

B.Sc. III Practicals

180 Hours (12 hours per week)

INORGANIC CHEMISTRY

Synthesis and Analysis

- Preparation of sodium trioxalato ferrate (III), $\text{Na}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$ and determination of its composition by permanganometry.
- Preparation of Ni-DMG complex, $[\text{Ni}(\text{DMG})_2]$.
- Preparation of copper tetraammine complex. $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$.
- Preparation of *cis*- and *trans*- bisoxalato diaqua chromate(III) ion.

Instrumentation

Colorimetry

- Job's method
 - Mole-ratio method
- Adulteration – Food stuffs.
Effluent analysis, water analysis.

Solvent Extraction

Separation and estimation of Mg(II) and Fe(II))

Ion Exchange Method

Separation and estimation of Mg(II) and Zn(II).

ORGANIC CHEMISTRY

Laboratory Techniques

Steam Distillation

Naphthalene from its suspension in water
Clove oil from cloves
Separation of *o*- and *p*-nitrophenols

Column Chromatography

Separation of fluorescein and methylene blue
Separation of leaf pigments from spinach leaves
Resolution of racemic mixture of (\pm) mandelic acid

Qualitative Analysis

Analysis of an organic mixture containing two solid components using water, NaHCO_3 , NaOH for separation and preparation of suitable derivatives.

Synthesis of Organic Compounds

- (a) Acetylation of salicylic acid, aniline, glucose and hydroquinone. Benzoylation of aniline and phenol
- (b) Aliphatic electrophilic substitution
Preparation of iodoform from ethanol and acetone
- (c) Aromatic electrophilic substitution
Nitration
 Preparation of m-dinitrobenzene
 Preparation of p-nitroacetanilide
Halogenation
 Preparation of p-bromoacetanilide
 Preparation of 2,4,6-tribromophenol
- (d) Diazotization/coupling
Preparation of methyl orange and methyl red
- (e) Oxidation
Preparation of benzoic acid from toluene
- (f) Reduction
Preparation of aniline from nitrobenzene
Preparation of m-nitroaniline from m-dinitrobenzene.

Stereochemical Study of Organic Compounds via Models

R and S configuration of optical isomers.
E, Z configuration of geometrical isomers.
Conformational analysis of cyclohexanes and substituted cyclohexanes.

PHYSICAL CHEMISTRY

Electrochemistry

- (a) To determine the strength of the given acid conductometrically using standard alkali solution.
- (b) To determine the solubility and solubility product of a sparingly soluble electrolyte conductometrically.
- (c) To study the saponification of ethyl acetate conductometrically.
- (d) To determine the ionisation constant of a weak acid conductometrically.
- (e) To titrate potentiometrically the given ferrous ammonium sulphate solution using

$\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$ as titrant and calculate the redox potential of $\text{Fe}^{++}/\text{Fe}^{+++}$ system on the hydrogen scale.

Refractometry, Polarimetry

- (a) To verify law of refraction of mixtures (e.g., of glycerol and water) using Abbe's refractometer.
- (b) To determine the specific rotation of a given optically active compound.

Molecular Weight Determination

- (a) Determination of molecular weight of a non-volatile solute by Rast method/Beckmann freezing point method.
- (b) Determination of the apparent degree of dissociation of an electrolyte (e.g., NaCl) in aqueous solution at different concentrations by ebullioscopy.

Colorimetry

To verify Beer – Lambert law for $\text{KMnO}_4/\text{K}_2\text{Cr}_2\text{O}_7$ and determine the concentration of the given solution of the substance.