

**MJD Govt. College Taranagar (Churu)**  
**Department of Chemistry**  
**B.Sc.-III (Syllabus)**  
**ORGANIC CHEMISTRY**  
**PAPER-II**

**Unit-I**

**Spectroscopy**

Nuclear Magnetic resonance (NMR) spectroscopy. Paramagnetic resonance (1H NMR) spectroscopy, nuclear shielding and deshielding chemical shift and molecular structure, spin-spin splitting and coupling constants, areas of signals, interpretation of PMR spectra of simple organic molecules such as ethyl bromide, ethanol, acetaldehyde, 1,1,2,2-tetrabromoethane, ethyl acetate, toluene and acetophenone. Problems pertaining to the structure elucidation of simple organic compounds using UV, IR and NMR spectroscopic techniques.

**Unit-II**

**(a) Heterocyclic Chemistry**

Nomenclature, preparation and properties of compounds having one heteroatom with five and six member ring (Pyrrole, Thiophene, Furan and Pyridine)

**(b) Fats, Oil and Detergents**

Natural fats, edible and industrial oils of vegetable origin, common fatty acids, glycerides. hydrogenation of unsaturated oils. saponification value, iodine value, acid value. Soaps, synthetic detergents, alkyl and aryl sulphonates.

**Unit-III**

**(a) Organic Synthesis Via Enolates**

Acidity of  $\alpha$ -hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate, the Claisen condensation, Keto-enol tautomerism of ethyl acetoacetate. Alkylation of 1,3-dithianes. Alkylation and acylation of enamines.

**(b) Amino Acids, Peptides, Proteins and Nucleic Acids**

Classification, structure and stereochemistry of amino acids. Acid base behavior, electrophoresis. Preparation and reactions of  $\alpha$ -amino acids, structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis. solid-phase peptide synthesis. Structures of peptides and

proteins, level of protein structure. Proteins denaturation/renaturation.  
Nucleic acids: Introduction, Constitution of nucleic acids-Ribnonucleosides and ribonucleotides. The double helical structure of DNA.

## **Unit IV**

### **Carbohydrates**

Classification and nomenclature. Monosaccharides. mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharides. Erythro and threo diastereomers. Conversion of glucose into mannose. Formation of glycosides, ethers and esters. Determination of ring size of monosaccharides. Cyclic structure of D(+)-glucose. Mechanism of mutarotation. Structure of ribose and deoxyribose. An introduction to disaccharides (maltose, sucrose and lactose) and polysaccharides e.g. starch and cellulose (without involving structure determination.)

## **Unit-V**

### **(a) Synthetic Polymers**

Addition of chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers. Condensation or step growth polymerization. Polyesters, polyamides, phenolformaldehyde resins, urea- formaldehyde resins, epoxy resins and polyurethanes.

### **(b) Synthetic Dyes**

Color and constitution (electronic concept). Classification of dyes. Chemistry and synthesis of Methyl orange, Congo red, Malachite green, Crystal violet, Phenolphthalein, Fluorescein, Alizarin and Indigo.