UP STATE PARAMEDICAL FACULTY

DIPLOMA IN LABORATORY TECHNICIAN -- 106
DURATION : 2 YEARS

First Year -- course

Topics :-

1-Anaotomy, Physiology, Clinical Pathology, Genral Pathology
2 -Hematology, Biochemistry-I, Microbiology-I

Second Year -- course

Topics :-

1- Histopathology, Cytopathology, Microbiology-II
2- Blood Banking, Biochemistry-II

Anaotomy

1. Definitions of relevant organ/system. , 2. Cell structure and function. 3. Cellular activities and reproduction. 4. Surface anatomy & Surface marking of major arteries And veins and related bony structures 5. Outline of Endocrine system.
6. Outline of Skeletal system. 7. Outline of Cardio-vascular system. 8. Outline of lymphatic system. 9. Outline of Respiratory system. 10. Outline of Gastrointestinal system. 11. Special attention towards liver and pancreas. 12. Outline of urogenital system. 13. Outline of central nervous system.

PRACTICAL --Topics

1. To study the gross anatomy of upper extremities. 2. To study the gross anatomy of upper extremities. 3. To study the gross anatomy of Lower extremities. 4. To study the gross anatomy of Lower extremities. 5. To study the gross anatomy of head- neck region. 6. To study the gross anatomy of vertebral column. 7. To study the gross anatomy of cardio vascular system. 8. To study the gross anatomy of cardio vascular system. 9. To study the gross anatomy of spleen & lymph nodes. 1
10. To study the gross anatomy of Respiratory system. 11. To study the gross anatomy of Digestive system. 12. To study the gross anatomy of Endocrine system. 13. To study the gross anatomy of Urinary system. 14. To study the gross anatomy of Genital system. 15. Micro anatomical studies, 16. Micro anatomical studies with the help of Models, 17. Micro anatomical studies Charts & Slides.

PHYSIOLOGY

1. Introduction to Physiology. 2. Physiology of body cells, tissues, organs system. 3. Blood, its components and functions. 4. Blood groups, blood clotting factors, clotting time bleeding time P.T. /P.C. , 5. Blood pressure & Pulse-Definition, measurement techniques, and factors controlling blood pressure. 6. Functions of respiratory system. 7. Functions of Digestive organs. 8. Functions of excretory organs. 9. Fluid and electrolyte balance. 10. Functions of pancreas, Thyroid & parathyroid glands. 11. Introduction to male and female reproductive system. 12. Female and Male reproductive system-Hormonal action. 13. Plasma proteins-Total plasma protein, Albumin, Globulin and Fibrinogen normal values and functions of plasma protein. 14. Hemoglobin-normal values in male, female and children & function of Hemoglobin. 15. Red Blood Cell, normal value, Anemia and Polycythemia. 16. Platelets-Normal value and functions of platelets.

Practical topics:-

1. Study of compound microscope. 2. Collection of Blood sample & commonly used anticoagulants. 3. Preparation of peripheral blood smear. 4. Determination of total leucocyte Count (TLC). 5. Determination of differential leucocyte count (DLC). 6. Determination of total erythrocyte count (RBC). 7. Estimation of Hemoglobin (Sahli's and other methods) , 8. Determination of bleeding time and clotting time. 9. Determination of Blood groups (A, B, O and Rh system) , 10. Determination of Platelets count., 11. Determination of Arneth count.
12. Measurement of Blood pressure. 13. Examination of respiratory system (Respiratory Rate)
14. Measurement of Heart rate. 15. General Examination.

Pathology

HAEMATOLOGY & CLINICAL PATHOLOGY

Topics

1. Introduction to pathology. 2. Composition of blood -1.(RBC,WBC,Platelet) ,3. Composition of blood -2. (Plasma & Plasma Protein) ,4. Routine Instruments in haematology ,5. Collection and Preservation of Blood.,6. Use of autoanalyser in haematology. 7. Making of stains in haematology. 8. Preparation of thick & thin smears.
9. Leishman stain (PPreparation & method of staining) , 10. Other stains in haematology (Preparation & Method of staining).,11. Anti coagulant vials-their preparation and use.
12. Erythocytes & abnormal erythrocytes ,13. Reticulocyte count. ,14. Platelet count.
15. Absolute Values., 16. Hemoparasites , 17. ESR,PCV , 18. Osmotic fragility Test.
19. LE Cell,20. Coagulation Disorders. 21. Lab Diagnosis of Bleeding Disorders.
22. Formation & Composition of Urine , 23. Collection & Preservation of Urine. , 24. Abnormal constituents of urine., 25. Urinometer & Esbach's Albuminometer , 26. Physical & Chemical examination of urine., 27. Microscopic examination of urine. 28. Liver function test. , 29. Renal Function Test., 30. Examination of body fluids -. 1(Pleural,Peritoneal & Synovial.),31. Examination of body fluids -2.CSF ,32. Semen Examination., 33. Investigations for Aneamia., 34. Hemolytic Aneamia, Foetal Hb.
35. Bone Marrow indications,contra indications & aspiration.
36. Introduction to leukemia , 37. Chronic leukemia & acute leukemia,
38. Use of auto analyser in Haematology.

Practical:--

1. Making of slide and staining. 2. Asessing hemoglobin with different methods. 3. Loading of Neubauer's chamber. 4. TLC 1 5. DLC , 6. ESR & PCV ,7. Reticulocyte count , 8. RBC Count , 9. Platelet Count , 10. Buffy coat preparation, 11. Coomb's Test - Direct & Indirect , 12. LE Cell , 13. Osmotic fragility Test , 14. PT/PC , 15. Blood grouping methods , 16. Uses of anti-coagulants , 17. Bone Marrow Aspirations ,18. Cell Count in Acute Leukemia, 19. Cell Count in Chronic Leukemia , 20. Examination of Malarial Parasite. , 21. Examination of Microfillaria. , 22. Fetal Hemoglobin , 23. Urine collection and preservation , 24. 24 hrs. Urine protein estimation , 25. Urine examination – Physical / Chemical , 26. Urine examination – Microscopy , 27. CSF examination. , 28. Semen examination , 29. Other body fluid examination , 30. Rh antibody titre , 31. Automation in haematology .

Bio-Chemistry -1st year

Topics:-

1. Introduction of Biochemistry , 2. Biochemistry Use in Medicine , 3. Units of Measurement , 4. Measurement of Volumetric Apparatus (Pipettes, Flasks & Cylinders) 5. Laboratory Hazards , 6. Laboratory Safety , 7. Laboratory Design & Administration , 8. Sample Collection , 9. Universal Precautions , 10. Waste Disposal & Management 11. Concept and Calculations Molecular Weight, 12. Concept and Calculations Equivalent Weight, 13. Basic Principles of Centrifugation , 14. Mole, Molar, Buffer & Normal Solution , 15. Definitions of Acid Base , 16. Calorimeter , 17. Preparation of Anticoagulants , 18. Preservation of Anticoagulants , 19. pH & Buffer , 20. Water Purification , 21. Sterilization .

PRACTICAL SCHEDULE
Preparation of Various Types of Solution

1. Normal & Molar , 2. Percentage , 3. Buffers - General Reactions of Carbohydrate , 4. Glucose --General Reactions of Protein , 5. Albumin , 6 --Examination of Normal Urine -- Physical Examination & Chemical Examination (Chloride, Sulphate, Urea, Ammonia, Phosphate) 7 - Examination of Abnormal Urine --- Physical Examination & Chemical Examination (Protein, Glucose, Ketone Bodies, Bile Salt, Bile Pigment, Blood, Urobilinogen, Chyle, Phenyl Ketonuria, Alkeptonuria) , 8- **Estimation of Blood Sugar --- Normal Value & Hyper Value & Hypo Value , 9 - Glucose Tolerance Test -- Normal Value & Hyper Value , 10 - Estimation of Blood Urea -- Normal Value & Hyper Value & Hypo Value , 11-- Demonstration of Fully Automatic Analyzer -- . Programming of Different Analytes & Standardization**

Microbiology -1st years

Topic:-

1. General introduction & terms used in Microbiology , 2. Safety measures in Microbiology , 3. Universal precautions , 4. Bio-Waste Disposal , 5. Growth & nutrition of Bacteria , 6. Care and Handling of Microscopes , 7. Use, Care and maintenance of common Lab equipments like centrifuges-I , 8. Use, Care and maintenance of common Lab equipments like centrifuges-II , 9. Principles & methods of sterilization , 10. Antiseptics and disinfectants , 11. PH, Buffer & reagents-I , 12. PH, Buffer & reagents-II , 13. Routine bacteria Culture media-I , 14. Routine bacteria Culture media-II , 15. Media for bacterial identification-I , 16. Media for bacterial identification-II , 17. Media for Drug Sensitivity Testing , 18. General characteristics & Classification of Bacteria , 19. Classification of staining methods smear preparation , 20. Gram stains and other routine stains in Microbiology, 21. Z.N. Stains and other stains for Mycobacterium , 22. Leishman staining ,23. Gram positive and negative Cocci , 24. Gram negative bacilli 25. Gram positive bacilli , 26. Anaerobic bacteria , 27. Mechanism of drug resistance in bacteria . , 28. Anti bacterial sensitivity testing-I , 29. Anti bacterial sensitivity testing-II

PRACTICAL -- Topics

1. Microscopy , 2. Preparation of load for autoclaving & hot air sterilization ,3. Autoclaving , 4. Use of hot air oven , 5. Disinfection , 6. Preparation of Buffer & reagents 7. Preparation of Culture media (Selective medias) , 8. Preparation of Culture media (Special medias) , 9. Smear preparation , 10. Use of centrifuges , 11. Preparation of stains , 12. Gram's staining , 13. Zeihl Neelsen staining , 14. Leishman / romanowsky staining , 15. Albert's & other special staining , 16. Inoculation of culture media-I , 17. Inoculation of culture media-II , 18. Drug Sensitivity Testing-I , 19. Drug Sensitivity Testing-II .

Paper 1st Year

Paper	Subject	Marks		Duration
Paper-I	Anatomy, Physiology	75	100	3hrs
	Internal Assessment	25		
Paper-II	Hematology ,Clinical & General Pathology	75	100	3hrs
	Internal Assessment	25		
Paper-III	Biochemistry-I, Microbiology-I	75	100	3hrs
	Internal Assessment	25		

Practical - 1st year

Paper	Subject	Marks	Duration
Paper-I	Anatomy, Physiology , Hematology,	**100**	**3hrs**
Paper-I I	Clinical Pathology, General Pathology , Biochemistry-I, Microbiology-I	**100**	**3hrs**

SECOND YEAR –COURSE

HISTOPATHOLOGY & CYTOLOGY

Topics ;-

1. Instruments in Histopathology lab – 1. For grossing & for procesing., 2. Instruments in Histopathology lab – 2. For section cutting & staining. 3. Receiving of sample in Histopathology , 4. Registration of samples and record keeping , 5. Preservation of samples in Histopathology. 6. Grossing of general pathology specimens. , 7. Grossing of respiratory system , 8. Grossing of GIT , 9. Grossing of Hepatobiliary system 10. Grossing of male gential system ,11. Grossing of female genital system , 12. Grossing of breast tissue. 13. Grossing of Urinary system , 14. Grossing of Bones , 15. Grossing of thyroid and and endocrine glands , 16. Grossing of Brain tissue , 17. Tissue Blocking and section cutting. , 18. Reagents in Histopathology. , 19. Staining of slides in Histopathology I (H & E). , 20. Staining of slides in Histopathology II(Retic /PAS/VG/Amyloid). 21. Paraffin blocks filing. 22. Slide filing in Histopathology , 23. Specimen mounting & Labeling., 24. Cataloguing for museum , 25. Instruments in Cytopathology laboratory. , 26. Receiving of samples in Cytopathology , 27. Preservatives used in Cytopathology , 28. Staining of slides in cytopathology-1: H & E. 29. Staining of slides in cytopathology -2:Pap / gimsa , 30. Slide Filing of slides in Cytopathology.

MICROBIOLOGY -- ll

1-Bacteriology

1. Collection of specimens , 2. Identification methods for various bacterias ,
3. Methods to prepare Identification medias ,4. Lab diagnosis of diarrhoea ,
5. Lab diagnosis of UTI , 6. Lab diagnosis of respiratory tract infection ,
7. Lab diagnosis of meningitis ,8. Lab Diagnosis of Tuberculosis , 9. Lab diagnosis of wound infection , 10. Bacteriological examination of water & air, 11. Care and handling of lab animals , 12. Preservation of bacteria .

Practical

1. Urine Sample , 2. Sputum , 3. Wourd swab , 4. CSF , 5. Stool ,6. Animal inoculation
7. Bleeding of mice & rabbit , 8. Collection of sheep blood aseptically , 9. Care and handling of lab animals

2-Parasitology

1. Introduction and classification of parasites , 2. Medically important parasites -I
3. Medically important parasites -II , 4. Procedure/Method of stool examination .
5. Preparation & staining of blood films for haemoparasite .

Practical:-

1. Preparation of blood film for Parasites , 2. Staining (Leishman, Geimsa) & Blood smear examination , 3. Demonstration of P.vivax, P. falciparum & filarial worms 1
4. Preparation of stool smears --(i) Saline ,(ii) Concentrated
5. Stool examination

3 -Immunity

1. Antigens and Antibodies , 2. Antigen-Antibody reaction .

Practical

1. VDRL test , 2. WIDAL test , 3. Latex agglutination , 4. ELISA Test .

4 - Virology

1. Introduction and classification of viruses , 2. Lab diagnosis of virus including cultivation of viruses , 3. Medically important DNA viruses including HBV , 4. Medically important RNA viruses including HIV

5 - Mycology

1. Introduction & classification of fungi , 2. Lab diagnosis of fungi , 3. Medically important fungi-I , 4. Medically important fungi-II , 5. Preparation of smears for fungus examination , 6. Media for fungal culture of Fungi .

Practical

1. Staining methods for fungus , 2. Preparation of smears for fungus examination-I ,
3. Preparation of smears for fungus examination-II , 4. Preparation of media for culture of fungi .

Blood Banking:-

1. Blood Banking - an introduction. 2. Blood Bank setup and Functioning, sterilization & sanctity. , 3. Common Blood groups. 4. Rare blood groups, 5. Genetics & Blood grouping methods. 6. Cross matching. 7. Preparation of grouping sera.
8. Storage of Blood. 9. Labeling & Maintenance of blood bags. 10. Transportation of Blood bags. 11. Preparation of different components of Blood-I , 12. Preparation of different components of Blood-II, 13. Immune sera – Types , production & uses ,
14. Screening tests done in blood bank – Diseases & methods- I , 15. Screening tests done in blood bank – Diseases & methods- II , 16. Rh antibody titre., 17. Coombs test-Direct & Indirect, 18. Blood transfusion reactions, 19. Issuing the blood, madico-legal implications., 20. Disposal of expired blood.

Practical -Topics:-

1. Grossing in General pathology 2. Grossing of GIT ,3. Grossing of Hepatobiliary system ,4. Grossing of Female genital system , 5. Grossing of Breast tissue.
6. Grossing of Urinary system , 7. Grossing of Bones , 8. Grossing of Thyroid and endocrine glands , 9. Staining of slides in Histopathology - H & E , 10. Staining of slides in Histopathology - PAS , 11. Staining of slides in Histopathology - AFB , 12. Staining

of slides in Histopathology - GIEMSA , 13. Processing in Histopathology I , 14. Processing in Histopathology II , 15. Processing in Histopathology III , 16. Processing in Histopathology IV , 17. Blocking in Histopathology I , 18. Blocking in Histopathology II 19. Section Cutting in Histopathology I , 20. Section Cutting in Histopathology II 21. Section Cutting in Histopathology III , 22. Section Cutting in Histopathology IV 23. Making Stain in Cytopathology I , 24. Making Stain in Cytopathology II 25. Making Stain in Cytopathology III , 26. Making Stain in Cytopathology IV 27. Making Stain in Cytopathology V , 28. Staining of slides in Cytopathology- H& E 29. Staining of slides in Cytopathology - PAP , 30. Staining of slides in Cytopathology - AFB , 31. Staining of slides in Cytopathology - GIEMSA , 32. Blood Grouping And Cross Matching I , 33. Blood Grouping And Cross Matching II , 34. Blood Grouping And Cross Matching III , 35. Rh Antibody I , 36. Rh Antibody II , 37. Coomb's Test I , 38. Coomb's Test II , 39. Component Preparation I , 40. Component Preparation II

Biochemistry-II

Topics

1. Chemistry of Carbohydrate , 2. Chemistry of Protein ,3. Chemistry of Lipid
4. Radioisotopes & Their Use in Biochemistry ,5. Principles of Electrophoresis ,
6. Liver Function Test , 7. Renal Function Test
8. Thyroid Function Test, 9. Body Fluid ,10. Quality Control ,11. Standardization
12. Ultraviolet and Visible Light Spectroscopy , 13. Elisa , 14. Radioimmunoassay
15. Polymerase Chain Reaction (PCR) ,16. Chromatography ,17. Spectrometry ,
18. Point of Care Testing , 19. Introduction of Electrolyte & Water Balance ,
20. Clinical Approach of Electrolyte & Water Balance , 21. Immunochemistry
22. Automation in Clinical Biochemistry .

PRACTICAL

Estimation of Serum Cholesterol

1. Normal Value , 2. Hyper Value & Hypo Value

Estimation of Serum Creatinine

3. Normal Value , 4. Hyper Value & Hypo Value

Estimation of Serum Protein

5. Normal Value , 6. Hyper Value & Hypo Value

Estimation of Serum Bilirubin

7. Normal Value
8. Hyper Value & Hypo Value

Estimation of Serum Calcium

9. Normal Value
10. Hyper Value & Hypo Value

Estimation of Serum Alkaline Phospatase

11. Normal Value , 12. Hyper Value & Hypo Value

Demonstration of ELISA

. T3 & T4 , TSH , PRL .

Demonstration

Centrifuge ,. pH Meter ,. Electrophoresis

PCR ,Thin Layer Chromatography (TLC) .

Second Year -Paper

Paper	Subject	Marks		Duration
Paper - I	Histopathology, Cytopathology, Microbiology-II	75	100	3hrs
	Internal assessment	25		
Paper - II	Blood Banking, Biochemistry-II	75	100	3hrs
	Internal assessment	25		
Practical	Oral & Practical	100		3hrs

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