DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

FIRST YEAR

ANATOMY

1) Introduction of Bones of the Human Body of :

• Upper Limb : clavicle, scapula, humerus, radius, ulna, carpus, metacarpus & phalanges
• Lower Limb : hipbone, femur, tibia, fibula, tarsus, metatarsus & phalanges
• Skull : name the bone of skull and sutures between them.
• Thorax : ribs and their articulations
• Vertebral Column : cervical, thoracic, lumber, sacral and cocasial vertebrae

2) Surface Markings of the Body :

• Nine regions of the abdomen • Four quadrants of the Hip

3) Introduction of different Vital Organs :

A) Respiratory Organs :

• Nasopharynx • Oropharynx • Larynx • Trachea • Bronchi • Lungs (and their lobular segments)
• Thoracic cavity • Pleura and Pleural cavity

B) Circulatory Organs

• Anatomical position of the heart • Pericardium of the heart • Chambers of the heart
• Great vessels of the heart • Valves of the heart

C) Digestive Organs :

• Tongue • Teeth • Oral cavity • Pharynx • Oesophagus • Stomach • Small intestine • Large intestine and its colons

PRACTICAL :

- Labeled Digrams of different organs and bones, Viva

PATHOLOGY

1. The Cell in health and disease

a. Introduction of pathology. b. Cellular structure and metabolism. c. Inflammation – Acute and Chronic
d. Derangement of Body Fluids and Electrolytes
• Types of shocks
• Ischaemia
• Infection
e. Neoplasia – Etiology and Pathojgenesis

2. Introduction of hematology

a. Formation of Blood. b. Erythropoiesis. c. Leucopoiesis. d. Thrombopoiesis. e. Collection of Blood f. Anticoagulants. g. Red cell count – Haemocytometer, Methodsand Calculation. h. WBC Count – Methods
i. Differential Leucocytes Count (DLC) – Morphology of White Cells, Normal Values Rananocostry Stains : Staining procedures. Counting Methods, Principle of staining. j. Hb estimation – Method- Colorimetric Method- Chemical Method- Gasmetric Method- S. G. Method- Clinical Importance

Practical :

I.
• Collection of Sample • Hb estimation • TLC and DLC • RBC Count • Peripheral blood film – staining and study of Malarial Parasite
II. Laboratory management – Sample Collection, Labeling, Transport, Screening, Reporting and Dispatch of Reports.

BIOCHEMISTRY

1. Introduction of Biochemistry
2. Elementary knowledge of inorganic chemistry : - Atomic weight, molecular weight, equivalent weight, acid, bases.
3. Definition and preparation of solutions : - Percent solution, Molar solution, Normal solution and Buffer Solutione etc.
4. Definition and preparation of Regent.
5. Unit of measurement
6. Elementary knowledge of organic chemistry

• Organic compounds
• Aliphatic and Aromatic
• Alcohols, Aldehydes, Ketones, Amines, Esters, Phenol etc

7. pH indicators : pH paper, universal and other indicators, pH measurement : different methods.

Practical

Introduction and usage of Glassware and Instruments

Glassware :

• Composition of Glass • General glass wares

Instruments :

• Balance • Hot plate and Magnetic stirrer • Centrifuges • Incubators • Constant temperature bath
• Colorimeter : Principal, Function • Photometer • Flame Photometry

MICROBIOLOGY

I**. Introduction and brief history of Microbiology**

• Historical Aspect • Relationship of Micro-organism to men • Micro-organism in Disease and Health

II. Requirement and uses of common Laboratory Equipments

• Incubator, Hot Air Oven, Water Bath
• Anaerobic Jar, Centrifuge, Autoclave
• Microscope
• Glassware – Description of Glassware, its use, handling and care

III. Sterilization :

• Definition • Classification and General Principle of Sterilization • Autoclave – its structure, functioning, control and indicator

IV. Antiseptics & Disinfectants

• Definition • Types • Mode of Action • Uses

V. Collection, Transportation and processing of clinical samples for Microbiological investigations

Practical :

Demonstration of washing of instruments.

PHYSIOLOGY

1. Cell :

• Definition • Structure and functions the cytoplasmic Organelles • Reproduction : Miosis, Mitosis

2. The important physico-chemical laws applied to physiology

• Diffusion • Osmosis • Bonding • Filtration • Dialysis • Surface Tension • Adsorption • Colloid

3. Fundamentals of different Organ Systems

• Cardiovascular System • Respiratory System • Digestive System • Excretory System • Reproduction System • Endocrine System • Lymphatic System

PRACTICAL

Viva and diagrams of different Vital Organs.

PATHOLOGY

I. Hematology :

• ESR • Methods • Factors – Affecting ESR • Normal Values • Importance • RBC – Indices • Platelets

II. Body Fluids :

a) Urine :

• Method of Collection • Normal Constitutents • Physical Examination • Chemical Examination

b) Stool Examination :

• Method of Collection • Normal Constituents and appearance • Abnormal Constituents (Ova, Cyst)

c) C.S.F. Examination

• Physical Examination • Chemical Examination • Microscopy

• Cell Count • Staining

d) Semen Analysis

• Collection • Examination • Special Tests

PRACTICAL :

a) Urinek, Stool, Semen and C.S.F. – Collection, Hnadling, Examinations

b) Absolute Eosinophil Count, PCV, RBC indices, ESR Estimation, Platelt Count

BIOCHEMISTRY

1. Aim and Scope of Biochemistry
2. Collection and Recording of Biochemical Specimen, separation of serum/plasma preservation and siposal of Biological materal.
3. Chemical examination of urine : Qualitative, Sugar, Protein, Bile Salt, Bile Pigment, Ketones Bodies
4. chemical examination of Stool : Occult Blood.
5. Chemical examination of other Body Fluids : CSR, Plural Fluid, Ascitic Fluid etc.
6. Laboratory management and Maintenance of Records.

PRACTICAL :

• Urine Examination Physical, Chemical, Microscopic, Biochemistry

• Stool Examination

• Body Fluids : Physical and chemical examination CSF, Pleural Fluid, and Ascitic fluid

MICROBIOLOGY

Bacteiology

• Definition • Bacteria – General characteristics of Bacteria • Classification and morphology of Bacteria • Structure of Cell, Capsule, Flagella, and Spore • Growth of Bacteria • Nutrition of Bacteria

Virology :

• Definition • General Introduction of Virus • Physiochemical characteristic of Viruses • Diseases caused by different Virus and mode ofinfection

Parasitology :

• Definition • General characteristics of Parasite • Classification of Parasite • Mode of transmission

Fungus

• Definition • Structure • Classificaiton

PRACTICAL:

Staining – Type of Staining, Principal, Procedure and Interpretation

SECOND YEAR
ANATOMY

A) Reproductive Organs :
• Male and Female Conads : Testes, Epididymis, Ovary, Fallopian Tube, Uterus, Vagine etc.
• Introduction of male Genital Organs • Introduction of female Genital Organs
B) Liver and Spleen :
• Introduction • Anatomical position • Gall bladder
C) Excretory Organs ;
• Cortex and medulla of Kidney • Ureter • Urinary Bladder • Urethra (male and female)
D) Muscles :
• Introduction, Origin and Insertion, Function

PRACTICAL
Labeled Diagrams of different organs and bones, Viva

PATHOLOGY

a) Human blood group antigens and antibodies
b) ABO Blood group systems
• Sub. – group • Source of antigens and types of antibodies
c) Rh Blood group System
• Types of Antigen • Mode of Inheritance • Types of Antibodies
d) Other Blood group Antigens
e) Blood Collection
• Selection and screening of donor • Collection of blood
• Various anticoagulants • Sotrage of Blood. • Changes in Blood on Sotrage

PRACTICAL :
Blood gruping
Tube Method
Slide Method

BIOCHEMISTRY

1. Carbohydrates : -
• Introduction • Importance • Classificaiton • Properties • Estimation of Glucose • Clinical Significance
2. Protein : -
• Introduction and Physiological importance • Amino acids • Essential amino acids • Classification
• Denaturation of Proteins • Estimation of Total protein, Albumin, Globilin, A/G Ration
3. Introduction, Properties and function of important hormones
4. Enzymes and Co-enzymes
• Introduction and difference • Functions • Estimation of important enzymes
i) SGOT (AST) ii) SGPT (ALT) iii) Alkalline Phosphatase iv) Acid Phosphatase v) Amylase, lactate dehydrogenase. vi) CPK, CPK-MB

PRACTICAL :
Method of estimation of glucose : Benedicts Reaction, Glucose oxidase Method
Method of estimation of Protein, Albumin.

MICROBIOLOGY

Staining of Bacteria :

1. Composition and preparation of Staining
2. Principle and Procedure of Bacteriological stain

• Gram's Stain • Ziehl-Neelsen Stain • Albert Stain • Spore and Negative Stain

Cultivation of Micro-organism :

• Introduction and uses of culture • Classification of culture media • Composition of common of Laboratory culture media • Special media and preparations • Techniquesof inculation and isolation • Antimicrobial sensitivity • Anaerobic cultivation techniques

Isolation of Viruses in Laboratory by tissue culture

• Cell and tissue culture technology • Embryonated Egg • Principles of animal cell culture and their use in Virology

Different staining techniques used in Virology

Principle of different serological test used in Virology

Mode of Transmission of Viral agents

Prevention of Viral disease

Immunity in Viral infection

PRACTICAL

1. Staining : ZN Staining of M. T. B. and M. Lepra, Albert Staining
2. Culture

• Type of Media
• Preparation
• Inoculation
• Colony Characteritic
• Staining and Antibiotic Sensitivity

PHYSIOLOGY

1. Blood

• Definition • Composition • Function

2. Formation of different type of blood Cells

• Erythrocytes • Leucocytes • Thrombocytes

3. Mechanism of Blood Clotting

4. Cerebrospinal Fluid

• Formation • Composition • Function

5. Special Senses

• Hearing • Taste • Smell • Touch • Sight

PRACTICAL :

Viva and diagrams of Corpuscles

PATHOLOGY

IMMUNOLOGY AND SEROLOGY

Hormones -

• Thyroid Hormones • Growth Mhormone • Isulin

- Glycosylated Hemoglobin

COOMB'S Test

• Direct and Indirect Test • Titration of Antibody

HISTOPATHOLOGY (Theory and Practical)

a) Fixation of tissues

• Classification of Fixatives

b) Tissue Processing

• Collection
• Steps of fixation
c) Section Cutting
• Microtome and Knives
• Techniques of Section Cutting
• Mounting of Sections
• Frozen Sections
d) Decalcification
• Fixation
• Declacification
• End Point
e) Staining Dyes and their properties, H & E Stain, Special Stains

PRACTICAL :

• COOMB'S Test
• Anti D Titre

BIOCHEMISTRY

1. Lipids : -
• Introduction and functions • Classification • Steroids • Metabolism • Estimation : Total lipids, HDL, LDL, VLDL, Total cholesterol, Trigycede • Clinical significance
2. Principal of Assay procedures for biological materal and estimation of kidney function tests.
• Urea • Uric acid • Creatinine
3. Electrolytes :
• Function • Properties • Estimation of Essential electrolytes : Soldium, potassium, calcium, chloride and phos phorus etc. • Clinical Importance
4. Genetics
• DNA, RNA Structure • Gene coding • Transcription & Translation • Genetic Disorders

PRACTICAL :

Method of estimation of urea
Method of estimation of Creatinine
Method of estimation of Cholesterol

MICROBIOLOGY

I) Immunology
• Definition • Immunity : Definition and Classificaiton • Antigen • Antibodies – Immunoglobulin
• Antigen and antibody reaction and clinical importance • Structure and function of immune system
• Immune response • Hypersensitivity
2) i. Principle & procedure of Serological Tests.
• BIDAL, CRP, Brucella, Agglutination, ASO • Cold agglutination, VDRL, TPHA
i) Advanced techniques in Mcrobiology ELISA, RIA etc
ii) Epidemiological Markers of Micro-organism serotyping
iii) Preparation & Standardization of Antigen and Antisera
iv) Prepaation & Standardization of vaccine and immunization
3) i) General introduction, life cycle, mode of transmission, pathogenicity, and lab diagnosis of various Protozoa.
ii) Entamoeba Hisolytica
iii) Entamoeba coli
iv) Giardia lamblia
v) Trichomonas Vaginalis

vi) Leishmenia donovani
4) i) Sprozoa
• Malaria Parasite • Toxoplasma Gondii
ii) Balatidium Coli
5) General introduction life cycle, mode of transmission, pathogenicity and lab diagnosis of various Helminths :
i) Cestodes or Tapeworms :
• Taenia solium • Taenia sagnata • Hymenolepis nana • Echincoccus granulosus
ii) Trematodes of Flukes :
• Fasciola hepatica • Fasciola gigantic • Gestrodiscoides hominis
iii) Nematodes :
• Trichinella spiralis • Trichuris trichiura • Ancylostoma duodenale • Enterobjus vermicularis • Ascaris lumbricoides

PRACTICAL :

Demonstration :

Slide Agglutination

• VDRL
• VIDAL
• ASO
• CRP
• Stool Examination
• Physical
• Microscopic Demonstration of Ova, Cyst, Pus Cells
• Hanging Drop Examination