ANDHRA PRADESH PARA MEDICAL BOARD

HYDERABAD

(Established Under the Andhra Pradesh Para Medical Board Act, 2006)

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Syllabus for

DIPLOMA IN MEDICAL LAB TECHNICIAN COURSE
(TWO YEARS COURSE)

B.N.S. Kumar
Secretary

In view of representation from the Faculty the Syllabus for the 1st year in all Para medical courses is modified accordingly and kept on website.

DIPLOMA IN MEDICAL LAB TECHNICIAN COURSE (TWO YEARS COURSE)	
Syllabus for First Year	
Paper-I	**BASIC HUMAN SCIENCES** A) Basics of Anatomy B) Basics of Physiology C) Basics of Biochemistry D) Basics of Bio-statistics
Paper-II	A) Basics of Pathology B) Basics of Blood Banking C) Basics of Microbiology D) Basics of Central Sterilization Services.
Paper-III	A) Hospital Awareness B) Familiarization of different tables/tubes in surgical department, Surgical Awareness, preparation of patient for surgery. C) Patient related services. D) Communication and Computer Skills, Audio & Visual Aids.

DIPLOMA IN MEDICAL LAB TECHNICIAN COURSE
(TWO YEARS COURSE)

Syllabus for Second Year

Paper-I	A) Pathology, Blood Banking B) Detailed Techniques of Clinical Pathology, Histopathology, Cytopathology, Biopsy. C) Haemostatic and Pathology, Forensic Lab Investigation (Autopsy), Routine staining techniques in Haematology, D) Clinical Pathology & Investigation.
Paper-II	A) Microbiology, Parasitology and Microbes (Bacteriology) B) Mycology C) Virology, immunology Techniques. D) Animal Care
Paper-III	A) Biochemistry, Techniques of Biochemistry & Metabolism B) Clinical Aspects, Serological Investigations and Immunology Techniques, Investigation of various fluids in the Body, Complete Urine Analysation. C) Laboratory Management, Fertility Study Including DNA & RNA Investigations. D) Instrumentation Study, Instrument Measurement & Critical Care equipment.

1st YEAR

PAPER-I

Basics of Anatomy & Physiology

Basics of Anatomy

1. Introduction to Human Anatomy
2. Cell- Tissues Properties, Different Tissues
3. Digestive System & Hepatobiliary System
4. Respiratory System
5. Cardio Vascular System
6. Lymphatic System
7. Bones and Joints
8. Nervous System
9. Endocrine System
10. Sense Organs
11. Excretory System
12. Reproductive System

Basics of Physiology

1. Introduction to Human Physiology
2. Blood
3. Cardio Vascular System
4. Lymphoid System
5. Digestive System
6. Respiratory System
7. Nervous System
8. Endocrine System
9. Excretory System
10. Reproductive System
11. Sense Organs

Basics of Bio – Chemistry

1. Introduction to Basics of Bio-chemistry including code of ethics for Medical Lab Technicians and Medical Lab Organization.

2. Reception, Registration and bio-chemical parameters investigated.

3. Glassware and plastic ware used in a bio-chemical laboratory.

   a. Glassware:
   1) Types of glass and composition.
   2) Types of glassware used, their identification, application & uses.
   3) Cleaning, drying, maintenance and storage of glassware.

   b. Plastic ware: Brief outline

4. Instrumental methods of Bio-chemical analysis.

   a. Colorimetry :

   Visual and photoelectric methods, instrumentation, principle & laws involved construction, operation, care and maintenance, applications.

   b. Spectrophotometry

   Principle and theory, types, construction, & applications

5. Basic lab operations like

   a. Separation of solids from liquids

   1. Centrifugation: Principle, Different types of centrifuges care and maintenance, applications.
   2. Filtration using funnel.
   3. Weighing : Different types of balances used, care and maintenance.
   4. Evoporation
   5. Distillation
   6. Refluxing
   7. Drying different salts and dessicotion.

6. Water Chemicals and related substances
    a. Purity of chemicals
    b. Corrosives
    c. Hygroscopic Subsatance

7. Prevention, Safety and first aid in lab accidents.

8. Collection of Specimens

    a. Blood: Types of Spencimens, Collection, Precations during collection processing and preservation.

    b. Urine: Types of Specimens, Collection, Precautions during collection, Processing and Preservation.

9. Urine biochemical parameters.

10. Units of measurements

11. **Solutions :** Types based on solute and solvent, Types based on method of expressing concentration, calculations.

12. **Carbohydrates:** Definitions, Biological importance, Acid value, iodine value, saponification value.

13. Amino acids and Proteins Definition, Biological importance, Classification, Qualitative tests.

14. **Diagonistic tests :** Blood sugar, Glucose tolerance test, Blood urea, Serumuric acid, Serum creatinine.

15. Vitamins and Minerals

    a. Vitamins:
    Water Soluble vitamins, Fat Soluble vitamins, Sources, Daily requirements, Deficiency diseases.

    b. Minerals :

    Sources, Daily requirements, Deficiency diseases.

Paper-II

Basics of Pathology

Introduction to Pathology in brief

1. Urine – Analysis – Physical Examination – specific gravity PH, reaction,

   colour.

   Chemical Examination – Sugar Albumin,

   bile salts,

   bile Pigments etc.

   Microscopic,

   Sediment for RBC,

   WBC,

   Epitheleal cells,

   casts,

   crystals,

   parasites.

   Preparation of Reagents, procedure and principle of tests.

2. **Sputum Analysis** – Physical Examination,
   Preparation and staining smear for Microscopic Examination.

3. **Semen Analysis** – Physical Examination Microscopy – counting,
   motility,

   staining,

   Morphology,

   abnormal and normal forms.

4. **Body Fluids** – Differential count of Peritoneal, pericardial, pleural fluids and CSF, charging chamber, Identifying and counting the cells.

Basics of Microbiology

I. Introduction to Microbiology in brief

Definition,
History

II. Microscopy

a) Principle working and maintenance of compound Microscope.
b) Principle of Flourescent microscope, Electron Microscope, Dark Ground Microscope.

History
Types of Microscope: (a) Light Microscope, (b) DGI, (c) Fluroscent, (d) Phase contrast.

(e) Electron Microscope : a). Transmision**,** b) Scanning, Principles of operational mechanisms of various types of Microscopes.

III. Sterilization and disinfection – classification and Methods of sterilization.

Sterilization: Definition, types and principles of sterilization methods:

(a) Heat (dry heat, moist heat with special reference to autoclave, (b) Radiation, (c) Filtration, efficiency testing to various sterilizers.

Antiseptics and Disinfectants :

Definition, types and properties, mode of action, uses of various disinfectants, precautions while using the disinfectants, qualities of a good disinfectants, testing efficiency of various disinfectants.

1) Principle and Methods of sterilization by heat

    a) By Dry Heat, flaming, Red Heat, Hot air oven, incineration.
    b) By Merit Heat-pasteurization, Inspissation, tyndalisation, autoclave.

2) Filtration Methods

3) Ionising Radiation – Disinfection, Mode of action and uses of important chemical disinfections – Phenol and Phenolic compounds, alcohols, halogens, dyes and acids and alkalies.

4) Gaseous Methods of sterilization.

IV. Cleaning, drying & Sterilization of Glassware disposal of contaminated material i.e. clinical infective material inoculated culture media. Handling and Disposal of Biomedical waste.

V. **Biomedical waste management in a Microbiology Laboratory :** types of the waste generated, segregation, treatment, disposal.

VI. Morphology and classification of Bacteria Sp. of cell, capsule, flagella, spore, Anaerobic Methods of cultivation of Bacteria.

Paper-III

A. Hospital Awareness

A brief idea of hospital as on organization management different units of a hospital effective communication skills, communication channel

Maintenance of records
Effective leadership
General patient care
Medical terminologies
Vital signs
Unit preparation
Transporting & Transferring patients
Sterilization Techniques
Control of infection
Medication – Oral & parenteral
Admission – Discharge procedure
Bandages

Practicals : Posted in ward & taught clinically

A. Surgical Department

Familiarization of different tubes

1. Drainage tube
2. Post Operative Exercises
3. Post OP Management of Patient
4. Shock of Management
5. Changing Surgical Dressing.

1. Preoperative preparation of patient
2. Preanesthetic preparation
3. Assisting in operation
4. Anaesthesia
5. CSSD

1. Recovery room
2. Movement of papers
3. Scheduling of theaters
4. Supplying of articles
5. Specific area practices
    a. As scrubnurse
    b. As circulating nurse

D).Communication and Computer Skills, Audio & Visual Aids.

COMMUNICATION	Process Types of communication Strategies for effective Communication Barriers of communication
SOFT SKILLS	Presentation with the use of visual aids such as power point Conversation Extempore speech, usage of effective language for communication of health work. Case studies and situational analysis Survey and Reporting
COMPUTER	Computer basic MS – Office MS – Word MS – Excel MS – Power Point
INTERNET CONCEPTS	Browsing Down- Loading Use of Slide Projector

2nd Year
Paper-II

A).General Microbiology

Microbiology & Techniques

Methods of Collection of clinical specimen for Micro-Biological investigation like sputum – pettroff method of concentration , urine, swabs, stool, blood, CSF and aspirations.

Processing of clinical specimen collected for Isolation and identification of organism.

Compostion and preparation of staining reagents and different methods of staining in brief.

a) Simple staining
b) Gram Staining
c) Spore staining
d) Capsular staining
e) Zeihl Neelson staining
f) Albert staining
g) Negative staining
h) Flagellar staining
i) Flourescent staining

Classification of culture Media composition and preparation and uses in brief.

a) Basal Media – Peptone water, Nutrient broth, glucose broth.
b) Enriched Media – Blood agar, Loefflers serum slope, chocolateagar
c) Enrichment Media – Selenites broth, tetrathionatebroth Alkaline peptone water.
d) Differential Media – Maconkeys Media.
e) Selective Media – Lowenstcin Jenson Media, Potassium tellurite Media, TCHS, Wilson and Blair Media Deoxycholate citrate agar media.

Blood culture media in brief Glucose broth, Hartleys broth, bile broth sugar Media for Bio-chemical Reaction.

Robertson cooked Meat Media, Thioglycolate media, Media and Reagents for different Biochemical eaction i.e. Indole test, V.R. tests, M.R. test, citiate, urease, triple sugar Iron agar, Oxidase, catalase test, Nitrate reduction test, Pheny alkaline deaminase test, glucose phosphate broth, gelatin liquefaction. Sabourauds dextrose Agar, PDA.

Classification of bacteria and Features

On bacilli of differential staining Gram.s Stain .(its modification) ZN .Stain (its modification) On basis of their structure,

Pre-remit of sample collections-general & disease specific their processing & storage

Identification of bacteria on basis of cultural characteristics ,morphological , & serological features Staphylococcus & streptococcus including pneumonococcl, Family Enterobacterical, Haemophilus bordetlla, Corynebacterium, Nessieria .Treponema, Leptospira ,mycoplasma,chlamydia & Trieagents.

Identification of pathogenic & nonpathogenic fungi

Morphologically:biochemically;Yeast:Dermatophytes.Cryptococococci,Histoplasma;Nocardia.Common lab fungal contaminants

Characteristic diagnostic serological tests in diseases

CholeraTyphoidTuberclosis ,VDRL.TPHA, Satellitism.ELISA PCR

Uerology Viral genome

General morphology & ultra structure of virus and growth cycles Unit-7 Their types & symmetry

Cultivation of virus in embryonated eggs: primary culture & secondary culture
Assay methods: Physical & chemical.

Classification Unit-10 On basic of structure
On basic of nuclear material

Clinical diagnosis serological techniques for identification of bacteria: TMV Bacteriophages.

HIV .SV 40 ,myxo & paramyxovirus.

B).Detailed techniques of Clinical Microbiology

Classification of bacteria

On bacilli of differential staining Gram.s Stain .(its modification)
ZN .Stain (its modification)

On basis of their structure, Pre -remit of sample collections-general & disease specific their processing & storage,

Identification of bacteria on basis of cultural characteristics, morphological. & serological features.

Features Staphylococcus & streptococcus including pneumonococcl, Family Enterobaclerical, Haemophilus bordetlla, Corynebacterium, Nessieria .Treponema. Leptospira mycoplasma,chlamydia & Trieagents.

Characteristic diagnostic serological tests in diseases

Cholera,Typhoid,Tuberclosis .VDRLTPHA, Satellitism.ELISA PCR.

Uerology General morphology & ultra structure of virus and growth cycles
Introduction to clinical microbiology

Public health, diagnostic testing, pharmaceutical sales, and basic research and development

Microbial pathogenicity including both overt microbial factors and complex interactions with the host that produce symptoms of disease

The cellular, biochemical, molecular, and genetic bases for modern understanding of microbial disease will be included

Epidemiology of Infectious Disease

The causes, distribution, control, and prevention of infectious disease in human populations.
Basic epidemiological concepts, including study design, analysis, and modeling of infectious disease data, establishing causal relationships, detecting confounding factors

Safety Measures in Clinical Microbiology
Glassware used in clinical Microbiology Laboratory: Care and Handling of Glassware, cleaning of glassware.
Equipments used in clinical Microbiology Laboratory : care & Maintenance..

C).Metabolism

Introduction to Metabolism and Bioenergetics
Universal carrier molecules
Bioenergetics of phosphate compounds
Regulation of metabolic processes
Glycolysis .Release of energy from glucose
Phases of glycolysis
Energy yield from the pathway
Anaerobic glycolysis
Sources of glucose for glycolysis

The Citric Acid Cycle

Cellular respiration, Stages of cellular respiration
The Citric acid cycle, Phases of reactions of citric acid cycle
Additional Pathways in Carbohydrate Metabolism
Pentose phosphate pathway. Glyoxylate cycle, Gluconeogenesis. Glycogen synthesis. Starch synthesis Section-3 Electron Transportand Oxidative Phosphorylation

Introduction

Components of electron transport chain
Electron Transport-Carriers and arrangement of carriers into complexes, pathway of Electron Transfer through the Carriers
Proton Motive force

Photosynthesis

Basic process of photosynthesis, physics of light
Chloroplast structure
Light reaction and photophosphorylation
Dark reaction - Calvin cycle
Photorespiration

Lipid Metabolism
Lipid digestion and absorption
Fatty acid oxidation
Ketone body metabolism
Fatty acid biosynthesis
Cholesterol biosynthesis
Eicosanoids
Synthesis of phospholipids and sphingolipids.

D). Microbes : (Bacteria, Fungi) :

Classification of Microbes with special reference to prokaryotes & Eukaryotes, Morphological classification of bacteria, bacterial Anatomy (Bacterial Cell Structures).

Host Microbe Relationship.

Growth and Nutrition of Microbes :

General nutritional & other requirements of the Bacteria, nutritional types of the bacteria autotrophs, Heterotrophs, Phototrophs, Chemotrophs, Saprotrophs, Ithotrophs & Organotrophs, Photoautotrophs, Chemoheterotrophs, Photoorganotrophic, Heterotrophs, Chemolithotrophic, Autotrophs Mixotrophic, Physical conditions required for growth, normal growth cycle of bacteria (growth curve), types of Microbial .

Cultures : Synchronous, static, continuous culture.

Paper-I

A).Clinical Pathology

1. **Urine Analysis:** Composition of normal urine, collection of urine specimens, routine urine analysis-physical chemical & microscopic examination.

2. **Stool Analysis :** Composition of normal stool, collection of stools specimens, routine stool analysis-physical, chemical & Microscopic examination.

3. **Cerebrospinal Fluid Analysis:** Composition of normal CSF, collection and processing of specimens, routine CSF analysis-physical, chemical & Microscopic examination.

4. **Semen Analysis:** collection of semen, routine semen analysis-physical, chemical & Microscopic examination.

5. **Sputum Analysis :** methods and presentation in collection of sputum physical, chemical & Microbiological examination, concentration method for AFB (Acid Fast Bacillus).

Morphology and Special Hematological Tests

Normal morphology count Isolation from whole blood & count.

Effect on count & morophologyof physiochemical parameters & the diseased state

Red cell anomalies & their relevance w.r.t normal & diseased state

Blood Transfusion

Pre-requisite ment &the complication of mis-matched transfusion, Methods of blood matching
White blood cells & platelets

Morphology count & methods of isolation

Effect on count & morophologyof cell by the physiochemical parameters.diseased

State & the relevance of condition of the diseases

Anaemia's Defination(in general) & courses

Types of anaemia & their classification, Physiochemical

Characteristic features & eterology of a plastic anaemia, haemoloyti megaloblastic

Clinical features & diagonosis

Definition (in general) & their etrology

Classification of leukaemia. FAB classification. Etiologies physiochemical

Features of different Type of leukaeias. with reference to clinical states

Diagonosis of different types of leukaemias

Coagulation studies

General pathways (intrinsic & extrinsic)
Properties (physiochemical)mode of action of coagulation factors
Platelet studies .platelet function tests (for different Coagulation factors)

Effect of promoters & inhibitors at diff steps in coaguation;their solution & mode of action
Diseases associated with coagulation disorders ,their etrology & characteristics Features

Red Cell mass studies

Chemical method & radioactive methods
Red Cell function studies

Reception, labeling and recording of laboratory investigations
Cleaning of glassware, pipettes, E.S.R tubes and counting chambers
Preparation of capillary pipette, distilled water, reagents, buffers collection of blood
Preparation of blood smear
Staining of blood and bone marrow smears.
Measurement of hemoglobin, counting of leucocytes, erythrocytes, platelets and reticulocytes.

Recognition of blood cells in peripheral blood smear,Determination of haematocrite and E.S.R. preperation of haemolysate and determination of alkali resistant hemoglobin, paper electrophoresis of hemoglobin.

Formation of Blood:

(a) Erythropoiesis,

(b) Leucopoiesis,

(c) thrombopoiesis.

1. Collection and preservation Blood sample for various Haematological estimation.

2. **Haemoglobin:** Definition and types, normal values, synthesis and breakdown, haemoglobin estimation techniques, principles & procedures for HB estimation, errors involved and means to minimize errors for HB estimation.

3. **Total Leucocytes count (TLC):** Normal values, clinical significance, method of estimation, source of errors.

   Haemoglonin Estimation-
   Materials, procedure, of Tallquist, sahlis. Alkali haldanis, cyanmeth aemoglobin and S.G. method, advantages and disadvanteas and clinical significance.

4. **Differential Leucocytes Count(DLC):** Normal values, clinical significance, sources of errors and means to minimize them.

   Erythrocyte sedimentation rate(ESR) : Normal values, definition, principle and procedure to determine EST, factors influencing ESR and clinical significance, errors included and their minimization.

   Estimation of PCV-

   Macro & Micro Method, procedure filling the tube, centrifuginy and reading, advantages of each – normal values and clinical significance Estimation of Erythrocyte indices – calculation and importance MCV, MCH, MCHC, RDW, index.

5. **Packed cell volume/Haematocrit value :** Normal values, estimation by macro and Micro method, Merits and demerits of estimation method, factors influencing PCV, clinical significance.

6. **Red cell indices (RCI) :** Definition, procedure and general formula for calculating indices, clinical significance, normal value, numerical problems related to RCI.

7. **Absolute eosinophil count:** Principle and procedure for counting AEC, clinical significance, normal value, risk of error involved if any.

8. **Reticulocyte count:** Principle and procedure, clinical significance, normal value, risk of error involved if any.

   Reticulocyte Count:

   Methods (dry & wet) staining, diluting fluids, normal Morphology and values, clinical significance.

9. **Platelets count:** Normal values, procedure and estimation, clinical significance, errors and re-correction.

   Platelet count:

   Morphology and functions of platelets diluting fluids, procedure, formula for calculation and clinical significances.

10. **Preparation of Blood Films :** Types, methods of preparation.

Blood Banking Preparation : Blood collection procedure, transport and storage, preparation and use of whole Blood and Blood components-washed red cells, plasma preparation, etc.

Quality control in Blood banks : specimen collection, risk assessment for aids and serum hepatitis.

a. Preparation of anti coagulants-
   Double oxalate, sodium citrate, EDTA, Heparin, action of each preparation, uses disadvantages, quantity required.

b. RBC.WBC Count:
   Methods (Micro dilution and bulk dilution) Materials required, diluting fluids, preparation, procedures, advantages of each methods, precautions, formula for calculation and clinical significance.

B).Haemostatis and Pathology

Definition and scope of pathology
Causes ofdiseases, hereditary and acquired, Diseases, Subdivisions of pathology, Techniques in pathology, Diagnostic pathology (biopsies, cytology, autopsy)
Inflammation
Definition
Causes and types
General Effects of inflammation
Dynamics of Inflammation - Function of fluid exudates: function of cellular exudates, Chemical mediators
Environ mental and nutritional pathology
Smoking. Radiation injury. Nutritional: malnutrition, obesity, Vitamin deficiencies

Haemodynamics and circulatory disorders
Haemorrhage, thrombosis and embolism, Ischaemia, infarction and oedema, Haemorrhage, haemostasis, Shock

Neoplasia
Definition
Nomenculature

Examples of benign and malignant tumours
Features of benign and malignant tumours, Spread of tumours
Growth disorders. Atrophy, hypertrophy, hyperplasia, metaplasia, dyplasiaand neoplasia. Precancerous lesions, and carcinoma in situ.

Hematopoiesis, Anemia introduction & Classification
Megaloblastic anemia
Iron deficiency anemia & other hypochromic microcytic anemias
Hemolytic Anemias I- Introductions & Classification

Hemolytic Anemias II- Structural hemoglobinopathies, Aplastic Anemia, Anemia of chronic disorders Malaria

Leukemias-

Introductions & classification
Acute leukemia, Chronic myeloid leukemias, Chronic Lymphocytic leukemias. Myelodysplastic syndromes & other preleukemic conditions, Physiology of coagulation & Haemostasis

Bleeding disorders - Introduction & Classification, Congenital bleeding disorders. Acquired bleeding disorders

C). Anatomy & Histo Technology

Anatomy And Histotechnology: Different Body Systems Of Human Being
Human Anatomy & Physiology.

Cell structure, division & function Cell organelles
Tissue: Types of tissues and the ir functions Skeletal system.
Digestive system
Physiology and anatomy of mouth, stomach, intestine .Absorption of food and its excretion.Role of Bile in digestion and excretion liver function and a brief description of liver and biliary tree.

Brief description of larynx, bronchi, lungs
Cardiovascular system: Anatomy and Physiology of heart, arteries and veins.
Circulation: Systematic and pulmonary (in brief),Brief review of chamber.
Urinary system
Structure and Function of the Kidney, utrus, bladder, urethra and nephron
Give special emphasis on formation of Urine, Physiology and Anatomy of male and female reproductive organs

Endocrine: Pituitary, thyroid, parathyroid, thymus, adrenals and pancreas

Central nervous system
Brain, spinal cord and meninges explain with its functions
Skins: Structure and Functions. Studyandgive small project on bones and cartilages, HLA system.

Cytology
Cytological Staining. Cytological preparation with special emphasis on MGG, Pap stains, Cytological Fixatives. Cytological Screening.

Histopathology, Theory of Histopathology, Reception of specimens. Histopathology of Tumor cell, Histo pathology of Liver, Kidney, Adrenal. Ovary. Testies. Method of preparing stains & Fixatives

Theory of Tissue processing and embedding, Theory of H & E staining. Use of Microtome. Tissue section cutting, Embedding and preparation of blocks, Fixation of Tissue with DPX mount. Theory of frozen section preparation.

Preparation
Preparation of smear for Fine needle aspiration cytology, Pap's smear theory and identification of cells in a normal vaginal smear

Stool examination: normal, abnormal constituent. Normal and abnormal constituent of Urine. Normal and abnormal constituent of aminotic fluid, Normal and abnormal constituent of Semem analysis.

Haematology & Blood Banking

Introduction to Haematology and Haemostasics :

(a) Definition,

(b) Importance,

(c) Important equipment used

1. Laboratory organization and Maintenance.
2. Introduction to Blood, its composition, function and normal cellular components.
3. Collection of Blood.

   Methods of collection vein puncture, finger puncture and Vacuatainer methods, materials required procedures, precautions, uses of the sample and advantages of each methods. POCT (sample collection at bed side).

Routine staining techniques in Haematology :

Giemsa stan,

Leishman stain,

principle,

composition,

preparation of staining reagents and procedure.

EST-

Methods used, procedure, stages, factors affecting and clinical significance.

Blood group system and Blood group incompatibility ABO, RH systems, cross, matching test in emergency.

D).Histopathology and Cytopathology

Histopathology and Techniques
Management and planning, receiving and recording of specimens, indexing, maintaining records,

Knowledge of maintenance and use of the following : Microscope, Automatic tissue processor vacuum embedding bath, mictotomes (various types with working of each), hot plates, refrigerators, cryostat, Tissue processing —details of paraffin embedding, vacuum embedding. Decalcification

Microtomes

Section cutting and different types of microtomes
Frozen section — usesand techniques

Theory and principles of different staining procedures in Histopathology, Histochemistry Functions of organs

Structure and function of vital organs like liver, spleen, kidney, heart, brain etc. in short, Museum methods —mounting of specimens, preparation of mounting medium, sealing the Jars

Various medicolegal procedures maintaining records.
Histopathology

Theory of Histopathology
Reception of specimens, Histopathology of Tumor cell, Histopathology of Liver, Kidney, Adrenal, Ovary, Testies

Method of preparing stains & Fixatives.

Theory of Tissue processing and embedding
Theory of H &E staining
Use of Microtome. Tissue section cutting. Embedding and preparation of blocks
Fixation of Tissue with DPX mount, Theory of frozen section preparation.

Preparation of smear for Fine needle aspiration cytology, Pap's smear theory and identification of cells in a normal vaginal smear

Stool examination: normal, abnormal constituent.
Normal and abnormal constituent of Urine, Normal and abnormal constituent of aminotic fluid, Normal and abnormal constituent of Semem analysis.

Cytopathology

Cytology

General properties of living organisms

General properties of chemistry of the cells

General properties of cellular membranes

General properties of cytoskeleton

General properties of endoplasmic reticulum

General properties of Golgi body

General properties of Lysosomes

General properties of nuclear envelope

General properties of chromatin and chromosomes

General properties of mitosis

General properties of meiosis

Outline of Embryology

Gametogenesis

reproductive cycle

fertilization

cleavage

A model of gastrulation.

Histology

Epithelial tissue

connective tissues (blood connective, cartilage, bone)

muscular tissue Unit-20 nervous tissue.

Paper-III

A).Techniques of Biochemistry

Bioenergetics. Entropy, Enthalpy & their basic introduction,
Un Concept of free energy, Thermodynamics 1 st & 2nd Law.

Terms

CarbohydrateStructure. properties,, chemical reactions & functions.
Amino Acids Essential & non Essential amino acids with structure & function.
Proteins Primary, Secondary, tertiary & quatnery (Overrview).

LipidsStructure, Classification & properties.Enzymes: Classification, enzyme action & their mechanism. Section-3 Carbohydrates

Carbohydrates intermediate metabolism, glycogenesis, glycogenolysis, gluconeogenesis & glycolysis.

TCA. HMP, and its regulations Disorcerds of carbohydrates metabolism related to each cycle (inborn error of metabolism).

Proteins
D ifferent metabolic pathway of amino acid.
The flow sheet of amino acids oxidation.
Transamination, oxidativedeamination and pathways leading to acetyl co-A.
Decarboxylation of Amino acids, formation of nitrogenous excretion products.
Urea cycle and ammonia excretion.

Biochemical aspects of Hormone

Hormone receptors and intracellular messengers, Adenylate cyclase, protein kinase and phosphodiesterase.

Role of Insulin, glucagons, epinephrine and their mechanism Various endocrine and regulatory systems mediated by cyclic AMP.

Fat and Water soluble and their deficiency.

Mineral metabolism Minor and Major (cu. Fe, Ca. Mg & P) Inborn error of Nucleic acids metabolism. Reference

B).Clinical Aspects

Reception and recording of specimens Unit-2 Maintenance of laboratory records, reporting.
Specimen collection
Whole blood, plasma, serum, urine. C.S.F & other bodyfluids. preservation of specimens, anticoagulants. Section-3 Quality Control:

Role of quality control and its importance
Accuracy, Reliability, Precision

Internal and external quality control measure, preparation of reagents, standardization of methods, safety measu res and precautions.

Types, use, careand maintenance of flasks, pipettes, cylinders, funnels, tubes, thermometers.
Analytical instruments and techniques
Principles photoelectric colorimeters, spectrophotometers, flaimephotometers. electrophoresis. Chromatography, Elisa and RIA, isotopes.

Types of photoelectric colorimeters, spectrophotometers, flamephotometers, electrophoresis, Chromatography, Elisa and RIA, isotopes.

Use, careand maintenance photoelectric colorimeters
Use, care and maintenance Spectrophotometers
Use. care and maintenance Flame photometers
Use, careand maintenance Electrophoresis
Use, careand maintenance Chromatography
Use, careand maintenance Elisa and RIA
Use, careand maintenance isotopes

Biochemical test profiles

Principle and use of Glucose tolerance test
Principle and use of liver function tests
Principle and use of kidney function tests
Principle and use of Thyroid Function Test

C).Laboratory Management

TERMS:- NORMAL SOLUTION, MOLAR SOLUTION, SATURATED SOLUTION, UNSATURATED SOLUTION AND BUFFER SOLUTION.

PREPARATION OF SOLUTION:- NORMAL, MOLAR, SATURATED, UNSATURATED AND BUFFER.

CLEARING:- GLASS WARES.

PIPPETS:- TYPES AND USE OF PIPPETS.
PH:- DETERMINATION OF UNKNOWN.
CALORIMETER:- TYPES COMPONENTS USE AND MAINTENANCE.
DISTILLATION:- WATER

PROTIENS:- AMINO ACIDS, ESSENTIAL AMMINO, PROTIENS, DENATURIATION OF PROTIENS, METABOLISM FORMATION OF UREA, CREATININE etc. DETERMINATION OF PLASMA PROTIENS (ALBUMEN, GLOBULIN, FIBRINOGEN) BLOOD UREA, URIC ACID & CREATININE.

NUCLEIC ACIDS:- DNA. RNA. AND THEIR IMPORTNACE.

CARBOHYDRATES:- CLASIIFICATION, PROPERTIES METABOLISM, DEIFNITION OF GLYCOLYSIS, GLYCOGENELYSIS,CLUCONEGESIS AND HORMONAL REGULATION OF BLOOD SUGAR. DIABETES MELLITUS KETOSIS, GLYCOURIA, WATER AND MINERAL METABOLISM, DETERMINATION OF BLOOD GLUCOSE, GTT & INSULIN TOLERANCE TEST.

LIPIDS:- DEFINITION, CLASSIFICATION, STERIODS, METABOLISM, TRIGLYCERIDES, CHOLESTROAL, PLASMALIPOOPROTIENS-KETONE DODIES AND KETOSURIA. DETERMINATION OF SERUM CHOLESTROL, HDL, LDL, VLDL & TRIGLYCERIDES.

ELECTROLYTES IN BODY FLUIDS:- SODIUM, POTASSIUM,CLACIUM, PHOSPHORUS & CHLORiDES- DETERMINATION & CLINICAL SIGNIFICANCE.

ENZYMES:- ASSAYS IN CLINICAL LABORATORIES:- (a) CREATINE KINASE, (b) PHOSPHATASE(ACID & ALKALINE), (c) TRANSAMINASE(SGOT & SGPT), (d) AMYLASE.

JAUNDICE:- DEFINITION AND ITS TYPES, ESTIMATION OF SERUM BILIRUBIN (TOTAL DIRECT & INDIRECT) AND ITS MEDICAL IMPORTANT.

LIVER FUNCTION TEST (LFT):- AND SERUM BILIRUBIN ESTIMATION (TOTAL DIRECT & INDIRECT)AND ITS MEDICAL IMPORTANT.

RENAL FUNCTION TEST (RFT).

HORMONES:- DEFINITION & FUNCTIONS OF SOME IMPORTANT HORMONES. RADIOISOMETRIC ASSAYS FOR T3, T4 & TSH.

PRACTICALS

1. Monitoring of vital signs, Spo2
2. ABG analysis
3. Types of Anesthesia required for different types of surgeries
4. A regular check of cannula and drains
5. Maintain records and reports
6. Transportation of patient to SICU
7. Suctioning of Endotracheal tube / Tracheostomy tube
8. After care of equipment
9. Mechanical ventilation – Settings and modes