

Semester III

List of Practicals

- 1 Extraction and estimation of proteins from plant material.
2. Extraction and estimation of RNA from biological material
- 3 Extraction and estimation of DNA from biological material
- 4 Estimation of phosphate in serum.
- 5 Estimation of creatinine in serum.
- 6 Estimation of calcium in serum.

M.Sc. Biochemistry
M.Sc. Semester IV (2016-18)

Paper 1. Molecular Biology

Unit I

Concept and definition of the gene, complexity of the eukaryotic gene. Structural organization of the DNA in the nuclear material- General properties of histones, nucleosomes and solenoid structure.

Unit II

DNA synthesis: The enzymes of DNA replication in prokaryotes and eukaryotes, mechanism of replication in bacteria and viruses, reverse transcriptase, salient features of eukaryotic nuclear and mitochondrial DNA replication.

Unit III

RNA synthesis: The enzymes of transcription in prokaryotes and eukaryotes, mechanism of transcription in bacteria, heteronuclear RNA, post transcriptional processing of RNA, role of ribozymes.

Unit IV

Protein synthesis: Concept of the genetic code, structure of r-RNA and t-RNA, enzymes of translation in prokaryotes and eukaryotes, mechanism of protein synthesis, post translational processing of proteins.

Unit V

Regulation of gene expression in prokaryotes and eukaryotes, structure and mechanism of various operons, such as Lac, Trp and Ara.

R. P. Indhe
M. S. Chauhan

Paper 2. Metabolism II

Unit I

Proteins: Digestion and absorption of proteins, general reactions of protein metabolism, nitrogen balance, ammonia transport, urea cycle.

Unit II

Amino acid metabolism: Glucogenic and ketogenic amino acids, One carbon metabolism, Biosynthesis of non essential amino acids, Pyruvate forming and glutamate forming amino acids, Inborn errors associated with them.

Unit III

Catabolism of methionine, aspartate, lysine, branched chain and aromatic amino acids. Inborn errors associated with them

Unit IV

Biosynthesis and degradation of purines and pyrimidines and their regulation. Structure and regulation of ribonucleotide reductase. Inhibitors of nucleic acid biosynthesis. Inherited disorders of purine and pyrimidine metabolism.

Unit V

Mineral metabolism : Biological role of minerals and trace elements, toxic effects of heavy metals, such as, Hg, Cd, Pb, As.

Paper 3. Immunology

Unit I

Types of immunity, innate, acquired, passive and active, self vs nonself discrimination. Physiology of immune response : HI and CMI specificity and memory, antigen-antibody reactions. Antigen types. Immunoglobulins - structure, distribution and functions, Isotypic, Allotypic and Idiotypic variants. Immunoglobulin superfamily.

Unit II

Lymphoid tissue, origin and development of T- and B- lymphocytes, differentiation of lymphocytes, lymphocyte-sub-populations of mouse and man. Structure and function of lymphoid tissue. T and B cells and their surface antigens. Activation of T- and B- lymphocytes and signaling pathways in T- and B- cells. Antigen Processing and Presentation, Lymphokines, Phagocytic cells, macrophage, dendritic cells, K and NK cells

R. J. Gade
A. J. B. C.

Unit III

MHC genes and products, polymorphism in MHC genes, Role of MHC antigens in immune responses., MHC antigens in transplantation and HLA tissue typing. Structure and function of class I and class II molecules.

Effector mechanisms in immunity, macrophage activation, cell mediated cytotoxicity, cytotoxicity assay,

Unit IV

Hypersensitivity reactions and types.

The complement system, mode of activation, classical, alternate and lectin pathway, biological functions of C proteins.

Immunological tolerance and suppression.

Unit V

Immunotechniques- Agglutination and precipitation, Single and double immuno diffusion, Immunoelectrophoresis, Immuno fluorescence, RIA and ELISA, Monoclonal antibodies.

Paper 4. Clinical Biochemistry

Unit I

Collection and preservation of biological fluids and their significance, chemical analysis of CSF and its significance.

Water and electrolyte balance. Acid base balance.

Unit II

Disorders of carbohydrate metabolism, Postprandial and Glucose tolerance test. Biochemical changes in diabetes mellitus, Hypoglycemia, Ketone bodies. Biochemical changes in diabetes mellitus, glycohaemoglobin, serum lipids and other complication of diabetes mellitus. Lipids, lipoproteins and apolipoproteins-role in diseases.

Unit III

Evaluation of organ function tests of gastric, pancreas, kidney and liver.

Bilirubin, direct and indirect Vanderwal tests and their clinical significance, jaundice. Fatty liver, Bile pigments - chemical nature and physiological significance.

R. Indre
Mam

Unit IV

Porphyryns chemistry and disorders, structure of Hb, derivatives and abnormal Hb. Detection by spectrophotometry and by fluorescence.

Enzymes in differential diagnosis of diseases and their clinical significance.

Unit V

Detoxification, phase I and phase II reactions, Enzymes of detoxification. Carcinogenesis, characteristics of cancerous cells, agents promoting carcinogenesis.

Free radicals in biological systems, Antioxidants.

Semester IV

List of Practicals

1. Assay of serum enzymes- acid and alkaline phosphatase, SGOT and SGPT and amylase.
2. Estimation of cholesterol in serum
- 3 Assay of enzymes of N-metabolism: NR, GDH.
4. Assay and kinetic analysis of salivary amylase and serum alkaline phosphatase. Effect of enzymes and substrate concentration, pH, and temperature on enzyme activity.
5. Estimation of chloride, urea, bilirubin, uric acid in serum
- 6 Electrophoretic separation of proteins

SCHEME OF PRACTICAL EXAMINATION FOR M.Sc. I to IV SEMESTER

Duration 7 hr

1. Two experiments from the Semester wise list (60 marks)
 2. Viva (30 marks) Record (10 marks)-
-

R. P. Indre
M. Jain