

ADIKAVI NANNAYA UNIVERSITY

CBCS SEMESTER PATTERN

Semester-V : BIO-CHEMISTRY

PAPER -V

Theory: BCT-501-Physiology, Clinical Biochemistry and Immunology 60 hrs

(5periods/12 hours week)

Unit- I : Physiology

Digestion and absorption of carbohydrates, lipids and proteins. Composition of blood and coagulation of blood. Transport of gases in blood (oxygen and CO₂). Muscle: Structure of myofibril and mechanism of muscle contraction.

Unit II: Endocrinology

12 hours

Endocrinology- organization of endocrine system. Classification of hormones. Outlines of chemistry, physiological role and disorders of hormones of hypothalamus, pituitary, thyroid, parathyroid, adrenal gland, pancreatic hormones and gonads. . Introduction of hormones of gastrointestinal tract and placenta.

Unit- III : Nutritional Biochemistry

12 hours

Classification of Nutrients, calorific values of foods and their determination by bomb calorimeter. BMR and factors affecting it. Significance of BMR. Specific dynamic action of foods[SDA]. Energy requirements and recommended dietary allowance (RDA) for pregnant and lactating women. Biological value of proteins. . Sources of complete and incomplete proteins, Bulk and trace elements-Ca, Mg, Fe, I, Cu, Mo, Zn, Se and F.

Unit- IV : Clinical Biochemistry

12 hours

Disorders of blood coagulation (haemophilia). Types of anemias, haemoglobinopathies-sickle cell anemia.

Liver : Structure and functions of Liver, jaundice . Liver function tests- conjugated and total bilirubin in serum, albumin: globulin ratio, Hippuric acid , Rose Bengal dye ,Serum enzymes in liver diseases- SGPT, GGT and alkaline phosphatase.

Kidneys-structure of nephron, urine formation, normal and abnormal constituents of urine. Biological buffers. Role of kidneys in maintaining acid-base and electrolyte balance in the body.

Unit- V : Immunology

12 hours

Organization of immune system. Innate and acquired immunity. Organs and cells of immune system. Cell mediated and humoral immunity . structure of Ig G , Classification of immunoglobulins,. Epitopes / antigenic determinants. Concept of haptens. Adjuvants. Monoclonal antibodies. Antigen-antibody reactions- agglutination, Precipitation immunoprecipitation, immunodiffusion. . Immunodiagnosics- ELISA,RIA. Vaccines and their classification. Traditional vaccines-live and attenuated. Modern vaccines- recombinant and DNA vaccines.

Practical: BCP-501-Nutritional and Clinical Biochemistry

45 hrs

List of Experiments:

(3 periods/week)

1. Estimation of vitamin C by 2, 6 -dichlorophenol indophenol method
2. Estimation of hemoglobin in blood.
3. Total count - RBC and WBC.
4. Differential count Of WBC
5. Determination of blood group and Rh typing. .

6. Urine analysis for albumin, sugars and ketone bodies.
7. Estimation of Serum creatinine.
8. Estimation of blood Glucose Folin-wu method.
9. Estimation of serum total cholesterol.

MODEL PAPER

Sub: Biochemistry
Vth Semester (Theory)

Time : 3hrs
3hrs

Duration :

SECTION –A

Answer any Five questions 5x5 =25marks

1. Myofibril
2. parathyroid gland
3. Bomb calorimeter
4. RDA
5. Sick cell anaemia
6. Jaundice
7. Nephron
8. IgA

SECTION-B

Answer the questions 5x10 =50marks

9 .A) Write the digestion and absorption of lipids

Or

B) Write in detail extrinsic and intrinsic pathway of blood coagulation process?

10A) why pituitary called as Master gland explain in detail?

Or

B) Write about adrenaline hormones ?

11A) what is BMR explain the factors effecting BMR?

Or

B) Write the biological significance of calcium and copper?

12A) Write the structure and functions of liver?

Or

B) Write the homeostasis mechanism of kidneys?

13A) What is immunity and write about different types of immunity?

Or

B) Write in detail antigen-antibody reactions?

ADIKAVI NANNAYA UNIVERSITY
CBCS SEMESTER PATTERN
Semester-V : BIO-CHEMISTRY
PAPER -VI

Theory: BCT-601- Molecular Biology and Recombinant DNA technology

Unit- I : DNA Replication and Transcription

12 hours

Nature and structure of the gene. DNA as genetic material . DNA replication- models of replication, Meselson-Stahl's experimental proof for semi-conservative model. DNA polymerases I, II and III of *E.coli*, helicase, topoisomerases, primase, ligase. Mechanism DNA Replication in *E.Coli* . Inhibitors of DNA replication.

Transcription - RNA polymerases of prokaryotes, Mechanism of Transcription -. Initiation-sigma factors and their recognition sites, Promoters,. Elongation, Termination- rho dependent and rho independent. Inhibitors of Transcription .

Unit- II: Protein Synthesis and Regulation of Gene Expression

12 hours

Genetic code : features of genetic code, wobble hypothesis, degeneracy of genetic code.

Protein synthesis- Ribosome structure,t-RNA , activation of amino acids (aminoacyl t-RNA synthetases). Initiation, elongation and termination of protein synthesis.

Post- translational modifications, signal hypothesis. Inhibitors of protein synthesis.

Regulation of prokaryotic gene expression- induction and repression. Ex: Lac operon in *E.coli*

Unit- III: Recombinant DNA technology

12 hours

Basic steps in r-DNA technology. Tools of r-DNA technology: Enzymes- Restriction endonucleases, ligase, phosphatases, reverse transcriptase, polynucleotide kinases, terminal transferase nucleases- S_1 and RNAase H. Restriction mapping. Cloning vectors- Plasmids, Cosmids, λ phages vectors

Applications of gene cloning- production of insulin and human growth hormone, production of Bt cotton and edible vaccines.

Unit-IV Molecular biology Techniques and Bioinformatics

Construction of c-DNA and genomic libraries. Isolation and sequencing of cloned genes- colony hybridization, nucleic acid hybridization, using β - galactosidases, green fluorescent proteins (GFP) DNA sequencing- Maxam Gilbert and Sanger's methods. Polymerase chain reaction- principle and applications. Outlines of blotting techniques-Southern, Northern and Western.

DNA Fingerfrinting .

Introduction to Bioinformatics- definitions of proteomics and genomics. Gene bank, NCBI, DDBJ, Swissprot, PDB. Sequence alignments- BLAST and FASTA.

Unit V-Applied Biochemistry

12 hours

Fermentation Technology: types of fermentations .Batch, continuous culture techniques, design of fermentor, principle types of fermentors. . Industrial production of chemicals- alcohol, acids (citric acid), solvents (acetone), antibiotics (penicillin)

Enzyme Technology: Immobilization of enzymes and cells, different methods. Industrial applications of immobilization

Practical: BCP-601: Molecular Biology & Recombinant DNA technology

45 hrs

List of Experiments:

(3 periods/week)

1. Isolation of DNA from onion/liver/coconut endosperm.
2. Estimation of DNA by diphenylamine method.
3. Estimation of RNA by orcinol method.
4. Sequence alignments of insulin/BSA with other proteins using BLAST and FASTA.
5. Immobilization of microorganisms.
6. Ethyl alcohol production from grapes.

MODEL PAPER

Sub: Biochemistry

Vth Semester (Theory)

Time : 3hrs

Duration :

3hrs

SECTION –A

Answer any Five questions 5x5 =25marks

1. Okazaki fragments
2. DNA polymerase –I
3. Amin acyl t-RNA synthetase
4. Inhibitors of transcription
5. Edible vaccines
6. Growth hormones
7. PCR
8. Application of immobilized enzyme

SECTION-B

Answer the questions 5x10 =50marks

9 .A) Write the mechanism of semi conservative process of replication

Or

B) Write in detail about the transcription of prokaryotes?

10A) explain in detail about gene expression

Or

B) Write an account of genetic code and degeneracy of genetic code

11A) what is r-DNA technology and its applications?

Or

B) Write a history about gene cloning?

12A) illustrate the construction of c-DNA libraries ?

Or

B) write an account DNA sequencing ?

13A) write the various types of fermentations and their applications?

Or

B) discuss the immobilization of the enzymes ?