

Syllabus

M.Sc. (Chemistry) Programme

(SEMESTER – II)

Lab Course – II

Programme Code- (MSCCH -21)

Course Code – (MSCCH -5010 L)

Lab Organic/Physical Chemistry Lab Course

Block I: Physical Chemistry

Unit 1 Kinetic Studies

Determination of the velocity constant of acid catalyzed hydrolysis of an ester.

Determination of activation energy of a reaction.

Determination of Frequency factor of a reaction by kinetic studies.

Validity of Arrhenius equation.

Determination of the effect of change in temperature on rate constant of a reaction.

Determination of the effect of change in concentration of the reactants on rate constant of a reaction.

Determination of the effect of change in concentration of the catalyst on rate constant of a reaction.

Determination of the effect of change in ionic strength on the rate constant of a reaction.

Determination of the rate constant for the oxidation of iodide ions by hydrogen peroxide.

Unit 2 Surface Chemistry

Flowing Clock reactions (Ref. Experiments in Physical Chemistry by Showmaker).

Study of the adsorption of an acid by charcoal.

Validity of Freundlich's Adsorption isotherm.

Determination of Partition Coefficients.

Determination of molecular surface energy of a liquid by Stalagmometer method.

Determination of association factor of the given liquid by drop-pipette method.

Note: The candidates shall have to do a minimum of 05 experiments.

Block II Organic Chemistry

Unit 3 Multi-step Synthesis of Organic Compounds

The exercises should illustrate the use of organic reagent and may involve purification of the products by chromatographic techniques.

Photochemical reaction:

Benzophenone Benzpinnacol Benzpinacolone

Beckmann rearrangement: Benzanilide from benzene

Benzene Benzophenone Benzophenoneoxime Benzanilide.

Benzilic acid rearrangement: Benzilic acid from benzoin

Benzoin Benzil Benzilic acid

Synthesis of heterocyclic compounds

Skraup synthesis: Preparation of quinoline from aniline.

Fischer indol synthesis: Preparation of 2-phenyl indole from phenylhydrazine.

Enzymatic synthesis

Unit 4 Enzymatic reduction:

Reduction of ethyl acetoacetate using Baker's yeast to yield enantiomeric excess of S(+)-ethyl-3-hydroxybutanoate and determine its optical purity.

Biosynthesis of ethanol from sucrose

Synthesis using microwaves

Alkylation of diethyl malonate with benzyl chloride.

Synthesis using phase transfer catalyst

Alkylation of diethyl malonate or ethylacetoacetate with an alkyl halide.

Unit 5 Paper Chromatography/Thin Layer Chromatography

Separation and identification of the sugars present in the given mixture of glucose, fructose and sucrose etc. By Paper chromatography, thin layer chromatography and determination of R_f values.

Note: Organic exercise 30; Physical 30; Record(including test) 15; attendance 10; viva 15