



**UNIVERSITY OF LUCKNOW
LUCKNOW
M.Sc. Pharmaceutical Chemistry (Core)
Biochemistry and Bacteriology
Semester IV, Paper I, PH3CO10
Unit I**

1. Amino acids, Proteins and Nucleic Acids

- a. Cells-classification and cell division. Ramachandran plot and secondary structure of proteins.
- b. Tertiary structure and structural motifs-protein folding and domain structure of proteins.
- c. Quaternary structure of proteins.
- d. Purification and characterization of proteins. Functions of proteins.
- e. Chemical synthesis of proteins-protecting groups,
- f. Solid phase peptide synthesis.
- g. DNA and RNA. Double helical structure of DNA.
- h. Replication of DNA & RNA
- i. Classification of RNA. Genetic code.
- j. Nucleic acids as carriers of genetic information.
- k. Protein biosynthesis. DNA fingerprinting technique.
- l. Elementary principles of Recombinant DNA technology, gene therapy, cloning and bioinformatics.

Unit II

2. Enzymes and Hormones

- a. Nomenclature and classification of enzymes.
- b. Mechanism of enzyme action.
- c. Substrate specificity of enzymes. Enzyme inhibition.
- d. Isoenzymes. Allosteric enzymes.
- e. Enzyme synthesis.
- f. Enzymes and digestion of food.
- g. Clinical uses of enzymes. Immobilization of enzymes. Clinical tests for sugar and cholesterol. ELISA.
- h. Functions and modes of actions of hormones. Pituitary, thyroid, parathyroid, pancreatic, adrenal and adrenocortical hormones. Male and female sex hormones. Antihormones.



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Unit III

3. Biological Oxidation and Metabolism

- a. ATP and ADP. Oxidative phosphorylation. Cytochromes.
- b. Food as a source of energy. Calorific value of food.
- c. Basal metabolism. Respiratory quotient.
- d. Carbohydrate metabolism: Glycogenesis and Glycolysis. Blood sugar level. Cori cycle. The role of insulin.
- e. The citric acid cycle. Genetic and metabolic disorders. Diabetes mellitus (type 1 and type 2). Lipaemia.
- f. Lipid metabolism.
 - i. Oxidation of fatty acids.
 - ii. Ketogenesis and ketosis. Biosynthesis of fatty acids.
 - iii. Essential fatty acids.
 - iv. Prostaglandins-nomenclature, structure and biosynthesis.
- g. Metabolism of amino acids and proteins.
 - i. Oxidative deamination and trans amination reactions.
 - ii. Urea formation-ornithine cycle. Inborn errors of metabolism.

Unit IV

4. Blood Composition and Acid Base Balance

- a. Blood groups-Rh factor. Blood transfusion. Composition of blood cells.
- b. Chemistry of haemoglobin. Anaemias.
- c. Plasma proteins. Blood clotting- factors and mechanism. Coagulants.
- d. Regulation of acid base balance. Acidosis and alkalosis.
- e. Renal function formation and composition of urine.



UNIVERSITY OF LUCKNOW
LUCKNOW
M.Sc. Pharmaceutical Chemistry (Core)
Analytical Chemistry
Semester IV, Paper II, PH3CO11
UNIT I

1. Titrimetric and Gravimetric Methods of Analysis

- a. General principles: Solvents in analytical chemistry, acidbase equilibria, concentration systems, stoichiometric calculation, acid-base titration, titration curves, acid base indicators, applications of acid-base titration, complexometric titration, metal-ion indicators, precipitation titration, Mohr's titration, Volhard's titration, adsorption indicators, Fajans' titration, titration curves in oxidation-reduction titration, redox indicators, applications of redox titrations.
 - b. Quantitative analysis via functional group, spot tests
 - c. Bio-Assay: Quantitative assay of drugs by biological methods.
2. Optical rotation, refractive index, atomic absorption, kinematic, Viscosity, pharmacokinetics.

Unit-II

3. Separation Techniques I

- a. Solvent Extraction: Fundamental treatment, theoretical principle, classification, and factors favouring extraction, extraction equilibria, applications. Liquid . liquid extraction, use of oxine. Ultra centrifugation, dithiazone - in extraction.
- b. Solid phase extraction and solid phase micro extraction, applications.
- c. Ion- Exchange: Theories, use of synthetic ion exchange in separation, chelating ion exchange resins, liquid ion exchangers, experimental technique.

Unit-III

4. Separation Techniques II

- a. An introduction to chromatographic methods, paper, thin layer and column chromatography, theory of chromatography, classification of chromatographic techniques, retention time, relationship between retention time and partition coefficient, the rate of solute migration, differential migration rates, band broadening & column efficiency, kinetic variables affecting band broadening (No mathematical derivation), Electrophoresis and capillary electrophoresis.

Unit-IV

5. GC, LC and HPLC

- a. Instrumentation of GC, LC and HPLC, applications in qualitative and quantitative analysis, comparison of GC and HPLC, Ion chromatography, pyrolytic gas chromatography, size exclusion chromatography, super critical fluid chromatography, affinity chromatography. Column matrices. Detectors. Affinity and chiral columns.



**UNIVERSITY OF LUCKNOW
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M.Sc. Pharmaceutical Chemistry (Core)
Pharmaceutical Training
Semester IV, Paper III, PH3CO12**

- 3-4 Months training in any Pharmaceutical or Scientific laboratory.
- After the completion of training project report will be submitted, followed by its presentation & viva-voce