

UNITIV-Commonbodyailments

Diabetes – Causes, hyper and hypoglycemic drugs – Blood pressure – Sistolic &DiastolicHypertensive drugs – Cardiovascular drugs – depressants and stimulants –Lipid profile –HDL,LDLcholesterol lipid loweringdrugs. (Structurenot required)

UNITVHealth promoting drugs

Vitamins A, B, C, D, E and K micronutrients– Na, K, Ca, Cu, Zn and I, Medicinallyimportant inorganic compounds of A1, P, As, Hg and Fe, Examples and applications, Agentsfor kidney function (Aminohippuric acid). Agents for liver function (Sulfo bromophthalein),antioxidants,treatment ofulcerand skindiseases.(Structurenotrequired)

RECOMMENDEDREFERENCEBOOKS

1. AshutoshKar,—MedicinalChemistry,WileyEasternLtd.,NewDelhi,1993.
2. DavidWilliamandThomasLemke,FoyesPrinciplesofMedicinalChemistry,BIPublishers.
3. RomasNogrady,MedicinalChemistry,OxfordUniv.Press

DEPARTMENT OF CHEMISTRYNON-MAJORELECTIVECOURSE-VI FOOD CHEMISTRY (30 HOURS)PAPER CODE - 21UCHN06

InternalAssessmentMarks:25

ExternalMarks:75

UNIT-I Food source&Constituents offoods

Food:Source,functionsoffoods.Foodgroups:Basicfivefoodgroups.

Constituents of food : Carbohydrates, Classification– Storage of Carbohydrates anditsfunction. Proteins – Classification sources and functions. Fats and oils, Dietary sources, Usesoffat sand oils andtheirrolein biological systems.

UNIT-IIFoodAdulteration

Adulterants in different foods - Milk, and milk products, Vegetable oils and fats spices,cereals, pulses.Contamination with toxic chemicals - Pesticides and Insecticides Detectionandprevention offoodAdulteration.

UNIT-III FoodSpoilageand foodpreservation

Causes of Foodspoilage-Foodpreservation- Principle andmethodsof preservation-Byusing high temperature - sterilization, pasteurization and Blanching.Low temperature foodperservationmethods.

UNIT-IVVitamins

Classification, sources, functions and deficiencies of fat soluble vitamins – A,D,E, and K,watersoluble vitamins– B_1,B_2, and B_6.

UNIT-VMinerals

Mineral elements in foods, Principal mineral elements– sources, functions and deficienciesofNa, K, Mg,Fe, S andP.

Referencebooks:

1. Food&Nutrition-Dr.M.Swaminathan
2. FoodScience-Srilakshmi
3. Foodprocessing&preservation–Sivasankar
4. Text book on food chemistry - Dr. M.Swaminathan

DEPARTMENT OF CHEMISTRYNONMAJOR ELECTIVE COURSE-VII-AGRO CHEMISTRY (30 hours)PAPER CODE-21UCHN07

InternalAssessmentMarks:25 **External Marks:75**

UNITI Chemistry ofsoil

1.1 Definition of soils, Classification, Properties of soils-physical properties - structureand texture,soilwater, soil airand soil temperature.

1.2 Chemicalproperties-soilmineralmatter-soilcolloids,ion-exchangereactions.Soilfertilityand its evaluation.

UNITIISoil analysis

2.1 Soilorganicmatterandtheirinfluenceonsoilproperties–Nratio effects.

2.2 Soilreactions.SoilpH,acidity,alkalinity,bufferingofsoilsanditseffectsontheavailability of N, P, K, Ca, Mg, I, Al, Mn & sulphuric acid- soils salinity, acid & alkalinesoils-theirformation andreclamation.

UNITIIIFertilizers

3.1 Primary,secondaryandmicronutrientsonplantgrowthanddevelopment.Nitrogenousfertilizers,manufactureof ammoniumnitrate,ammonium sulphateandurea.

3.2 Phosphatefertilizers-preparationandusesofmonoanddiammoniumphosphates,superphosphate.

3.3 Potassiumfertilizers-potassiumnitrate,potassiumchloride,potassiumsulphateandmixedfertilizers.

UNITIVPesticides

4.1 Classification-Insecticides,fungicidesandherbicides,applicationandtoxicity.Insectattractantsandrepellents-fluorinecompounds,boroncompounds,arseniccompounds,organomercuriccompounds.

4.2 GeneralmethodsofpreparationofDDT,BHC.StructureandusesofHerbicides:2,4-D and 2,4,5-T.Structure and uses of Fungicides: Preparation of Bordeaux mixture,lime-sulphur.

UNITVWaterTreatment &WaterAnalysis

5.1 WaterTreatment-Hardandsoftwater,watersofteningmethods-limesodaprocess,phosphateconditioningand ion-exchangeprocesses.

5.2 Water analysis - determination of hardness of water, acidity, alkalinity,pH value, amount of freeCO_2, fluoride content,chloride content. Biological oxygen demand (BOD), chemical oxygen demand(COD),recyclingof water.

References

1. PlantEcologyandSoilScience,R.S.ShuklaandP.S.Chandel.
2. Shreve'sChemicalProcessIndustries,G.T.Austin
3. AgriculturalChemistry,B.A.Yagodin.

DEPARTMENT OF CHEMISTRY

NONMAJORELECTIVECOURSE-VIII

PAPERCODE -21UCHN08

InternalAssessmentMarks:25

ExternalMarks:75

POLYMER& PLASTICS (30Hours)

UNIT-I

1.1 Basicconcepts: Monomer, polymerization, degree ofpolymerization, repeat units.Classification of Polymers-addition and condensation polymers, natural and synthetic, basedonstructure, inorganicandorganic, thermoplasticandthermosetting resin.

1.2 General methods of preparation of polymers. Polymerization through functional groups,multiplebonds and ringopening and Coordinationpolymerization.

UNIT-II

2.1 Structure of polymers- linear, branched and cross linked. Homo & hetro copolymers.Block copolymers &graft copolymers. Stereochemistry of polymers-Isotactic ,SyndiotacticandAtactic

2.2 Propertiesofpolymers:Thecrystallinemeltingpoint.Theglassystateandglasstransitiontemperature

UNIT-III

3.1. Molecularweightofpolymers

3.2 Numberaveragemolecularweightandweightaveragemolecularweight.Determinationofmolecularweight byViscosityand Osmometrymethods.

3.3. Polymerprocessing-calendaring,Diecasting,blowmoulding,andWetspinning.

UNIT-IV

4.1 Polyolefins-polythene, PTFE,Freons ,PVC,polypropyleneandpolystyrene.

4.2 Naturalandsyntheticrubbers.-Constitutionofnaturalrubber.Butyl,Buna-N,Neoprene,Thiocol,Polyurethaneand siliconerubbers.

UNIT-V

5.1. Plastics and Resins Definitions. Thermoplastic and thermo setting resins.Constituents ofplastic-fillers, dyes, pigments, plasticizers, Lubricants and catalysts.Uses of thermoplasticresinsand thermo setting resins.

REFERENCES:

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

2.R.B.Seymour,IntroductiontoPolymerChemistry, MCCrawHill,NewYork1971.

3.S.S.Dara,ATextBookinEngineeringChemistry,S.Chand&CompanyLtd,NewDelhi.ThirdEdition ,1992.