

## THIRD SEMESTER

Course No. GenEd-4 (FM = 50; C = 4)

Paper: Chem 0331

A: Organic Chemistry-II (M = 35)

Unit 1 (M = 20)

Reaction and synthesis.

Alkyl halides: S<sub>N</sub>1, S<sub>N</sub>2, E1 and E2 reactions (elementary mechanistic aspects), Saytzeff and Hoffmann elimination reactions.

Aldehydes and ketones: synthesis, reactions: Cannizzaro reaction, Aldol condensation, Perkin reaction, Benzoin condensation, Claisen condensation, haloform reaction, oxidation and reduction reactions.

Carboxylic acids and their derivatives: esterification of carboxylic acids and hydrolysis of esters (BAC2 and AAC2 only)

Phenols: Kolbe reactions, Reimer-Tiemann reaction, Fries rearrangement, Claisen rearrangement.

Grignard reagents - preparations and application in organic synthesis.

Amines: Hofmann degradation, Gabriel's phthalimide synthesis, distinction of primary, secondary and tertiary amines; aromatic diazonium salts and their synthetic uses.

Unit 2 (M = 15)

Biomolecules

Carbohydrates: classification of carbohydrates, Fischer configuration (D/L) of aldoses (tetrose, pentose and hexose), fructose. Ring structure of ribose, glucose and fructose. Mutarotation of glucose. Glycosidic linkage: sucrose, lactose. Reducing and non-reducing property.

Amino acids, peptides and proteins: natural amino acids and their structures, synthesis of alanine using Strecker synthesis. Zwitterion structures, isoelectric point.

Peptide linkage, structure of short peptides indicating N-terminal and C-terminal residues.

Proteins: primary, secondary, tertiary and quaternary structure

Heterocyclic compounds: structure (with numbering) of heterocycles: furan, pyrrole, thiophene, pyran, pyridine, indole, quinoline, isoquinoline, imidazole, oxazole, pyrimidine, purine. Nucleic acids: structure of pyrimidine and purine bases; nucleosides, nucleotides, RNA and DNA.

B: Organic Practical-II (M = 15)

Organic preparation

Preparation of i) acetanilide from aniline ii) benzoic acid from benzamide iii) semicarbazone from vanillin.