DANTULURI NARAYANA RAJU COLLEGE (AUTONOMOUS)
(A College with Potential for Excellence)
Bhimavaram ,W.G.Dist,A.P
syllabus for the Academic Year 2013-14

Department: BIOCHEMISTRY **Paper: BIOMOLECULES-IA.**

Class:I B.SC **Semester:I**

Unit 1:
Classification of carbohydrates monopsaccharides ,disaccharids
Oli gosaccharides, polysaccharides, physical and chemical properties of carbohydrates.
Amino sugars ,glycol sides ,structures and Biological input of disaccharides
Bacterial cell wall polysaccharides.outline of glyco protiens, glycolipids.
Unit 2:
Classification Of lipids, saturated and unsaturated fatty acids.
Structures and proteins of fats and oils,phospholipids, sphingolipids and cholesterol.
Prostagladins-Structure and biological role of PGD2,PGE2,and PGF2 lipo protiens:types
Of functions
Biombrane behavior of amphipathic lipids of water artificial membranes and types of membrane
Unit 3:
Aminoacids classification and structures. Tirtation curve of glycine and pk values
Streochemistry and chemical reactions.essential and non essential amino acids.
Unit 4:
Non protein aminoacids, peptide bonds-nature and confirmation.
Naturally occurring peptides glutothorine enkephalin.
Proteins classification based on shapes size. Stereo chemistry
Unit 5:
Chemical reactions of amino acids and proteins denaturation.
Structural organization of proteins.Primary$2^0 3^0 4^0$ structures and peptides
Hb and Mb forces stabilizing the structure of proteins
Unit 6:
Water as biological solvent and its role. Biological solvents of P^h
Functional groups in biopolymers such as proteins and nucleic acids.Importance of bufferinbiological systems.

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syllabus fortheAcademicYear2013-14

Department: BIOCHEMISTRY **Class:I B.SC** **Semester:II**

Paper: NUCLEICACIDS & BIOCHEMICAL TECHNIQUES- IB

Unit 1:
Structure of prophyrins, photoporphyrin,pgb and properties identification of porphrins.
Structure of metalloporphyrins,Heme,cytochromes and chlorophylls.
Structures of purines pyrimidines, nuceliotides ,stability and formation of phospodi ester linkages

Unit 2
Effects of acids ,alakali and nucleases on DNA and RNA. Structure of nucleic acids
Tm values and their significance. Reassociation kinetics, cot curves and their
significance.
Methods of tissue homogenisation(mechanical blender and sonicator) Principal
Principal & applications of centrifugation,ultra centrifugation. Preparatrine & analytical
centrifigation
unit 3:
Principle and applications of chromatographic techniques,paper, thinlayer, gelfiltration.
Ionexchange and affinity and paper chromatography and polychrylamide and agaroseg elelectro phoresis
Colorimeter, spectrometer, laws of light absorption, Beer-Lambert law.
Unit 4:
UV and visible absorption spectra, molar extinction principle of imetry,spectrophoto meter
Tracer techniques,radar isotopes,units of radio activity & use of radio active
Isotopes in biology
unit 5:
Board outline of intermediary metabolism methods of investigation.
Intermediary metabolism in vivo studies such as analysis of extesstion.Respiratory exchange
Removal of organs and purification, enzymes system, isotopes, Uses of inhibitors.

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Syllabus for the Academic Year 2013-14

Department: BIOCHEMISTRY **Paper: ENZYMOLOGY & BIOENERGITICS - IIA**

Class: II B. SC **Semester: III**

Unit 1:
High energy compounds
Organization of electron carriers and enzymes in mitochondria
Classes of electron-transferring enzymes,inhibitorsof electron transport

Unit 2:
Un couplers and inhibiters of oxidative phosphorylation
Bio energitics thermo dynamic principles,chemical equilibria.
Free energy,enthalpy,entropy,free energychange in biological transformations in living systems
Unit 3:
Michael's menten equation for uni-substrate reaction significance of K_m and V_{max}.
Enzymes Inhibition irreverk9sible and reversible,types of reversible inhibitions competitive and non competitive
Regulation of enzyme activity-allosterism and cooperativity & covalent, modulation- covalent phosphorilation of phosphorylase.
Unit 4:
Introduction to bio catalists difference between chemical and biological catalysis
Unit 5:
Definition of holoenzyme,apo-enzyme,coenzyme,cofactor.fundamentals of Enzyme,
Enzyme units
Unit 6:
Factors affecting the catalysis-substrate concentration, P^h temperature.
Iso enzymes, multi enzymes complexes,ribozyme.

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Department: BIOCHEMISTRY **Paper: INTERMEDIARY METABOLISM - II B**

Class: II B. SC **Semester:IV**

Unit 1:

Catabolism of purines and pyrimidines.Biosynthesis of deoxyrivo nucleotides ribo nucleotide reductase.

Biosynthesis cholesterol.Disorders of lipid metabolism & general reactions of amino Acids metabolism

Unit 2:

Decarboxylation and deaminitiomurea cycle and regulation

Metabolism of glycine,serine,aspartic Acid,methionine,phenylalanineandleucine

Unit 3:

Biosynthesis of creartine.Inborn errors of aromatic and branched chain amino acids metabolism

Nitrogen cycle,non-biological and biological nitrogen fixation, nitrigenase system

Biosynthesis and regulation of purine and pyrimidin enucleotides,denovo and salvage pathway

Unit 4:

Pasteur effect.Critic acid cycle,regulation,energy yield,amphi pathicrole.Gluco neogenesis.

Photosynthesis-light and dark reactions,Calvin cycle,pathway.Disorders of carbohydrate Metabolism

Catabolism of fattyacids with even and Odd number of carbonatoms ,ketogenesis, denovo

Unit 5:

Synthesis of fatty acids.

Elongation of fattyacids in mitochondria and microsomes degradation of triacylglycerol and lecithin

Unit 6:

Biosynthesis and degradation of heme. Concept of anabolism and catabolism

Glycolytic pathway,energy yield.Fate of pyruvate formation of lactace and ethanol.

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Syllabus for the Academic Year 2013-14

Department: BIOCHEMISTRY **CLASS: III B. SC** **Semester: V**

Paper : CLINICAL BIOCHEMISTRY & BALANCED DIET - III A

Unit 1:

Disorders of lipids metabolism-plasma lipoprotiens,lipo proteinenias, fatty liver and Atherosclerosis

Plasma protein inhealth and disease, disorders of blood coagulation

Unit 2:

types of Anemias, Haemoglobin, pathesissickle cell anemia and thalassemia

Biochemical test for the diagnosis of heart disease -HDL/LDL cholesterol

SGOT,LDH,CK,C-reactive Protein, cardiac troponins

Calorific values of foods and their determination by bomb claorimeter

Unit 3:

BMR and factors effecting it.SDA of foods .role of fatty acids In human nutrition

Energy requirements and recommended dietiary allowance for children ,adults and Pregnant women

Sources of complete and incomplete proteins

Biological values of proteins .Malnutrition-kwashiorkar Marasmus and PEM

Vitamin-sources structure,biochemical roles,deficiency disorders of Water and fat soluble vitamins

Unit 4:

Bulk and trace elements Ca,mg,Fe,I,Cu,Mo,Zn,Se and F. Obesity and starvation.

Liverdisease-jaundice,hepatitis,cirrhosis liver function test-conjugated and totalbiliriumin serum,albuminglobukin ratio immunicacid.

Bromosulphoxylumtest, and hippunic acid test Serum enzymes in liver disease-SGPT,GGT

Unit 5:

Kidney-structure of nephron,urine formation normal and abnormal constituents of urine biological buffer

Role of kidney inmaintaining acid-base and electrolyte balance in the body.

Phenolredrenal function

Unit 6:

Hypoglycemia,hyperglycemia,Glycosuria,renal threshold value.

Classification of diabetesmellitus, glucosetolerance test, diabeticketo acidosis.

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Syllabus for the Academic Year 2013-14

Department: BIOCHEMISTRY **Paper : PHYSIOLOGY & IMMUNOLOGY - III B**

Class: III B. SC **Semester:VI**

Unit 1:
Composition of blood and coagulation of blood .Transport of gases in blood
Structure of heart,cardiaccycle,cardiacfactor controlling bloodpressure.Mechanism of musclecontraction
Immunodiagnostics RIA,ELISA vaccines and their classification
Traditional vaccines-liver and attenuated, toxoids
Unit 2:
Theories of antibody formation-clonal selection theorey monoclonal antibodies
Agglutination,immune oprecipitation,immune diffusion.Blood group antigens
Modern vaccines-recombinant and peptide vaccines outlines of hypersensitivity
Reactions
Fundamentals of graft rejection and MHC proteins. Immune deficiency diseases
Unit 3:
Organization of endocrine system, classification of hormones, outline of chemistry, physiological role and disorders of hormones of pancreas
Unit 4:
Thyroid, parathyroid, gonads, placenta, adrenals, pituitary and hypothalamus
Introduction of gastro intestinal hormones glucocorticoid sand insulin
Mechanism of hormonal actions ignaltransduction pathways for adrenaline
Unit 5:
Organ and cells of immune system, innate and acquired immunity. Cell mediated and
Humoral immunity
Classification of immunoglobulins,structure of ig Gepitopes determinates . Concept of haptens, adjuvants
Unit 6
Nervou ssystem structure of neuron, resting potential, action potential and inhibitory neurotransmitters
Physiology of vision-visual pigments and visual cycle
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Syllabus for the Academic Year 2013-14

Department: BIOCHEMISTRY **Paper : MOLECULAR BIOLOGY - IV A**

Class: III B. SC **Semester: VII**

Unit 1:

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.

ligase,phosphatases,reverse transcriptase

Terminal transferase nucleases-S_1 and RNAa seh.

Unit 2:

Protiensynthesis-Ribosome structure,t-RNA,activation of amino acids(amino acylt-RNA synthetases)

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

Unit 3:

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

Regulation of prokaryotic gene expression induction and repression. Ex:Lacoperonin E.coli

Unit 4:

Basic steps in r-DNA technology

Enzymes-Rewtriction endonucleases, polynucleotidekinases

Nature and structure of the gene.DNA as genetic material.DNA replication-models of replication Meselson-Stahl'sexperimental proof for semi-conservative model.

DNA polymerasesI,II AND III of E.coil,helicase,topoisomerases,primase,ligase

Unit 5:

Applications of genecloning production of insulin and human growth hormone ,production of Btcotton and edible vaccines

Restriction mapping .Cloning vectors-Plasmids ,Cosmids, λphages vectors

Construction of c-DNA and genomic libraries.Isolation and sequencingof clonedgenes-colony hybridization, nucleic acid hybridization,

Maxam Gilbert AND Sanger's methods. Polymerase chain reaction-principle and applications.

Unit 6:

Introduction to Bio informatics-definitions of proteomics and genomics.

Gene bank,NCBI,DDBJ,Swissprot,PDB.Sequence alignment-NLAST and FASTA

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Annual Curricular Plan for the Academic Year 2013-14

Department: BIOCHEMISTRY **Class: III B. SC.** **Semester: VIII**

Paper : MICRO BIOLOGY & rDNA TECHNOLOGY - IV B

Unit 1:
Production of Bt cotton and Ediblevaccines.Introduction to bioInformatics-definition of proteomics,genomics
Genebank,NCBI,DDBJ,PDB,sequences alignments BLAST & FASTA
Hybrid released translation and hybrid arrested and released translation using reporter Genes
Unit 2:
Polymerasechainreaction-Principleandapplications
Outlines of blotting techniques-southern,northern & western
Unit 3:
Application of gene cloning-production of insulin and human growth hormone
Bacteria growthcurve and kinetics of growth.Industrialuses of aspergillus Niger,yeastand Spirulina
Unit 4:
One step growth determination of plaque formingunits.isolation and cultivation of Bacterial plaques
Outlines of cloning strategies.
Unit 5:
DNA sequencing maxamgilbert and sangers methods.Restriction mapping
Tools of R-DNA technology:enzymes-restriction endonucleases,ligase.,phosphatise
Cloning vectors-plasmids,tiplasmids,cosmids,shuttle vectors,Host-E.Coil.
Construction ofC-DNA and genomic libraries.Isolation and sequencing of clonalgenes colony hybridisation
Unit 6:
Isolation and cultivation of bacteria.selective media and enriched media
Introduction of brief history microbiology, classification of microorganisms, prokaryotic microorganisms

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syllabus for the Academic Year 2014-15

Department: BIOCHEMISTRY **Paper: BIOMOLECULES-IA.**
Class:I B.SC **Semester:I**

Unit 1:
Classification of carbohydrates monopsaccharides ,disaccharids
Oli gosaccharides, polysaccharides, physical and chemical properties of carbohydrates.
Amino sugars ,glycol sides ,structures and Biological input of disaccharides
Bacterial cell wall polysaccharides.outline of glyco protiens, glycolipids.
Unit 2:
Classification Of lipids, saturated and unsaturated fatty acids.
Structures and proteins of fats and oils,phospholipids, sphingolipids and cholesterol.
Prostagladins-Structure and biological role of PGD2,PGE2,and PGF2 lipo protiens:types
Of functions
Biombrane behavior of amphipathic lipids of water artificial membranes and types of membrane
Unit 3:
Aminoacids classification and structures. Tirtation curve of glycine and pk values
Streochemistry and chemical reactions.essential and non essential amino acids.
Unit 4:
Non protein aminoacids, peptide bonds-nature and confirmation.
Naturally occurring peptides glutothorine enkephalin.
Proteins classification based on shapes size. Stereo chemistry
Unit 5:
Chemical reactions of amino acids and proteins denaturation.
Structural organization of proteins.Primary$2^0 3^0 4^0$ structures and peptides
Hb and Mb forces stabilizing the structure of proteins
Unit 6:
Water as biological solvent and its role. Biological solvents of P^h
Functional groups in biopolymers such as proteins and nucleic acids.Importance of bufferinbiological systems.

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syllabus fortheAcademicYear2014-15

Department: BIOCHEMISTRY **Class:I B.SC** **Semester:II**

Paper: NUCLEICACIDS & BIOCHEMICAL TECHNIQUES- IB

Unit 1:
Structure of prophyrins, photoporphyrin,pgb and properties identification of porphrins.
Structure of metalloporphyrins,Heme,cytochromes and chlorophylls.
Structures of purines pyrimidines,nuceliotides,stability and formation of phospodiesterlinkages

Unit 2
Effectsofacids,alakaliandnucleasesonDNAandRNA.Structureofnucleicacids
Tmvaluesandtheirsignificance.Reassociationkinetics,cotcurvesandtheir
significance.
Methodsoftissuehomogenisation(mechanicalblenderandsonicator)Principal
Principal&applicationsofcentrifugation,ultracentrifugation.Preparatrine&analytical
centrifigation
unit 3:
Principleandapplicationsofchromotographictechniques,paper,thinlayer,gelfiltration.
Ionexchangeandaffinityandpaperchromatographyandpolychrylamideandagarosegelelectrophoresis
Colorimeter,spectrometer,lawsoflightabsorption,Beer-Lambertlaw.
Unit 4:
UVandvisibleabsorptionspectra,molarextinctionprincipleofflorimetry,spectrophotometer
Tracertechniques,radarisotopes,unitsofradioactivity&useofradioactive
isotopesinbiology
unit 5:
Boardoutlineofintermediarymetabolismmethodsofinvestigation.
Intermediarymetabolisminvivostudiessuchasanalysisofextesstion.Respiratoryexchange
Removaloforgansandpurification,enzymessystem,isotopes,Usesofinhibitors.

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Syllabus for the Academic Year 2014-15

Department: BIOCHEMISTRY **Class: II B. SC** **Semester: III**

Paper: ENZYMOLOGY & BIOENERGITICS - IIA

Unit 1:
Highenergycompounds
Organizationofelectroncarriersandenzymesinmitochondria
Classesofelectron-transferringenzymes,inhibitorsofelectrontransport

Unit 2:
Uncouplersandinhibitersofoxidativephosphorylation
Bioenergiticsthermodynamicprinciples,chemicalequilibria.
Freeenergy,enthalpy,entropy,freeenergychangeinbiologicaltransformationsinlivingsystems
Unit 3:
Michael'smentenequationforuni-substratereactionsignificanceof$K_m$andV_{max}.
EnzymesInhibitionirreversibleandreversible,typesofreversibleinhibitionscompetitiveandnoncompetitive
Regulationofenzymeactivity-allosterismandcooperativity&covalent,modulation-
covalentphosphorilationofphosphorylase.
Unit 4:
Introductiontobiocatalistsdifferencebetweenchemicalandbiologicalcatalysis
Unit 5:
Definitionofholoenzyme,apo-enzyme,coenzyme,cofactor.fundamentalsofEnzyme,
Enzymeunits
Unit 6:
Factorsaffectingthecatalysis-substrateconcentration,P^htemperature.
Isoenzymes,multienzymescomplexes,ribozyme.

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Syllabus for the Academic Year 2014-15

Department: BIOCHEMISTRY **Paper: INTERMEDIARY METABOLISM - II B**

Class: II B. SC **Semester:IV**

Unit 1:

Catabolism of purines and pyrimidines.Biosynthesis of deoxyrivo nucleotidesribo nucleotide reductase.

Biosynthesischolesterol.Disorders of lipid metabolism & general reactions of amino Acids metabolism

Unit 2:

Decarboxylation and deaminitiomureacycle and regulation

Metabolismofglycine,serine,asparicAcid,methionine,phenylalanineandleucine

Unit 3:

Biosynthesisofcreartine.Inbornerrorsofaromaticandbranchedchainamino acids metabolism

Nitrogencycle,non-biological and biological nitrogen fixation,nitrigenase system

Biosynthesis and regulation of purine and pyrimidinenucleotides,denovo and salvagepathway

Unit 4:

Pasteureffect.Criticacidcycle,regulation,energyyield,amphipathicrole.Gluconeogenesis.

Photosynthesis-lightanddarkreactions,Calvincycle,pathway.Disorders of carbohydrate Metabolism

Catabolism of fattyacids with even and Odd number of carbonatoms,ketogenesis,denovo

Unit 5:

Synthesis of fattyacids.

Elongationoffattyacidsinmitochondriaandmicrosomesdegradationoftriacylglycerolandlecithin

Unit 6:

Biosynthesisanddegradationofheme.Conceptofanabolismandcatabolism

Glycolyticpathway,energyyield.Fateofpyruvateformationoflactaceandethanol.

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Syllabus for the Academic Year 2014-15

Department: BIOCHEMISTRY **CLASS: III B. SC** **Semester: V**

Paper : CLINICAL BIOCHEMISTRY & BALANCED DIET - III A

Unit 1:

Disorders of lipids metabolism-plasma lipoprotiens,lipo proteinenias, fattyliver and Atherosclerosis

Plasma protein inhealth and disease, disorders of blood coagulation

Unit 2:

types of Anemias, Haemoglobin,pathesissicklecell anemia and thalassemia

Biochemical test for the diagnosis of heart disease -HDL/LDL cholesterol

SGOT,LDH,CK,C-reactive Protein, cardiac troponins

Calorific values of foods and their determination by bomb calorimeter

Unit 3:

BMR and factors effecting it.SDA of foods .role of fatty acids In human nutrition

Energy requirements and recommendeddietiary allowance for children,adultsand Pregnantwomen

Sources of complete and incomplete proteins

Biological values of proteins .Malnutrition-kwashiorkar Marasmus and PEM

Vitamin-sources structure,biochemical roles,deficiency disorders of Water and fat soluble vitamins

Unit 4:

Bulk and trace elements Ca,mg,Fe,I,Cu,Mo,Zn,Se and F. Obesity and starvation.

Liverdisease-jaundice,hepatitis,cirrhosis liver function test-conjugated and totalbiliriumin serum,albuminglobukin ratio immunicacid.

Bromosulphoxylumtest, and hippunic acid test Serum enzymes in liverdisease-SGPT,GGT

Unit 5:

Kidney-structure of nephron,urine formation normal and abnormal constituents of urine biological buffer

Role of kidney inmaintaining acid-base and electrolyte balance in the body.

Phenolredrenal function

Unit 6:

Hypoglycemia,hyperglycemia,Glycosuria,renalthresholdvalue.

Classification of diabetesmellitus, glucosetolerance test, diabeticketo acidosis.

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Syllabus for the Academic Year 2014-15

Department: BIOCHEMISTRY **Paper : PHYSIOLOGY & IMMUNOLOGY - III B**

Class: III B. SC **Semester:VI**

Unit 1:

Composition of blood and coagulation of blood .Transport of gases in blood

Structure of heart,cardiaccycle,cardiacfactor controlling bloodpressure.Mechanism of musclecontraction

Immunodiagnostics RIA,ELISA vaccines and their classification

Traditionalvaccines-liver and attenuated,toxoids

Unit 2:

Theories of antibody formation-clonalselection theorey monoclonal antibodies

Agglutination,immune oprecipitation,immune diffusion.Blood group antigens

Modern vaccines-recombinant and peptide vaccines outlines of hypersensitivity Reactions

Fundamentals of graft rejection and MHC proteins.Immune deficiency diseases

Unit 3:

Organization of endocrinesystem,classification of hormones,outline of chemistry,physiological role and disorders of hormones of pancreas

Unit 4:

Thyroid,parathyroid,gonads,placenta,adrenals,pituitary and hypothalamus

Introduction of gastro intestinal hormones glucocorticoid sandinsulin

Mechanism of hormonalactions ignaltransductionpathways for adrenaline

Unit 5:

Organ and cells of immunesystem,innate and acquired immunity. Cell mediated and Humoral immunity

Classificationofimmunoglobulins,structure of ig Gepitopes determinates . Concept of haptens,adjuvants

Unit 6

Nervoussystemstructureofneuron,restingpotential,actionpotentialandinhibitoryneurotransmitters

Physiologyofvision-visualpigmentsandvisualcycle

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Department: BIOCHEMISTRY **Paper : MOLECULAR BIOLOGY - IV A**

Class: III B. SC **Semester: VII**

Unit 1:
Transcription-RNApolymerasesofprokaryotes,Mechanismoftranscription-.Initiation-sigmafactorsandtheirrecognitionsites,
Promoters,Elongation,Termination-rhodependentandrhoindependent.INHIBITORSOFTranscription.
ligase,phosphatases,reversetranscriptase
terminaltransferasenucleases-S_1andRNAaseh.
Unit 2:
Protiensynthesis-Ribosomestructure,t-RNA,activationofaminoacids(aminoacylt-RNAsynthetases)
Genetic code:features of genetic code,wobble hypothesis,degeneracy of genetic code.
Unit 3:
Post-translationalmodifications,signalhypothesis.Inhibitorsofproteinsynthesis.
Regulationofprokaryoticgeneexpressioninduction and repression.Ex:LacoperoninE.coli
Unit 4:
Basic steps inr-DNAtechnology
Enzymes-Rewtrictionendonucleases,polynucleotidekinases
Natureandstructureofthegene.DNAasgeneticmaterial.DNAreplication-modelsofreplicationMeselson-Stahl'sexperimentalproofforsemi-conservativemodel.
DNApolymerasesI,IIANDIIIofE.coil,helicase,topoisomerases,primase,ligase
Unit 5:
Applications of genecloning production of insulin and human growth hormone ,production of Btcotton and edible vaccines
Restriction mapping .Cloning vectors-Plasmids ,Cosmids, λphages vectors
Constructionofc-DNAandgenomiclibraries.Isolationandsequencingofclonedgenes-colonyhybridization,nucleicacidhybridization,
MaxamGilbertANDSanger'smethods.Polymerasechainreaction-principleandapplications.
Unit 6:
IntroductiontoBioinformatics-definitionsofproteomicsandgenomics.
Genebank,NCBI,DDBJ,Swissprot,PDB.Sequencealignment-NLASTandFASTA

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Department: BIOCHEMISTRY **Class: III B. SC.** **Semester: VIII**

Paper : MICRO BIOLOGY & rDNA TECHNOLOGY - IV B

Unit 1:
Production of Bt cotton and Ediblevaccines.Introduction to bioInformatics-definition of proteomics,genomics
Genebank,NCBI,DDBJ,PDB,sequences alignmentsBLAST&FASTA
Hybrid released translation and hybrid arrested and released translation using reporter Genes
Unit 2:
Polymerasechainreaction-Principleandapplications
Outlines of blotting techniques-southern,northern & western
Unit 3:
Application of gene cloning-production of insulin and human growth hormone
Bacteria growthcurve and kinetics of growth.Industrialuses of aspergillus Niger,yeastand Spirulina
Unit 4:
One step growth determination of plaqueformingunits.isolationandcultivationof Bacterialplaques
Outlinesofcloningstrategies.
Unit 5:
DNAsequencingmaxamgilbertandsangersmethods.Restrictionmapping
ToolsofR-DNAtechnology:enzymes-restrictionendonucleases,ligase.,phosphatise
Cloningvectors-plasmids,tiplasmids,cosmids,shuttlevectors,Host-E.Coil.
ConstructionofC-DNAandgenomiclibraries.Isolationandsequencingofclonalgenescolonyhybridisation
Unit 6:
isolationandcultivationofbacteria.selectivemediaandenrichedmedia
Introductionofbriefhistorymicrobiology,classificationofmicroorganisms,prokaryoticmicroorganisms

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Department: BIOCHEMISTRY **Paper: BIOMOLECULES-IA.**

Class:I B.SC **Semester:I**

Unit 1:
Classification of carbohydrates monopsaccharides ,disaccharids
Oli gosaccharides, polysaccharides, physical and chemical properties of carbohydrates.
Amino sugars ,glycol sides ,structures and Biological input of disaccharides
Bacterial cell wall polysaccharides.outline of glyco protiens, glycolipids.
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Prostagladins-Structure and biological role of PGD2,PGE2,and PGF2 lipo protiens:types
Of functions
Biombrane behavior of amphipathic lipids of water artificial membranes and types of membrane
Unit 3:
Aminoacids classification and structures. Tirtation curve of glycine and pk values
Streochemistry and chemical reactions.essential and non essential amino acids.
Unit 4:
Non protein aminoacids, peptide bonds-nature and confirmation.
Naturally occurring peptides glutothorine enkephalin.
Proteins classification based on shapes size. Stereo chemistry
Unit 5:
Chemical reactions of amino acids and proteins denaturation.
Structural organization of proteins.Primary$2^0 3^0 4^0$ structures and peptides
Hb and Mb forces stabilizing the structure of proteins
Unit 6:
Water as biological solvent and its role. Biological solvents of P^h
Functional groups in biopolymers such as proteins and nucleic acids.Importance of bufferinbiological systems.

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Department: BIOCHEMISTRY **Class:I B.SC** **Semester:II**

Paper: NUCLEICACIDS & BIOCHEMICAL TECHNIQUES- IB

Unit 1:
Structure of prophyrins, photoporphyrin,pgb and properties identification of porphrins.
Structure of metalloporphyrins,Heme,cytochromes and chlorophylls.
Structures of purines pyrimidines, nuceliotides ,stability and formation of phospodi ester linkages

Unit 2
Effects of acids ,alakali and nucleases on DNA and RNA. Structure of nucleic acids
Tm values and their significance. Reassociation kinetics, cot curves and their
significance.
Methods of tissue homogenisation(mechanical blender and sonicator) Principal
Principal & applications of centrifugation,ultra centrifugation. Preparatrine & analytical
centrifigation
unit 3:
Principle and applications of chromatographic techniques,paper, thinlayer, gelfiltration.
Ionexchange and affinity and paper chromatography and polychrylamide and agaroseg elelectro phoresis
Colorimeter, spectrometer, laws of light absorption, Beer-Lambert law.
Unit 4:
UV and visible absorption spectra, molar extinction principle of imetry,spectrophoto meter
Tracer techniques,radar isotopes,units of radio activity & use of radio active
Isotopes in biology
unit 5:
Board outline of intermediary metabolism methods of investigation.
Intermediary metabolism in vivo studies such as analysis of extesstion.Respiratory exchange
Removal of organs and purification, enzymes system, isotopes, Uses of inhibitors.

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Syllabus for the Academic Year 2014-15

Department: BIOCHEMISTRY **Class: II B. SC** **Semester: III**

Paper: ENZYMOLOGY & BIOENERGITICS - IIA

Unit 1:
High energy compounds
Organization of electron carriers and enzymes in mitochondria
Classes of electron-transferring enzymes,inhibitorsof electron transport

Unit 2:
Un couplers and inhibiters of oxidative phosphorylation
Bio energitics thermo dynamic principles,chemical equilibria.
Free energy,enthalpy,entropy,free energychange in biological transformations in living systems
Unit 3:
Michael's menten equation for uni-substrate reaction significance of K_m and V_{max}.
Enzymes Inhibition irreverk9sible and reversible,types of reversible inhibitions competitive and non competitive
Regulation of enzyme activity-allosterism and cooperativity & covalent, modulation- covalent phosphorilation of phos
Unit 4:
Introduction to bio catalists difference between chemical and biological catalysis
Unit 5:
Definition of holoenzyme,apo-enzyme,coenzyme,cofactor.fundamentals of Enzyme,
Enzyme units
Unit 6:
Factors affecting the catalysis-substrate concentration, P^h temperature.
Iso enzymes, multi enzymes complexes,ribozyme.

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Syllabus for the Academic Year 2014-15

Department: BIOCHEMISTRY **Paper: INTERMEDIARY METABOLISM - II B**

Class: II B. SC **Semester:IV**

Unit 1:

Catabolism of purines and pyrimidines.Biosynthesis of deoxyrivo nucleotides ribo nucleotide reductase.

Biosynthesis cholesterol.Disorders of lipid metabolism & general reactions of amino Acids metabolism

Unit 2:

Decarboxylation and deaminitiomurea cycle and regulation

Metabolism of glycine,serine,aspartic Acid,methionine,phenylalanineandleucine

Unit 3:

Biosynthesis of creartine.Inborn errors of aromatic and branched chain amino acids metabolism

Nitrogen cycle,non-biological and biological nitrogen fixation, nitrigenase system

Biosynthesis and regulation of purine and pyrimidin enucleotides,denovo and salvage pathway

Unit 4:

Pasteur effect.Critic acid cycle,regulation,energy yield,amphi pathicrole.Gluco neogenesis.

Photosynthesis-light and dark reactions,Calvin cycle,pathway.Disorders of carbohydrate Metabolism

Catabolism of fattyacids with even and Odd number of carbonatoms ,ketogenesis, denovo

Unit 5:

Synthesis of fatty acids.

Elongation of fattyacids in mitochondria and microsomes degradation of triacylglycerol and lecithin

Unit 6:

Biosynthesis and degradation of heme. Concept of anabolism and catabolism

Glycolytic pathway,energy yield.Fate of pyruvate formation of lactace and ethanol.

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Syllabus for the Academic Year 2014-15

Department: BIOCHEMISTRY **CLASS: III B. SC** **Semester: V**

Paper : CLINICAL BIOCHEMISTRY & BALANCED DIET - III A

Unit 1:

Disorders of lipids metabolism-plasma lipoprotiens,lipo proteinenias, fatty liver and Atherosclerosis

Plasma protein inhealth and disease, disorders of blood coagulation

Unit 2:

types of Anemias, Haemoglobin, pathesissickle cell anemia and thalassemia

Biochemical test for the diagnosis of heart disease -HDL/LDL cholesterol

SGOT,LDH,CK,C-reactive Protein, cardiac troponins

Calorific values of foods and their determination by bomb claorimeter

Unit 3:

BMR and factors effecting it.SDA of foods .role of fatty acids In human nutrition

Energy requirements and recommended dietiary allowance for children ,adults and Pregnant women

Sources of complete and incomplete proteins

Biological values of proteins .Malnutrition-kwashiorkar Marasmus and PEM

Vitamin-sources structure,biochemical roles,deficiency disorders of Water and fat soluble vitamins

Unit 4:

Bulk and trace elements Ca,mg,Fe,I,Cu,Mo,Zn,Se and F. Obesity and starvation.

Liverdisease-jaundice,hepatitis,cirrhosis liver function test-conjugated and totalbiliriumin serum,albuminglobukin ratio Bromosulphoxylumtest, and hippunic acid test Serum enzymes in liver disease-SGPT,GGT

Unit 5:

Kidney-structure of nephron,urine formation normal and abnormal constituents of urine biological buffer

Role of kidney inmaintaining acid-base and electrolyte balance in the body.

Phenolredrenal function

Unit 6:

Hypoglycemia,hyperglycemia,Glycosuria,renal threshold value.

Classification of diabetesmellitus, glucosetolerance test, diabeticketo acidosis.

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Syllabus for the Academic Year 2014-15

Department: BIOCHEMISTRY **Paper : PHYSIOLOGY & IMMUNOLOGY - III B**

Class: III B. SC **Semester:VI**

Unit 1:
Composition of blood and coagulation of blood .Transport of gases in blood
Structure of heart,cardiaccycle,cardiacfactor controlling bloodpressure.Mechanism of musclecontraction
Immunodiagnostics RIA,ELISA vaccines and their classification
Traditional vaccines-liver and attenuated, toxoids
Unit 2:
Theories of antibody formation-clonal selection theorey monoclonal antibodies
Agglutination,immune oprecipitation,immune diffusion.Blood group antigens
Modern vaccines-recombinant and peptide vaccines outlines of hypersensitivity
Reactions
Fundamentals of graft rejection and MHC proteins. Immune deficiency diseases
Unit 3:
Organization of endocrine system, classification of hormones, outline of chemistry, physiological role and disorders of hormones of pancreas
Unit 4:
Thyroid, parathyroid, gonads, placenta, adrenals, pituitary and hypothalamus
Introduction of gastro intestinal hormones glucocorticoid sand insulin
Mechanism of hormonal actions ignaltransduction pathways for adrenaline
Unit 5:
Organ and cells of immune system, innate and acquired immunity. Cell mediated and
Humoral immunity
Classification of immunoglobulins,structure of ig Gepitopes determinates . Concept of haptens, adjuvants
Unit 6
Nervou ssystem structure of neuron, resting potential, action potential and inhibitory neurotransmitters
Physiology of vision-visual pigments and visual cycle
.

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Syllabus for the Academic Year 2014-15

Department: BIOCHEMISTRY **Paper : MOLECULAR BIOLOGY - IV A**

Class: III B. SC **Semester: VII**

Unit 1:

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.

ligase,phosphatases,reverse transcriptase

Terminal transferase nucleases-S_1 and RNAa seh.

Unit 2:

Protiensynthesis-Ribosome structure,t-RNA,activation of amino acids(amino acylt-RNA synthetases)

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

Unit 3:

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

Regulation of prokaryotic gene expression induction and repression. Ex:Lacoperonin E.coli

Unit 4:

Basic steps in r-DNA technology

Enzymes-Rewtriction endonucleases, polynucleotidekinases

Nature and structure of the gene.DNA as genetic material.DNA replication-models of replication Meselson-Stahl'sexperimental proof for semi-conservative model.

DNA polymerasesI,II AND III of E.coil,helicase,topoisomerases,primase,ligase

Unit 5:

Applications of genecloning production of insulin and human growth hormone ,production of Btcotton and edible vaccines

Restriction mapping .Cloning vectors-Plasmids ,Cosmids, λphages vectors

Construction of c-DNA and genomic libraries.Isolation and sequencingof clonedgenes-colony hybridization, nucleic acid hybridization,

Maxam Gilbert AND Sanger's methods. Polymerase chain reaction-principle and applications.

Unit 6:

Introduction to Bio informatics-definitions of proteomics and genomics.

Gene bank,NCBI,DDBJ,Swissprot,PDB.Sequence alignment-NLAST and FASTA

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Annual Curricular Plan for the Academic Year 2014-15

Department: BIOCHEMISTRY **Class: III B. SC.** **Semester: VIII**

Paper : MICRO BIOLOGY & rDNA TECHNOLOGY - IV B

Unit 1:
Production of Bt cotton and Ediblevaccines.Introduction to bioInformatics-definition of proteomics,genomics
Genebank,NCBI,DDBJ,PDB,sequences alignments BLAST & FASTA
Hybrid released translation and hybrid arrested and released translation using reporter Genes
Unit 2:
Polymerasechainreaction-Principleandapplications
Outlines of blotting techniques-southern,northern & western
Unit 3:
Application of gene cloning-production of insulin and human growth hormone
Bacteria growthcurve and kinetics of growth.Industrialuses of aspergillus Niger,yeastand Spirulina
Unit 4:
One step growth determination of plaque formingunits.isolation and cultivation of Bacterial plaques
Outlines of cloning strategies.
Unit 5:
DNA sequencing maxamgilbert and sangers methods.Restriction mapping
Tools of R-DNA technology:enzymes-restriction endonucleases,ligase.,phosphatise
Cloning vectors-plasmids,tiplasmids,cosmids,shuttle vectors,Host-E.Coil.
Construction ofC-DNA and genomic libraries.Isolation and sequencing of clonalgenes colony hybridisation
Unit 6:
Isolation and cultivation of bacteria.selective media and enriched media
Introduction of brief history microbiology, classification of microorganisms, prokaryotic microorganisms

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Syllabus for the Academic Year 2016-17

Department: BIOCHEMISTRY **Paper: BIOMOLECULES-IA.**

Class:I B.SC **Semester:I**

Unit 1:
Classification of carbohydrates monopsaccharides ,disaccharids
Oli gosaccharides, polysaccharides, physical and chemical properties of carbohydrates.
Amino sugars ,glycol sides ,structures and Biological input of disaccharides
Bacterial cell wall polysaccharides.outline of glyco protiens, glycolipids.
Unit 2:
Classification Of lipids, saturated and unsaturated fatty acids.
Structures and proteins of fats and oils,phospholipids, sphingolipids and cholesterol.
Prostagladins-Structure and biological role of PGD2,PGE2,and PGF2 lipo protiens:types
Of functions
Biombrane behavior of amphipathic lipids of water artificial membranes and types of membrane
Unit 3:
Aminoacids classification and structures. Tirtation curve of glycine and pk values
Streochemistry and chemical reactions.essential and non essential amino acids.
Unit 4:
Non protein aminoacids, peptide bonds-nature and confirmation.
Naturally occurring peptides glutothorine enkephalin.
Proteins classification based on shapes size. Stereo chemistry
Unit 5:
Chemical reactions of amino acids and proteins denaturation.
Structural organization of proteins.Primary$2^0 3^0 4^0$ structures and peptides
Hb and Mb forces stabilizing the structure of proteins
Unit 6:
Water as biological solvent and its role. Biological solvents of P^h
Functional groups in biopolymers such as proteins and nucleic acids.Importance of bufferinbiological systems.

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syllabus fortheAcademicYear2016-17

Department: BIOCHEMISTRY **Class:I B.SC** **Semester:II**

Paper: NUCLEICACIDS & BIOCHEMICAL TECHNIQUES- IB

Unit 1:
Structure of prophyrins, photoporphyrin,pgb and properties identification of porphrins.
Structure of metalloporphyrins,Heme,cytochromes and chlorophylls.
Structures of purines pyrimidines, nuceliotides ,stability and formation of phospodi ester linkages

Unit 2
Effects of acids ,alakali and nucleases on DNA and RNA. Structure of nucleic acids
Tm values and their significance. Reassociation kinetics, cot curves and their
significance.
Methods of tissue homogenisation(mechanical blender and sonicator) Principal
Principal & applications of centrifugation,ultra centrifugation. Preparatrine & analytical
centrifigation
unit 3:
Principle and applications of chromatographic techniques,paper, thinlayer, gelfiltration.
Ionexchange and affinity and paper chromatography and polychrylamide and agaroseg elelectro phoresis
Colorimeter, spectrometer, laws of light absorption, Beer-Lambert law.
Unit 4:
UV and visible absorption spectra, molar extinction principle of imetry,spectrophoto meter
Tracer techniques,radar isotopes,units of radio activity & use of radio active
Isotopes in biology
unit 5:
Board outline of intermediary metabolism methods of investigation.
Intermediary metabolism in vivo studies such as analysis of extesstion.Respiratory exchange
Removal of organs and purification, enzymes system, isotopes, Uses of inhibitors.

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Syllabus for the Academic Year 2016-17

Department: BIOCHEMISTRY **Class: II B. SC** **Semester: III**

Paper: ENZYMOLOGY & BIOENERGITICS - IIA

Unit 1:
High energy compounds
Organization of electron carriers and enzymes in mitochondria
Classes of electron-transferring enzymes,inhibitorsof electron transport

Unit 2:
Un couplers and inhibiters of oxidative phosphorylation
Bio energitics thermo dynamic principles,chemical equilibria.
Free energy,enthalpy,entropy,free energychange in biological transformations in living systems
Unit 3:
Michael's menten equation for uni-substrate reaction significance of K_m and V_{max}.
Enzymes Inhibition irreverk9sible and reversible,types of reversible inhibitions competitive and non competitive
Regulation of enzyme activity-allosterism and cooperativity & covalent, modulation- covalent phosphorilation of phos
Unit 4:
Introduction to bio catalists difference between chemical and biological catalysis
Unit 5:
Definition of holoenzyme,apo-enzyme,coenzyme,cofactor.fundamentals of Enzyme,
Enzyme units
Unit 6:
Factors affecting the catalysis-substrate concentration, P^h temperature.
Iso enzymes, multi enzymes complexes,ribozyme.

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Syllabus for the Academic Year 2016-17

Department: BIOCHEMISTRY **Paper: INTERMEDIARY METABOLISM - II B**

Class: II B. SC **Semester:IV**

Unit 1:

Catabolism of purines and pyrimidines.Biosynthesis of deoxyrivo nucleotides ribo nucleotide reductase.

Biosynthesis cholesterol.Disorders of lipid metabolism & general reactions of amino Acids metabolism

Unit 2:

Decarboxylation and deaminitiomurea cycle and regulation

Metabolism of glycine,serine,aspartic Acid,methionine,phenylalanineandleucine

Unit 3:

Biosynthesis of creartine.Inborn errors of aromatic and branched chain amino acids metabolism

Nitrogen cycle,non-biological and biological nitrogen fixation, nitrigenase system

Biosynthesis and regulation of purine and pyrimidin enucleotides,denovo and salvage pathway

Unit 4:

Pasteur effect.Critic acid cycle,regulation,energy yield,amphi pathicrole.Gluco neogenesis.

Photosynthesis-light and dark reactions,Calvin cycle,pathway.Disorders of carbohydrate Metabolism

Catabolism of fattyacids with even and Odd number of carbonatoms ,ketogenesis, denovo

Unit 5:

Synthesis of fatty acids.

Elongation of fattyacids in mitochondria and microsomes degradation of triacylglycerol and lecithin

Unit 6:

Biosynthesis and degradation of heme. Concept of anabolism and catabolism

Glycolytic pathway,energy yield.Fate of pyruvate formation of lactace and ethanol.

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Syllabus for the Academic Year 2016-17

Department: BIOCHEMISTRY **CLASS: III B. SC** **Semester: V**

Paper : CLINICAL BIOCHEMISTRY & BALANCED DIET - III A

Unit 1:

Disorders of lipids metabolism-plasma lipoprotiens,lipo proteinenias, fatty liver and Atherosclerosis

Plasma protein inhealth and disease, disorders of blood coagulation

Unit 2:

types of Anemias, Haemoglobin, pathesissickle cell anemia and thalassemia

Biochemical test for the diagnosis of heart disease -HDL/LDL cholesterol

SGOT,LDH,CK,C-reactive Protein, cardiac troponins

Calorific values of foods and their determination by bomb claorimeter

Unit 3:

BMR and factors effecting it.SDA of foods .role of fatty acids In human nutrition

Energy requirements and recommended dietiary allowance for children ,adults and Pregnant women

Sources of complete and incomplete proteins

Biological values of proteins .Malnutrition-kwashiorkar Marasmus and PEM

Vitamin-sources structure,biochemical roles,deficiency disorders of Water and fat soluble vitamins

Unit 4:

Bulk and trace elements Ca,mg,Fe,I,Cu,Mo,Zn,Se and F. Obesity and starvation.

Liverdisease-jaundice,hepatitis,cirrhosis liver function test-conjugated and totalbiliriumin serum,albuminglobukin ratio Bromosulphoxylumtest, and hippunic acid test Serum enzymes in liver disease-SGPT,GGT

Unit 5:

Kidney-structure of nephron,urine formation normal and abnormal constituents of urine biological buffer

Role of kidney inmaintaining acid-base and electrolyte balance in the body.

Phenolredrenal function

Unit 6:

Hypoglycemia,hyperglycemia,Glycosuria,renal threshold value.

Classification of diabetesmellitus, glucosetolerance test, diabeticketo acidosis.

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Syllabus for the Academic Year 2016-17

Department: BIOCHEMISTRY **Paper : PHYSIOLOGY & IMMUNOLOGY - III B**

Class: III B. SC **Semester:VI**

Unit 1:
Composition of blood and coagulation of blood .Transport of gases in blood
Structure of heart,cardiaccycle,cardiacfactor controlling bloodpressure.Mechanism of musclecontraction
Immunodiagnostics RIA,ELISA vaccines and their classification
Traditional vaccines-liver and attenuated, toxoids
Unit 2:
Theories of antibody formation-clonal selection theorey monoclonal antibodies
Agglutination,immune oprecipitation,immune diffusion.Blood group antigens
Modern vaccines-recombinant and peptide vaccines outlines of hypersensitivity
Reactions
Fundamentals of graft rejection and MHC proteins. Immune deficiency diseases
Unit 3:
Organization of endocrine system, classification of hormones, outline of chemistry, physiological role and disorders of hormones of pancreas
Unit 4:
Thyroid, parathyroid, gonads, placenta, adrenals, pituitary and hypothalamus
Introduction of gastro intestinal hormones glucocorticoid sand insulin
Mechanism of hormonal actions ignaltransduction pathways for adrenaline
Unit 5:
Organ and cells of immune system, innate and acquired immunity. Cell mediated and
Humoral immunity
Classification of immunoglobulins,structure of ig Gepitopes determinates . Concept of haptens, adjuvants
Unit 6
Nervou ssystem structure of neuron, resting potential, action potential and inhibitory neurotransmitters
Physiology of vision-visual pigments and visual cycle
.

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Syllabus for the Academic Year 2016-17

Department: BIOCHEMISTRY **Paper : MOLECULAR BIOLOGY - IV A**

Class: III B. SC **Semester: VII**

Unit 1:

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.

ligase,phosphatases,reverse transcriptase

Terminal transferase nucleases-S_1 and RNAa seh.

Unit 2:

Protiensynthesis-Ribosome structure,t-RNA,activation of amino acids(amino acylt-RNA synthetases)

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

Unit 3:

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

Regulation of prokaryotic gene expression induction and repression. Ex:Lacoperonin E.coli

Unit 4:

Basic steps in r-DNA technology

Enzymes-Rewtriction endonucleases, polynucleotidekinases

Nature and structure of the gene.DNA as genetic material.DNA replication-models of replication Meselson-Stahl'sexperimental proof for semi-conservative model.

DNA polymerasesI,II AND III of E.coil,helicase,topoisomerases,primase,ligase

Unit 5:

Applications of genecloning production of insulin and human growth hormone ,production of Btcotton and edible vaccines

Restriction mapping .Cloning vectors-Plasmids ,Cosmids, λphages vectors

Construction of c-DNA and genomic libraries.Isolation and sequencingof clonedgenes-colony hybridization, nucleic acid hybridization,

Maxam Gilbert AND Sanger's methods. Polymerase chain reaction-principle and applications.

Unit 6:

Introduction to Bio informatics-definitions of proteomics and genomics.

Gene bank,NCBI,DDBJ,Swissprot,PDB.Sequence alignment-NLAST and FASTA

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Syllabus for the Academic Year 2016-17

Department: BIOCHEMISTRY **Class: III B. SC.** **Semester: VIII**

Paper : MICRO BIOLOGY & rDNA TECHNOLOGY - IV B

Unit 1:
Production of Bt cotton and Ediblevaccines.Introduction to bioInformatics-definition of proteomics,genomics
Genebank,NCBI,DDBJ,PDB,sequences alignments BLAST & FASTA
Hybrid released translation and hybrid arrested and released translation using reporter Genes
Unit 2:
Polymerasechainreaction-Principleandapplications
Outlines of blotting techniques-southern,northern & western
Unit 3:
Application of gene cloning-production of insulin and human growth hormone
Bacteria growthcurve and kinetics of growth.Industrialuses of aspergillus Niger,yeastand Spirulina
Unit 4:
One step growth determination of plaque formingunits.isolation and cultivation of Bacterial plaques
Outlines of cloning strategies.
Unit 5:
DNA sequencing maxamgilbert and sangers methods.Restriction mapping
Tools of R-DNA technology:enzymes-restriction endonucleases,ligase.,phosphatise
Cloning vectors-plasmids,tiplasmids,cosmids,shuttle vectors,Host-E.Coil.
Construction ofC-DNA and genomic libraries.Isolation and sequencing of clonalgenes colony hybridisation
Unit 6:
Isolation and cultivation of bacteria.selective media and enriched media
Introduction of brief history microbiology, classification of microorganisms, prokaryotic microorganisms

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Syllabus for the Academic Year 2017-18

Department : BIOCHEMISTRY **Class : III M. SC** **Semester:V**

Paper : MOLECULAR BIOLOGY& rDNA TECHNOLOGY - IV A

Unit 1:
Basicstepsinr-DNA technology.
Enzymes –Rewtrictionendo nucleases, polynucleotide kinases
ligase, phosphatases, reverse transcriptase,
Termina ltransferase nucleases-S_1 and RNA aseh.
Nature and structure of thegene.DNA asgenetic material.DNA replication-modelsof replication Meselson-Stahl's experimental proof forsemi-conservative model.
Unit 2:
DNA polymerases I,II AND III of E.coil, helicase, topoisomerases,primase,ligase. Mechanism DNA Replication in E.Coli. Inhibitors of DNA reputation
Transcription-RNA polymerases of prokaryotes, Mechanism of transcription-.Initiation-sigma factors and their recognitionsites,
Promoters ,Elongation, Termination
Unit 3:
Rho dependen t and rho independent .INHIBITORS OF Transcription.
Genetic code: features of genetic code, wobble hypothesis ,degeneracy of genetic code.
Protien synthesis-Ribosome structure, t-RNA, activation of aminoacids(aminoacylt -RNA synthetases).Initiation, elongation and termination of protein synthesis.
unit 4:
Post-translational modifications, signal hypothesis. Inhibitors of protein synthesis.
Regulation of prokaryotic gene expression-induction and repression .Ex:Lacoperon in E.coli
Unit 5:
Introduction to Bio informatics-definitions of proteomics and genomics
Gene bank, NCBI, DDBJ, Swissprot, PDB. Sequence alignment-NLAST and FASTA.
Restriction mapping. Cloning vectors-Plasmids, Cosmids, λ phages vectors

Unit 6:
Applications of genecloning-production of insulin and human growth hormone, production of Bt cotton and edible vaccines
Construction of c-DNA and genomic libraries. Isolation and sequencing of cloned genes -colony hybridization
Maxam Gilbert AND Sanger's methods. Polymerase chain reaction-principle and applications.
Outlines of blotting techniques-Southern, Northern and Western.

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Syllabus for theAcademic Year2017-18

Department: BIOCHEMISTRY Paper: CLUSTERIII,APPLIEDBIOCHEMISTRY-IVB

Class: IIIB.SC Semester:VI

Unit 1:
Methods for measuring nucleic acid and protein interactions–foot printing, CAT assay, gel Shift analysis.
DNA markers in genetic analysis–RFLP, Mini satellites, Micro satellites, PCR based RAPD markers, Chromosomal Walking, Chromosomal jumping.
RNA silencing– siRNAs and anti-sense RNAs-their design and applications. Principle and applications of Nano technology
Unit 2:
Plant tissue culture: Culture media–Composition and preparation ,Totipotency, Organo genesis and plant regeneration,
Somatic embryogenesis, Artificial seeds, Micro propagation .Isolation and culture of protoplasts ,Somatic hybridization.
Animal tissue culture: Composition and preparation no of culture media, Primary cultures, established /continuous cell lines. T
Unit 3:
Generation of stem cells by cloning, stem cell differentiation, stem cell plasticity, preservation of stem cells.
Stem cells–Sources embryonic stem cells, adult stem cells, cord blood stem cells.
Unit 4:
Organogenesis through stem cells for transplantation.
Tissue and organ culture.
Unit 5:
genetherapy- types and its applications
Principles of vaccination, Design of vaccines.
Conventional vaccines–Whole organism, live and attenuated ,purified macro molecules.
Unit 6:
Classification of vaccines.
New generation vaccines-Recombinant antigen vaccines, recombinant vector antigens, DNA vaccines, synthetic vaccines, edible vaccines.
Vaccinedeli very systems– Liposomes ,micelles,

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Syllabus for the Academic Year 2017-18

Department: BIO CHEMISTRY **Paper : BIO MOLECULES - I A**

Class: I B. SC **Semester: I**

Unit 1:
Amino acids classification and structures. Tirtation curve of glycine and pk values
Streochemistry and chemical reactions.essential and non essential amino acids.
Non protein amino acids, peptide bonds –nature and confirmation.
Unit 2:
Naturally occurring peptides glutothorine enkephalin.
Proteins classification based on shapes size. Stereochemistry
Chemical reactions of amino acids and proteins denaturation.
Unit 3:
Structural organization of proteins. Primary $2^0 3^0 4^0$ structures and peptides
Hb and Mb forces stabilizing the structure of proteins
Unit 4:
Classification of carbohydrates monopsaccharides, disaccharids
Oligosaccharides, polysaccharides, physical and chemical properties ofcarbohydrates.
Amino sugars,glycosides,structures and Biological input of disaccharides
Streo chemistry and chemical reactions. essential and non essential amino acids.
Unit 5:
Classification Of lipids, saturated and unsaturated fatty acids
Structures and proteins of fats and oils, phosphorlipids,sphingo lipids and cholesterol.
Prosta gladins-Structure and biological role of PGD2 ,PGE2 ,and PGF2 lipo protiens: types of functions
Biombrane behavior of amphipathic lipids of water artificial membranes and types of membrane
Unit 6:
Water as biological solvent and its role. Biological solvents of P^h
Functional groups in biopolymers such as proteins and nucleic acids.Importance of buffer in biological
systems.

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Department: BIO CHEMISTRY **Class: I-B** **Semester: II**

Paper :NUCLEIC ACIDS AND BIOCHEMICAL TECHNIQUES -I B

Unit 1:
Method s of Tissue homogenisation (mechanica lblender and sonicator)Principal
Principal& applications of centrifugation, ultra centrifugation. Pre paratrine &analytical
Centrifugation
Unit 2:
Structures of purines pyrimidines , nuceliotides, stability and formation of
Phospodi ester linkages
Methods of tissue homogenisation(mechanical blender and sonicator)Principal
Unit 3:
Principal & applications of centrifugation ,ultra centrifugation . Preparatrine & analytical
Centrifugation
Principle and applications of chromatographic techniques, paper, thin layer, gel filtration.
Colori meter,spectro meter,laws of light absorption ,Beer-Lambert law.
Unit 4:
UV and visible absorption spectra,molar extinction principle of florimetry, spectro photo meter
Tracer techniques radar isotopes ,units of radio activity& use of radio active
Isotopes inbiology
Board outline of intermediary metabolism methods of investigation.
Unit 5:
Ion exchange and affinity and paper chromatography and polychrylamide and agarosegel
Electrophoresis
Intermediary metabolism in vivo studies such as analysis of extesstion .Respiratory exchange

Unit 6:
Structure of prophyrins,photo porphyrin,PGB and properties identification of porphrins.
Effects of acids,alakali and nucleases on DNA and RNA. Structure of nucleic acid

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Department: BIOCHEMISTRY **Class:IIIBSC** **Semester:V**

Paper: PHYSIOLOGY, CLINICAL BIOCHEMISTRY & IMMUNOLOGY-IIIA

Unit 1:

Digestion and absorption of carbohydrates, lipids and proteins. Composition of Blood.
Coagulation of blood. Transport of gases in blood .Muscle: structure of myofibril and mechanism of muscle contraction
Endocrinology organization of endocrine system .Classification of hormones .Outlines of chemistry Physiological role and disorders of hormones of hypothalamus, pituitary, thyroid and adrenal gland. Pancreatic hormone sand gonads Introduction of hormones of gastroint estinal tract and placenta.

Unit 2:

Classification of nutrients, calarofic values of foods and their determination by bomb calari meter.
BMR and factors affecting it .Significance of BMR .Specific dynamic action of foods.
Energy requirements and recommendeddietary allowance for pregnant and lactating women.

Unit 3:

Biological values of proteins .Sources of complete and incomplete proteins,bulk and trace elements
Disorders of blood coagulation .Type of anemias ,haemoglobino patheissickle cell anemia.
Structure and function of liver ,jaundice .Liver function tests conjugated and total bilurubininserum.

Unit 4:

Albumin :glubulinratio, hippuricacids, roseBengaldye. Serum enzymes inliver diseases
Biological buffers.Role of kidneys inmaintaining acid-base and electrolyte balance in body

Unit 5:

Organization of immune system.Innate and acquired immunity. Organs and cells of immune system
Cellmediatedandhumoralimmunity,classificationofimmunoglobulines,epitotesdeterminants

Unit 6:

Conceptofhaptens.Adjuvants.Mono conicalanti bodies.Antigen-antibody reactions.

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Department: BIOCHEMISTRY. **Paper: BIOCHEMICAL CORRELATIONS IN DISORDERS-IIIB**

Class: IIIBSC **SEMESTER:VI**

Unit 1:
Hyper and hypodisorder sof adrenal Gland & protein calorie malnutrition-kwashiorkor,marasmus
Disorders of water soluble vitamins :Beri-Beri ,scurvy, pellagra, perniciousanemia
Unit 2:
Obesity,cardiovascular diseases,inflammatory bowel disease
Alzheimer's,Huntington diseases,creutzfeldt-Jakob disease
Haemoglobinopatheis:sickle cell anemia,thalassemia
Unit 3:
WilsonDisease,menkensdisease,goiter
Unit 4:
Concept of self andnon selfi mmune recognisation
Organspecificautoimmunedisorders-hashimoto'sthyroiditids,Gravesdiseases
Myastheniagravis,systamiclupuserythematus,rheumatoidarthritis,diabetesmellitus-1
Unit 5:
Cancertypes, mechanismetiology, metabolic changes ,treatment
Digestive system: gastritis, pepticulcers, pancreatitis.
Steatorrhea ,cirrhosis, of liver ,gallstones ,appendicitis
Unit 6:
Renal disorders :acute and chronicrenal failure ,kidney stones acute
Chronic

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Department: BIO CHEMISTRY **Paper: ENZYMOLOGY & BIOENERGITICS - II A**

Class: II - A **Semester: III**

Unit 1:
Zymogen activation-activation of trysinogen and chymot rypsiogen.
Isoenzymes, multienzymes complexes ,ribozyme.
Bioenergitics thermodynamic principles,chemical equilibria.
Unit 2:
Free energy,enthalpy,entropy,free energy change inbiologica l transformations in living systems
High energy compounds
Oxidation phosphorylation.Mechanism of oxidative phosphorylation
Uncouplers and inhibiters of oxidative phosphorylation
Unit 3:
Energy,change oxidation-reduction reactions
Michael'smentenequationforuni-substratereactionsignificanceof$K_m$andV_{max}.
Unit 4:
EnzymesInhibitionirreversibleandreversible,typesofreversibleinhibitionscompetitiveandnoncompetitive
OutlineofmechanismofEnzymeaction-Acid-basecatalysis,covalentcatalysis,electrostaticcatalysis.
Regulationofenzymeactivity-allosterismandcooperativity&covalent,modulation-
covalentphosphorilationofphosphorylase.
Unit 5:
Introductiontobiocatalistsdifferencebetweenchemicalandbiologicalcatalysis.
Nomenclatureandclassificationofenzymes.enzymespecificity.avtivesiteprincipleofenergyofactivationtran
smissionstate.
Definitionofholoenzyme,apo-enzyme,coenzyme,cofactor.fundamentalsofEnzyme,Enzymeunits
Unit 6:
Factorsaffectingthecatalysis-substrateconcentration,P^htemperature.
Organization of electron carrier sand enzymes inmito chondria
Classesofelectron-transferringenzymes,inhibitorsofelectrontransport

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Department: BIOCHEMISTRY **Paper: INTERMEDIARY METABOLISM - II B**

Class: IIB. **Semester: IV**

Unit 1:

Pasteur effect. Critic acid cycle ,regulation, energy yield ,amphipathi c role. Gluconeo genesis.
Photosynthesis-lightanddarkreactions,Calvincycle,pathway.Disorders of carbohydrate metabolism
Significance of thymidylate .Disorders of nucleotide metabolism-gout,l esch-Nyhan syndrome.

Unit 2:

Catabolism of purines and pyrimidines .Biosynthesis of deoxyrivo nucleotides ribo nucleotide reductase.
Biosynthesis and regulation of purine and pyrimidi nenucleo tides ,denovoandsalvage pathway

Unit 3 :

Utilisation of nitrateion,Ammoniaincorporation into organic compounds& mechanismofgluamine
Nitrogen cycle,non-biological and biological nitrogen fixation, nitrigenase system
Biosynthesis of creartine.Inbornerrors of aromatic and branched chainaminoacids metabolism
Metabolism of glycine,serine,aspartic Acid, methionine, phenylalanine and leucine

Unit 4:

Catabolism of carbonskeleton of aminoacids of glycogenic and keto genic aminoacids.
Catabolism of fatty acids with even and Odd number of carbon atoms,ketogenesis,denovo
Synthesis of fattyacids.

Unit 5:

Elongation /of fatty acids in mitochondria and microsomes degradation of triacylglycero land lecithin
Biosynthesis cholesterol.Disorders of lipid metabolism& general reactions of aminoacids metabolism
Decarboxylation and deaminitiomu eacycle and regulation

Unit 6:

Biosynthesis and degradation of heme.Concept of anabolism and catabolism
Glycolytic pathway, energy yield. Fate of pyruvate formation of lactace and ethanol.

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Department: BIOCHEMISTRY **Paper: organization of cell-cluster I**

Class: III B.SC. **Semester: VI**

Unit-I Basics of Cell Biology (structure & function)
1.1 Discovery of cell and Cell Theory.
1.2 Comparison between plant and animal cells.
1.3 Comparison between of prokaryotic And eukaryotic cell
1.4 Membrane structure & transport – Models of membrane structure, Membrane lipids, proteins and carbohydrates.
1.5 Solute transport by Simple diffusion, Facilitated diffusion and Active transport

Unit- II: CELL SIGNALING
2.1 Introduction to types of cell signalling (exocrine, endocrine and paracrine) ,
2.2 types of cell membrane receptors: G-Protein linked receptors.
2.3 Secondary messengers - cAMP, cGMP, IP3, , diacyl glycerol, Ca2+, NO.
2.4 Enzyme linked receptors
2.5 Ion-channel linked receptors

Unit –III STRUCTURE OF CELL ORGANELLES
3.1 structure and functions of cell organelles - Endoplasmic reticulum, Golgi complex, glycosylation of proteins
3.2 Lysosomes, ribosomes, peroxisomes
3.3 Mitochondria: Structure and Functions. Oxidative Metabolisms in the Mitochondrion, The Role of Mitochondria in the formation of ATP .
3.4 Chloroplast: structure and functions & an overview of photosynthesis.

Unit-IV CYTOSKELETON & Nucleus
3.1 Cytoskeleton – components of Cytoskeleton, Microtubule and Microfilaments
3.2 Structure of nucleus
3.3 Extracellular matrix
3.4 Cell-cell interactions
12

Unit –V Organization of genes and chromosomes
5.1 Organization of genes and chromosomes (definitions of unique and repetitive DNA, interrupted genes, gene families
5.2 cell division: Mitosis and meiosis, their regulation,
5.3 steps in cell cycle, regulation and control of cell cycle
5.4 Programmed cell death (Apoptosis)

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Department: BIOCHEMISTRY **Paper: GENETICS& ECOLOGY**

Class: III B.SC **Semester: VI**

Unit-I Mendel's Laws and Inheritance
1.1 Mendel experiments-Mendel Laws and deviations: incomplete dominance and Co dominance
1.2 Penetration and pleiotropism
1.3 Recessive and Dominant epistatic gene interactions.
1.4 Concept of multiple alleles.

Unit II -Genes and their variations: 2.1 Structure of gene, gene and environment
2.2 gene copies and heterogeneity
2.3 Eukaryotic chromosome organization, histone proteins.
2.4 Gene transfer in bacteria (Conjugation, transformation and transduction).
2.5 linkage, recombination, interference and coincidence
2.6 sex determination

Unit III Mutations and Repair:
3.1 Gene mutations-Spontaneous, missense, nonsense, frame shift and induced mutations
3.2 Mutagens –Physical and chemical mutagens
3.3 Repair Mechanisms- Light induced repair, Mismatched repair, post – replicational repair, excisional repair, SOS repair. Unit IV chromosomal disorders 4.1 Haemophilia, sickle cell anemia, Thalassemia
4.2Phenyl ketonuria
4.3 colour Blindness, cystic fibrosis
4.4 klinefelter's syndrome, Turner's syndrome
4.5 Edward syndrome, Patau syndrome
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4.6 Cri-du-chat syndrome, Down's syndrome
4.7 chronic myelogenous leukaemias

Unit V ECOLOGY
5.1 Concept of an ecosystem
5.2 Ecosystem structure & function;
5.3 producers, consumers and decomposers
5.4 food chains, food webs and ecological pyramids
5.5 characteristic features of the following ecosystems: forest ecosystem, desert ecosystem and aquatic
ecosystem.
5.6 energy flow and mineral cycling (C,N,P);
5.7 conservation of biodiversity

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Department : BIOCHEMISTRY **Class : III M. SC** **Semester:V**

Paper : MOLECULAR BIOLOGY& rDNA TECHNOLOGY - IV A

Unit 1:
Basicstepsinr-DNA technology.
Enzymes –Rewtrictionendo nucleases, polynucleotide kinases
ligase, phosphatases, reverse transcriptase,
Termina ltransferase nucleases-S_1 and RNA aseh.
Nature and structure of thegene.DNA asgenetic material.DNA replication-modelsof replication
Meselson-Stahl's experimental proof forsemi-conservative model.
Unit 2:
DNA polymerases I,II AND III of E.coil, helicase, topoisomerases,primase,ligase.Mechanism
DNA Replication in E.Coli. Inhibitors of DNA reputation
Transcription-RNA polymerases of prokaryotes, Mechanism of transcription-.Initiation-sigma factors and their recognitionsites,
Promoters ,Elongation, Termination
Unit 3:
Rho dependen t and rho independent .INHIBITORS OF Transcription.
Genetic code: features of genetic code, wobble hypothesis ,degeneracy of genetic code.
Protien synthesis-Ribosome structure, t-RNA, activation of aminoacids(aminoacylt -RNA synthetases).Initiation, elongation and termination of protein synthesis.
unit 4:
Post-translational modifications, signal hypothesis. Inhibitors of protein synthesis.
Regulation of prokaryotic gene expression-induction and repression .Ex:Lacoperon in E.coli
Unit 5:
Introduction to Bio informatics-definitions of proteomics and genomics
Gene bank, NCBI, DDBJ, Swissprot, PDB. Sequence alignment-NLAST and FASTA.
Restriction mapping. Cloning vectors-Plasmids, Cosmids, λ phages vectors

Unit 6:
Applications of genecloning-production of insulin and human growth hormone, production of Bt cotton and edible vaccines
Construction of c-DNA and genomic libraries. Isolation and sequencing of cloned genes -colony hybridization
Maxam Gilbert AND Sanger's methods. Polymerase chain reaction-principle and applications.
Outlines of blotting techniques-Southern, Northern and Western.

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Department: BIOCHEMISTRY **Paper: CLUSTERIII,APPLIEDBIOCHEMISTRY-IVB**

Class: IIIB.SC **Semester:VI**

Unit 1:

Methods for measuring nucleic acid and protein interactions–foot printing, CAT assay, gel Shift analysis.

DNA markers in genetic analysis–RFLP, Mini satellites, Micro satellites, PCR based RAPD markers, Chromosomal Walking, Chromosomal jumping.

RNA silencing– siRNAs and anti-sense RNAs-their design and applications. Principle and applications of Nano technology

Unit 2:

Plant tissue culture: Culture media–Composition and preparation ,Totipotency, Organo genesis and plant regeneration,

Somatic embryogenesis, Artificial seeds, Micro propagation .Isolation and culture of protoplasts ,Somatic hybridization.

Animal tissue culture: Composition and preparation no of culture media, Primary cultures, established /continuous cell lines. T

Unit 3:

Generation of stem cells by cloning, stem cell differentiation, stem cell plasticity, preservation of stem cells.

Stem cells–Sources embryonic stem cells, adult stem cells, cord blood stem cells.

Unit 4:

Organogenesis through stem cells for transplantation.

Tissue and organ culture.

Unit 5:

genetherapy- types and its applications

Principles of vaccination, Design of vaccines.

Conventional vaccines–Whole organism, live and attenuated ,purified macro molecules.

Unit 6:

Classification of vaccines.

New generation vaccines-Recombinant antigen vaccines, recombinant vector antigens, DNA vaccines, synthetic vaccines, edible vaccines.

Vaccinedeli very systems– Liposomes ,micelles,

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Department: BIO CHEMISTRY **Paper : BIO MOLECULES - I A**

Class: I B. SC **Semester: I**

Unit 1:
Amino acids classification and structures. Tirtation curve of glycine and pk values
Streochemistry and chemical reactions.essential and non essential amino acids.
Non protein amino acids, peptide bonds –nature and confirmation.
Unit 2:
Naturally occurring peptides glutothorine enkephalin.
Proteins classification based on shapes size. Stereochemistry
Chemical reactions of amino acids and proteins denaturation.
Unit 3:
Structural organization of proteins. Primary $2^0 3^0 4^0$ structures and peptides
Hb and Mb forces stabilizing the structure of proteins
Unit 4:
Classification of carbohydrates monopsaccharides, disaccharids
Oligosaccharides, polysaccharides, physical and chemical properties ofcarbohydrates.
Amino sugars,glycosides,structures and Biological input of disaccharides
Streo chemistry and chemical reactions. essential and non essential amino acids.
Unit 5:
Classification Of lipids, saturated and unsaturated fatty acids
Structures and proteins of fats and oils, phosphorlipids,sphingo lipids and cholesterol.
Prosta gladins-Structure and biological role of PGD2 ,PGE2 ,and PGF2 lipo protiens: types of functions
Biombrane behavior of amphipathic lipids of water artificial membranes and types of membrane
Unit 6:
Water as biological solvent and its role. Biological solvents of P^h
Functional groups in biopolymers such as proteins and nucleic acids.Importance of buffer in biological
systems.

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Department: BIO CHEMISTRY **Class: I-B** **Semester: II**

Paper :NUCLEIC ACIDS AND BIOCHEMICAL TECHNIQUES -I B

Unit 1:
Method s of Tissue homogenisation (mechanica lblender and sonicator)Principal
Principal& applications of centrifugation, ultra centrifugation. Pre paratrine &analytical
Centrifugation
Unit 2:
Structures of purines pyrimidines , nuceliotides, stability and formation of
Phospodi ester linkages
Methods of tissue homogenisation(mechanical blender and sonicator)Principal
Unit 3:
Principal & applications of centrifugation ,ultra centrifugation . Preparatrine & analytical
Centrifugation
Principle and applications of chromatographic techniques, paper, thin layer, gel filtration.
Colori meter,spectro meter,laws of light absorption ,Beer-Lambert law.
Unit 4:
UV and visible absorption spectra,molar extinction principle of florimetry, spectro photo meter
Tracer techniques radar isotopes ,units of radio activity& use of radio active
Isotopes inbiology
Board outline of intermediary metabolism methods of investigation.
Unit 5:
Ion exchange and affinity and paper chromatography and polychrylamide and agarosegel
Electrophoresis
Intermediary metabolism in vivo studies such as analysis of extesstion .Respiratory exchange

Unit 6:
Structure of prophyrins,photo porphyrin,PGB and properties identification of porphrins.

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Department: BIOCHEMISTRY **Class:IIIBSC** **Semester:V**

Paper: PHYSIOLOGY,CLINICAL BIOCHEMISTRY & IMMUNOLOGY-IIIA

Unit 1:

Digestion and absorption of carbohydrates,lipids and proteins.Composition of Blood.
Coagulation of blood. Transport of gases in blood .Muscle: structure of myofibril and mechanism of muscle contraction
Endocrinology organization of endocrine system .Classification of hormones .Outlines of chemistry
Physiological role and disorders of hormones of hypothalamus, pituitary, thyroid and adrenal gland.
Pancreatic hormone sand gonads Introduction of hormones of gastroint estinal tract and placenta.

Unit 2:

Classification of nutrients, calarofic values of foods and their determination by bomb calari meter.
BMR and factors affecting it .Significance of BMR .Specific dynamic action of foods.
Energy requirements and recommendeddietary allowance for pregnant and lactating women.

Unit 3:

Biological values of proteins .Sources of complete and incomplete proteins,bulk and trace elements
Disorders of blood coagulation .Type of anemias ,haemoglobino patheissickle cell anemia.
Structure and function of liver ,jaundice .Liver function tests conjugated and total bilurubininserum.

Unit 4:

Albumin :glubulinratio, hippuricacids, roseBengaldye.Serum enzymes inliver diseases
Biological buffers.Role of kidneys inmaintaining acid-base and electrolytebalanceinbody

Unit 5:

Organization of immunesystem.Innate and acquired immunity.Organs and cells of immunesystem
Cellmediatedandhumoralimmunity,classificationofimmunoglobulines,epitotesdeterminants

Unit 6:

Conceptofhaptens.Adjuvants.Monoconicalantibodies.Antigen-antibodyreactions.

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Department: BIOCHEMISTRY. **Class: IIIBSC** **SEMESTER:VI**

Paper: BIOCHEMICAL CORRELATIONSINDISORDERS-IIIB

Unit 1:
Hyper and hypodisorder sof adrenal Gland & protein calorie malnutrition-kwashiorkor,marasmus
Disorders of water soluble vitamins :Beri-Beri ,scurvy, pellagra, perniciousanemia
Unit 2:
Obesity,cardiovascular diseases,inflammatory bowel disease
Alzheimer's,Huntington diseases,creutzfeldt-Jakob disease
Haemoglobinopatheis:sickle cell anemia,thalassemia
Unit 3:
WilsonDisease,menkensdisease,goiter
Unit 4:
Concept of self andnon selfi mmune recognisation
Organspecificautoimmunedisorders-hashimoto'sthyroiditids,Gravesdiseases
Myastheniagravis,systamiclupuserythematus,rheumatoidarthritis,diabetesmellitus-1
Unit 5:
Cancertypes, mechanismetiology, metabolic changes ,treatment
Digestive system: gastritis, pepticulcers, pancreatitis.
Steatorrhea ,cirrhosis, of liver ,gallstones ,appendicitis
Unit 6:
Renal disorders :acute and chronicrenal failure ,kidney stones acute
Chronic

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Department: BIO CHEMISTRY **Paper: ENZYMOLOGY & BIOENERGITICS - II A**

Class: II - A **Semester: III**

Unit 1:
Zymogen activation-activation of trysinogen and chymot rypsiogen.
Isoenzymes, multienzymes complexes ,ribozyme.
Bioenergitics thermodynamic principles,chemical equilibria.
Unit 2:
Free energy,enthalpy,entropy,free energy change inbiologica l transformations in living systems
High energy compounds
Oxidation phosphorylation.Mechanism of oxidative phosphorylation
Uncouplers and inhibiters of oxidative phosphorylation
Unit 3:
Energy,change oxidation-reduction reactions
Michael'smentenequationforuni-substratereactionsignificanceof$K_m$andV_{max}.
Unit 4:
EnzymesInhibitionirreversibleandreversible,typesofreversibleinhibitionscompetitiveandnoncompetitive
OutlineofmechanismofEnzymeaction-Acid-basecatalysis,covalentcatalysis,electrostaticcatalysis.
Regulationofenzymeactivity-allosterismandcooperativity&covalent,modulation-covalentphosphorilationofphosphoryla
Unit 5:
Introductiontobiocatalistsdifferencebetweenchemicalandbiologicalcatalysis.
Nomenclatureandclassificationofenzymes.enzymespecificity.avtivesiteprincipleofenergyofactivationtransmissionstate.
Definitionofholoenzyme,apo-enzyme,coenzyme,cofactor.fundamentalsofEnzyme,Enzymeunits
Unit 6:
Factorsaffectingthecatalysis-substrateconcentration,P^htemperature.
Organization of electron carrier sand enzymes inmito chondria
Classesofelectron-transferringenzymes,inhibitorsofelectrontransport

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Department: BIOCHEMISTRY **Paper: INTERMEDIARY METABOLISM - II B**

Class: IIB. **Semester: IV**

Unit 1:
Pasteur effect. Critic acid cycle ,regulation, energy yield ,amphipathi c role. Gluconeo genesis.
Photosynthesis-lightanddarkreactions,Calvincycle,pathway.Disorders of carbohydrate metabolism
Significance of thymidylate .Disorders of nucleotide metabolism-gout,l esch-Nyhan syndrome.
Unit 2:
Catabolism of purines and pyrimidines .Biosynthesis of deoxyrivo nucleotides ribo nucleotide reductase.
Biosynthesis and regulation of purine and pyrimidi nenucleo tides ,denovoandsalvage pathway
Unit 3 :
Utilisation of nitrateion,Ammoniaincorporation into organic compounds& mechanismofgluamine
Nitrogen cycle,non-biological and biological nitrogen fixation, nitrigenase system
Biosynthesis of creartine.Inbornerrors of aromatic and branched chainaminoacids metabolism
Metabolism of glycine,serine,aspartic Acid, methionine, phenylalanine and leucine
Unit 4:
Catabolism of carbonskeleton of aminoacids of glycogenic and keto genic aminoacids.
Catabolism of fatty acids with even and Odd number of carbon atoms,ketogenesis,denovo
Synthesis of fattyacids.

Unit 5:
Elongation /of fatty acids in mitochondria and microsomes degradation of triacylglycero land lecithin
Biosynthesis cholesterol.Disorders of lipid metabolism& general reactions of aminoacids metabolism
Decarboxylation and deaminitiomu eacycle and regulation
Unit 6:
Biosynthesis and degradation of heme.Concept of anabolism and catabolism
Glycolytic pathway, energy yield. Fate of pyruvate formation of lactace and ethanol.

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Department: BIOCHEMISTRY **Paper: organization of cell-cluster I**

Class: V B. **Semester: V0I**

Unit-I Basics of Cell Biology (structure & function)
1.1 Discovery of cell and Cell Theory.
1.2 Comparison between plant and animal cells.
1.3 Comparison between of prokaryotic And eukaryotic cell
1.4 Membrane structure & transport – Models of membrane structure, Membrane lipids, proteins and carbohydrates.
1.5 Solute transport by Simple diffusion, Facilitated diffusion and Active transport

Unit- II: CELL SIGNALING
2.1 Introduction to types of cell signalling (exocrine, endocrine and paracrine) ,
2.2 types of cell membrane receptors: G-Protein linked receptors.
2.3 Secondary messengers - cAMP, cGMP, IP3, , diacyl glycerol, Ca2+, NO.
2.4 Enzyme linked receptors
2.5 Ion-channel linked receptors

Unit –III STRUCTURE OF CELL ORGANELLES
3.1 structure and functions of cell organelles - Endoplasmic reticulum, Golgi complex, glycosylation of proteins
3.2 Lysosomes, ribosomes, peroxisomes
3.3 Mitochondria: Structure and Functions. Oxidative Metabolisms in the Mitochondrion, The Role of Mitochondria in the formation of ATP .
3.4 Chloroplast: structure and functions & an overview of photosynthesis.

Unit-IV CYTOSKELETON & Nucleus
3.1 Cytoskeleton – components of Cytoskeleton, Microtubule and Microfilaments
3.2 Structure of nucleus
3.3 Extracellular matrix
3.4 Cell-cell interactions
12

Unit –V Organization of genes and chromosomes
5.1 Organization of genes and chromosomes (definitions of unique and repetitive DNA, interrupted genes, gene families
5.2 cell division: Mitosis and meiosis, their regulation,
5.3 steps in cell cycle, regulation and control of cell cycle
5.4 Programmed cell death (Apoptosis)

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Department: BIOCHEMISTRY **Paper: GENETICS& ECOLOGY**

Class: VIII B. **Semester: VI**

Unit-I Mendel's Laws and Inheritance
1.1 Mendel experiments-Mendel Laws and deviations: incomplete dominance and Co dominance
1.2 Penetration and pleiotropism
1.3 Recessive and Dominant epistatic gene interactions.
1.4 Concept of multiple alleles.

Unit II -Genes and their variations: 2.1 Structure of gene, gene and environment
2.2 gene copies and heterogeneity
2.3 Eukaryotic chromosome organization, histone proteins.
2.4 Gene transfer in bacteria (Conjugation, transformation and transduction).
2.5 linkage, recombination, interference and coincidence
2.6 sex determination

Unit III Mutations and Repair:
3.1 Gene mutations-Spontaneous, missense, nonsense, frame shift and induced mutations
3.2 Mutagens –Physical and chemical mutagens
3.3 Repair Mechanisms- Light induced repair, Mismatched repair, post – replicational repair, excisional repair, SOS repair. Unit IV chromosomal disorders 4.1 Haemophilia, sickle cell anemia, Thalassemia
4.2Phenyl ketonuria
4.3 colour Blindness, cystic fibrosis
4.4 klinefelter's syndrome, Turner's syndrome
4.5 Edward syndrome, Patau syndrome
14

4.6 Cri-du-chat syndrome, Down's syndrome
4.7 chronic myelogenous leukaemias

Unit V ECOLOGY
5.1 Concept of an ecosystem
5.2 Ecosystem structure & function;
5.3 producers, consumers and decomposers
5.4 food chains, food webs and ecological pyramids
5.5 characteristic features of the following ecosystems: forest ecosystem, desert ecosystem and aquatic
ecosystem.
5.6 energy flow and mineral cycling (C,N,P);
5.7 conservation of biodiversity.