BHARATHIAR UNIVERSITY : COIMBATORE 46
M.Sc. LABORATORIAL MANAGEMENT (2 Years)
Under The CENTRE FOR COLLABORATION OF INDUSTRY AND INSTITUTION
CCII COLLABORATIVE PROGRAMME

SCHEME OF EXAMINATION – CBCS PATTERN
For the students admitted from the academic year 2013 -2014 batch and onwards

Study Components	Course Title	Inst.hrs / Week	Exam				Credit
			Dur.hrs	CIA	Marks	Total Marks	
SEMESTER – I							
Core Paper – I Biochemistry I		4	3	20	55	75	3
Core Paper – II General Microbiology– I		4	3	20	55	75	3
Core Paper III Haematology – I		4	3	20	55	75	3
Elective Paper I – Anatomy		4	3	20	55	75	3
Core Practical I Biochemistry I		4	3	30	45	75	3
Core Practical II General Microbiology I		4	3	30	45	75	3
Core Practical III Haematology I		4	3	30	45	75	3
SEMESTER – II							
Core paper IV – Biochemistry II		4	3	20	55	75	3
Core paper V – Immunology I		4	3	20	55	75	3
Core paper VI - Haematology II		2	3	20	55	75	3
Elective Paper II – Instrumentation & Bioinformatics		4	3	20	55	75	3
Core Practical IV Biochemistry II		4	3	30	45	75	3
Core Practical V Immunology I		4	3	30	45	75	3
Core Practical VI Haematology II		4	3	30	45	75	3
SEMESTER III							
Core Paper VII – Biochemistry III		6	3	20	55	75	3
Core Paper VIII – Medical Bacteriology & Mycology I		6	3	20	55	75	3
Core Paper IX – Haematology III		6	3	20	55	75	3
Core Paper X – Histopathology		6	3	20	55	75	3
Core Practical VII Biochemistry III		4	3	30	45	75	3
Core Practical VIII Medical Bacteriology & Mycology I		4	3	30	45	75	3
Core Practical IX Haematology		4	3	30	45	75	3
Core Practical X Histopathology		4	3	30	45	75	3
Elective Paper – III Nano Biotechnology		4	3	20	55	75	3

SEMESTER – IV						
Core Paper XI - Biochemistry IV	6	3	20	55	75	3
Core Paper XII – Virology & Parasitology I	6	3	20	55	75	3
Core Paper XIII – Haematology IV	6	3	20	55	75	3
Elective Paper – IV – Research Methodology	4	3	20	55	75	3
Core Practical XI Biochemistry	4	3	20	55	75	3
Core Practical XII Virology & Parasitology	4	3	20	55	75	3
Core Practical XIII Haematology	4	3	20	55	75	3
Project & Viva	4	3	25	75	75	3
Total					2350	94

SEMESTER –I

Core Paper I: BIOCHEMISTRY-I

UNIT- I

Cell membrane transport -Uniport –symport-antiport-active transport -facilitated transport-passive transport-Exocytosis ,endocytosis ,pinocytosis,phagocytosis-Cellular organelles-nuleus, -endoplasma –reticulam- golgi apparatus-lysosomes-mitochondria -plasma membrane

UNIT – II

CHEMISTRY OF CARBOHYDRATES

MONOSACCHRIDES ; STERIOSOMERS,EPIMERISM -Reactions of monosaccharides ;-BENEDICT'S REACTION ,Osazone formation, reduction to form alcohols; oxidation of sugars ,formation of furfural DERIVATIVES,ACTION OF ALKALI ON SUGARS-Disccharides – sucrose, lactose, maltose Polysaccharides – starch, glycogen ,cellulose, lnulin, agar-Micropolysaccharides : Heparin , Chondroipin sulphate

UNIT – III

CHEMISTRY OF LIPIDS-Classification : saturated and unsaturated fatty acids-Properties of fatty acids : Oxidation of fatty acids-Triglycerides : phospholipids ,phospholipases ,Cholesterol

UNIT – IV

AMINOACIDS AND PROTEINS

Classification ; Based on structure ,based on metabolic fate, based on nutritional requirement-Properties and reactions ; special biological functions ,peptide bonds-Primary ,secondary ,tertiary and quaternary structure ,sequence analysis ,iso –electric pH -Precipitation reactions ; chromatography ,electrophoresis ,ultra certifugation ,colour reactions ,quatitative estimation

UNIT – V

ENZYMOLOGY

Classification ; Oxidoreductases , Transferases , Hydrolases ,Lyases ,Isomerases,Ligases , coenzymes ,mode of action of enzymes ,active ,specificity ,kinetic michaelis constant,competitive ,non competitive and allosteric inhibitors -Factors affecting and enzyme reaction -Clinical enzymology-Individual enzymes and their clinical significance-LDH , CPK,AST , ALT , ACP, GGT

References:

Clinical Biochemistry – Teitz
Practical Biochemistry – Harold Varley
Text book of Biochemistry – D.M Vasudevan and Sreekumari.S

Practical I – BIOCHEMISTRY - I

PREPARATION OF REAGENT-ESTIMATION OF BLOOD SUGAR BY FOLIN –WU METHOD AND Glucose oxide method-Estimation of Cholestrol,Triglycerides,HDL,LDL,and VLDL-Estimation of urea by DAM method-Estimation of creative by Jaffe's method-Estimation of blood uric acid by Caraways method-Estimation of Bilirubin-Estimation of Calcium and magnesium -Estimation of sugar protein and albumin-Estimation of inorganic phosphorous by method of cromoric-Hbarc

Core Paper II - GENERAL MICROBIOLOGY - I

UNIT –I

History of microbiology ,microbial dicrelsity –Prokaryotes and eukaryotes.-Ultra structure bacteria -Reproduction in eukaryotes and prokaryotes-Classification of bacteria and algal, differences between archaebacteria and Eubacteria .

UNIT – II

Physiological and biological properties-Virus – unique properties , structure and morphology -Virions ,viroids and perions -Viral replication-Bacteriophages -Fungi – properties and classifications

UNIT – III

Factors influencing microbial growth – environmental and nutritional factors , autotrophs and chemolitholeophs.-Microbial locomotion –flagellar ,gliding and amoeboicl motion-Maintenance and transport of cultures.

UNIT – IV

Sterilization – physical and chemical methods , disinfectants – modes of action and testing of disinfectants-Antibiotics – mechanism and sources of action-Antibiotic sensitivity test – Kirby ,Bauer and Stoke's method

UNIT –V

Genetic materials in bacteria : Bacterial chromosome , plasmid ,copy number , replication of plasmid , types of plasmid , episomes -Transposable elements – is element and teasposon -Mutation ,site directed mutagenesis ,DNA repair- Mechanisam of gene transfree – transformation ,transduction and conjuction-Recombination –types ,mechanism and enzyme involve

References:

Text book of microbiology – Ananthanarayanan and Jayaram Panicker
Diagnostic Microbiology
Parasitology –K.D. Chatterjee

PRACTICAL II - GENERAL MICROBIOLOGY I

Handling and Maintenance of bright held microscopy -Micrimetry measurement of micro organism-Motility determination – hanging drop method

STAINING TECHNIQUE

Simple Staining-Gram staining-Acid – fast Staining-Spore Staining-Negative staining

MEDIA PREPARATION- Liquid media - Solid media- Agar deep- Agar slant- Agar plate

PURE CULTURE TECHNIQUE- Streak plate method- Pour plate method- Spread plate method

Core Paper III – HEMATOLOGY - I

UNIT – I

Quality assurance in hematology -Sample collection-sample handling -external quality control - internal quality control-levey- jennings Q.C charts -Safety measures in laboratory-Ethics in laboratory-Relationship maintenance with patient and patient care.

UNIT- II

Functions of Hb - Hemoglobin estimation –1.physical method2.colorimeric method3.chemical method4.gasometric method

Hb variants

Hb H,Hb S,Hb C,Hb E,Hb D,

Estimation of Hb variants

Electrophoresis-HPLC

UNIT –III

Haemotomtry-RBC count ; Bulk and micropipette method-WBC count ; Bulk and micro pipette method-Platelet count-Esinophil count-retic count-PCV-ESR-red cell indices –MCV , MCH,MCHC-Clinical significate of all parameters

UNIT-IV

Automation in haematology lab -Electronic cell counter-Principle and working of coulter counter -Flow cytometry-Volume Histograms-Platelet indices

UNIT – V

CLINICAL PATHOLOGY

Formation of urine-Composition of urine-Analysis of urine-Physical examination-Chemical examination-Microscopical examination-Analysis of CSF-Physical ,chemical and microscopical examination-Analysis of semen-Physical ,chemical and microscopical examination

References:

Practical Haematology – Dacie and Lewis

Clinical Diagnosis by Laboratory methods – Todd and Sanford

PRACTICAL III- HAEMATOLOGY - I

Hemoglobin Estimation-Different methods-Colorimetric method-Physical method-Haemocytometry1.RBC Count – micropipette method - Bulk dilution method2.WBC count – micropipette method - bulk dilution metho3.platelet Count -Packed cell volume-Erythrocyte sedimentation rate-Red cell indices

Elective Paper I - ANATOMY

UNIT- I

Introduction to anatomy -Terms used in anatomy-The systems of the body-General histology-Cell structure -Cell division-The elementary tissues of the body and their functions Musculo skeletal system-Gross anatomy of all bones including long bones, flat bones, irregular bones and sesmoid bones and important cartilages of different parts are to be covered. Detailed study of the vertebral column and specific points about cervical ,dorsal and tumbar vertebrae.

UNIT – II

RESPIRATORYSYSTEM-Nasalcavity,Paranasal sinuses,Nasopharynx,oeophagus,Larynx,Hypopharynx,Trachex,bronchi,Bronchial tree,Thoracic cavity,medrasternum,pleura,lungs,position,relation,structure,bronchopulmonary segments
Cardiovascular system-Heart,pericardium,cardiac,chambers,aorta,its paired and unpaired branches,major blood vessels of extremities and brain.

UNIT – III

Digestivesystem-Oralcavity,teeth,salivaryglands,tongue tonsil,oewsopharynx,oesophagus,stomach,duodenum,small intenstine,rectum,anal canal,mesentry,omentum,peritoneum,peritoneal cavity
Liver – position,relations,structure,gall bladder,cystic duct,common bile duct,gall stones,portal circulationPancreas – position,structure,pancreatic ductSpleen-position,relation,blood supply

UNIT-IV

Genito urinary system-Kidneys,collecting system,urinary bladder and urethra in male and female .Testis ,seminal vesicles,spermatic cord prostate,penis,ovaries,fallopian tubes,uterus,vagina,vulva and clitoris.

UNIT – V

NERVOUS SYSTEM-Brain – its coverings ,different parts,cerebrum,cerebellum,midbrain,pons medulla oblongata-Corpus calosum , oranial nerves and ventricles of brain-Spinal coral – its position and structure coverings , spinal nerves and applied anatomy-Brief study of important peripheral nerves, sympathetic and parasympathetic system

References:

Anatomy - B.D. Chaurasia's Human Anatomy
Text book of Ross and Wilson
Anatomy and Physiology

SEMESTER II
Core Paper IV – BIOCHEMISTRY II

UNIT – I

Plasma proteins-Functions and properties-Albumin ; ceruloplasmin , 1-antitrypsin ,carrier proteins, immunoglobulins, multiple myeloma, clotting factors,anticoagulants, haemophilia,serum pattern in normal and abnormal states-Structural and contractile proteins collagen ,elastin muscle proteins, muscle contraction

UNIT – II

METABOLISAM OF CARBOHYDRATES-Digestion and absorption , embden –merhf ,pathway of glycolysis;cori's cycle,rate of pyruvate , gluconcogenesis,HMP pathway,glycogenolysis-Glycogen synthesis,glycogen storage diseases, fructose metabolisam ,galatose metabolisam,galatosmia,glucronicacid pathway-Regulation of blood groups ,GTT , inpaired glucose tolerance , glycosuria urea ,insulin , glucagon ,diabetis mellitus, ketosis , lacticacidosis , glycosilated Hb

UNIT – III

Metabolism of lipids 1.digetion and absorption 2.transport-Lipoproteins-Chylomicrons -VLDL -HDL –LDL-Hyperlioprotinemieas-Free fatty acids-Beta oxidations-Oddchain fatty acids-Alpha oxidation-Lipid peroxidation-Fatty acids synthesis ,elongation , desaturation , synthesis of triglecerides, adipotissue,hormone sensitive lipers , ketone bodys, ketosis -Cholesterol synthesis and regulation -Plasma cholesterol , steroid hormones, fatty liver , lipotropic factors , bile acid

UNIT – IV

Metabolisam of amino acid-Digestion and absorption -Intra organ transport -Formation of ammonia-Urea cycle-Blood urea-Glycin-Creatine-Creyatinine-Serine , serine-choline-glycin cycle, beta alanine, threonane, methionine, cysteine,gluta thione,metabolisam of sulphur , cystinuria, homocystine uria,oystathionuria,phenylalanine and tyrosine.-Melanine,catecholamines, phynyl keton uria, alkapton uria, albinisum,tryptophan,nicotinic acid synthesis-Serotonine, melatonin, glutamic acid, GABA, glutamine,aspartic acid,aspargin ,histidine,histamine,one carbon metabolisam,transmethylation reaction,branched chain amino acids,lysine,arginine,proline

UNIT – V

Citric acid cycle and biological oxidation -Citric acid cycle ,amphibolic role,regulation ,bioenergetics,redoxpotential potential-Biological oxidation ,NAD^+,FAD ,cytochromes,hydroperoxidases, oxygenases,highenergycompounds-Flow of electrons, oxidativephosphorylapiln,chemiosmotic theory , ATP synthase,inhibitors and uncouplers,superoxyide

References:

B.D.Chaurasia's Human Anatomy
Textbook of Ross and Wilson

Practical IV – BIOCHEMISTRY II

Colorimetry , Spechophotometry-Estimation of SGOT , SGPT, Gamma GT-Estimtion of LDH-ESTIMATION OF CREATINE KINASE-BICHEMICAL ANALYSIS OF BODY FLUIDS

Core Paper V – IMMUNOLOGY - I

UNIT – I

Infection : Sources ,methods of transmission Nosocomal infection.

Immunity : Types ,mechanisam of innate immunity ,inflammation ,phagocytosis ,organs and cells with immune functions .CMI ,HMI (cell mediated and flumord medical immunity)

UNIT –II

Antigens ,Epilopes ,Antibodies -Immunoglobulin –Structure ,classes and functions -Monoclonal antibodies – production and application-Antigen – antibody reactions – agglllutination,precipitation ,complement fixation,radio immunoassay ,immunofluorescence ,ELISA ,western blotting.

UNIT – III

Major histocompatibility complex ,antigin processing and presentation-Complement system ,complement activation regulation-B-cell generation ,activation, differentiation-T-cell generation ,activation, differentiation

UNIT –IV

Organ and tissue transplantation – Allograft reaction and GVH reaction-Immunology of malignancy – tumor Ag's , immunce response in malignancy-Immunotherapy for cancer-Immunotherapy – ABO and Rh blood group-Hemolytic disease of newborn

UNIT – V

Autoimmunity – Mechanism, Autoimmune disease-Hypersensitivity – I.II.III & IV -Immunodeficiency disease -Immunoprophylaris : - Vaccines : types of vaccines (live , killed and submit vaccines with eg)

REFERENCE:

Text Book of Microbiology – Ananthanarayanan and Jayaram Panicker
Diagnostic Microbiology
Parasitology - K.D.Chatterjee

PRACTICAL V - IMMUNOLOGY - I

AGGLUTINATION TESTS

ABO blood grouping -Rh – typing-Cross matching-Widal Test

LATEX AGGULUTINATION TEST

RA latex agglutination test-ASO latex agglutination test-CRP Latex agglutination test-Beta HCG test

FLOCCULATION TESTS

Rapid Plasma regain test

PREPARATION TESTS

Ouchterlong double immune diffusion-Counter immune electrophoresis (CIE)-Rocket immune electrophoresis

ENZYME IMMUNO ASSAY

Detection of HIV antibody using ELISA-Detection of HBs Antigen using ELISA

Core Paper VI – HAEMATOLOGY II

UNIT - I

Haematopoiesis : Erythropoisis : Pronormoblast ,Early nomoblast ,Intermediate normoblast,Late normoblast,Reticulocyte and RBC-Leucpoiesis : Development of granulocytes metamyelocyte ,Band form ,Mature cells ,Development of monocytes and lymphocytes -Development of platelets : megakaryoblast ,promegakaryocyte ,megakaryocyte ,platelet-Examination of blood smear-Normal colure, shape and size of cells-Abnormal types of cells

UNIT – II

Coagulation -Synthesis of haem and globin-Catabolism of Haemoglobin-Homeostatic mechanism-Coagulation : Coagulation factors mechanisam of coagulation -Extrinsic pathway and Intrinsic pathways .

UNIT – III

Dessiminated intravascular coagulation-Coagulation disorders-Haemophilias-Laboratory investigation of bleeding disorders – Bleeding time-Clotting time-Clot retraction time-Prothrombin time-Activated partial thromboplastin time-Platelet count

UNIT – IV

Systematic lupus erythematosis-Symptoms of SLE-Diagnosis of SLE-Demonstration of LE – Cell-Treatment of SLE-Physical properties of coagulation factors Fibrinogen ,protrombin ,tissue thromboplatstine,calcium ions,labile factors ,stable factors ,antihaemophilic factor,plasma thromboplastic component,stuart prower factor,antihaemophilic factor,Hageman factor,firin stabilizing factor

UNIT – V

Fibrinolysis : mechanisam and Tests -Platelet function tests-Platelet structure-Platelet function tests : -Closure time assay viscoelastometry ; platelet aggregation tests-Haemostasis analysis system

References:

Practical Haematology – Dacie and Lewis
Clinical Diagnosis by Laboratory Methods – Todd and Sanford

PRACTICAL VI – HAEMATOLOGY II

Smear preaparation ,staining-Examination of thick and thin smear-Coagulation studies-Tests for bleeding disorders-Bleeding time- duke method-Ivy's method-Clot retraction time -Prothrombian time-Activated pratical Throboplastin time-Platelet count-D-Dimer assay-Protein – C-Protein –S-Fibrinigen asscey-SLE cell estimation

Elective Paper II -INSTRUMENTATION AND BIOINFORMATICS

UNIT –I

Colurimetry :principles and application ,beerlamberts law ,turbid metry ,nephelometry ,lumino metry , flamephotometre

Microscopy ;light , scanning and transmission electronphase contrast ,polarization ,confocan and interference microscopy ,CCD camera. Introduction to atomic microscopic

UNIT – II

Principle intrumnet design ,methods,and application of chromatography. Ion exchange ,molecular ,affinity,chromatoghraphy,TLC,GC,HPLC. Basic principles and application of centrifugation. Apparatus and procedures. Differencial centrifugation , density gradient centrifugation

UNIT – III

Electrophoresis - Gel electrophoresis, PAGE, SDS PAGE ,Paper electrophoresis ,Two dimensional electro phoresis - Potentiometry ,pH metre,ion selective electrodes - Principle instrument design methods and application of polarimetry ORD ,CD,Lights scattering ,refractometry,flow cytometry ,cytometry.

UNIT –IV

BIOINFRAMATICS

Introduction to bioinframatics , internet ,datamining online data bases and search tools ,data organization , biological dat bases,structural data bases ,derived and specialized databases,DNA& RNA sequence data bases,genomic sequences,protein sequence data bases. - Distance matrix methods and parsimony - Multiple sequence alignment – tree alignment ,star alignment,pattern in pair wise alignment,genetic algoritham

UNIT – V

Sequence analysis software - SS search - BLAST ,FLASTA,CLUSTAL ,phylogenetic analysis ,construction of phylogenetic tree,evolutionary changes in nucleotide and protein sequences, structure prediction , structural alignment tool,homology modeling , drug design - Applications of bioinframatis pharmasutical industry,immunology,agriculture,forestry,basic research ,geo informatics,legal ethical and commercial condidration

REFERENCE:

Biophysical Chemistry Principles and Techniques – Upadhyay ,Nath

SEMESTER III

Core Paper VII – BIOCHEMISTRY -III

UNIT – I

Chemistry and metabolism of nucleo tides-Purine bases pyrimidine bases ,nucleosides, nucleotidas,biosynthesis of purine nucleotides slavage pathway-Degradation of purines, uric acids, gout,synthesis of pyramidine, nucleotides, regulation of pyramidine , nucleotide synthesis,disorder of pyramidine metabolisam-Deoxiribonucleotide formation , degradation of pyramidine, nucleotide

UNIT – II

DNA structure replication and protein bio synthesis-Structure of DNA, Watson-Crick model, nucleoproteins, introns and exons , cyistron ,replication ,DNA polimerases , okazaki fragmints , cellcycle, repair enzymes ,DNA damage ,restriction endonucleaces-mRNA transcription – initiation alongation ,termination ,post transcriptional processing ,spliceosome,reverse transcriptors ,t-RNA ,r-RNA,ribosomes.protein biosynthesis,genetic code,translation, initiation ,elongation , termination,inhibitors of protein synthesis

UNIT-III

molecular genetics and control of geneexpression-principle of heriditory , dominats ,autosomalrecessive ,X-linked recessive ,population genetics ,gene location on chromosomes ,mutations ,recombination mutagens, gene amplification, gene switching ,transportation of genes ,somatic recombination ,enhancer, virus ,RNA virus, lysogeny ,antiviral agents

UNIT – IV

Recombinant DNA technology -restriction of endonucleases, vectors, clonine,selection ,gene libraroy ,southernblot, ininsitu hybridization ,northen blot,western blot ,chimiric molecules, clinical application -DNA fingur printing ,restriction fragment length ploymorphisim ,geen therapy ,DNA sequency ,PCR, hybridoma technology and monoclonal antibodies.

UNIT – V

Hemoglobin -Structure of haem, biosynthesis of haem, stunt bilirubin , porphyrias, catabolisam of haem,bile pigment,hyper bilirubin emiyas,globin, Hb,quarternary structure ,transport of gases, oxygen dissocation curve-Fetal Hb , carboxiHb,meth Hb,Hb varients ,Anemias

REFERENCE:

Clinical Biochemistry – Teitz
Practical Biochemistry – Harold Varley
Text book of Biochemistry – D.M.Vasudevan and Sreekumari.S

PRACTICAL VII – BIOCHEMISTRY-III

Paper chromatography of aminoacids-Thin layer chromatography of aminoacids-Ion exchange chromatography of aminoacids-Serum electrophoresis-Estimation of 17-kelosteroids in urine-Clour reactions of amino acid

Core Paper VIII - MEDICAL BACTERIOLOGY AND MYCOLOGY I

UNIT – I

Morohology and ultra structure of bacterial cell –Archaebacteria, eubacteria ; structure and classification –growth requirement of bacteria : nutritional and environmental factorn requirements -Endospore formation ,types of bacterial spores -Bacterial growth ,growth curve-Classification of bacteria , - phenotypic and enotypic classification

UNIT – II

Identification of bacteria

Hanging drop techniques ,staining techniques (simple , geams staining ,AFB ,Sponge , negative staining)-Biochemical identification – indole ,methyl red, voges proskrauer , citrate tests, urease , starch , hydrolysis , catalase , oxvidase , TSI etc.

UNIT – III

Detailed study of morphology ,cultural characteristics ,Biochemical , epidermiology ,pathogenesis, laboratory diagnosis , prophyloxis and treatment of the following bacteria .-Entrobacteriaceae ,pseudomonas , vibrocholerae

UNIT –IV

General characters of Fungi –yeast and mold.Nutrition in fungi .cultivation of fungi culture media and cultural characters.Methods for isolation of fungi.Staining methods used in mycology wet and differential staining .Study of microscopic morphology ultra structure of yeast.

UNIT-V

Reproduction in fungi-Asexual and Sexual method classification of fungi principles and approaches .Antifungal agents –mechanism of action

References :

Text Book of Microbiology – Ananthanarayanan and Jayaram Panicker
Diagnostic Microbiology
Parasitology - K.D.Chatterjee

PRACTICAL VIII - MEDICAL BACTERIOLOGY AND MYCOLOGY I

Study of normal flora human body-Isolation ,charactrisation and identification of pathogens from various clinical specimens-Study of morphology ,cultural and biochemicalcharacters of common bacterial pathogens-Study of antibiotic sensitive of common pathogens-Study of microbial flora of air in various localities-Microbial analysis of water-Microbial analysis of milk-Procedure of clipping for leprae bacilli-Preservation of stock culture-Bacteriology of food
FUNGAL INFECTIONS-Candida albicans-Crypto coccus neoformaqns-Aspergillus infections
DERMATOPHYTE INFECTIONS-Microsporum Canis-Epidermophyton floccusum-Trichophyton rubrum-Trichophyton mentagrophytes

Core Paper IX – HAEMATOLOGY III

UNIT – I

Reception ,labeling and recording laboratory investigation

Reception of laboratory investigation-Venepunture-Labeling of lab investigation-Barcode used in blood banks-Preparation of buffer-Preparation of distilled water-Preparation of reagents-Cleaning of glass wares

UNIT – II

Blood banking -Blood group antigen and anti bodies-Blood group system-ABO blood group, Bombay blood group, Rh blood group system – other blood group system-Inheritance of blood group -Haemoliytic diseases of new born-ABO grouping -Forward typing-Reverse typing – Du testing

UNIT –III

Cross maching – major cross maching , minor cross maching-Direct coomb's test , indirect coomb's test-Blood transfusion-Screening of donors, anticoagulants used in blood banks, blood transfusion-Transfusion reaction-Blood and blood components

UNIT – IV

Autologous transfusion-Transfusion transmitted disease-Transfusion therapy -Blood preservation and storage-Changes occurred in stored blood

UNIT – V

Orientation of routine blood bank-Quality assurance- general condition , equipment reagents, donar processing -Stemsal processing – storage and transplantation -Disposal of waste and biologically hazard sunstance in the blood bank

References:

Practical Haematology - Dacie and Lewis
Clinical Diagnosis by Laboratory Methods – Todd and Sanford

PRACTICAL IX – HAEMATOLOGY-III

Preparation of Reagent-Blood banking-Blood grouping –slide method-Forward grouping / tube method-Reverse grouping-Du test-Cross matching – major cross Mtch-Minor cross match-Direct coob's test-Indirect coob's test-Blood transfution

Core Paper X - HISTOPATHOLOGY

UNIT – I

Introduction -Specimen collection – autopsy ,biospsy -Examination of fresh specimen-Fixation -Functions of fixative-Classification of fixative – simple fixative , compound fixative-Other methods for fixation -FNAC – procedure and staining

UNIT – II

Tissue processing-Fixation -dehydration-dehydrating agent-clearing – clearing agent-impregination – impregination reagent-embedding – procedure -automatic tissue proessing -section cutting-different types of microtomes-rotary ,roking.sledging , sliding and freezing microtomes-microtom knives – part of a knife -honing and stropping -automatic tissue sharpener-section cutting , adhesives

UNIT – III

Staining of smears-theory of staining -types of stainig – mordants-haemotoxlin and eosin staining-PAS staining-Special stains-Stain for carbohydrates and amyloid-Mucicarmine -Microwave alcian blue -Microwave colloidal iron method-PAS method-Bet's carmine method for glycogen-Congored ameloid method

UNIT – IV

Stain for connective tissue-Jone's method for basement membrane -Microwave alcian blue PAS method for Kidney section -PAS method for skin and liver transplant sections -Gomori's one step trichrome method -Masson's trichrome stain-Vangieson's method for collagen-Verhoeff's elastic stain -Modified gomoris method for reticulin

Demonstration and identification of pigment and metals-Lison's method for Hb-Aluminon stain for aluminium-Microwave Rh o damine copper method-Pearls method for ferric iron-Dahl's methods for calcium -Lonkossa's method for calcium-Silver method for mercury-Hall's methods for bilurubin-Lillie's fernous iron – uptake method for melanin-Gomari's method for urates

UNIT-V

Museum technique -Collection of museium specimes-Preparation of specimens-Storage of specimes-Mounting – methods of mounting

Cancer immunology-Cancer -Carcino genesis-Immune response to cancer –Ongogens-Tumor markers

REFERENCE:

Culling – Histopathology Technique

PRACTICAL X - HISTOPATHOLOGY

Tissue processing-Fixation-Clearing-Impregnation-Embedding-Blocking-Microtomy-Section cutting-Slide preparation-Staining-Periodic acid sotiff stain-Haematoxygen and eosin stain-Special stains-Perl's Prussian blue staining-Reticulin stain

Semester IV
Core Paper XI – BIOCHEMISTRY IV

UNIT- I

Kidney function tests-Formation of urine,glomrular functions,functions of the tubules,renal threshold reabsorption of the water, renal function tests-Urine analysis ,proteinuria,clearance tests,creatinine clearance, urea clearance ,tubular functions tests, acids and bases, renal regulation of Ph-Cellular buffers, disturbances in acid-base balance-Anion gap,metabolic acidosis ,metabolic alkalosis ,fluid and electrolyte balance ,osmolality ,renin angiotension system, hypotonic and hypertonic contraction.

UNIT-II

Gastrointential functions tests-Gastric functions ,hydrochloric acid secretion, gastric juice analysis -Pancreatic secretion, malbsorption -Liver function tests-Serum bilirubin, total protein, SGOT,SGPT,ALP-Jaundice ,conjugation

UNIT –III

Vitamins-Vitamin A- role in vision-Vitamin D,Vitamin E,free radicles,vitamin K-B-complex group of vitamins-Thiamine ,Riboflavin ,Niaic,Pyridoxine(B6) pantothemic acid, Biotin, folic acid-Vitamin B12-Ascorbic acid (vitamin C) –deficency manifestations

UNIT – IV

Mineral metabolisam-Calcium, calcitonin ,phosphorous, magnesium sodium, potassium, chloride, sulphur, iron –absorption and transport-Iron deficiency ,haemochromatosis, copper, cerloplamin, iodine, manganese zinc, molybdenum, cobalt ,nickel, chromium, fluorine, selenium

UNIT – V

HORMONES-General properties of hormones, mechanism of action ,radio immunoassay, ELISA,ADH, oxytocin, hypothalamic releasing factors-Hormones of anterior pituitary ,growth hormone, ACTH, endorphins, TSH, gonadotrophis, Prolactin ,thyroid hormones, assessment of thyroid functions-Gastrointestinal hormones, catacholamins adrenal cortex, synthesis of steroid hormones, actions, abnormal secretion, sex hormone

REFERENCE:

Clinical Biochemistry – Teitz
Practical Biochemistry – Harold Varley
Text book of Biochemistry – D.M.Vasudevan and Sreekumari.S

PRACTICAL XI - BIOCHEMISTRY IV

ANALYSIS OF BIOCHEMICAL PARAMETERS-LFT-RFT-TFT-HORMONAL ASSAY

Core Paper XII - VIROLOGY AND PARASITOLOGY I

UNIT – I

General morphology and ultra structure of viruses -Introduction -Introduction to virology ,size and shape of viruses ; general characteristics of viruses -Ultra structure of viruses Morphological categories , Helical Icosahedral envelop and complex -Genetic material and viral genome

UNIT –II

Cultivation and viruses-Cultivation of viruses in embryonated eggs, experimental animals and cell culture ;primary and secondary cell culture suspension of cell culture and monolayer cell cultures-Assays of viruses :- physical and chemical methods of assays , protein nuclear acid, radioactivity rules , electron microscopy ,plaque method , pock counting method end point method and infectivity of plant viruses.

UNIT – III

Morphology ,mode of transmission ,pathogenesis ,Lab diagnosis ,prophylaxes and treatment of the following viruses -Pox (vaccinia , variola) Herpes (HSV , Varicella) , Adeno ,Papova (HV -14) ,Hepanda (HBV) parvo viridae.

UNIT-IV

Parasitology ;general Concepts,Introduction to Parasitology ,Classification ,Host parasite relationship.

Laboratory technique in Parasitology – examination of faeces for ova and cysts ,verm burden. Concentration methods, Flotation, Sedimentation technique, staining by iron heamotoxylin methods, blood smear examination, thick/thin Smears, Cultivation of protozoal parasites.

Protozoology ; Pathogenic mechanisms ,disease transmissions and their life cycles, entamoeba and human disease plasmodia, leishmania, Trypanosoma, Giardia ,Trichomonas ,balantidium ,Toxoplasma ,Cryptosporidium and other protozoan parasites causing human infections. Influence of parasitic infections on immunocompromised hosts.

UNIT -V

Helminthology : classification ,Cestodes ,Taenia
,Solium,Tsaginata,T.echinococcus,trematodes,Fasciola hepatica,Fasciolopsis
buskii,Paragomimus westermanii,Nematodes
,Ascais,Schitosomes,Anchylostoma,Trichuris,Trichinella,Enterobius,Strogyloids and Wuchereria their

References :

Text Book of Microbiology – Ananthanarayanan and Jayaram Panicker
Diagnostic Microbiology
Parasitology - K.D.Chatterjee

PRACTICAL XII – VIROLOGY & PARASITOLOGY

VIRAL CULTIVATION METHOD –ECG INOCULATION-Amniotic route-Allantoic route-Chorio allantoic route-Yolk sac route

SEROLOGICAL TESTS-Detection of HIV antibody using ELISA-Detection of HBs anigen using ELISA-Detection of HCV antibody using ELISA-Compliment fixation test-Haemagglutination testHaemagglutination Inhibition test-life cycle,Tranmission ,pathogenicity and Lab Diagnosis.

BLOOD SMEAR EXAMINATION

Examination for malarial parasites-Examination for microfilarise

Core Paper XIII – HAEMATOLOGY IV

UNIT-I

ANAEMINA-Classification of Anaemia-Morphological classification –Normocytic nomochromic – Hypochromic microcytic-Normochromic macrocytic –Normochromic microcytic –Anaemia-Eetiology classification-Iron deficiency anaemia-Causes of iron deficiency –Laboratory findings

UNIT – II

Aplastic anaemia L-Laboratory findings – peripheral picture and bone marrow Megaloblastic anemia-Vitamine B12 and folic acid deficiency **–**Laboratory findings –peripheral picture and bone marrow

UNIT – III

Haemolytic anaemia –Common laboratory feature-Sickle cell anaemia-Thalassemia – βthalassemia –α thalassemia

UNIT – IV

Leukaemia – chronic and leukemic –Chronic lymphoid leukemia-Chronic myeloid leukarmia Acute myeloid and acute lymphatic leukaemia-FAB classification of leukamicesSymptoms,lab diagnosis and treatment of leukaemias-Leukaemoid rection

UNIT – V

Bone marrow aspiration

Procedure –preparation of smear staining of smear-Staining : PAS ; may grunwald –giemsa stainPaliative care unit

References:

Practical Haematology - Dacie and Lewis

Clinical Diagnosis by Laboratory Methods – Todd and Sanford

PRACTICAL XIII – HAEMATOLOGY IV

Detailed study of blood picture-Examination and identification of different types of anaemias-Reticulocyte count-Examination and identification of different types of Leukamias

ELECTIVE PAPER III: NANOBIOTECHNOLOGY

UNIT –I

History –bionanotechnology –concept and future prospects –application in Life Sciences –Terminology –nanotechnology ,biotechnology ,bionanatechnology ,biogenic nanoparticles,nanomedicine,nanowires,quantum Dots,nanocomposite ,nanoparticles.

UNIT –II

Molecular nanotechnology – nanomachines –collagen .uses of nanoparticles –cancer therapy –manipulation of cell and biomolecules .Cytoskeleton and cell organelles.Types of nanoparticles production-physical ,chemical and biological .Biosynthesis of nanoparticles by various groups of microorganisms,Microorganisams synthesizing silver nanoparticles,Mechanism involved in silver nanoparticles biosynthesis ,Process design for industrial scale synthesis of nanoparticles

UNIT – III

Nanoparticles –types ,functions –Silver ,gold and titanium ,Physical and chemical properties of nanoparticles .Interaction of nanoparticles with biomolecules ,Charcterization of nanoparticles –UV –Vis spectroscopy ,Electron Microscopy – HRTEM ,SEM,AFM ,EDS,XRD,F-IR and DLS

UNIT – IV

Uses of nanopartcles in biology ;Drug delivery –protein medicated and nanoparticle mediated Uses of nanoparticles in MRI ,DNA and Protein Microarrays .Nanotechnology and nanoparticles in health sectors .Toxicology in nanoparticles –Dosimetry.

UNIT – V

Advantages of nanoparticles –drug targeting ,protein detection,MRI ,development of green chemistry –commercial viability nanoparticles .Disadvantages –health risk associated with nanoparticles ,inadequate knowledge on nanoparticles research .

References :

An Introduction to Biotechnology – Ethud Gazit

ELECTIVE PAPER IV - RESEARCH METHODOLOGY

UNIT – I

Introduction

Meaning-Objectives-Types of research-Significance of research -Research problem-Necessity of defining of the problem-Techniques involved in defiency a problem-Research design-Features of good design-Hypothesis -Sources and types of hypothesis-Testing of hypothesis

UNIT – II

Scaling Technique and concept of sampling-Measurement scales-Levels of measurements-Techniques for scaling-Ralaibility in scaling-Limitations concept of sampling-Sampling process-Features and limitations types-Techniques and solution methods-Sample size and distribution

UNIT – III

Data collection -Sources of information primary and secondary data-Methods of collecting 1^0 data-Designing a questionare-Pretesting in the questionnaire-Editing 1^0 data-Sources of 11^0 data and its uses-Sensus and sample panals and simulations -Experiments

UNIT – IV

Data presentation, processing and analysis-Classification of data – objectives & types of classification-Guidelines for class selection-Charting of data-Bar chart-Histogram-One dimensional & two dimensional graph-Meaning-Importance-Process of data analysis-Types of analysis-Measure of central tendencies-Measures of dispersion-Bivariate analysis-Mutiveriated analysis

Correlation regression

UNIT – V

Interpretation & report writing-Meaning and importance of interpretation-Significance of report writing -Steps in writing report -Layout of the research report-Types of report -Mechanics of writing a research report

Role of computer in research

REFERENCE BOOK:

C R KOTHARI – Research methodology.

PROJECT AND VIVA