SYLLABUS

B.Sc., CHEMISTRY (SEMESTER)

CHOICE BASED CREDIT SYSTEM

COURSE SCHEME & SCHEME OF EXAMINATIONS

Qualification: Passed in H.Sc., or any other Examination accepted by the Syndicate as
Equivalent

Duration of the Course: B.Sc., Chemistry – 3 years (6- Semesters)

OBJECTIVES OF THE COURSE:

- *To enable the students to understand the knowledge of chemistry.*
- *To acquire skills in the field of life oriented, application oriented and job oriented chemistry.*
- *Study of skill based subject can develop various skills in the field of chemistry which will enable the students to get a job.*
- *Visit to various chemical industries by the students will create a sound knowledge in the field of Industrial Chemistry.*
- *Study of Industrial Chemistry and Visit to industry helps for linking of Colleges with industry.*

SUBJECTS OF STUDY:

I	Part -I	-Tamil	
	Part-II	-English	
	Part-III	i)	Core Subjects-Chemistry
		ii)	Allied Subjects
	Part-IV	i)	Non-major subjects
		ii)	Skill based Subjects
		iii)	Environmental Studies
		iv)	Value Education

STRUCTURE OF THE QUESTION PAPERS :

Internal – 25 marks
External – 75 marks
Total - 100 marks

Question Paper: Three Parts A, B and C
Section – A - 10 x 1 = 10 marks (multiple choice, True or False)
Section – B - 5 x 7 = 35 marks (either A or B)
Section – C - 3 x 10 = 30 marks (3 out 5 questions)

1. For Internal Examination : 25 marks

1. Two Tests to be conducted - 15 marks (average of 2 tests to be taken)
2. Group discussion / Seminar / Quiz - 5 marks
3. Two Assignments / Project - 5 marks each (average of 2 to be taken)
4. 1st Internal Examination - between 30th and 40th working days
5. IInd Test will be conducted - between 70th and 80th working days
6. Eligibility for the degree - passing minimum is 35%

External Examination = 75

Passing Mark : No minimum for internal exam.

: Minimum 23 for External

I Semester

Part	Study component	No. of Course	Credits	Hours
I	Tamil / Other Languages	1	3	6
II	English	1	3	6
III	Core subject-1 Inorganic Chemistry-I	1	4	4
	Core practical-I	1	-	2
	Allied Subject – I – paper 1	1	4	4
	Allied Subject – I – practical-1	1	-	2
IV.	**Skill based subject** 1. Sugar Technology	1	2	2
	2. Perfume Chemistry	1	2	2
	Non Major Elective Industrial Chemistry	1	2	2
Total		9	20	30

II Semester

Part	Study component	No. of Course	Credits	Hours
I	Tamil / Other Languages	1	3	6
II	English	1	3	6
III	Core subject-2 Organic Chemistry-I	1	4	4
	Core practical-I	1	2	2
	Allied Subject – I – paper 2	1	4	4
	Allied Subject – I – practical-1	1	1	2
IV.	**Skill based subject** 1. Leather Technology	1	2	2
	2. Paper and Pulp Technology	1	2	2
	Non Major Elective Drugs and cosmetics	1	2	2
Total		9	23	30

III Semester

Part	Study component	No. of Course	Credits	Hours
I	Tamil / Other Languages	1	3	6
II	English	1	3	6
III	Core subject-3 Physical Chemistry-I	1	4	4
	Core practical-II	1	-	2
	Allied Subject – I – paper 3	1	4	4
	Allied Subject – I – practical-2	1	-	2
	Allied Subject – II – paper 1	1	4	4
	Allied Subject – II – practical-1	1	-	2
Total		8	18	30

IV Semester

Part	Study component	No. of Course	Credits	Hours
I	Tamil / Other Languages	1	3	6
II	English	1	3	6
III	Core subject-4 Inorganic Chemistry-II	1	4	4
	Core practical-2	1	2	2
	Allied Subject – I – paper 4	1	4	4
	Allied Subject – I – practical-2	1	1	2
	Allied Subject – II – paper 2	1	4	4
	Allied Subject – II – practical-1	1	1	2
Total		8	22	30

V Semester

Part	Study component	No. of Course	Credits	Hours
III	Organic Chemistry – II (Cr.-5)	3	12	12
	Physical Chemistry-II (Cr.-6) Inorganic, Analytical and Applications of Computers in Chemistry -III (Cr-7)	3	-	8
	Core practicals-3,4 and 5			
	Allied Subject – II – paper 3	1	4	4
	Allied Subject – II – practical-2	1	-	2

IV	Environmental Studies	1	2	2
	Skill based subject Pharmaceutical & Medicinal Chemistry	1	2	2
Total		10	20	30

VI Semester

Part	**Study component**	**No. of Course**	**Credits**	**Hours**
III	Organic Chemistry – III (Cr.8	3	12	12
	Physical Chemistry-III (Cr.9) Applied Chemistry – III (Cr.10) Core practicals-3,4 and 5	3	15	8
	Allied Subject – II – paper 4	1	4	4
	Allied Subject – II – practical-2	1	1	2
IV	Value Education	1	2	2
	Skill based subject Medical Laboratory Technology & Bio Chemistry	1	2	2
V	Extension Activities	1	1	0
Total		11	37	30

I SEMESTER

Core Subject Paper-I

INORGANIC CHEMISTRY – I

Credit – 4

(15 x 4 = 60 hrs)

Max 100 Marks

Ext : 75

Int : 25

Unit-I

A. Laboratory hygiene and safety – Storage and handling of chemicals – Carcinogenic chemicals – Toxic and poisonous chemicals – Waste disposal – Fume disposal – General precautions for avoiding accidents – First aid techniques – Poisoning – methods to avoid poisoning – Treatment for specific poison laboratory safety measures.

B. Principles and techniques of semi micro methods – Aims of semi micro qualitative analysis – Types of reactions involved in qualitative analysis – Dry reactions – Precipitation reactions – applications of solubility product principle in qualitative analysis – Complexation reaction – Oxidation and reduction reactions – Spot tests – Preparation of solution for cation testing on semi micro scale – Removal of interfering ions in the analysis of cations – Oxalate, tartrate, borate, fluoride, chromate, phosphate and arsenite.

C. Oxidation – reduction : Concepts of oxidation – reduction in terms of oxidation number – calculation of oxidation number – redox reactions – half reactions – Balancing ionic equations by ion electron method (half reaction) – Reactions involving - $Cr_2O_7^{2-}$ and Fe^{2+} & MnO_4^- and Fe^{2+} & $Cr_2O_7^{2-}$ in acid medium & CrO_4^{2-} and SO_3^{2-}

Unit II

Periodicity of properties – cause of periodicity – atomic and ionic radii-electron affinity-ionisation energy – electronegativity – Pauling and Millikan scale – Allred and Rochow's sclae – factors affecting the magnitude of electronegativity – application of electronegativity.

Unit-III

Chemical bonding – valence bond approach – types of overlapping and orbital diagrams – sigma and pi bonds. Hybridization and geometry of molecules – sp. sp^2, sp^3, sp^3d and d^2sp^3 hybridization with example, VSEPR theory – shapes of molecules – molecular ortibal theory – Bonding and antibonding orbitals rleative order of energies of molecular orbitals – MO theory applied to homonuclear molecules – H_2 O_2, F_2 and Cl_2 – heteronuclear molecules – HF, CO and NO – comparative study of VB and MO theories.

UNIT IV

Lattice energy of ionic compounds – Definitions – Experimental determination of lattice energy – Born Haber cycle – Explanation of some properties of ionic crystals on the basis of lattice energy – Fajans rule – van der waals forces – Ion-ion, ion-dipole interactions.

UNIT V

Halogens – position of halogens in the periodic table – anomalous behaviour of fluorine – modern method of isolation of fluorine – estimation of available chlorine in bleaching powder – properties and uses – perchloric acid – potassium perchlorate. Oxides and oxy acids of bromine – brominating mixture – periodic acid – preparation - properties – uses – inter halogen compounds – polyhalides – pseudohalogens – basic iodine.

Test Book:

1. Text Book for Inorganic Chemistry by Puri and Sharma. (Latest Edition 2008)
2. Text Book for Inorganic Chemistry by P.L.Soni. (Latest Edition 2008)

PART IV

Skill based subject

Sugar Technology

Credit – 2
Hours - 2
Max -100
Ext. - 75
Int – 25

Unit – I Sugar Industry in India – Sugarcane and Sugar Beet – Manufacture of cane sugar.

Unit-II Extraction of Juice – Concentration – Separation of crystals – Recovery of glucose from molasses Defection.

Unit-III Sulphitation and carbonation – Testing and Estimation of Sugar

Unit-IV Double Sulphitation Process

Unit-V Preparation of Bagasse – Use of Bagasse for manufacture of paper and electricity Preparation of Alcohol from Molasses Preparation of Absolute Alcohol Manufacture of Wine, Beer, Methylated Spirit, Power Alcohol, estimation of No. of Hyroxyl groups.

Visit to a Industry and submission of Report. For Industrial visit / Assignment = 5 marks (Internal). Contact District Industrial Centre. (DIC for visits).

Text Book: Industrial Chemistry including Chemical Engineering – B.K. Sharma – Goel Publishing House. 13th Revised and Enlarged Edition.

PART IV

SKILL BASED SUBJECT
PERFUME CHEMISTRY

Credit – 2
Hours - 2
Total Marks -100
Internal : 25
External : 75

Paper III : Perfume Chemistry

Unit – I Introduction – Esters, Alcohols, Ketones

Unit-II Diphenyl Compounds – Production of natural perfumes – flower perfumes

Unit-III Jasmine – Lily, Orange blossom, Rose – Fruit flowers

Unit-IV Artificial flavours

Unit-V Banana Compounds – Grape Compounds, apple compounds and Pine apple compounds (Demonstration of Jasmine Perfume)

Visit to a Industry and submission of Report. For Industrial visit / Assignment = 5 marks (Internal). Contact District Industrial Centre. (DIC for visits).

Text Book: Industrial Chemistry including Chemical Engineering – B.K. Sharma – Goel Publishing House. 13th Revised and Enlarged Edition.

PART IV

Non-major elective

Credit – 2
Hours - 2
Total Marks -100
Internal : 25
External : 75

Industrial Chemistry

Unit – I Industrial Chemistry – Scope – Various type of chemical industries – Fertilizers – Agricultural – Polymer – Cement – Petrochemical – Organic chemicals etc.

Milk and Milk Products Industry : Composition of Milk. Flavour and aroma of Milk, Physical properties of milk. Effect of heat on milk, Milk products, cream, Butter, ice cream, Milk Powder.

Unit-II Agricultural Industry – Nutrients for plants – Major and minor nutrients – Role of NPK – Urea – Super Phosphate – Mixed fertilizers – Fertilizer manufacturing units in India – Insecticides and pesticides – DDT. (Health Hazards of pesticides.

Unit-III Polymer Industry – Natural and Synthetic rubbers – examples for synthetic rubber – applications – Plastic – Bakelite – Nylon 66 – PVC – Uses (Structure not necessary).

Unit-IV Petrochemical industry : Crude oil – Chemicals from crude oil – Natural gas – LPG, Aviation fuel – Fuels used in locomotives – trucks and ships – Fuels used in light commercial vehicles – Air pollution problems due to Automobiles and its control.

Unit-V Nuclear Power Plants – Nuclear Power plants in India – Nuclear fuels – Concepts of Nuclear fission and energy production – Nuclear waste disposal and hazards.

Soap and detergents: Manufacture of Soap and Detergents. Cleaning action of soap.

Problems of Detergents Waste water in water resources.

Visit to various nearest industries and submission of report – 5 marks

Text Books:

1. Industrial chemistry including chemical Engineering. 2007. B.K. Sharma Goal Publishing. House 13th Revised and enlarged edition.

2. Applied Chemistry – K.Bagavathi Sundari, S.Chand. 2007.
3. Fundamental concepts of Applied chemistry by Jaya Shree GhosH - S year 2008. Chand Company.

II SEMESTER

Core Subject Paper-2

ORGANIC CHEMISTRY - I

Credit – 4
(15 x 4 = 60 hrs)
Max 100 Marks
Max :100
Ext. : 75
Int : 25

Unit I

a. **Polyhalogen derivatives** : Chlorofluoro carbons – westron and freon – preparation and applications. Preparation and properties of $ChCl_3$, ChI_3 and CCl_4.

b. **Organometallic compounds :** Grignard reagents – preparation, structure and synthetic applications, limitations, Organozinc, organocadmium and organolithium compounds.

Unit II

a. **Alcohols:** Preparation by hydroboration, reduction of carbonyl compounds, acids and esters, by using Grignard reagents. Reaction with metals. Mechanism and reactivity towards HX, dehydration – rearrangement. Ascending and descending the alcohol series – estimation of no. of hydroxyl groups.

b. **Ethers:** mechanism of Williamson's synthesis, mechanism of cleavage by HX – estimation of methoxy group by Zeisel method. Application of crown ethers.

c. **Thioalcohols and thioethers** : Preparation and properties of sulphonal and mustard gas. Phosphorus ylides – Definition with examples, mechanism of Wittig reaction.

UNIT III

Stereoisomerisms

a. **Geometrical isomerism :** Definition – geometrical isomerism of maleic and fumaric acids – aldoximes and ketoximes – determination of configuration of geometrical isomers – E, Z notations – stereochemistry of addition of bromine to double bond.

b. **Optical Isomerism :**

(i) Optical activity – specific rotation and its polarimetric determination – definition of optical isomerism – elements of symmetry.

(ii) Optical isomerism of compounds containing asymmetric carbon atom – racemisation and resolution of racemic mixtures – Walden inversion – asymmetric synthesis. Chirality – specifications of absolute configuration by R and S notations.

(iii) Optical activity of compounds without asymmetric carbon atoms; allenes, spiranes and biphenyl compounds.

(iv) Optical activity of elements other than carbon atoms. Quaternary ammonium compounds and tertiary amine oxides.

UNIT-IV - CARBOHYDRATES:

Disaccharides: Preparation, properties constitution and configuration of sucrose and maltose. Polysaccharides: A general study of starch and cellulose – uses of cellulose in industries.

UNIT-V –DYES

Definition – theory of colour and constitution – classification of dyes according to structure and applications.

(i) Azodyes – preparation of methylorange congo red and bismark brown

(ii) Triphenyl methane dyes: Preparation of malachite green, rosaniline and crystal violet.

(iii) Phthalein dyes: Phenolphthalein, fluorescein and eosin preparation and properties.

(iv) Vat dyes – preparation of Indigo.

Text Book:

Test Book of organic Chemistry by P.L. Soni. 2008 Latest Edition.

PART IV – SEMESTER II

Skill Based Subject

LEATHER TECHNOLOGY

Credit – 2
Hours - 2
Total Marks -100
Internal : 25
External : 75

Unit – I History of tanning industry in India – Conventional tanning process – Animal skin.

Unit-II Manufacture of leather, preparation of hides for tanning, use of various inorganic and organic chemicals for tanning process.

Unit-III Various processes of tanning – soaking, liming, deliming, dehairing and bating.

Unit-IV Vegetable tanning, type of tanning for sales, belting and heavy leather.

Unit-V Vegetable tanning – synthetic tanning, chrome tanning, finishing of leather.

Environmental Pollution

Pollution problems caused by tanneries and its control.
Treatment of tannery effluents by primary Secondary and tertiary processes, Use of reverse Osmosis system for the treatment of polluted water.

Visit to a Industry and submission of Report. For Industrial visit / Assignment = 5 marks (Internal). Contact District Industrial Centre. (DIC for visits).

Text Book: Industrial Chemistry including Chemical Engineering – B.K. Sharma – Goel Publishing House. 13th Revised and Enlarged Edition.

PART IV – SEMESTER II

SKILL BASED SUBJECT

PAPER AND PULP TECHNOLOGY

Credit – 2
Hours - 2
Total Marks -100
Internal : 25
External : 75

Unit – I Introduction, Manufacture of Pulp, Various raw materials used for the preparation of Pulp.

Unit-II Preparation of Sulphite Pulp, soda pulp, Rag Pulp

Unit-III Various processes: Beating, Refining, Filling sizing and colouring.

Unit-IV Manufacture of paper, calendaring, uses.

Unit-V Various Paper industries in India.

Visit to a Industry and submission of Report. For Industrial visit / Assignment = 5 marks (Internal). Contact District Industrial Centre. (DIC for visits).

Text Book: Industrial Chemistry including Chemical Engineering – B.K. Sharma – Goel Publishing House. 13th Revised and Enlarged Edition.

PART IV – SEMESTER II

NON MAJOR ELECTIVE

DRUGS AND COSMETICS

Credit – 2
Hours - 2
Total Marks -100
Internal : 25
External : 75

Unit – I Importance of Drugs – Important terminologies, their meaning – Bacteria, virus, fungi, Names of drugs – Types of Bacteria.

Unit-II Antibiotics: Definition – uses of Antibiotics. 1. Ampicillin, streptomycin, tetracycline, rifomycin, Erythromycin, drug actions and side effects.

Unit-III Vitamins: Classifications Role of vitamins in body's health – Uses of Vitamins – Antipyretics, Analgies and anti-inflammatory agents sulphonamide – Drug actions – uses of sulpha drugs.

Unit-IV Preparation of Washing Powder, Cleaning Powder, White, Black, Yellow, Rose coloured phenoyls.

Unit-V Preparation of shampoo, liquid blue, preparation of blue, green and red inks, soap oils, face powder and pain balm.

Visit to a Pharmaceutical Industry and submission of Report.For Industrial visit / Assignment = 5 marks (Internal). Contact District Industrial Centre. (DIC for visits).

Text Book: 1. Industrial Chemistry including Chemical Engineering – B.K. Sharma – Goel Publishing House. 13th Revised and Enlarged Edition.

2. Albert Burger – Medicinal Chemistry

3. G.R.Chatwal - Medicinal Chemistry

4. Mrs.Lakshmi – Pharmaceutical Chemistry

5. ISI Manuals (Contact District Industries Centre)

6. Organic Chemistry by P.L. Sony.

II SEMESTER

Core Subject Paper-3

Physical chemistry - I

Credit – 2

Hours - 4

Max :100 Marks

Ext. - 75

Int - 25

Unit I

a. Postulates of kinetic theory gases – Derivation of ideal gas laws from the expression on the basis of kinetic theory of glass – Deviations – Vander Wall's equation – reduced equation of state – law of corresponding states compressibility factor for gases – Boyle and inversion temperatures of gases.

b. Maxwell – Boltzmann law of distribution of velocities (Derivation not necessary) graphical representation – effect of temperature on various velocities – experimental verification of Maxwell's law.

c. Mean free path – viscosity of gases – collision number – Brownian movement and determination of Avogadro number – Loschmidt number – principle of equipartition of energy.

Unit II

Liquid State:

Nature of cohesive forces in liquids – Trouton's rule and its significance.

Physical properties and chemical constitution

Molar volume and its application.

Surface tension – influence of temperature on surface tension – Parachor – atomic and structural Parachors – applications.

Viscosity – influence of temperature on viscosity – relation to chemical constitution - molecular viscosity – atomic and structural viscosity – Rheochor.

Refraction – refractive index – specific refractive index – molar, atomic and structural refraction – applications – liquid crystal – their applications.

UNIT – III

a. Adsorption : Definition of various terms – adsorption of gases on solids – characteristics of adsorption of gases on solids – physical adsorption and chemisorptions – factors influencing adsorption – adsorption isotherm – BET theory (Elementary idea only) – applications of adsorption.

UNIT-IV

Catalysis : Definition – characteristics – theories of catalysis – promoters and poisons – enzyme catalysis – mechanism – Michaleis – Menten equation acid – base catalysis and autocatalysis – application of catalysis.

UNIT-V

CHEMICAL KINETICS

a. Introduction – rate of reaction – rate law and rate constant – order and molecularity of a reaction. Reaction of first and pseudo unimolecular reactions. Catalytic decomposition of hydrogen peroxide – Decomposition of dinitrogen pentoxide. Inversion of can sugar and hydrolysis of ester by acid.
b. Second, third and zero order reactions – examples – rate equation – half life period (no derivation required).
c. Influence of temperature on the rate of reaction – Arrhenius rate equation and its significance – measurement of parameters. Theory of reaction rates : Bimolecular collision theory – unimolecular

reactions – Lindemann’s hypothesis – Absolute Reaction Rate theory.

d. Influence of ionic strength on reaction rate – primary and secondary salt effect – kinetics of fast reactions – relaxation method.

Text Book: Text Book of Physical Chemistry by Puri and Shrma.

IV SEMESTER

Core Subject Paper-4

INORGANIC CHEMISTRY II

Credit – 4

Hours - 4

Max :100 Marks

Ext. - 75

Int - 25

Unit I

Metallurgy – occurrence of metals – minerals and ores – mineral wealth of India – refining of metals – zone refining – electrolytic refining – van Arkel – de Boer process – important ores and extraction of the following metals – titanium, thorium, molybdenum, cobalt and platinum – their important alloys and applications.

UNIT II

Preparation, properties and uses of some important compounds – titanium oxide, thorium oxide, ammonium molybdate – vanadium pentoxide, sodium cobalti nitrate, chloroplatinic acid.

UNIT III

General discussion of group IV elements – comparison between carbon and silicon – hydrides of silicon and silicates – structure, carbonyl chloride – lead monoxide – red lead – white lead.

General discussion of group V elements – active nitrogen – preparation and properties of hydrazine, hydrazoic acid and hydroxylamine – test for arsenic.

UNIT IV

COORDINATION COMPOUNDS

Introduction – Nomenclature – isomerism in complexes – geometrical and optical – Werner's theory – Sidgwick theory – EAN rule – Valence bond theory – low spin and high spin complexes – magnetic properties – Limitations of VB theory – Crystal field theory – Octahedral and square planar complexes – Color of coordination complexes – Modified CFT – ligand field theory. Metal carbonyls – bonding and structure of Fe, Co, Ni and Cr carbonyls.

Unit V

THE INNER TRANSITION ELEMENTS

a. The lanthanide series – Occurrence – Properties – electronic configuration, oxidation states, ionic radii-lanthanide contraction-consequences-causes, color, magnetic properties, oxidation potential, basic character, solubility of compounds, double salts, complexes – Extraction of lanthanides from monazite sand.

b. The actinide series – Sources – Transuranic elements – Preparation – Electronic configuration – Properties – Oxidation states – Ionic radii – Color of ions – Comparison of actinides with lanthanides.

Text Book: Text book of Inorganic Chemistry by Puri and Sharma (2007 Edition)

V SEMESTER

Core Subject Paper-5

ORGANIC CHEMISTRY - II

Credit – 4
Hours - 4
Max :100 Marks
Ext. - 75
Int - 25

Unit I

Aromatic compounds – 1

a. Introduction – general characteristics of aromatic compounds. Aromaticity and Huckel's rule. Structure of benzene – M.O. model.
b. Mechanism of aromatic eletrophilic substitution (Halogenation, nitration, sulphonation and Friedel-Crafts reactions.
c. Directive influence of substituents based on electronic effects.
d. Trisubstituted benzenes – steric hindrance and rules for trisubstitution in benzene.
e. Mechanism of aromatic nucleophilic substitution, unimolecular, bimolecular and benzyne mechanisms.

Unit II

AROMATIC HYDROCARBONS, HALOGEN, NITRO AND AMINO COMPOUNDS

a. Preparation, properties and uses of toluene xylene and mesitylene.
b. Aromatic halogen compounds: preparation, properties and uses of bromobenzene and benzyl bromide – Reactivity of aryl halides, distinction between nuclear and side chain halogenated derivatives.
c. Aromatic nitro compounds: preparation and properties of nitrotoluenes.

d. Aromatic amino compounds: Preparation by reduction of nitro compounds and from chlorobenzene. Effect of substituents on the basic character of aromatic amines. Comparison between aliphatic and aromatic amines. Estimation of aniline. Preparation of sulphanilic acid, nitroanilines and phenylene diamines.

e. Preparation and synthetic applications of benzene diazonium chloride.

UNIT III

AROMATIC COMPOUNDS – 2

a. Aromatic aldehydes : Benzaldehyde – mechanism of cannizzaro, perkins, claisen, knoevenagal reaction and benzion condensation.
b. Preparation & properties of cinnamaldehyde & vannilin.
c. Phenolic ketones: phloroactetophenone – preparation – Houben – Hosch synthesis.
d. Phenols : Acidity of phenols – effect of substituents on the acidity of phenol mechanism of Kolbe's reaction.

UNIT IV

AROMATIC ACIDS

a. Effect of substituents on acidic character.
b. Substituted acids: preparation, properties of salicylic acid and anthranilic acid.
c. Dicarboxylic acids: preparation, properties of phthalic acid, phenylacetic acid, mandelic acid, cinnamic acid & coumarin.
d. Aromatic sulphonic acids preparation, properties and uses of benzene sulphonic acid, saccharin, chloramine – T and dichloramine-T

UNIT V

a. Poly nuclear hydrocarbons and their derivatives:

i. Isolated systems : Preparation and properties of diphenyl, benzidine diphenic acid, diphenylmethane, triphenylmethane and stilbene.

Condensed systems : Preparation properties, uses and structure of Naphthalene, Naphthylamines, Naphthols, Naphthaquinones, anthracene, anthraquinone, alizarin and phenanthrene.

Text Book: Text book of Inorganic Chemistry by Puri and Sharma (2007 Edition)

V SEMESTER

Core Subject Paper-6

Physical Chemistry-II

Credit – 4

Hours - 4

Max :100 Marks

Ext. - 75

Int - 25

Unit I

a. Particle and wave nature of electron de Broglie's theory – equation – Davison – Germer experiment – photoelectric effect – Compton effect – Heisenberg's uncertainty principle – The Schrodinger wave equation (Derivation not required).

b. Postulates of quantum theory – Eigen values and eigen function – significance of ψ and ψ^2 - quantum number – Zeemann effet.

UNIT-II

SOLID STATE

a. Laws of crystallography – law of constancy of interfacial angle, law of symmetry, law of rational indices – Miller indices – symmetry elements in a crystal – calculations involving interplanar spacing in crystal systems.

b. X-ray diffraction – Bragg's equation – experimental method of determination of interplanar spacing – X ray specrophotometer – the Debye – Scherrer method.

c. Types of crystals – ionic, molecular, covalent and metallic crystals.

d. Ionic crystals" Analysis of NaCl, KCl. CsC1 – determination of Avogadro number.

e. Molecular crystals – Water and ammonia.

f. Covalent crystals – Diamond and graphite.

g. Metallic crystals – Metallic bond in metals.

h. Conductors, insulators and semiconductors – Frankel and Schottky defects.

Unit – III

PHASE RULE

a. Definitions of terms – Gibb's phase rule – one component system – water, carbon di oxide and sulphur – polymorphism – two component system – reduced phase rule – simple eutectic system – Ph-Ag system – KI-water system.
b. Partially miscible liquid system – CST – completely immiscible liquid system.
c. Distribution law: Mathematical formulation – experimental verification – condition under which the law is obeyed.

Unit – IV

GROUP THEORY

A. Molecular symmetry elements and symmetry operations – operations – products of symmetry operations – properties of a group - classes and sub groups – groups multiplication table – $C_{2v.}$
B. Point groups – classification of molecules into point groups – $C_{2v,}$ $C_{3v,}$ C_{2h}, $D_{2h,}$ D_{3h}, D_{4h}, D_{6h}, T_d and O_h.
C. Vector and matrix algebra – symmetry operations and transformation matrices.

UNIT – V

SPECTROSCOPY

A. **Introduction** – electro magnetic radiation – different regions – absorption spectroscopy – molecular spectra – types of molecular spectra.
B. **Rotational spectra of diatomic molecules** – rigid rotator – selection rule – determination of moment of inertia and bond length – intensities of spectral lines – effect of isotropic substitution.
C. **Vibrational spectra** – IR spectra of diatomic molecules – Hooke's law – simple harmonic oscillator force constant – selection rule –

vibrational energy level diagram – anharmonic oscillator – applications – force constant determination.

Modes of vibration in polyatomic molecules – vibrational spectra of H_2O and CO_2.

D. Rotational vibrational spectra of diatomic molecules.
E. **Raman spectra** – Raman effect – stokes and anti stokes lines – quantum theory of Raman effect – experimental study – comparison between IR and Raman spectra – applications of Raman spectra.
F. **Electronic spectra** – Franck – Condon principle.
G. **Nuclear magnetic resonance spectroscopy** – principle, instrumentation – interpretation of nmr spectra – spectra of ethanol.
H. **electron spin resonance spectroscopy** – principle – difference between nmr and esr – hyperfine structure in esr spectrum – selection rule, hydrogen atom esr spectrum.

Text Book: Text book of Physical Chemistry by Puri and Sharma (Latest Edition 2008)

V SEMESTER

Core Subject Paper-7

INORGANIC, ANALYTICAL AND APPLICATIONS OF COMPUTERS IN CHEMISTRY

Credit – 4

Hours - 4

Max :100 Marks

Ext. - 75

Int - 25

Unit I

a. Acids and bases – Arrehenius concept – Lowry Bronsted concept:- conjugate acid – base pairs, relative strengths of acids and bases - Lux – Flood concept – limitations – Lewis concept – Levelling effect – Usanovich concept – hard and soft acids.
b. Non aqueous solvents : Classification of solvents – Chemical reaction in liquid ammonia – Precipitation reaction – Acid – base reactions in liquid ammonia – Protolysis – Ammonolysis.

Unit II

BIO INORGANIC CHEMISTRY

a. Metallo porphyrins – Porphyrins – Chlorophyll – Vitamin B_{12}.
b. Myoglobin and hemoglobin – Structure – Their role in biological systems – Hill constant, cooperativity effect, Bohr effect – Explanation for cooperativity effect in hemoglobin.
c. Role of alkali and alkaline earth metal ions in biological systems – Role of Na^+ and K^+ ions-sodium pump – Role of Mg^{2+} and Ca^{2+} ions.
d. Biological functions and toxicity of elements – Cr, Cu, As and radioactive elements.

UNIT – III

a. Methods of obtaining the Precipitate – Condition – Choice of Precipitant – merits and demerits of Organic Precipitants – Types – Specific and selective precipitants Sequestering agents – theory of precipitation – Dendrites – Paneth – Fajans – Hahn law – Coprecipitation – post precipitation – precipitation from homogeneous solution.
b. Precision – Accuracy – Absolute and relative error – Classification of errors – Confidence Limit – Students Q-test Rejection of experimental data – Sources and elimination of errors – Significant figures and computation.

UNIT-IV

Analysis of experimental results

Graphical method- Curve fitting – Method of least squares – Problems involving straight line graphs.

Instrumental methods of Analysis

Beer-Lamberts Law – Principles of Colorimetric Analysis – Visual Colorimeter – Standard Series method – Balancing method – Estimation of Ni^{2+}, Fe^{2+}.

Basic principles of common types of Chromatography – Column Chromatography – Thin layer Chromatography – Paper Chromatography – Ion exchange Chromatography Applications of each technique.

UNIT – V

Application of ‘C’ language in Chemistry – Introduction of ‘C’ language – Character set – ‘C’ tokens – Keywords and Identifiers – Constants, variables, Data types and operators – Computation of some simple problems in Chemistry such as 1) Half life period, 2) Normality,

Molality and Molarity of a solution. 3) Root mean square velocity, 4) Ionic strength of an electrolyte, 5) Lambert’s Beer’s Law.

Text Book: Text book of Inorganic Chemistry by Puri and Sharma (Latest Edition 2008)

V Semester

ELECTIVE SUBJECTS
PHARMACEUTICAL AND MEDICINAL CHEMISTRY

Credit – 2

Hours - 2

Max :100 Marks

Ext. - 75

Int - 25

UNIT I

a. Introduction to the different systems of medicine

Ayurveda, Siddha, Homeopathy and Allopathy – History of medicinal chemistry – Discovery of drugs – an introduction.

b. Analgesics and Antipyretics

Nareotic analgesics – Morphine and derivaties. Totally synthetic analgesics – pethidine and methadones.

Antipyretic analgesics – salicyclic acid derivatives, indol derivatives and pl-amino phenol derivatives (Medicinal uses and structure only)

c. Diagnostic tests and estimation of sugar, urea and cholesterol in serum, urine etc., Detection of pesticides and poisons – Antidotes for poisoning – First aid for poison by pesticides.

UNIT – II

Chemotherapy and application of a few drugs (Elementary study)

(i) Sulpha drugs – Sulphadiazine, prontosil and prontosil-S.

(ii) Antimalarials – quinine and its derivatives

(iii) Arsenical drugs – salvarasan – 606 – Neosalvarsan

(iv) Antibiotics: Definition, Penicillin – Tetracycline (Auromycine and Terramycin) – Streptomycin and Chloromyceitin – drug action and uses.

UNIT – III

Hormones and Vitamins

(i) Definition and Classification, Testosterone, Progesterone, Thyroxine, Vitamin C, Structure only (Structural elucidation not necessary)

UNIT – IV

Anaesthetics

(i) Caseous anaesthetics – Vinyl ether – Cyclopropane – Halohydrocarbons – Chloroform – Haloethane – Trichloro ethylene – Intravenous anaesthetics – Thiopentone – Local anaesthetics – Cocaine and its derivatives.

Note: Therapeutic use only.

Unit – V

Synthetic drugs and its therapeutic function of paracetamol – Aspirin – naproxen – amoxyllin – ciprofloxacin – Ibuprofen.

Visit to a Industry and submission of Report. For industrial visit / Assignment = 5 marks (Internal). Contact District Industrial Centre. (DIC for visits).

Reference:

1. Industrial Chemistry including Chemical Engineering – B.K.Sharma – Goel Publishing House. 13th Revised and Enlarged Edition.
2. Grodman and Gilman's "The Pharmacological basis of therapeutics".
3. Pharmacology, Mary J. Mycek and Richard a. Harvey 2nd Edition 2000.
4. Foy's Principles of Medicinal Chemistry, David A. Williams and Thomas L. Lemke Edn, V, 2002.
5. Hand book of experimental Pharmacology S.K. Kulkarni, 3rd Edn 1999.
6. A text book of Pharmaceutical Chemistry Jayashree Ghosh S. Chand & Company Ltd 1997.
7. Pharmaceutical Chemistry Dr.S. Lakshmi Sultan Chand & Sons 2004.
8. Industrial Chemistry, B.K.Sharma Goel Publishing house, Edn XIII, 2008.

9. Pharmaceutical Manufacturing encyclopedia, Vol. I and II 2nd Edn 2000.
10. Unit Process in organic synthesis, Grogging 5th Edn, 2000.
11. Biopharmaceutics and Pharmokinetics D.M. Brahamanikav and Sunil, B.Jaiswal, Edn XIX, 2004.

Text Book : Text book of Phrama Chemistry by Jayashree Ghosh. S. Chand Company (Latest Edition 2008).

SEMESTER VI

Core Subject Paper-8

ORGANIC CHEMISTRY - III

Credit – 4

Hours - 4

Max :100 Marks

Ext : 75 Int : 25

UNIT I

a. Molecular rearrangements : Detailed mechanisms of the following : pinacol – pinacolone, Hofmann, curtius, benzil-benzilic acid, claisen, benzidine, Beckmann – Fries and Wagner-Meerwein rearrangements.
b. Free radicals : Definition – preparation and reactions of short lived and long lived free radicals – stability of free radicals – detection of free radicals – chain reactions – photochemical reactions of olefins, cis-trans isomerisation. Mechanism of Sand Meyer reaction, Gomberg reaction and Hofmann – Loeffler reaction.

UNIT II

a. PRINCIPLES AND APPLICATIONS OF SPECTROSCOPY :

UV : Introduction : Type of electronic transition – absorption laws – bathochromic shift and hypsochromic shift – hyperchromic and

hypochromic effect – applications of UV to organic compounds – Woodward Fieser rule – calculation of λ_{max}.

IR : Introduction : Instrumentation – Mode of vibration – overtone and combination bands – applications of IR to organic compounds – finger print region – effect of hydrogen bond.

NMR : Introduction – chemical shift – shielding and deshielding effects – factors influencing chemical shift – solvent used – splitting of signals – coupling constants NMR spectra of ethanol and anisole.

Simple problems involving the application of UV, IR and PMR spectroscopy.

UNIT-III

Heterocyclic compounds: preparation and properties of pyrrole pyridine quinoline and isoquinine.

Alkaloids: Definition – occurrence and extraction of alkaloids-general methods for determining the structure of alkaloids – classification of alkaloids – structure and synthesis of following alkaloids – coiine, piperine, nicotine and papavarine.

UNIT-IV

d. Alicyclic compounds : General methods of preparation and properties of cycloparaffines – Baeyer's strain theory and its modification.

e. Conformational Analysis : Difference between configuration and conformation. Fischer, Saw – horse and Newman projection formulae – Conformational analysis of ethane, n-butane 1,2 – dichloroethane, cyclohexane and monosubstituted cyclohexane.

f. Civetone and Muscone any one method of synthesis – Structure only (no Structural elucidation)

UNIT-V

a. Terpenes :

i. Introduction, classification, occurrence and isolation – general properties – isoprene rule – general methods of determining structure – synthesis. Properties and structure of citral, geranial, terpeniol, menthol and camphor.

b. Proteins and Nucleic acids:

i. Definition – classification of proteins – colour reactions of proteins – primary, secondary, tertiary and quarternary structure of proteins (an elementary idea only).

ii. Nucleic acids – nucleosides – nucleotides – RNA and DNA general structure.

Text Book: Text book of Organic Chemistry by P.L. Soni. (Latest Edition 2008).

CORE PAPER-9

PHYSICAL CHEMISTRY III

Credit – 4
Hours - 4
Max :100 Marks
Ext. - 75
Int - 25

Unit I

Thermodynamics I

First Law; statement – mathematical formulation – internal energy – enthalpy or heat content – heat changes at constant volume and at constant pressure conditions – relationship between C_p and C_v – work done, heat change and enthalpy change for reversible isothermal expansion and compression of an ideal gas – calculation of q, w, ΔE, ΔH for reversible adiabatic expansion of an ideal gas – relation between T, V and P of an ideal gas undergoing adiabatic reversible expansion comparison of work done in isothermal and adiabatic reversible expansion of an ideal gas – application of I law to non ideal gas undergoing reversible isothermal and adiabatic expansion – Joule effect – Joule Thomson effect – Joule Thomson coefficient in the case of ideal and real gases – inversion temperature – Hess' law of heat summation – Kirchoff's equation – Bond enthalpies.

Unit-II

SECOND LAW OF THERMODYNAMICS

1. Limitations of I law of thermodynamics – spontaneous process – statement of II law – conversion of heat into work – thermodynamic efficiency – Carnot cycle – refrigeration cycle – Carnot theorem – Kelvin scale of temperature.
2. **Entropy** – definition and significance – derivation of the concept of entropy – entropy changes in reversible and irreversible (spontaneous) processes. Entropy as a thermodynamic function – dependence of entropy on the variables of the system for ideal

gases – entropy of mixing of gases - $\Delta S$for physical transformation in chemical reactions – entropy and probability.

3. **Free energy function** – Helmholtz free energy (A) – definition and its temperature dependence – Gibbs free energy (G) – definition, variation of Gibbs free energy with temperature and pressure. Gibbs – Helmholz equation and its applications – Maxwell's relationships – criteria for reversible and irreversible processes in terms of entropy and free energy changes.
4. **Partial molar quantities** – Definition and significance of chemical potential – Gibbs – Duhem equation – variation of chemical potential with temperature and pressure – chemical potential in the case of system of ideal gases. Clausius – Clapeyron equation – derivation and applications – thermodynamic properties of real gases – fugacity and activity concepts.

Unit-III

1. **Application of thermodynamics** to various type of equilibria – equilibrium constant and free energy changes – vant hoff reaction isotherm and Van't Hoff isochore – thermodynamic interpretation of law of mass action and Lechatelier principle.
2. **Thermodynamics of ideal solution** – free energy change of mixing, enthalpy changes of mixing and entropy changes of mixing – relation between osmotic pressure and vapour pressure lowering – thermodynamic derivation – relation between the depression of freezing point and concentration – elevation of boiling point and concentration – thermodynamic derivations. Thermodynamics III – Nernst heat theorem and its applications third law of Thermodynamics.

Unit-IV

Photochemistry

A. **Definition of photochemical reactions** – comparative study of thermal and photochemical reactions – laws of photochemistry – Lambert and Beer law – Grothus – Draper law – Stark – Einstein law – quantum efficiency and its determination – consequence of light absorption by atoms and molecules – photophysical processes – fluorescence, phosphorescence and other deactivating processes – Jablonski diagram.
B. **Photochemical processes** – kinetics of photochemical reactions.

    a. **Gaseous reactions** : Hydrogen – halogen reactions (Formation of HCI and HBr and decomposition of HI).
    b. **Photochemical equilibrium** – flash photolysis – photosesitisation, chemiluminescence – bioluminescence.

Unit-V

ELECTROCHEMISTRY

Electrochemical Cells

A. **Concepts of electrochemical cell** – cell diagram and terminology – conventions regardingh signs of cell e.m.f. – calculation of cell e.m.f. from single electrode potential – standard emf of the cell – Nernst equation.
B. **Reversible and irreversible cells** – thermodynamics and electromotive force – calculation of $\Delta G, \Delta H, \Delta S$ and K for cell reaction.
C. Single electrode potentials and cell emf measurement of single electrode potential – types of electrodes – reference electrodes – standard electrode potential – electrochemical series – experimental determination of cell emf – Westom cadmium cell.

D. Types of electrochemical Cells

1. Chemicals cells with and without transference – examples – liquid junction potential – salt bridge.
2. Concentration cells – definition – types of concentration cells – examples, emf of electrolyte concentration cells with and without transference.

Commercial cells – primary and secondary cells – dry cell – lead storage cell – Ni-Cd cell – fuel cell – H_2O_2 cell.

Applications of emf measurements

Determination of solubility and solubility products of sparingly soluble salt.

Determination of pH using hydrogen electrode, glass electrode and quinhydrone electrode.

Determination of transport number.

Potentiometric titrations.

Electrolysis and polarization.

Overvoltage – decomposition potential – hydrogen overvoltage – theories of overvoltage – electrochemical principles of corrosion and passivity – polarography – Elementary idea – dropping mercury electrode.

Text Book: Text book of Physical Chemistry by Puri and Sharma (Latest Edition 2008)

CORE PAPER-10

APPLIED CHEMISTRY

Credit – 4

Hours - 4

Max :100 Marks

Ext. - 75

Int - 25

WATER AND SEWEAGE TREATMENT

UNIT-I

Water Quality Analysis – Chemical and Physical Analysis of water Quality Parameters – Standards prescribed for Water Quality by WHO and other Indian standards. Sea Water as a source of Drinking Water – Electro dialysis method and Reverse osmosis method for purifications of water.

Sewage Treatment

Municipal Waste Water – Sewage Treatment – Aerobic and Anaerobic process – Miscellaneous Method of Sewage Treatment.

UNIT-II

a. Rubber

a. Natural and synthetic rubbers – composition of natural rubber, Neoprene, Styrene – Butadiene rubber (SBR).

b. Polymer Chemistry

a. Types of Polymerization – Addition and Condensation – Mechanism – Copolymer – Homopolymer – Definition of natural and synthetic fibres – natural and synthetic resins – Bakelite, Urea formaldehyde resins, Teflon, Nylon-66 and Dacron.

c. Insecticides and Pesticides

a. Definition – Classification – Inorganic pesticides: lead arsenate, Paris green, lime, sulphur, hydrocyanic acid – Organic pesticides, natural, synthetic (DDT, Gammaxene) – Fungicides – repellants.

d. Preparation of domestically useful chemical products

a. Washing powder – Cleaning powder – Phenoyls (White, Black and Coloured), Shampoo, Liquid Blue, Blue, Red and Green inks, Soap oil, Face powder, pain balm.

UNIT-III

a. Match Industry

a. Pyrotechnics and explosives – Raw materials needed for match industry – Manufacturing process – Pyrotechniques – Coloured smokes.

b. Silicate Industry

a. Cement, Glass and Ceramics, Raw materials and manufacture of Cement, Glass and Ceramics.

UNIT-IV

a. Petrochemicals

1. Elementary study – Definition – Origin – Composition – Chemicals from natural gas, Petroleum, Light Naphtha and Kerosene – Synthetic Gasoline.

b. Paints and lacquers

a. Pigments – Paints – Ingredients in Paints – Manufacture – Lacquers – Varnishes.

UNIT-V

Fertilizers : Definition-nutrients for plants-role of various elements in plants growth – natural and chemical fertilizers-classification of chemical fertilizers – urea, super phosphate and potassium nitrate – mixed fertilizer – fertilizer industry in India.

REFERENCES BOOKS

INORGANIC CHEMISTRY

1. R.Gopalan, P.S.Subramanian and K.Rengarajan. Elements of Analytical Chemistry Sultan Company (2008).
2. PL. Soni. Text book of Inorganic chemistry, Sultan Company (2008).
3. Puri, Sharma and Kalia. Principles of Inorganic Chemistry, S.Chand 20098.
4. Arthur, I., Vogel. A text book of quantitative inorganic analysis Latest Edition 2008.
5. F.A.Cotton and Wilkinson. Basic inorganic chemistry, Latest Edition 2006.
6. R.D.Madan. Advanced inorganic chemistry Latest Edition 2006.
7. H.Sisler. Non aqueous solvents Latest Edition 2006.
8. Douglas, A., Skoog and Donald, M. West. Principles of Instrumental analysis Latest Edition 2006.
9. J.D.Lee. Concise inorganic chemistry Latest Edition 2006.
10. Gilreath. Fundamentals of inorganic chemistry Latest Edition 2006.
11. James, E., Huheey. Inorganic chemistry Latest Edition 2006.
12. B.K. Sharma (Goel Publishing House) Latest Edition 2006.

ORGANIC CHEMISTRY

1. I.L. Finar ‘Organic Chemistry’ Vol.I
2. I.L. Finar ‘Organic Chemistry’ Vol.II
3. R.T. Morrison and R.W. Boyd ‘Organic Chemistry’.
4. Jerry March ‘Reaction Mechanism of Organic compounds’.

5. P.L. Soni ‘Organic Chemistry’.

6. S.Bahl, Arul Bahl ‘Advanced Organic Chemistry’.
7. E.L. Eliel ‘Stereochemistry of carbon compounds’.
8. B.M. Silverstein G.C. Bassler and T.C. Morrill, ‘Spectrometric Identification of Organic Compounds’.
9. Kemp ‘Organic spectroscopy’.
10. R.O.C. Norman ‘Organic synthesis’.
11. S.H. Pine, J.B. Hendrickson, D.J.Cram and G.S. Hammond ‘Organic chemistry’.

Physical Chemistry

1. N.Kundu and S.N. Jain. ‘Physical Chemistry’.
2. S. Glasstone. ‘A Textbook of Physical Chemistry’.
3. F.Daniels and R.A.Alberty. ‘Physical Chemistry’.
4. R.A. Alberty. ‘Physical Chemistry’.
5. G.M.Barrow. ‘Physical Chemistry’ McGraw Hill, New Delhi.
6. S.Glasstone. ‘Introduction to Electrochemistry’.
7. A.K.Chandra. ‘Introduction to Quantum Chemistry’.
8. C.N. Banwell ‘Molecular Spectroscopy’.
9. R.Chang, ‘Basic Principles of Spectroscopy’.
10. K.J.Kaidler ‘Chemical Kinetics’.
11. K.K.Rohatgi-Mukherji ‘Fundamentals of Photochemistry’.
12. V.R.Gowriker, Viswanathan and Sridhar ‘Polymer Science’.
13. Puri, Sharma and Pathania. Principles of Physical Chemistry.
14. P.L. Soni., O.P.Dharmarha and U.N.Dash. Text book of physical chemistry.
15. A.S.Negi and S.C.Anand. Textbook of Physical chemistry.
16. Bajpai. Advanced physical chemistry.

ANALYTICAL CHEMISTRY AND INTRODUCTION TO COMPUTERS

R. Gopalan, P.S. Subramanian, K.Rengarajan. Elements of Analytical Chemistry.

Skoog, West and Holler. Fundamental of Analysis Chemistry.

Alexis Leon and Mathew's Leon. Computers for everyone.

K.V.Raman. Computers in Chemistry.

E.Balagurusamy. Programming in ANSI C.

APPLIED CHEMISTRY

1. Albert Burger. Medicinal Chemistry.
2. Devadasan K.Chokalingam, Pharmaceutical Chemistry.
3. G.R.Chatwal. Medicinal Chemistry.
4. Mrs.Lakshmi. Pharmaceutical Chemistry.
5. Singh and V.K. Kapoor – Organic Pharmaceutical Chemistry
6. Bentley and Drivers – Text Book of Pharmaceutical Chemistry
7. I.L. Finar – Organic Chemistry. Vol.II.
8. Albert Lehninger – Bio Chemistry.
9. G.R. Chatwal – Pharmaceutical Chemistry Organic Vol-II.

SKILLED BASED SUBJECTS

MEDICAL LABORATORY TECHNOLOGY AND CLINICAL BIO-CHEMISTRY

Credit – 2

Hours - 2

Total Marks: 100

Internal : 25

External : 75

UNIT – I

Types of Micro – Organisms, General Characteristics of Bacteria, Fungi and Viruses, Sterilization and Disinfection. Types of Stains and Staining Procedures.

Collection and preparation of samples, Typhoid test, Tuberculin test, VDRL, Pregnancy and HIV Test. Blood collection, use of Anti coagulants, Transportations blood after collection, Rh and blood grouping.

UNIT – II

Determination of Hemoglobin content, Total RBC, WBC and Platelet count, ESR Calculation of Red blood cell Examination for Malaria Parasites, Routine examination of Urine.

UNIT – III

CARBOHYDRATES : Properties and General Classifications, Test for Glucose and other reducing sugar from urine and blood. Interpretation of results. Glucose Tolerance Test.

UNIT – IV

LIPIDS : General Properties, Functions and Classification of Lipids. Determination of Total Lipids, Phospho Lipids, Triglycerides and Cholesterol in blood.

UNIT – V

Analytical Bio Chemistry : Principles of Colorimetry, Flame Photo metry, Chromatography, Electrophorosis and Basic Immunochemical Techniques. Use of Microscope, Fundamentals of Automation in clinical laboratories.

Visit to a Hospital Clinical Lab and submission of Report. For Report / Assignment = 5 marks (Internal). Contact Govt. Hospital for visit.

Reference:

1. Clinical Bio-Chemistry by Varley. Sulthan Chand, 2005.
2. Text Book of Medical Laboratory Technology, Vol. I, Vol. II, Vol. III by Muherji. (2006).
   Sulthan Chand.

REVISED SYLLABUS FOR B.SC., CHEMISTRY MAJOR PRACTICALS

PRACTICAL – I
INORGANIC SEMI MICRO QUALITATIVE ANALYSIS
Duration of Examination: 3 hrs

Analysis of a mixture containing two anions of which one is an interfering ion-semi-micro method and two cations.

Anions : Carbonate, sulphate, nitrate, fluoride, chloride, bromide, iodide, oxalate, borate, phosphate, arsenite, arsenate and chromate.

Cations : Lead, bismuth, copper, cadmium, antimony, iron (II & III), aluminium,
chromium, zinc, manganese, cobalt, nickel, barium, strontium, calcium, magnesium and ammonium.

Distribution of Marks (Max. marks – 100)

Int : 40

Performance in the class	: 30 marks
Observation notebook	: 10 marks
Total	: 40 marks

Ext: 50

Viva code	-	10 marks
Record Note book	-	10 marks
Four radicals with correct procedures (4 x 10)	-	40 marks
TOTAL	-	60 marks

PRACTICAL - II

VOLUMETRIC ANALYSIS

A double titration involving the making up of the solution to be estimated and the preparation of a primary standard.

LIST OF EXPERIMENTS

I. ACIDIMETRY AND ALKALIMETRY

1. Estimation of Na_2CO_3
2. Estimation of NaOH / KOH
3. Estimation of oxalic acid

II. REDOX TITRATIONS

a. Permanganimetry

1) Estimation of ferrous ion

2) Estimation of oxalic acid

3) Estimation of calcium (direct method)

b. Dichrometry

1) Estimation of ferrous ion

2) Estimation of ferric ion using external indicator

III. IODOMETRY AND IODIMETRY

1) Estimation of potassium dichromate

2) Estimation of potassium permanganate

3) Estimation of copper

4) Estimation of arsenious oxide.

IV. ARGENTIMETRY

1) Estimation of potassium chloride.

V. EDTA Titration

1) Estimation of Hardness of water using EDTA.

Distribution of Marks (Max. marks – 100)

Duration of examination: 3 hrs

Int: 40

Regular Test in the Class	:	30 Marks
Observation note book	:	10 marks
Total	:	40 marks

Ext: 60

Viva voce	-	10 marks
Record Notebook	-	10 marks
Procedure writing	-	10 marks
Volumetric estimation	-	30 marks
TOTAL	-	60 marks

For Volumetric Estimation if the student have

Less than 2% Error	-	30 marks
2-3% Error	-	25 marks
3-4% Error	-	20 marks
3-5% Error	-	15 marks
Greater than 5%	-	10 marks

PRACTICAL – III

GRAVIMETRIC ANALYSIS AND ORGANIC PREPARATION

I. GRAVEIMETRIC ANALYSIS

1. Estimation of lead as lead chromate.
2. Estimation of barium as barium chromate
3. Estimation of calcium as calcium oxalate monohydrate
4. Estimation of copper as cuprous thiocyanate.
5. Estimation of nickel as NiDMG.

II. ORGANIC PREPARATION / SEPARATION

1. Nitration
   a. m-dinitrobenzene from nitrobenzene
   b. Picric acid from phenol
2. Bromination: p-bromoacetanilide from acetanilide.
3. Hydrolysis: Aromatic acid from (a) an ester (b) an amide.
4. Oxidation : Benzonic acid from benzaldehyde.
5. Benzoylation: (a) Amine (b) phenols
6. Acetylation : (a) Amine (b) phenols

Separation of mixtures

A mixture containing an acid or a base and a neutral compound (Acid or alkali separation).

Distribution of Marks (Max. marks – 100)

Duration of examination: 6 hrs

Int: 40

Regular Test in the Class	:	30 Marks
Observation note book	:	10 marks
Total	:	40 marks

Ext: 60

Record Note book - 10 marks Viva voce - 10 marks

Organic preparation (10 marks)	
Procedure	- 2 marks
Crude sample	- 6 marks
Recrystallised sample	- 2 marks

Gravimetric Estimation (30 marks)	
Procedure	- 10 marks
Estimation	- 20 marks
Less than 2% Error	– 20 marks
2-3% Error	- 18 marks
3-4% Error	- 16 marks
3-5% Error	- 14 marks
Greater than 5% Error	- 8 marks

PRACTICAL – IV
ORGANIC ANALYSIS AND ESTIMATION

I. ORGANIC ANALYSIS

Analysis of an organic compound containing one or two functional groups and confirmation by the preparation of a solid derivative – acids, phenols, aldehydes, ketones, esters, nitrocompounds, amines (primary, secondary and tertiary), amides, anilides, aliphatic diamide, side chain and nuclear halogen compounds, aliphatic diamide containing sulphur and monosaccharides.

II. ORGANIC ESTIMATION

1) Estimation of phenol
2) Estimation of aniline
3) Estimation of glucose.

Distribution of Marks (Max. marks – 100)

Duration of examination: 6 hrs

Int: 40

Regular Test in the Class	:	30 Marks
Observation note book	:	10 marks
Total	:	40 marks

Ext: 60

Record Note book - 10 marks Viva voce - 10 marks

Organic estimation (20 marks)	**Organic analysis (20 marks)**
Procedure - 5 marks	Preliminary reaction - 2 marks
Estimation - 15 marks	
Less than 3% Error – 15 marks	Elements present - 4 marks
	Aliphatic or aromatic - 3 marks
3-4% Error - 13 marks	Saturated/Unsaturated - 3 marks
4-5% Error - 10 marks	
Greater than 5% Error - 8 marks	Functional group - 6 marks
	Derivative - 2 marks

PRACTICAL – V

PHYSICAL CHEMISTRY EXPERIMENTS

1. Determination of molecular weight by

a. Transition temperature method – sodium thiosulphate pentahydrate, strontium chloride hexahydrate and sodium acetate trihydrate.

b. Cryoscopic method – Rast method – camphor and naphthalene.

2. Phase diagram involving

a. Simple eutectic and

b. Compound formation

3. Critical solution temperature

Determination of CST of phenol – water system and effect of impurity on CST – strength of sodium chloride.

4. Thermo chemistry

Heat of solution – potassium dichromate, ammonium oxalate and oxalic acid.

5. Viscosity

Determination of the composition of an unknown mixture.

6. Partition co-efficient experiments:

a. (i) Study of the equilibrium constant for the reaction

$$KI + I_2 \rightleftharpoons KI_3,$$

by determining the partition co-efficient of iodine between water and carbon tetrachloride.

(ii) Determination of strength of given KI.

b. Determination of association factor of benzoic acid in benzene.

7. Kinetics

Determination of relative strength of acids by

a) Acid catalysed hydrolysis of ester.

b) Inversion of cane sugar.

8. Electrochemistry

a) Conductivity

i) Determination of cell constant of the cell and equivalent conductance of solution.

ii) Conductivity titration between an acid and a base (HCl vs NaOH)

b) Potentiometric titrations

1. $KMnO_4$ vs $FeSO_4$
2. $K_2Cr_2O_7$ vs $FeSO_4$
3. HCl vs NaOH

9. INSTRUMENTAL METHODS OF ANALYSIS (Demonstration only)

Colorimetry

a) Using Photo Electric Colorimeter Estimate Nickel, Ammonia and Iron.
b) By Flame Photo metric method, Estimate Calcium, Sodium and Lithium
c) Using pH meter, Determine pH of water.
d) Using Dissolved oxygen meter determine Dissolved oxygen.
e) Using Abbes Refractometer determine Refractive Index of various oils.
f) Using Spectrophotometer determine the concentration of Chromium Ions.

Reference

Text book of Quantitative Inorganic Analysis by Vogel (Latest Edition 2008).

Distribution of Marks (Max. marks – 100)

Duration of examination: 6 hrs

Int: 40

Regular Test in the Class	:	30 Marks
Observation note book	:	10 marks
Total	:	40 marks

Viva voce	-	10 marks
Record Notebook	-	10 marks
For completion of the experiment	-	20 marks
Graph	-	2 marks
Calculation	-	5 marks

Tabulation	-	3 marks
Result	-	10 marks

TOTAL	-	60 marks

Revised syllabus in Allied Chemistry

Common to all Disciplines offering Allied chemistry

(Effective for those who join in June 2008 and later)

The syllabus is unitized and each paper consists of 5 units

Distribution of hours (A rough outline)

A – Theory Hours

Year	Semester	Name of the paper	Hrs/ week	Hrs / semester	Internal	External
I / II	I / III	Inorganic, Organic and Physical chemistry - I	4	60	25	75
	II / IV	Organic and physical chemistry – I	4	60	25	75
II / III	III / V	Organic, Inorganic and Physical chemistry – II	4	60	25	75
	IV / VI	Organic and Physical chemistry – II	4	60	25	75

B. PRACTICAL HOURS

Year	Name of the paper	Hrs/ week	Hrs / semester	Internal	External
I / II	Volumetric analysis	2	60	40	60
III / IV	Organic analysis	2	60	40	60

Note: Duration of University Practical Examination – 3 hours.

B.Sc., ALLIED CHEMISTRY SYLLABUS

ALLIED PAPER I

ORGANIC, INORGANIC AND PHYSICAL CHEMISTRY

Credit – 4

Hours – 4

Unit – I

1. **Hydrogen** : Isotopes of hydrogen – preparation, properties and uses of heavy hydrogen – ortho and para hydrogen – hydrides – definition – classification – examples.
2. **Oxides** - Definition – classification – examples.
3. **Water** : Hardness of water – types of hardness – removal of hardness – industrial implications of hardness in water – estimation by EDTA method (outline only) units of hardness of water.
4. **Hydrogen peroxide** – Manufacture, properties, structure and uses – estimation by permanganimetry method – strength of hydrogen peroxide.

Unit – II

1. Detection and estimation of nitrogen and halogens in organic compounds – empirical formula – molecular formula – structural formula – calculation of EF and MF from percentage compontion.
2. Nature of valency of carbon in organic compounds – tetrahedral arrangement of valency of carbon – bond-breaking and bond forming in organic reactions – homolytic cleavage – heterolytic cleavage – reaction intermediates – formation, stability and reactions of carbo cation ion and free radicals.
3. **Nucleophiles** – Electrophiles : Definition, types and examples – specific reactions involving these.
4. **Type of reactions** : substitution – addition – elimination – rearrangement and polymerization – illustration with examples.

Unit – III

a. **Gaseous state** – Postulates of kinetic theory of gases – derivation of expression for pressure of an ideal gas on the basis of kinetic theory – deducing the basic gas laws.

b. **Deviation of real gases** from ideal behaviour – reasons for deviation – Derivation of Vander waals gas equation – explanation of behaviour of real gases on the basis of Vander waals gas equation.

c. Average, rms and most probable velocities – (equations only – no derivation) relationship between these different velocities.

d. **Liquefaction of gases** – critical phenomenon – modern methods – Joule – Thomson effect – inversion temperature.

UNIT – IV

1. **Bonding** : V.B. Theory – postulates of V.B. theory – application to the formation of simple molecules like H_2 and O_2 – overlap of atomic orbitals – s-s, s-p and p-p overlap – principle of hybridization – sp, sp^2 and sp^3 hybridisation – VSEPR theory.

2. **M.O. theory** : Formation of M.O's – bonding and antibonding and non-bonding.

   M.O's – M.O. diagram for H_2, He and F_2.

UNIT – V

COLLOIDS

1. Colloidal state of matter – various types – classification.
2. Sols – dialysis – electro osmosis – electrophoresis – stability of colloids – protective action – Handy Schulze law – gold number.
3. Emulsion : Types of emulsions – emulsifier with examples.
4. Gels : Classification, preparation
5. Application of colloids.

Text Book:

Text Book of Physical Chemistry by Puri & Shrma (Latest Edition 2008).

ALLIED PAPER II

INORGANIC AND PHYSICAL CHEMISTRY

Credit – 4

Hours – 4

UNIT – I

NUCLEAR CHEMISTRY

1. Composition of the nucleus – nuclear forces – mass defect – binding energy – nuclear stability.
2. Soddy's group displacement law – illustration – law of radioactive disintegration.
3. Nuclear fission : Definition – theories of fusion – application of fission – the principle of atom bomb.
4. Nuclear fusion : Definition – emission of energy – Stellar energy – hydrogen bomb.
5. Application of radioactivity – In medicine, agriculture, industry and analytical fields – carbon dating.

UNIT – II

1. **Carbohydrates** : Definition – classification – monosaccharides – properties and uses of glucose and fructose – configuration of glucose – Haworth structure – conversion of glucose to fructose and vice versa.
2. **Disaccharides** : Sucrose – manufacture – properties and uses – structure – distinction between sucrose, glucose and fructose.
3. **Polysaccharides** : Starch and cellulose (□ructure only) - amylase - amylase – difference between these two.

UNIT – III

1. **Stereoisomerism** – chiral centre – optical activity of compounds containing one or two chiral centres – R-S notation – enantiomers – diastereoisomers – racemization – resolution.

2. **Geometrical isomerism** of maleic and fumaric acids. E-Z notation of geometrical isomers.

UNIT – IV

HALOGEN COMPOUNDS

1. **Aliphatic halogen compounds** : Preparation, properties and uses of ethyl iodide, chloroform, iodoform and carbon tetrachloride.
2. **Aromatic halogen compounds** : Chlorobenzene, hexachlorobenzene – halogenation of toluene – preparation, properties and uses of benzoyl chloride, chlorotoluene – DDT – preparation and mode of application.
3. Mechanicm of aliphatic substitution – S_N1, S_N2 – illustration with examples – differences – Saytzeff – Hofmann rules.
4. **Organo metallic compounds** : Definition – preparation – synthetic application of Grignard reagent.

UNIT – V

1. **Aminoacids and proteins** : Classification – synthesis – properties of aminoacids – polypeptides – proteins – classification and biological functions.
2. **Dyes** : Definition – theory of colour and constitution – classification based on structure and applications – preparation of methyl organge – bismark brown, malachite green – vat dye – indigo.

Text Book:

Text Book of Organic Chemistry by Soni (Latest Edition 2008).

ALLIED PAPER III

ORGANIC, INORGANIC AND PHYSICAL CHEMISTRY

Credit-4

Hours-4

UNIT-I

1. **Adsorption** : Definition – difference between adsorption and absorption – adsorbate, adsorbent – physical adsorption – chemical adsorption – differences between these two types – factors influencing adsorption – adsorption isotherm - Langmuir isotherm (no derivation, statement only) adsorption of gases on solid surface.

2. Chromatographic technique : Principle and application – partition and gas chromatography – thin layer chromatography – column chromatography – paper chromatography – gas-solid and gas-liquid chromatography.

Unit – II

1. **Catalysis** : Definition – different types of catalysis – acid-base catalysis – surface catalytic reactions – definition and examples – autocatalyst – catalytic poisoning – promoters – enzyme catalysis – characteristics.
2. **Polymers** : Definition – classification of polymers – properties of polymers – addition and condensation, polymerization reactions with examples – natural rubber – isoprene unit – vulcanization of rubber – preparation and application of polystyrene, urea – formaldehyde resin, Teflon and buna-S-rubber.

Unit – III

1. **Photochemistry** : Comparison of thermal and photochemical reactions – definition of photochemical reactions – laws of

photochemistry – Grottus – Draper law – Einstein law – quantum efficiency – reasons for low and high quantum yield with examples – consequence of light absorption by atoms and molecules – Jablonsky diagram – fluorescence – phosphorescence – photosensitization – chemiluminescence – bioluminescence – applications of photochemistry.

Unit-IV

1. **Coordination compounds** : Definition – nomenclature – definition of various terms involved in coordination chemistry – Werner's theory EAN rule – VB theory (outline only) – Nickel carbonyl – chelates.
2. **Nitrogen compounds** : Manufacture of ammonia – nitric acid – ammonium nitrate – ammonium sulphate – physico – chemical principles in the manufacture of ammonia.

Unit – V

1. **Air pollution** : Definition, composition of air – chemical reactions occurring in air due to sunlight – sources of air pollution – classification and effects of air pollutants – effect of fluorocarbons – ozone layer – composition – formation – depletion – green house effect.
2. **Acid rain** – formation theory and control of acid rain methods to control air pollution.
3. **Water pollution** : Types – sources – water sewages – industrial effluents – inorganic pollutants – organic pollutants – water pollution control – water treatment.
4. **Radioactive pollution** : Sources – nuclear traces – wastes – effect of radiation – preventive methods.

Text Book: Text Book of Physical Chemistry by Puri & Shrma (Latest Edition 2008).

Allied Paper IV

ORGANIC AND PHYSICAL CHEMISTRY

Credit-4

Hours-4

Unit-I

1. **Heterocyclic compounds** – preparation and reactions of pyrrole, furan, pyridine, quinoline, isoquinoline, uracil, thiamine, adenine and guanine.

2. **Alkaloids** – Pharmacologicl properties and importance of the following alkaloids – nicotine, quinine, piperine and cocaine (Structural elucidation not necessary).

3. **Vitamins and antibiotics**
    a. Classification and biological functions of vitamins A, B_6, B_{12}, C, D, E and K (Structural elucidation not required).

b. Classification and biological functions of antibiotics – penicillin, chloroamphenicol, streptomycin and tetracyclins.

Unit - II

Thermodynamics – Importance of thermodynamics – terms used in thermodynamics – open and closed systems, state functions and path functions, extensive and intensive properties, reversible and irreversible processes, statement and mathematical form of first law of thermodynamics – heat capacity at constant volume and pressure, relation between C_p and C_v. Statement of II law of thermodynamics – entropy – physical significance of entropy – Gibb's free energy and its significance.

Unit – III

Chemical kinetics : Reaction rate – order and molecularity of a reaction – zero order – first order. First order rate equation and half life period – derivation. Examples of first order reactions – second order reactions – examples. Carbon dating – enzyme catalysis – Michaelis and Menten mechanism – Lineweaver Burk plot – significance of K_m.

Unit – IV

Electrochemistry – Faraday's law of electrolysis – specific and equivalent conductance – electrochemical cell – Nerst equation – convention regarding the sign of EMF of aell – electrodes – reference electrodes – hydrogen and calomel electrodes – types of electrodes – metal – metal insoluble salt electrode – glass and ion selective electrodes – pH measurement using glass electrode – membrane potential – Hydrogen – oxygen fuel cell.

Unit – V

Basic principles of UV and IR spectroscopy – identification of simple organic molecules (ethanol and dimethyl ether, acetaldehyde and acetone) ethylene and acetylene, cis-2, butene and trans – 2 – butene, methylamine, dimethyl amine and trimethylamine – Proton NMR

spectroscopy – principle – instrumentation – chemical shift – spectrum of ethanol.

Text Book : Text Book of Physical Chemistry by Puri & Shrma (Latest Edition 2008).

SEMESTER-V

ENVIRONMENTAL STUDIES

Credits:2

Total Hours:30 (2hrs perweek)

Max 100 Marks Internal: 25

External: 75

UNIT-1: Earth and its Environment

a) Earth – Formation and Evolution of Earth over time- Structure of Earth and its components: Atmosphere, Lithosphere, Hydrosphere and Biosphere
b) Resources- Renewable and Non renewable resources.

UNIT-2: Ecology and Ecosystem concepts

a) Ecology: definition- Ecosystem: Definition-Structure and function – Energy flow-Food Chain and Food web- one example for an ecosystem.
b) Biogeochemical cycles- Nitrogen, Carbon, Phosphorous,Water.

UNIT-3: Biodiversity and India

a) Introduction-Definition-Values of Biodiversity-Threats to Biodiversity-Conservation of biodiversity.
b) Biodiversity of India-as a megadversity nation-biogeographical distribution-Hot spots of biodiversity-National Biodiversity Conservation Board and its function.

UNIT-4: Pollution and Global Issues

a) Definition, causes,effects and control measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear pollution.
b) Global issues: Gobal Warming and Ozone Layer Depletion.

UNIT-5: Development and Disaster Management

a) Sustainable Development-Sustainable Agriculture-organic farming, Irrigation-Water harvesting and Waste recycling- Cyber waste and management.
b) Disaster Management-Flood and Drought – Earthquake and Tsunami-Landslides and Avalanches- Cyclones and Hurricanes-Precautions, Warnings Rescue and Rehabilitation.

Reference Books

1. Agarawal, K.C.2001 Environmental Biology, Nidi Publ. Ltd., Bikaner
2. Bharucha Rach, The Biodversity of India, Publishing Pvt., Ltd., Ahemedabad-380 013, India, Email: mapin@icenet.net(R)
3. Brunner R.C., 1989, Hazardous Westel Incineration, Mc Graw Hill Inc. 480p
4. Clark R.S., Marine Pollution, Clanderson, McGraw Hill Inc.480p
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T.2001,Environment Enclyclopedia, Jaico Publ. House, Mumbai,1196p
6. De. A.K., Environmental chemistry, Wiley Eastern Ltd.,
7. Down to Earth, Centre for Science and Environmental®
8. Gleick, H.P. 1993, water in crisis, Pacitif Institute for Studies in Dev., Environmental & Security. Stockholm Env. Institute Oxford Univ. Press 473p
9. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai®
10. Heywood, V.H. & Watson, R.T., 1995 Globi Biodiversity Assessment Cambridge Univ. Press 1140p
11. Jadhav, H. & Bhosale, V.M. 1995 Environmental Protection and Laws, Himalaya Pub. House, Delhi 284p
12. Mckenney, M.L. & School, R.M. 1996 Environmental Science System & Solutions, Web enhanced edition 639p

13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications(TB)
14. Miller T.G. Jr., Environmental Sciences, Wadsworth Publishing Co.,(TB)
15. Odum, E.P. 1971 Fundamentals of Ecology W.B. Saunders Co. USA, 574p
16. Rao MN & Datta, A.K. 1987 Waste Water treatment Oxford & IBH Pub;. Co Pvt., Ltd., 345p.
17. Sharma B.K., 2001, Environmental Chemistry Goel Puibl. House,Meerut
18. Survey of the Environmental, The Hindu(M)
19. Townsend C., Harper J, and Michael Begon, Essentials of Econology, Blackwell Science(TB)
20. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances an and Standards, Vol-I and II, Enviro. Media®
21. Trivedi R.K., and P.K. Goel, Introduction to air pollution, Techno-Science Publications(TB)
22. Wagner K.D., 1998 Environmental Management W.B. Sauders Co. Philadelphia, USA 499p

SEMESTER-VI

VALUE EDUCATION

Credits:2
Total Hours:30 (2hrs perweek)
Max 100 Marks
Internal: 25
External: 75

Unit:I Values and the Individual

Values meaning -The Significance of Values - Classification of Values – Need of Value

Education- Values and the individual: Self Discipline, Self Confidence, Self Initiative,

Empathy, Compassion, Forgiveness, Honesty and Courage.

Unit:II Values and Religion

Karmayoga in Hinduism – Love and Justice in Christianity – Brotherhood in Islam- Compassion
compassion in Buddhism – Ahimsa in Jainism and Courage in Sikhism – Need for Religious
Harmony.

Unit:III Values and Society

Definition of Society- Democracy- Secularism – Socialism – Gender Justice – Human
Rights – Socio-Political Awareness- Social Integration- Social Justice.

Unit:IV Professional Values

Definition- Accountability- Willingness to learn – Team Spirit – Competence Development-
Honesty- Transparency-Respecting Others-Democratic Functioning- Integrity and Commitment.

Unit:V Role of Social institutions in Value Formation

Role of Family- Peer Group –Society- Educational Institutions-Role Models, and Mass
Media in value formation.

Reference Books

1. Subramanyam. K, values in Education. Madurai: Ramana Publications,1995.
2. Doss. A.G. Indian Social Institutions. Delhi: Forward Publishing Company,2000.
3. Joseph.K.P, e.d., Peace and Value Education: A Creative Response to Consumerism
   and Communalism, Hyderabad: National institute of Peace and Value Education,2003.
4. Bedi Kiran, What Went Wrong… and Continues, Delhi: Macmillan India Ltd.
5. Sekar, Vincent, Quest for Harmony: An Anthology of Religions in Dialogue, Bangalore:

Claretian Publications, 2001.

PART IV

ENVIRONMENTAL STUDIES AND VALUEDUCATION

QUESTION PAPER PATTERN

Descriptive type:

Part-A

5 questions × 6 marks =30 marks

A total of 8 questions should be given out of 8 questions, five questions must be answered.

Part-B

3 questions × 15 marks =45 marks

Five questions should be given from 5 units. 75 marks

One question for each unit.

Part A: 30 marks 5 × 6 =30 marks

1. Open choice.
2. Each question carries 6 marks
3. Answers should not exceed 100 words
4. All the questions should be distributed to all the units.

Part B: 45 marks 3 × 15 =45 marks

1. Open choice.
2. Answer any three out of five questions.
3. Each question carries 15 marks.
4. Answers should not exceed 250 words.
5. One question for each unit.