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Module-III

Carbohydrates

Classification and nomenclature.Monosaccharides, mechanism of osazone formation, interconversion of glucose and fructose, chain lengthening and shortening of aldoses.Configuration of monosaccharides.Erythro and threodiastereomers.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 (starch and cellulose) without involving structure determination.

[8hrs]

Module-III

Amino acids, Peptides, Proteins and Nucleic acids

Classification, structure and stereochemistry of amino acids.Acid-base behaviour, isoelectric point and electrophoresis.Preparation and reactions of α-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.

Levels of protein structures.Protein denaturation/renaturation.

Nucleic acids: introduction. Constituents of nucleic acids.Ribonucleosides and ribonucleotides.The double helical structure of DNA. **[8hrs]**

Module-III

Fats, Oils 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 ans aryl sulphonates.

Synthetic dyes

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

[8hrs]

Module-III

Synthetic polymers (04 Hrs)

Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization. Ziegler-Natta polymerization and vinyl polymers.

Condensation or step growth polymerization. Polysters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy resins and polyurethanes.

Natural and synthetic rubbers. **[6hrs]**

Essential readings:

1 Principles of Bio-Chemistry – Lehinger, Nelson and Cox
2 Fundamentals of Bio-Chemistry – Voet&Voet
3 Bio-Chemistry by Zubay
4 Bio-Chemistry, Rastogi, Tata McGraw Hill