

INT MARK: 25

SEMESTER –I

Exam Hours : 3

EXT MARK: 75

Subject Code : UQA1

AC I - INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY I

Objectives:

1. To study about Industrial Chemistry
2. To Study the properties of aromatic compounds and organic reactions
3. To learn the concepts of solid state chemistry and Chemical equilibrium

Unit-I

(12 Hrs)

1.1 Industrial Chemistry - Fuel gases –water gas, producer gas, L.P.G gas, Gobar gas and natural gas. Fertilizers- NPK and mixed fertilizers, micronutrients, and their role in plant life and biofertilizers, Soap and detergents an elementary idea about preparation and manufacture, cleaning action of soap and detergents

1.2 Pollution - Causes, effects and control measures of air pollution, water pollution and soil pollution

Unit-II

(12 Hrs)

2.1 Polar Effects - Inductive effect- Relative strength of aliphatic monocarboxylic acids and aliphatic amines Resonance- conditions for resonance, consequences of resonance- resonance energy-Basic property of aniline and acidic property of phenol.

2.2 Hyper conjugation - consequences of hyper conjugation- Heat of hydrogenation, bond length and dipole moment. Steric effect – Steric accelerated reaction and steric inhibited reaction.

Unit - III

(12 Hrs)

3.1 Aromatic Compounds - Structure, stability , resonance and aromaticity of benzene. Typical substitution reaction- Nitration, Halogenations, alkylation.

3.2. Organic Reactions – Decarboxylation, Benzoin, Perkin, Cannizaro, Claisen, Haloform & coupling reactions.

3.3 Chemotherapy - Explanations with two examples each for i) Analgesics ii) Antibacterial iii) Anti-inflammatory, iv) Antipyretic , v) Antibiotic, vi) Antitubercular vii) Antiviral viii) Antitussive ix) Antiallergic x) Antidiabetics xi) antihypertensive xii) Antiepileptics xiii) Tranquilizers, xiv) Antiseptic and disinfectant xv) Antimalarial xvi) Anaesthetics local and general (Structures not necessary).

Unit-IV

(12hrs)

4.1 Solid State- Typical crystal lattices – unit cell . Elements of symmetry. Bragg`s equation, Weiss indices, Miller indices, simple, body centred and face centred cubes.

4.2 Energetic - Review of first law of thermodynamics- state and path functions- need for the second law-Carnot`s cycle and thermodynamic scale of temperature, Entropy- Gibb`s free energy. Entropy change and free energy change to decide spontaneity. Elementary idea of third law- statement and explanation.

UNIT- V

(12 hrs)

5.1 **Chemical Equilibrium** - Criteria of homogeneous and heterogeneous equilibria.
Decomposition of HI, N_2O_4 , $CaCO_3$ and PCl_5

5.2 **Chemical Kinetics** Order of reactions and their determinations. Activation energy, effect of temperature on reaction rate.

5.3 **Catalysis** Types, mechanism of catalytic reactions, industrial applications.

References:

1. B.R Puri ,L.R.Sharma and M.S.Pathania , -“ Principles of Physical Chemistry ,”
2. Puri B.R.. Sharma L.R., Kalia K.K - Principles of Inorganic chemistry.35th edition , New edition: Shoban Lal NAgin chand and co. 2013.

Text books:

1. Organic Chemistry – P.L.Soni.
2. Inorganic Chemistry – P.L.Soni.
3. Physical Chemistry – Puri & Sharma

INT MARK : 40
EXT MARK: 60

SEMESTER -I & II
AC - II - ALLIED PRACTICAL

Subject Code :UQa2Y

I. VOLUMETRIC ANALYSIS

1. Acidimetry and alkalimetry

- a) Strong acid Vs Strong base
- b) Weak acid Vs Strong base
- c) Determination of hardness of water

2. Permanganimetry

- a) Estimation of Ferrous Sulphate
- b) Estimation of Oxalic Acid

3. Iodometry

- a) Estimation of Copper
- b) Estimation of Potassium dichromate
- c) Estimation of Potassium permanganate

II.ORGANIC ANALYSIS

A study of the reactions of the following organic compounds

1. Carbohydrate 2. Amide 3. Aldehyde 4. Ketone 5. Acid 6. Amine 7. Phenol

INT MARK : 25

SEMESTER –II

EXT MARK: 75

Subject Code : UQA3

AC III - INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY—III

Objectives:

1. To understand the various theories of coordination chemistry
2. To Study the natural products and polymers
3. To Learn about Chromatography

UNIT-I

(12 Hrs)

1.1 Coordination Chemistry Nomenclature of mononuclear complexes – Werner, Sidgwick, and Pauling’s theories. Chelation and its industrial importance to EDTA. Biological role of hemoglobin and chlorophyll. Application of complexes in qualitative and quantitative analysis.

1.2 Metallic Bond Electron gas, Pauling and band theories. Semiconductors, Intrinsic, n – type and p-type.

UNIT – II

(12 hrs)

2.1 Carbohydrates- Classification- glucose and fructose-preparation – elucidation of structure of glucose- configuration of glucose- Fischer and Haworth cyclic structures. Starch and cellulose- properties and uses.

2.2 Amino acids and protein – Amino acids- classification based on structure and essential and non -essential amino acids- preparation and properties – peptides (elementary treatment)-proteins -classification based on physical properties and biological functions. Structures of proteins -primary and secondary(elementary treatment).

UNIT III

(12 hrs)

3.1 Synthetic Polymers Teflon, alkyd and epoxy resins, poly esters – general treatment only.

3.2 Heterocyclic Compounds - Furan, thiophen, pyrrole and pyridine – preparation and properties- basic properties of pyridine and pyrrole- quinoline and isoquinoline.

3.3 Stereoisomerism Optical isomerism- lactic and tartaric acid-racemic mixture and resolution. Geometrical isomerism– maleic and fumaric acids. Keto-enol tautomerism.

UNIT IV

(12 hrs)

4.1 Surface Chemistry Emulsions, gels- preparation, properties and applications. Electrophoresis, chromatography- column, paper and thin layer chromatography

4.2 Photochemistry Laws of photochemistry and applications.

UNIT V

(12 hrs)

5.1 Electrochemistry Specific and equivalent conductivities – their determination – effect of dilution on conductivity. An elementary idea about ionic theory- Ostwald’s dilution law, Kohlrausch law, conductivity measurements, conductometric titrations.

5.2 pH and Buffer Importance of pH and buffers in living systems – pH determination by colorimetric and electrometric methods.

References:

1. B.R Puri ,L.R.Sharma and M.S.Pathania , -“ Principles of Physical Chemistry”
2. Puri B.R.. Sharma L.R., Kalia K.K - Principles of Inorganic chemistry.35th edition , New edition: Shoban Lal NAgin chand and co. 2013.

Textbook:

- 1.Organic Chemistry – P.L.Soni.
2. Inorganic Chemistry – P.L.Soni.
3. Physical Chemistry – Puri & Sharma