

BHARATHIAR UNIVERSITY :: COIMBATORE – 641 046

ALLIED CHEMISTRY PAPER- I (5X15 = 75 hours) (For The Students Admitted During The Academic Year 2017-2018 Batch & Onwards)

Unit I:

Chemical Bonding

1. Molecular orbital theory, bonding, antibonding and non-bonding orbitals. Molecular orbitals. MO configuration of H₂, N₂, O₂, F₂. Bond order. Diamagnetism and paramagnetism.
2. Preparation and properties, structure, preparation and uses of Borane- NaBH₄, Borazole-Chemistry.

Unit II:

1. Industrial Chemistry

Synthesis, properties and uses of silicones. Fuel gases: natural gas, water gas, semi water gas, carburetted water gas, producer gas, oil gas (manufacturing details not required)

2. Dye Chemistry

Terms: Chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyperchromic effect, hypsochromic effect- Dyes: azo and triphenylmethane dyes- Preparation one example- Methyl Orange, Malachite green.

Unit III:

1. Covalent bond: orbital overlap, hybridization, geometry of organic molecules- CH₄, C₂H₄, and C₂H₂. Inductive effect. Electrometric, mesomeric, hyperconjugative and steric effects. Effect in properties of compounds.

2. Stereoisomerism

Conditions of optical activity-Optical isomerism of tartaric acid, Racemisation, Resolution of racemates- Geometrical isomerism of maleic and fumaric acids.

Unit V:

1. Solutions types. Liquid in Liquid. Raoult's law- - Deviation from ideal behaviour –positive deviation-Negative deviation- Fractional distillation.

2. Kinetics- Rate, order, molecularity, pseudo first order, determination of order. Effect of temperature on the rate. Energy of activation.

Unit V:

1. Conductance-Types(definition only)- Ostwald dilution law - Kohlraush's law- -Applications- Conductometric titrations.

2. pH and its calculations- Buffers in living systems-Action of buffer solutions -. Henderson-Hasselbalch equation

ALLIED CHEMISTRY PAPER- II (5X15 = 75 hours) (For The Students Admitted During The Academic Year 2017-2018 Batch & Onwards)

Unit I:

1. Metals

General methods of extraction of metals. Types of ores. Methods of ore dressing.. Reduction methods, electrical methods, types of refining Van Arkel Zone refining.

2. Coordination chemistry

Nomenclature. Theories of Werner, Pauling, Chelation examples. Hemoglobin , Chlorophyll. Applications of EDTA in qualitative and quantitative analysis.

Unit II:

1. Aromatic compounds:

Electrophilic substitution in benzene- Mechanism of nitration, halogenation, alkylation, acylation, sulphonation, Preparation and properties of naphthalene.

2. Heterocyclics:

Preparation, uses and electrophilic substitution properties of furan, thiophene, pyrrole and pyridine.

Unit III:

1. Amino Acids: Classification, preparation and properties, preparation of peptides. Classification of proteins by physical properties and by biological functions.

2. Carbohydrates: classification, preparation and properties of glucose and fructose. Discussion of open chain ring structures of glucose and fructose.

Unit IV:

1. Energetics: Definition of first law thermodynamics. Types of systems. Reversible, irreversible. Isothermal and adiabatic processes. Spontaneous processes, Joule-Thomson effect. Enthalpy, bond energy.

2. Need for the second law. Carnot cycle and Carnot theorem. Entropy and its significance. Free energy change.

Unit V

1. EMF (Definition)-Theory of oxidation and reduction-Nomenclature of cell- Daniel cell- Reference electrode-Standard Hydrogen Electrode(SHE)-Saturated Calomel Electrode (SCE). Determination of pH-Hydrogen, Quinhydrone and glass electrodes

2. Hydrogen-Oxygen fuel cell-Batteries-Lead-storage battery-Batteries of future-Lithium ion batteries.

ALLIED CHEMISTRY PRACTICALS (3 HOURS PER WEEK) I. VOLUMETRIC ANALYSIS:

1. Estimation of sodium hydroxide using standard sodium carbonate.
2. Estimation of hydrochloric acid- standard oxalic acid.
3. Estimation of oxalic acid- standard sulphuric acid.
4. Estimation of ferrous sulphate- standard Mohr salt solution.
5. Estimation of oxalic acid- standard ferrous sulphate.
6. Estimation of potassium permanganate- standard sodium hydroxide.

II. ORGANIC ANALYSIS: systematic analysis

1. Detection of Elements (N, S, Halogens).
2. To distinguish between aliphatic and Aromatic.
3. To distinguish between saturated and unsaturated.
4. Functional group tests for phenols, acids (mono and di), aromatic primary amine, amide, diamide, carbohydrate,

Functional groups characterized by confirmatory test.