

ALLIED CHEMISTRY -II

SUB CODE: 08UPBAT4AC4

INT MARKS: 15

SEMESTER: IV

EXT MARKS: 60

Unit-I

- 1.1. Carbohydrates: Classification – properties of glucose and fructose- discussion about open-chain structure of glucose and fructose. Properties and Structures of sucrose. (No Structural Elucidation)
- 1.2. Aminoacids: Classification. Preparation and properties of alpha amino acids. Peptide synthesis. Classification of proteins by physical Properties and biological functions. Elementary ideas about RNA, DNA.
- 1.3. Definition and one example each- analgesics, antipyretics, tranquilisers, sedatives, hypnotics, local anesthetics and general anesthetics. Cause and treatment of – Diabetes, cancer and AIDS.

Unit-II

- 2.1. Industrial chemistry: Fuel gases- Natural gas, water gas, semi-water gas, Carburetted water gas, producer gas, oil gas (composition and uses only).
- 2.2. Synthesis, properties and uses of silicones.
- 2.3. Fertilisers: Preparation and uses of urea, ammonium sulphate, superphosphate, triple superphosphate and NPK fertilizer.

Unit-III

- 3.1. Photochemistry: Grotthus-Draper's law and Stark-Einstein's law of photochemical equivalence, Quantum yield. Examples for photochemical reactions. Phosphorescence, Fluorescence, Chemiluminescence and photosensitization – definitions with examples.
- 3.2. Electrochemistry-I: Strong and weak electrolytes, common ion effect, pH, buffer solutions, Henderson equation and buffer action in biological systems.
- 3.3. Electrochemistry-II: Galvanic cells: EMF, standard electrode potentials, reference electrodes (NHE and Calomel).

Reference Books:

1. Pharmacology and pharmacotherapeutics by R.S. Satoskar and S.D. Bhandarkar.
2. Advanced Organic chemistry by B.S. Bahl and Arun Bahl.
3. Text book of Inorganic chemistry by P.L. Soni.
4. Principles of Physical chemistry by Puri, Sharma and Pathania.
5. Ancillary chemistry by Ramachandra Sastri.
6. Fundamentals of chemistry by R. Gopalan.

INDUSTRIAL CHEMISTRY

SUB CODE: 17UCHCE6002

INT MARKS:25

SEMESTER: VI

EXT MARKS:75

UNIT –I Dyes

(10 h)

Dyes –Classification–according to structure and method of application. Definition and examples of Auxochrome and Chromophor. Preparation and uses of 1) Azo dye–methyl orange 2) Triphenyl methane dye–Malachite green. 3) Pthalein dye – fluorescein 4) Vat dye – indigo 5) Anthraquinone dye –alizarin. Natural dyes

UNIT–II Fuel cells

(15 h)

2.1 Fuel Cells– Definition, Efficiency of fuel cells, Types of Fuel cells–Primary cells–Zinc–Air Fuel cells, Molten Carbonate Cell, Proton Exchange membrane cell, Secondary cells–Zinc–Silveroxidecells, Iron–Nickel oxide cells, Advantages and Disadvantages of cells, Applications of Fuel cells.

2.2 Individual members: solid fuel – coal– analysis of coal. High and low temperatures carbonisation of coals. Manufacture of coal gas. Fractional distillation of coal tar.

2.3 Liquid fuel: Petroleum, occurrence, mining of petroleum. Distillation of crude petroleum. Knocking – Antiknock compounds – octane number and cetane number. Cracking – liquid phase, cracking –Aviation gasoline.

2.4 Gaseous fuel: Natural and artificial gaseous fuels, water gas, carburetted water gas, producer gas, semi water gas. Advantages of gaseous fuels, gas analysis

UNIT – III Water

(10 h)

Treatment of water for municipal purposes, Sewage and its composition, Purpose of sewage treatment– methods of sewage treatment. Sterilisation and disinfection of water – chemical methods of sterilisation – precipitation method, aeration, ozonolysis – analysis of water – BOD, COD, TDS

UNIT– IV Fats and Soaps

(10 h)

4.1 Fats and oils – Extraction, refining, structure, composition and analysis – Saponification number, iodine number, acid number and RM number; determination of iodine value and saponification value

4.2 Soaps and detergents – raw materials and manufacture, classification, synthesis and applications, mechanism of cleaning action, superiority of detergents over soaps

Unit – V Electrochemical industries**(15 h)**

Introduction, Aluminium, Raw materials, Quantitative requirements, carbon electrodes, Manufacture of Al, Physico-chemical techniques involved. Magnesium-raw materials, preparation of anhydrous MgCl_2 from carnallite, preparation of MgO from dolomite, KMnO_4 preparation uses. Hydroxylamine – preparation by electrolytic method – uses

REFERENCE BOOKS:

1. Analytical Chemistry, R. Gopalan, Sultan Chand.
2. Fundamentals of analytical chemistry, A. Skog and M. West.
3. Instrumental methods of Chemical Analysis, B.K. Sharma – Goel Publications.
4. Instrumental methods of Chemical Analysis, Willard Merrit and Dean.
5. Industrial Chemistry, B.K. Sharma
6. Chemical Process Industries (4th Edition), R. Norris Shreve Joseph A. Brink, Jr.
7. Perfumes, Cosmetics and Soaps, W.A. Poucher (Vol.3)
8. Handbook of Industrial Chemistry, Riegel (ed)

GENERAL CHEMISTRY-III

SUB CODE: 17UCHCT2003

INT MARKS:15

SEMESTER: II

EXT MARKS:60

Unit – I: Chemistry of aliphatic hydrocarbons – alkenes (15 h)

- 1.1 General methods of preparation – dehydrogenation, dehydrohalogenation, dehydration, Hoffmann and Saytzeff rules, cis and trans eliminations
- 1.2 Properties of alkenes—electrophilic and free radical addition, addition reactions with hydrogen, halogens, hydrogen halide (Markownikoff's rule) hydrogen bromide (peroxide effect), sulphuric acid, water, hydroboration, Ozonolysis, hydroxylation with KMnO_4 , allylic substitution by NBS
- 1.3 Dienes – Stability of dienes, conjugated, isolated and cumulative—stability and chemical reactivity—1,2 and 1,4 additions, Diels–Alder reactions, Synthesis of dienes—1,3 butadiene, isoprene, chloroprene

Unit – II: Chemistry of aliphatic hydrocarbons – alkynes (10 h)

- 2.1 Preparation and properties – acidity of alkynes, formation of acetylides, addition of water with HgSO_4 catalyst, addition of hydrogen halides and halogens, oxidation, ozonolysis and hydroboration
- 2.2 Commercial Importance of Alkynes

Unit – III: Chemical Thermodynamics -I (15 h)

- 3.1 Definitions of thermodynamic terms – intensive and extensive properties; isolated, closed and open systems; Thermodynamic processes – cyclic processes, reversible and irreversible processes, isothermal and adiabatic processes; Thermodynamic functions and their differentials; Zeroth law of thermodynamics; Concepts of heat and work
- 3.2 First law of thermodynamics, internal energy (U), enthalpy (H), relation between C_p and C_v , calculations of w, q, dU and dH for expansion of ideal gas under isothermal and adiabatic conditions, for reversible processes including free expansion, P–V, P–T, T–V relationships, Joule's law, Joule–Thomson coefficient and inversion temperature

Unit – IV: Thermochemistry (15 h)

- 4.1 Enthalpy of a reaction, Exothermic and Endothermic reactions, Variation of Enthalpy of reaction with temperature (Kirchhoff's equation)

4.2 Types of heat of reaction – Heat of combustion, Heat of solution, Heat of Neutralization, Heat of fusion, Heat of Vapourisation, Heat of sublimation, Heat of Transition and Heat of formation

4.3 Bond energy, Bond dissociation energy, calculation from thermo chemical data

Unit – V: Data analysis (5 h)

5.1 Accuracy, precision and significant figures

5.2 Error in chemical analysis, Types of error – absolute and relative error, methods of eliminating or minimizing errors, Normal error curve and its importance

5.3 Methods of expressing precision: mean, median, deviation, average deviation and coefficient of variation

REFERENCE BOOKS

1. Bahl and Arun Bahl, Advanced Organic Chemistry
2. T.S. Tewari, Textbook of organic Chemistry
3. B.R. Puri and Sharma, Principles of Physical Chemistry
4. G.W. Castellan, Physical Chemistry
5. B.S. Bahl and G.D. Tuli, Essentials of Physical Chemistry
6. R. Gopalan, Analytical Chemistry
7. B.K. Sharma, Instrumental methods of Chemical analysis
8. A. Skog and M. West, Fundamentals of analytical chemistry
9. Vogel, A Test book of Quantitative Inorganic Analysis

GENERAL CHEMISTRY-IV

SUB CODE : 17UCHCT2004

INT MARKS:15

SEMESTER: II

EXT MARKS:60

Unit – I Stereochemistry (10 h)

1.1 Isomerism: Types of isomerism – stereoisomerism – Optical isomerism– optical activity, conditions of optical activity and specific Rotations – chirality – meaning of (+) and (–) and D and L, Achirality – Elements of symmetry – Geometrical isomerism – methods of determining geometrical isomerism

Unit – II Gaseous state (15 h)

2.1 Characteristics of gases, Gas laws from the Kinetic theory of gases, Transport properties– Viscosity–thermal conductivity–diffusion– (only definition), Maxwell's distribution of molecular velocities, its types and relation between them, Collision properties

2.2 Law of equipartition of energy, Derivation of Van der waal's equation from Ideal gas equation, Limitations of Van der waal's equation, coefficient of compressibility and thermal expansion

2.3 Liquefaction of gases–critical phenomena, Methods of liquefaction of gases

Unit – III Liquid state (15 h)

3.1 Intermolecular forces in liquids, physical properties – Vapour pressure, Heat of vapourisation – Effect of temperature; Surface tension, determination of Surface tension by Capillary rise method and Stalagmometer method – effect of temperature; Viscosity – Determination using Ostwald Viscometer – effect of temperature and pressure

3.2 Mesomorphic state: Liquid crystals – classification, molecular arrangements and applications

Unit – IV Comparative study of the properties of s–block elements (10 h)

4.1 Alkali metals: Comparative study of elements: oxides, halides, hydroxides, sulphates and carbonates. Exceptional property of lithium

4.2 Alkaline Earth Metals: Comparative study of the elements : oxides, halides, hydroxides, sulphates and carbonates. Exceptional property of Beryllium

Unit – V Ionic equilibria (10 h)

5.1 Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and

bases, pH scale, common ion effect; dissociation constants of mono-, di- and triprotic acids (exact treatment).

REFERENCE BOOKS

1. B.R. Puri and Sharma, Principles of Physical Chemistry
2. Atkins, P. W. & Paula, J. de Atkin, Physical Chemistry
3. S. Glasstone, Electrochemistry
4. Glasstone and Lewis, Elements of Physical Chemistry
5. B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry
6. R.D. Madan, Modern inorganic Chemistry
7. S.P. Shukla and G.L. Trivedi, Modern Organic Chemistry
8. E. L. Eliel: Stereochemistry of Carbon Compounds
9. R. T. Morrison & R. N. Boyd: Organic Chemistry
10. Arun Bahl and B. S. Bahl: Advanced Organic Chemistry
11. Kalsi, Stereo chemistry, Conformation and mechanism
12. Arora, Stereo Chemistry in organic compounds

GENERAL CHEMISTRY–VII

SUB CODE:17UCHCT4007

INT MARKS:15

SEMESTER: IV

EXT MARKS:60

Unit I: Aromaticity (10 h)

- 1.1 Huckel's ($4n+2$) rule and its applications, Electrophilic substitution reaction in Benzene. General mechanisms–nitration, halogenations, sulphonation, Friedal Crafts acylation and alkylation. Directive influence–Orientation.

Unit II: Nitrogen family (15 h)

- 2.1 Oxides of group 15 elements: oxides of nitrogen–dinitrogen tetroxide, dinitrogen pentoxide; oxides of phosphorus, arsenic, and bismuth–trioxides, pentoxides.
- 2.2 Oxoacids of nitrogen: nitrous acid, nitric acid, hyponitrous acid, hydrazoic acid, pernitric acid
- 2.3 Oxoacids of phosphorus ortho-phosphorus acid, metaphosphorous acid, hypophosphorous acid; orthophosphoric acid, di-, tri-, and tetrapolyphosphoric acids
- 2.4 Uses of phosphites and phosphates; phosphate fertilizers and superphosphate of lime
- 2.5 Role of phosphorous in NPK fertiliser

Unit–III: Oxygen family (15 h)

- 3.1 Group 16 (oxygen group): structure and allotropy of elements, ozone
- 3.2 Oxides–normal oxides, peroxides, suboxides, basic oxides, amphoteric oxides, acidic oxides, neutral oxides
- 3.3 Oxides of sulphur– SO_2 , SO_3
- 3.4 Oxoacids of sulphur–thionic acid series
- 3.5 Peroxoacid series
- 3.6 Oxohalides–thionyl compounds

Unit IV: Inorganic polymers (10 h)

Types of inorganic polymers, synthesis, structural aspects and applications of silicones and siloxanes, Borazines and phosphazenes.

Unit V: Bioinorganic chemistry (10 h)

Metal ions present in biological systems, classification of elements according to their action in biological system. Excess and deficiency of some trace metals. Toxicity of metal ions (Hg, Pb, Cd and As), reasons for toxicity. Iron and its application in bio-systems.

REFERENCE BOOKS

1. Jerry March, Advanced Organic Chemistry
2. Advanced organic chemistry, B.S. Bahl and Arun Bahl, S.Chand and company ltd.
3. Organic Chemistry, R.T. Morrison and Boyd, Prentice Hall.
4. B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry
5. R.D. Madan, Modern inorganic Chemistry
6. P.L.Soni, Text book of Inorganic Chemistry
7. J.D. Lee, Concise Inorganic Chemistry
8. Douglas, B.E; Mc Daniel, D.H. & Alexander, J.J. Concepts & Models of Inorganic Chemistry
9. Cotton, F.A. & Wilkinson, G. Advanced Inorganic Chemistry
10. Miessler, G. L. & Donald, A. Tarr., Inorganic Chemistry
11. Shriver & Atkins, Inorganic Chemistry
12. Purcell, K.F & Kotz, J.C., Inorganic Chemistry
13. Huheey, J.E., Inorganic Chemistry
14. Lippard, S.J. & Berg, J.M., Principles of Bioinorganic Chemistry

GENERAL CHEMISTRY–VIII

SUB CODE: 17UCHCT4008

INT MARKS:15

SEMESTER: IV

EXT MARKS:60

Unit–I Halogen family (15 h)

1.1 Comparative study of F, Cl, Br, I and At; Exceptional properties of fluorine.

1.2 Interhalogen compounds: ClF, ICl; ClF₃, BrF₃, IF₃; ClF₅, BrF₅, IF₅ – preparation properties and structure.

1.3 Psuedohalogens: cyanide, thiocyanate, and azide – properties and structure.

Unit II Noble gases (5h)

Occurrence and uses of inertness of noble gases, position of rare gases in Periodic Table; preparation and properties of XeF₂, XeF₄ and XeF₆ & Clathrates;

Unit III Carbonyl compounds (15 h)

Structure, reactivity and preparation; Nucleophilic additions, Nucleophilic addition–elimination reactions with ammonia derivatives with mechanism; Mechanisms of Aldol and Benzoin condensation, Knoevenagel condensation, Claisen–Schmidt, Perkin, Cannizzaro and Wittig reaction

Unit–IV Photochemistry (15 h)

4.1 Characteristics of electromagnetic radiation – Laws: Grothus–Draper, Stark–Einstein, Lambert-Beer's law, physical significance of absorption coefficients, examples of photochemical reactions, chlorination of methane, actinometry, quantum yield, examples of low and high quantum yields, photolysis of acetaldehyde and photopolymerisation of polythene, photosensitisation, quenching, fluorescence, phosphorescence (Definition only) and chemiluminescence or Bioluminescence.

4.2 Role of photochemical reactions in biochemical processes

Unit–V Gravimetric analysis (10 h)

Principles of gravimetric analysis – theories of precipitation – precipitation from homogenous medium – co-precipitation and post precipitation. Precipitate–Definition, characteristics of a precipitate, Characteristics of precipitating agents and conditions of precipitation, specific and selective precipitants – DMG, cupferron, salicylaldehyde, oxime, EDTA – Use of sequestering agents.

REFERENCE BOOKS

1. P.L. Soni, Text book of Inorganic chemistry
2. B. R. Puri, L. R. Sharma, K. C. Kalia, Principles of Inorganic Chemistry
3. R.D. Madan, Modern inorganic Chemistry
4. R. Gopalan, Analytical Chemistry
5. B.S. Bahl and Arun Bahl, Advanced organic chemistry
6. R.T. Morrison and Boyd, Organic Chemistry
7. Puri, Sharma and Pathania, Principles of Physical chemistry

INORGANIC CHEMISTRY II

SUB CODE: 17UCHCT6013

INT MARKS:15

SEMESTER: VI

EXT MARKS:60

Unit – I Coordination Chemistry (10 h)

- 1.1 Coordination number, types of ligands, chelation and its effects. IUPAC nomenclature.
- 1.2 Isomerism – Structural isomerism, ionization, hydrate, linkage, ligand and coordination Isomerism
- 1.3 Stereoisomerism – Geometrical and optical isomerism in 4 and 6 coordinated complexes.
- 1.4 Werner's theory, Sidgwick's EAN rule, Valence bond theory – postulates, hybridization, geometry and magnetic properties of $[\text{Ni}(\text{CN})_4]^{2-}$, $[\text{NiCl}_4]^{2-}$, $[\text{Fe}(\text{CN})_6]^{3-}$, $[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{CoF}_6]^{3-}$. Limitations of VBT.

Unit – II (15 h)

Metallic carbonyls – 18-electron rule, Bonding, hybridization and structures of carbonyls of Ni, Cr, Fe, Co and Mn.

Unit – III (15 h)

- 3.1 Crystal field theory – Postulates, splitting of d-orbitals in octahedral, tetrahedral and square planar complexes. CFSE calculations in octahedral complexes. Factors affecting crystal field splitting.
- 3.2 Spectrochemical series – low spin and high spin complexes – Explanation of magnetic properties and colour using CFT. Limitations of CFT.
- 3.3 Comparison of VBT and CFT.

Unit – IV

- 4.1 Nucleophilic substitution reactions in octahedral complexes – SN^1 , SN^2
- 4.2 Trans effect in square planar complexes and its explanation by electrostatic polarization theory and π -bonding theory.

Unit – V Chromatography (10 h)

- 5.1 Chromatography techniques – column chromatography – Principles – adsorption, adsorbents – preparation of column elution, recovery of substance and applications– Thin layer Chromatography (TLC) – choice of adsorbent and solvent – preparation of chromatogram and application – R_f value.
- 5.2 Partition and paper chromatography – Solvents used and principles – factors affecting R_f value – separation of amino acid mixtures. Ion exchange chromatography –

5.3 Principle – resins – action of resins – experimental techniques – applications – separation of Zn–Mg,Co–Ni, Chloride – bromide.

5.4 Gas chromatography and High Pressure Liquid Chromatography – Principles – experimental techniques – instrumentation and applications. Electrophoresis

REFERENCE BOOKS:

1. Text book of Inorganic Chemistry, P.L. Soni.
2. Advanced Inorganic Chemistry, R.D. Madan.
3. Selected topics in Inorganic Chemistry, Wahid. U. Malik, G.D. Tuli , R.D. Madan.
- 2 Advanced Inorganic Chemistry, Sarkar.
4. Analytical Chemistry, R. Gopalan – Sultan Chand.
5. Fundamentals of analytical chemistry, A. Skog and M. West.
6. Instrumental methods of Chemical analysis, B.K. Sharma, Goel Publications.
7. Instrumental methods of Chemical analysis, Shrivastava and Jain.
8. Advanced Inorganic Chemistry, J.E. Huheey.
9. Concise coordination chemistry, Gopalan.

ORGANIC CHEMISTRY II

SUB CODE:17UCHCT6014

INT MARKS:15

SEMESTER: VI

EXT MARKS:60

UNIT – I

(10 h)

- 1.1 Aldehydes: aliphatic and aromatic aldehydes– methanal, ethanal, propanal, benzaldehyde, salicylaldehyde, unsaturated aldehydes–preparation and reactions.
- 1.2 Ketones–aliphatic and aromatic ketones – propanone–butanone – acetophenone and benzophenone, quinones, unsaturated ketones–preparation and properties

UNIT – II

(10 h)

- 2.1 Amino acids–classification of amino acids, Essential and Non–essential amino acids, Preparation of α -amino acids, Zwitter ions, iso–electric points. Peptides– synthesis– Merrifield's method for the synthesis of polypeptide on a solid support, determination of structure of polypeptides, end group analysis
- 2.2 Proteins: –Classification based on physical and chemical properties and on physiological functions. Primary and secondary structure of proteins. Helical and sheet structures (elementary treatment only) Denaturation of proteins. Nucleic acids. Types of nucleic acids – DNA and RNA, polynucleotide chain components – biological functions.

UNIT III

(15 h)

- 3.1 Carbohydrates: Classifications – Reactions of glucose and fructose – osazone formation. Mutarotation and its mechanism – Constitution of glucose and fructose. Cyclic structure. Determination of ring size. Haworth projection formula, configuration of monosaccharides. Epimerisation, chain lengthening and chain shortening of aldoses, inter conversion of aldoses and ketoses.
- 3.2 Disaccharides: Reactions and structure of sucrose.
- 3.3 Polysaccharides: Properties and structure of starch and cellulose.

UNIT IV

(15h)

- 2.1 Alkaloids –General methods of isolation and general methods of structure elucidation. Structure elucidation of coniine and piperine .
- 2.2 Terpenes – isoprene rule. Structure elucidation of Citral and alpha terpineol.
- 2.3 Vitamins – Classification – structure elucidation of ascorbic acid.

UNIT V

(10h)

Molecular rearrangements – Classification as anionotropic, cationotropic, sigmatropic and intramolecular. Pinacol – pinacolone rearrangement, Beckmann, Hoffmann, Benzilic acid rearrangement – mechanism only.

REFERENCE BOOKS:

1. Organic Chemistry, R.T. Morrison and Boyd – Prentice Hall.
2. Text book of Organic Chemistry, K.S.Tewari, S.N. Mehrotra and N.K. Vishno – Vikas Publishing house private limited.
3. Chemistry of Organic Natural Products, O.P. Agarwal – Goel Publishing house.
4. Reactions and Reagents, O.P. Agarwal – Goel Publishing House.
5. Synthetic dyes, Gurdeep R. Chatwal – Himalaya Publishing House.
6. Organic Chemistry, I.L. Finar, Vol I & II, Longman Group Limited.

PHYSICAL CHEMISTRY II

SUB CODE:17UCHCT6015

INT MARKS:15

SEMESTER: VI

EXT MARKS:60

Unit – I

(15 h)

Metallic and electrolytic conductors – specific, equivalent and molar conductance – measurement of conductance – variation of conductance with dilution for strong and weak electrolytes (qualitative explanation) – Transport number and its determination by Hittorff's and moving boundary method – effect of temperature and concentration – ionic mobility and ionic conductance – Kohlrausch's law and its applications.

Unit – II

(15 h)

- 2.1 Salt hydrolysis and pH of a salt solution, buffer action and explanation – buffers in human systems – Phosphate buffer and bicarbonate – carbonate buffer. Theory of strong electrolytes –and Debye – Huckel – Onsager theory – verification of Onsager equation – Wein effect and Debye – Falkenhagen effect – ionic strength. Activity and activity coefficients of strong electrolytes.
- 2.2 Applications of conductivity measurements – degree of hydrolysis, solubility product and conductometric titrations.

Unit – III

(10 h)

- 3.1 Galvanic cells – reversible and irreversible electrodes and cells – standard cell – emf and its measurement – types of electrodes – electrode reactions – electrode potentials – reference electrodes – standard electrode potentials.
- 3.2 Derivation of Nernst equation for electrode potential and cell emf – sign conventions – electrochemical series and its applications – formation of cells – electrode and cell reactions – cell emf – chemical cells and concentration cells with and without transference – examples – liquid junction potential.

Unit – IV

(10 h)

- 4.1 Applications of emf measurements – calculation of ΔG , ΔH , ΔS and equilibrium constants – determination of pH using quinhydrone and glass electrodes – potentiometric titrations.
- 4.2 Applications of Concentration cells – determination of valency of ions – transport number – solubility product.

Unit – V**(10 h)**

5.1 Group theory – Symmetry operations – products of symmetry operations – classes and subgroups – group multiplication table – properties of a group – point groups – C_{2v} , C_{3v} , C_{2h} , (any one example for each) .

REFERENCE BOOKS:

1. Electro Chemistry, S. Glasstone – Macmillan.
2. Principles of Physical Chemistry, B.R. Puri and Sharma, Shobanlal Nagin Chand and Co.
3. Group Theory in Chemistry, V. Ramakrishnan and M.S. Gopinathan, Vishal Publications.
4. Physical Chemistry Through Problems, S.G. Dogra. New Age International.
5. Modern Electro Chemistry – Vol –I & II J.O.M Bockris and A.K.N. Reddy, Plenum Publishing Corporation.
6. Modern Electro Chemical Methods, Crow.
7. Fundamentals of Electro Chemical Methods, Allan Bard.
8. An introduction to Green Chemistry, V. Kumar.
9. New Trend in Green Chemistry, V.K. Ahluwalia and M. Kidwai.
10. Environmental Chemistry, A.K. De.
11. Environmental Chemistry for Sanitary Engineering, Sawyer abd Mecrty.

ALLIED CHEMISTRY -II

SUB CODE: 18UPHAT2AC2

INT MARKS: 15

SEMESTER: II

EXT MARKS: 60

Unit-I

- 1.1. Carbohydrates: Classification – properties of glucose and fructose- discussion about open-chain structure of glucose and fructose. Properties and Structures of sucrose. (No Structural Elucidation)
- 1.2. Aminoacids: Classification. Preparation and properties of alpha amino acids. Peptide synthesis. Classification of proteins by physical Properties and biological functions. Elementary ideas about RNA, DNA.

Unit-II

Definition and one example each- analgesics, antipyretics, tranquilisers, sedatives, hypnotics, local anesthetics and general anesthetics. Cause and treatment of – Diabetes, cancer and AIDS.

Unit-III

- 1.1 Industrial chemistry: Fuel gases- Natural gas, water gas, semi-water gas, Carburetted water gas, producer gas, oil gas (composition and uses only).
- 1.2 Synthesis, properties and uses of silicones.
- 1.3 Fertilisers: Preparation and uses of urea, ammonium sulphate, superphosphate, triple superphosphate and NPK fertilizer.

Unit-IV

Photochemistry: Grotthus-Draper's law and Stark-Einstein's law of photochemical equivalence. Quantum yield. Examples for photochemical reactions. Phosphorescence, Fluorescence, Chemi luminescence and photosensitization – definitions with examples.

Unit-V

- 1.1 Electrochemistry-I: Strong and weak electrolytes, common ion effect, pH, buffer solutions, Henderson equation and buffer action in biological systems.
- 5.2. Electrochemistry-II: Galvanic cells: EMF, standard electrode potentials, reference electrodes (NHE and Calomel).

Reference Books:

1. Pharmacology and pharmacotheapeutics by R.S. Satoskar and S.D. Bhandarkar.
2. Advanced Organic chemistry by B.S. Bahl and Arun Bahl.
3. Text book of Inorganic chemistry by P.L. Soni.
4. Principles of Physical chemistry by Puri, Sharma and Pathania.
5. Ancillary chemistry by Ramachandra Sastri.

6. Fundamentals of chemistry by R. Gopalan.