

RVP RISHIKA VARUN PAWAR FOUNDATION
DR S PAWAR INSTITUTE OF
PARAMEDICAL SCIENCES COLLEGE
AFFILIATED TO TELANGANA PARAMEDICAL BOARD
Recognition Certificate. No. 139/01/10/TSPMB/2023



CURRICULUM

ADDRESS :2-151/1,MAVALA ADILABAD, TELANGANA STATE - PIN CODE - 504002

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DR S PAWAR INSTITUTE OF PARAMEDICAL SCIENCES COLLEGE



MAVALA - ADILABAD



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DRGA DOA DMLT DMPHA(Male)



RVP RISHIKA VARUN PAWAR FOUNDATION
DR S PAWAR DIAGNOSTIC AND RESEARCH CENTRE



DR S PAWAR INSTITUTE OF PARAMEDICAL SCIENCES COLLEGE



DR S PAWAR INSTITUTE OF PARAMEDICAL SCIENCES COLLEGE

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Estd .2023



RVP Rishika Varun Pawar Foundation

**DR.S PAWAR INSTITUTE OF
PARAMEDICAL SCIENCES COLLEGE**

Affiliated to TS Paramedical Board

College Address: HNo. 2-151/1, MAVALA

ADILABAD, TELANGANA-504002



Provided by
TELANGANA STATE PARA MEDICAL BOARD
HYDERABAD, TELANGANA

The logo for VVP Groups, featuring a shield with a microscope, a stethoscope, and a caduceus, with the text 'VVP GROUPS' at the bottom.

SYLLABUS
DMLT

Theory Papers 3 + Practical papers 3
6 Months Internship Training followed by
100% Jobplacement assurance

Sub Topics (Part - A,B,C& D) of all papers I, II & III Three
Hoursof theory , two hours of tutorial and weekly practical
sessions for a duration of 2 years diploma 30 - 36 weeks

INTRODUCTION

Medical Laboratory Technology

“The Science is devolving different branches of specialization and Medical Sciences are closely linked with each other scientific Medicine has been nurtured and grown to the present form in the laboratory. It is the knowledge gained in the technology that makes diagnosis of disease feasible, their treatment and subsequent follow us success.

Sometime it can harm the patient seriously; mainly the diagnosis depends upon the report of investigation done in the Laboratory by the Medical laboratory technology.

Thus the Laboratory Technician plays a vital role in the Medicine field .It is difficult forthe doctor alone.

In Fact it is necessary that every department in General Hospital Hospital Primary health centre at Taluk level, every Hospital belonging to state / Centre Govt. and all clinics &

Nursing Homes & Practitioners should have the assistance of trained technician.

So A gap has been developed between the requirement and the availability of trained lab Technician due to the fast grow in Laboratory & X-Ray field.

To fulfil the gap and to make the Para medical Board of India has realized the problemsand start training course in Medical laboratory technology & X-ray E.CG Technician.

DMLT-FIRST YEAR

Paper	SUBJECTS	(MAX. MARKS)		Total	Pass Marks	Practical Marks	Pass Marks
		INTERNAL	EXTERNAL				
I	A & B : ANATOMY & PHYSIOLOGY C: BASICS OF BIOCHEMISTRY D: BASICS OF BIostatISTICS A: Skeletal System B: Sources Of Infection	20	80	100	40	60	24
II	A: BASICS OF PATHOLOGY B: BASICS OF BLOOD BANKING C: BAICS OF MICROBIOLOGY A: Pharmacology B: Pathology C: Intravenous therapy D:Prevention of Pressure Sore E:Respiration F:Parasitology	20	80	100	40	60	24
III	A:HOSPITAL AWARENESS B: COMMUNICATI ON SKILLS C:PATIENT RELATED SERVICES D: BASICS OF CENTRAL STERILIZATION A: Bio-Medical B: Physical Examination C: Cardiac Procedures 20D: Neurological E: Urinary	20	80	100	40	60	24

Date and Schedule:

1.	Orientation Programme	June I/II Year
2.	Training after Theory classes	6 months
3.	Practical Examination	July II year
4.	Theory examination	Sept II year

- **Sankranti Holidays 10 Days**
- **Dasara and Batukamma holidays 15 days**
- **Summer Holidays 1 Month (May)**

PAPER -1

ANATOMY & PHYSIOLOGY (21 Periods)

A: Anatomy (Theory):-

1. Introduction:-(a). Common Anatomical terms & Anatomical Positions . Different parts of the human body

(b) Tissue with Function & Classification (c) Cell & Animal Cell

(2.) Skeletal system: (a) Bones, joint, & Movement (b) Muscles

(3) Genito- Urinary System:(a) Male & Female Reproductive Organic System (b) Urinary bladder, Kidney and Ureter (C). Uterus & Urethra

(4)Respiratory System(a) Lungs & Thoracic Cavity(b) Pleura (c) Surface marking of lungs

(5)Gastro- Intestinal System :- (a) Mouth (b)Pharynx & Salivary gland and Tonsils

(c)Oesophagus & stomach(d) Spleen & Pancreas (e) Gall Bladder & Liver (f) Surface making of Abdomen (g) Structure of Digestive Tract

(6) Movement of the body(a) Upper Limb –Bones, Important Vessels (b) Lower Limb –Bones Important Vessels

(7) Nerves System(a) C.S.F & Spinal Card (b) Nerves & Brain(c) Sympathetic And Sympathetic

(8) Cardio –Vascular System(a) Arterial System (b) Lymphatic and Venous System (c) Heart (d) Surface Making, Important Blood Vessels & Muscles(e) Pericardium

B: Physiology (Theory) (21 Periods)

1. Introduction to Human Physiology

2. Digestive System(a) Mastication deglutition(b)Function and Composition Saliva (c) Function of Stomach (d) Function and Composition of gastric juice (e) Function of Pancreatic Juice (f) Function of Bile

3. Respiratory System(a) Define-Respiratory Rate(b) Vital Capacity, Cyanosis (c)External & Internal Respiration (d) Transport of O₂ and CO₂ in the Blood (e) Function of Respiration its structure

4. Blood(a) Function of Blood (b) Composition of Blood (c) Anti- Coagulants(c)Description of Blood Cells(e) Blood Group of A B C O and Rh Factor(f) Function of Lymph (g)anaemia and its Type

5. Cardio- Vascular System(a) Define of Cardio output(b) Define the blood pressure, Electrocardiogram (e) Circulation (Systematic and Pulmonary) (f) Function of Heart (g) Function of Blood vessels (h) Cardio Cycle

6. Excretory System(a) Kidney (Function)(b) Formation of Urine (Normal and bnormal)

(c) Composition of Urine

7. ENDOCRINE GLAND(a) Define- Name and hormones Secreted by than (b) Action of Hormones in our body

8. Reproductive System(a)Male female Genital System(b) Function of Ovary(c) Formation of Ova and Their action of ovarian Hormones(d) Function of Testis- Their action Testosterone(e)Mensuration Cycle and Fertilization

(f)Progesterone and Oestrogen Hormones

9. Skin(a) Define the Skin (b) Function of Skin

10. Formation, Function &Composition of C.S.F

11. Special Senses-Smell, Taste, Touch, Hearing

REFERENCE BOOKS:

1. Anatomy & Physiology for Paramedical students – Pinky Rajendra Wadiya

2. Anatomy & Physiology -Teena kumari

3. Anatomy & Physiology- Indu Khurana Arushi Khurana
4. Anatomy & Physiology- Gyton
5. Ross & Wilson Anatomy & Physiology in Health & Illness
6. BD Chaurasias Human Anatomy Vol-I

C: BASICS OF BIO-CHEMISTRY (21 Periods)

1. Introduction to basics of Biochemistry 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 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

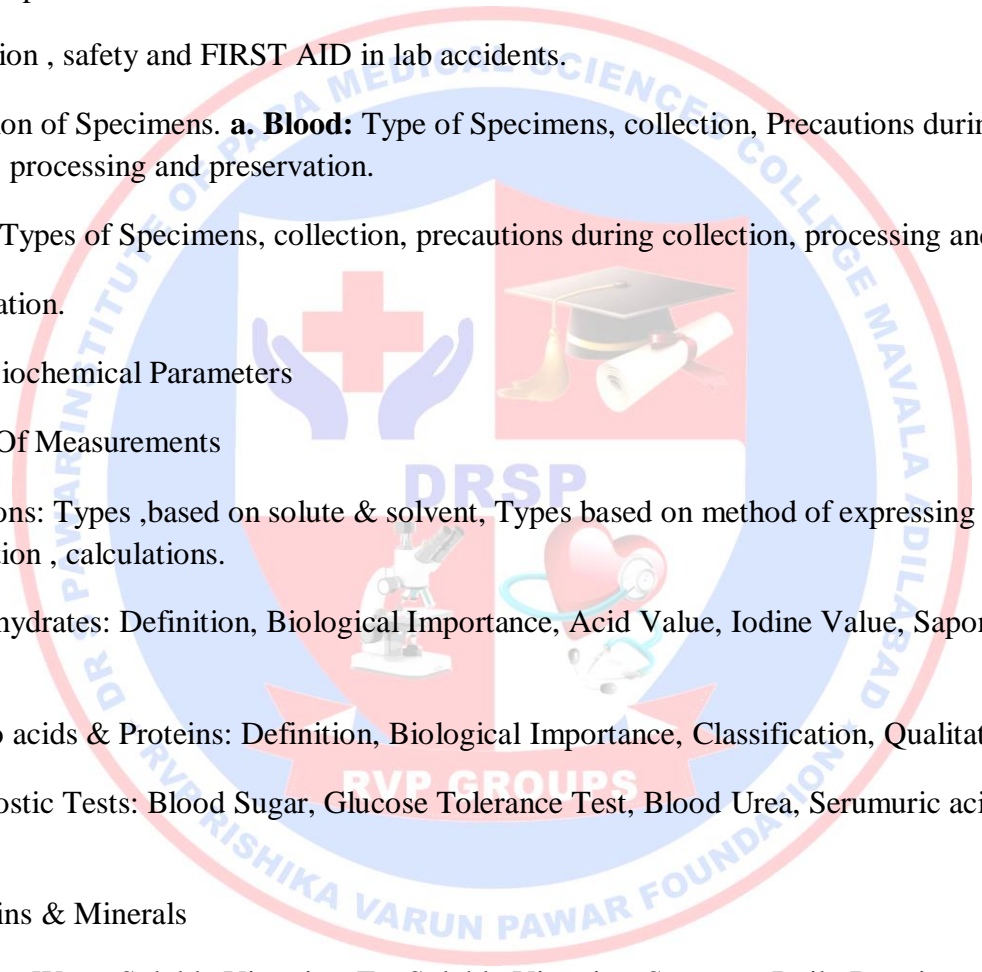
1. Centrifugation: Principle, Different types of centrifuges, care & maintenance, applications

2. Filtration using funnel

3. Weighing: Different types of balances used, care and maintenance.

4. Evaporation

5. Distillation

6. Refluxing
 7. Drying different salts and dessication
 6. Water Chemicals and related subsances
 - a. Purity of chemicals
 - b. Corrosives
 - c. Hygroscopic substances
 7. Prevention , safety and FIRST AID in lab accidents.
 8. Collection of Specimens. **a. Blood:** Type of Specimens, collection, Precautions 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 & solvent, Types based on method of expressing concentration , calculations.
 12. Carbohydrates: Definition, Biological Importance, Acid Value, Iodine Value, Saponification Value.
 13. Amino acids & Proteins: Definition, Biological Importance, Classification, Qualitative Tests.
 14. Diagnostic Tests: Blood Sugar, Glucose Tolerance Test, Blood Urea, Serumuric acid, Serum creatinne.
 15. Vitamins & Minerals
 - a. Vitamins: Water Soluble Vitamins, Fat Soluble Vitamins, Sources, Daily Requirements, Deficiency Diseases.
 - b. Minerals: Sources, Daily Requirements, Deficiency Diseases.
- 

REFERENCE BOOKS:

1. Text Book on Bio-Chemistry for DMLT & Paramedical courses – Dr . I Clement
2. Biochemistry - U satyanarayana
3. Concise Text Book of Biochemistry -DM Vasudevan
4. Basics of Clinical Biochemistry & Instrumentation For Para medical Students – Poonam Baccheti
5. A Text Book on Biochemistry for Paramedical Students -Dr. Kiran Dahiya
6. A Text Book of Medical Biochemistry – Dr. Rajagopal Ganapathy
7. Biochemsry & Clinical pathology 4th edition – VN Raje
8. Tesxt Book of Biochemistry forParamedical Students 2nd edition- PRamamoorthy
9. Biochemistry for Medical Laboratory Technology Students – Harbansand ashuma Sachdeva
10. Text Book of Applied Biochemistry and Nutrition & Dietetics – Harbans lal

Part D : Basics Of Bio-Statistics (15 Periods)

1. Introduction & Branches of Biostatistics
2. Types of variables, Measurements and measurement scales
3. Fundamentals of Biostatistics (Sample, Population, Variable)
4. Importance of Biostatistics in paramedical sciences
5. Methods of statistical analysis
6. Basics statistical concepts and data interpretation are discussed in the subject (Mean, Mode & Median)
7. The charecteristics of Biostatistics & its importance
8. Measurement of Distribution(Range, Variance & Standard Distribution)
9. Graphical methods to depict Data(histograms, bar-plots, pie charts, line graphs)

Reference Books:

1. Biostatistics for medical & nursing students – C.S. Agrawal
2. A text Book of biostatistics – Vinod Kumar
3. Research methodology 7 Biostatistics – Vinod kumar
4. Biomedical Statistics – a beginners Guide – shakti kumar Yadav
5. Fundamentals of biostatistics – khan & Khanum

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 & morphology of physiochemical parameters & the diseased state

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

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

Morphology count & methods of isolation

Effect on count & morphology of cell by the physiochemical parameters : diseased

State & the relevance of condition of the diseases Anaemia's Definition(in general) & courses

Types of anaemia & their classification, Physiochemical

Characteristic features & etiology of a plastic anaemia, haemolytic megaloblastic Clinical features & diagnosis

Definition (in general) & their etiology

Classification of leukaemia. FAB classification. Etiologies physiochemical

Features of different Type of leukaemias. with reference to clinical states Diagnosis 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 coagulation;their solution & mode of action

Diseases associated with coagulation disorders ,their etiology & 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 bloodPreparation 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. preparation 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, hemoglobin 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.

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

4. Differential Leucocytes Count(DLC): Normal values, clinical significance, sources of errors and means to minimize them.
- 4) 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, centrifuging 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 of diseases, 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 Environmental 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 Nomenclature

Examples of benign and malignant tumours Features of benign and malignant tumours, Spread of tumours Growth disorders. Atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia and 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 their 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, uterus, 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. Study and give 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 Semen analysis.

Haematology & Blood Banking

Introduction to Haematology and Haemostasis :

- (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 Vacutainer 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 stain, 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.

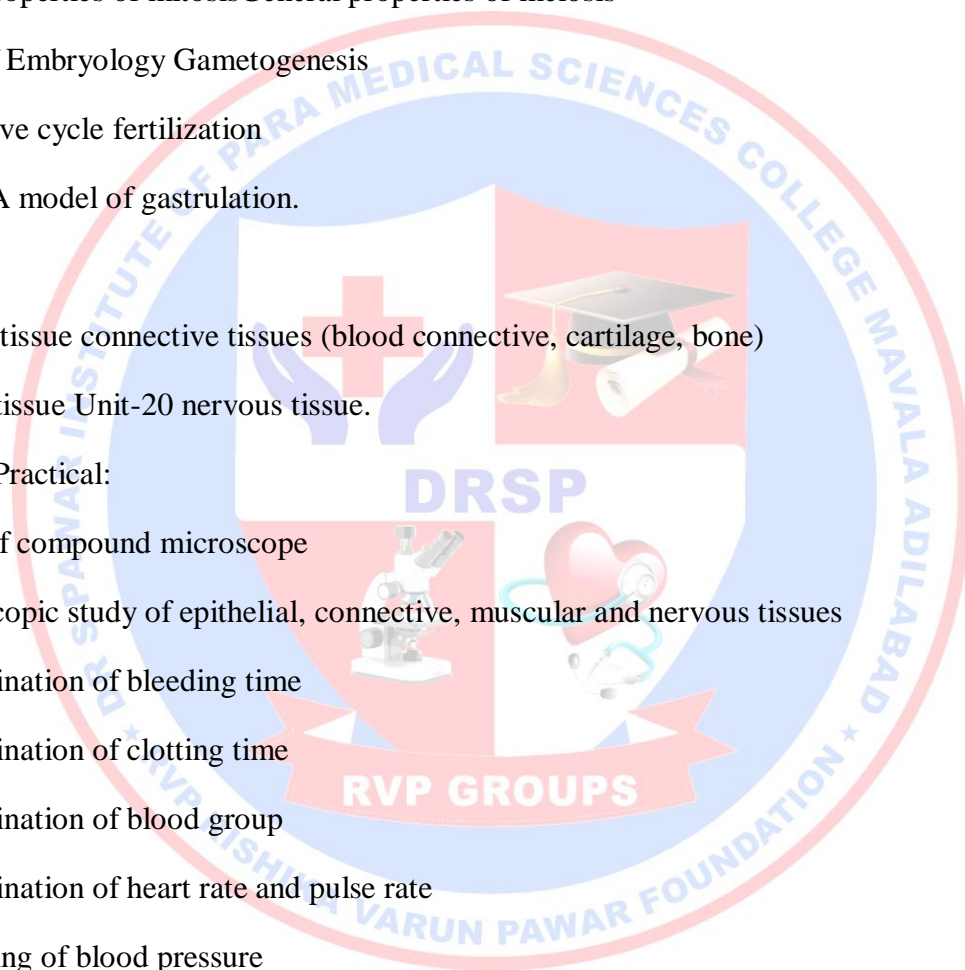
Histology

Epithelial tissue connective tissues (blood connective, cartilage, bone)

muscular tissue Unit-20 nervous tissue.

Paper I – Practical:

1. Study of compound microscope
2. Microscopic study of epithelial, connective, muscular and nervous tissues
3. Determination of bleeding time
4. Determination of clotting time
5. Determination of blood group
6. Determination of heart rate and pulse rate
7. Recording of blood pressure
8. Determination of ESR (erythrocytes sedimentation rate)
9. Qualitative analysis of carbohydrates (glucose, fructose, lactose, maltose, sucrose and starch)
10. Identification test for proteins (albumin and casein)
11. Quantitative analysis of reducing sugars DNS method and biuret method
12. Qualitative analysis of Urine for abnormal constituents



13. Determination of Blood Creatinine
14. Determination of Blood sugar
15. Determination of Serum Cholesterol
16. Preparation of Buffer solution and measurement of pH
17. Determination of enzymatic hydrolysis of starch
18. Determination of salivary amylase activity
19. Rh grouping and compatibility test.
20. Preparation of anticoagulants
21. Demonstration and care of autopsy instruments
22. Immunohisto chemistry
23. Preparation of dry and wet smear
24. Fixation of smears and staining with MCG



Paper-II

Basics of Pathology (12 Periods)

Introduction to Pathology in brief

1. Urine – Analysis – a. Physical Examination – specific gravity PH, reaction, Colour.
b. Chemical Examination – Sugar Albumin, Bile salts, Bile Pigments etc.
c. Microscopic, d. Sediment for RBC, WBC, Epithelial 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 & CSF, charging chamber, Identifying and counting the cells.

Reference Books:

1. Text Book on Pathology – Dr . I Clement
2. Pathology for paramedical students & health sciences -Ramnik sood
3. Text Book of Pathology & genetics – Rimpi Bansal
4. Histopathology – Aruna Singh
5. Text Book of pathology for allied health sciences – Ramadas Nayak

Part B : Basic Of Blood Banking (18 Periods)

1. History of blood banking , To study evolution of different blood groups.
2. Blood grouping, typing and complement system , To study basics of different blood groups& complement system
3. Identification of antibodies and antibody screening , To identify various antibodies in blood group systems & methods of screening antibodies
4. Various blood components and their functions , To have knowledge of blood components and their functions and uses
5. Coagulation and hemostasis , To know basics of coagulation pathways and hemostasis
6. Immune hemolytic anaemias and Hemolytic disease of newborn , To know types of hemolytic anaemias along with details of hemolytic disease of newborn
7. Cross matching & compatibility testing , To know major & minor cross matching and compatibility testing
8. Donor selection , To know criteria of selection of donor
9. Pre-transfusion serologic testing , To know different tests used for pre transfusion serologic testing
10. Donor recruitment, phlebotomy and Donor reactions , To know how to perform phlebotomy and different donor reactions

11. Adverse blood transfusion reactions , To have complete knowledge of adverse blood transfusion reactions
12. Investigations of transfusion reactions , To know how to investigate a blood transfusion reaction
13. Apheresis , To know what is apheresis & its importance
14. Preparation and storage of blood components and their uses , To know procedure of preparation of blood components & their uses
15. Record keeping, quality control and blood bank Inspections , To know importance of record keeping & preparation for inspection of blood banks according to the protocol
16. Guidelines for safe blood transfusion , To know the guidelines for safe blood transfusions
17. Safety procedures in blood banking , To know the safety procedures in blood banking to avoid serious hazards
18. Safe storage and transportation of blood and its components , To know how to store components, procedure for transportation of blood components
19. Safe disposal of lab waste in blood bank , To know in detail how to dispose lab waste in blood bank and its importance
20. Medicolegal aspects of blood banking , To know the importance of blood banking from medico-legal point of view
21. Administration of blood bank , To know different ways of administration in a blood bank ,
22. Management of donor reactions in Blood donation camp , To enumerate steps in management of reactions in donor at camp site
23. Component preparation , To observe various steps in procedure for component preparation & enumerate them
24. Investigating a transfusion reaction , To enumerate various steps in investigating a transfusion ,reaction
25. Conduction of blood donation camp , To per form MOCK conduction of blood donation camp & later attend a blood donation camp
26. Documentation in blood bank , To write down all the steps point wise on various documents required in blood bank and updation of these.

Reference Books:

1. Essentials of blood banking – SR Mehdi

2. Standard operating procedures and regulatory guidelines blood banking- Singal
3. Blood banking and transfusion practices – Paula R. Howard
4. Blood banking and transfusion medicine basic principles & Practice – Hillyer
5. Essentials of blood banking and transfusion medicine – Ganga S Pilli

Part C : Basics Of Microbiology (15 Periods)

Basics of Microbiology

1. Introduction to Microbiology in brief : Definition, History
2. Microscopy
 - a) Principle working and maintenance of compound Microscope.
 - b) Principle of Fluorescent microscope, Electron Microscope, Dark Ground Microscope.

History : Types of Microscope: (a) Light Microscope, (b) DGI, (c) Fluorescent, (d) Phase contrast. (e) Electron Microscope: a). Transmission, b) Scanning, Principles of operational mechanisms of various types of Microscopes. 3. 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 Moist Heat-pasteurization, Inspissation, tyndalisation, autoclave.

2) Filtration Methods

3) Ionising Radiation - Disinfection, Mode of action and uses of important chemical disinfectants - Phenol and Phenolic compounds, alcohols, halogens, dyes and acids and alkalis.

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.

Reference Books :

1. Text Book Of Microbiology for paramedical students – Aju Dhir
2. Text Book of Microbiology for DMLT Students & Paramedical students – Dr. I Clement
3. Text Book of Microbiology – Dr. Arora

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. Composition 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) 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 – Macconkeys Media.

e) Selective Media – Lowenstein 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 Enterobacterial, Haemophilus bordetilla, Corynebacterium, Nessieria .Treponema, Leptospira ,mycoplasma,chlamydia & Trieagents.

Identification of pathogenic & nonpathogenic fungi

Morphologically:biochemically;Yeast:Dermatophytes.Cryptococci,Histoplasma;Nocardi a.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 pneumococcl, Family

Enterobacterial, Haemophilus bordetlla, Corynebacterium, Nessleria .Treponema. Leptospira mycoplasma, chlamydia & Triagents.

Characteristic diagnostic serological tests in diseases

Cholera, Typhoid, Tuberculosis .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 Transport and 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.

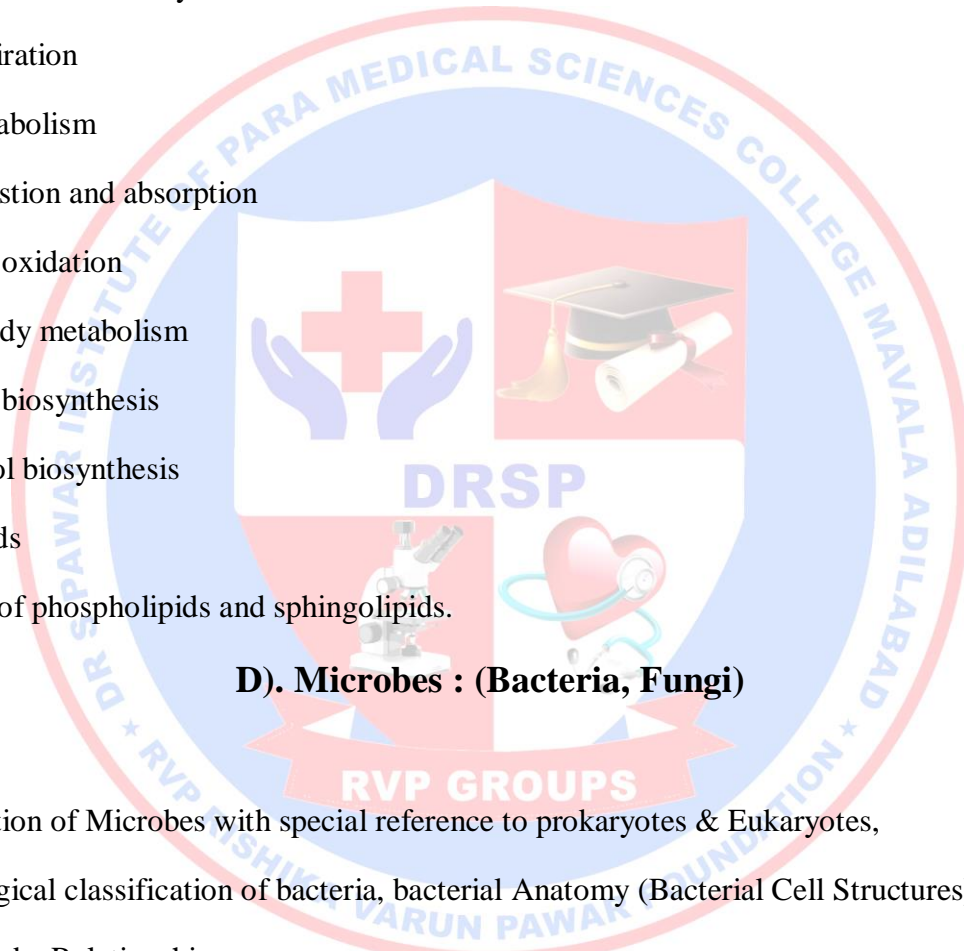
Growth and Nutrition of Microbes :

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 II – Practical :

1. Urine – Analysis – a. Physical Examination – specific gravity PH, reaction, Colour.
2. Chemical Examination – Sugar Albumin, Bile salts, Bile Pigments etc. c. Microscopic,
3. Sediment for RBC, WBC, Epithelial cells, Casts, Crystals, Parasites.
4. Sputum Analysis – Physical Examination, Preparation and staining smear for Microscopic examination
5. Semen Analysis – Physical Examination Microscopy – counting, Motility, Staining Morphology. Abnormal and normal forms.
6. Body Fluids – Differential count of Peritoneal, pericardial, pleural fluids & CSF, Charging chamber , Identify and counting the cells
7. Blood Grouping and typing
8. Pre-transfusion serologic testing
9. Preparation and storage of blood components and their uses
10. Principles of sterilization methods (Autoclave, Filtration , Hot air oven , Incineration, flaming & Radiation)
11. Identification of various bacteria by studying colony characters, gram staining , biochemical reaction
12. Identification of pure bacterial cultures of common pathogens
13. Bacteriological examination of water and milk samples
14. Germ-tube test for candida albicans
15. Collection transportation of clinical samples ,Processing including culture of following samples for identification of pathogens- Urine , Stool, Sputum, Throat swabs , Pus and Pus swabs , Blood Skin, eye and Ear swabs and CSF

Paper-III

A. Hospital Awareness (12 Periods)

A brief idea of hospital as an 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

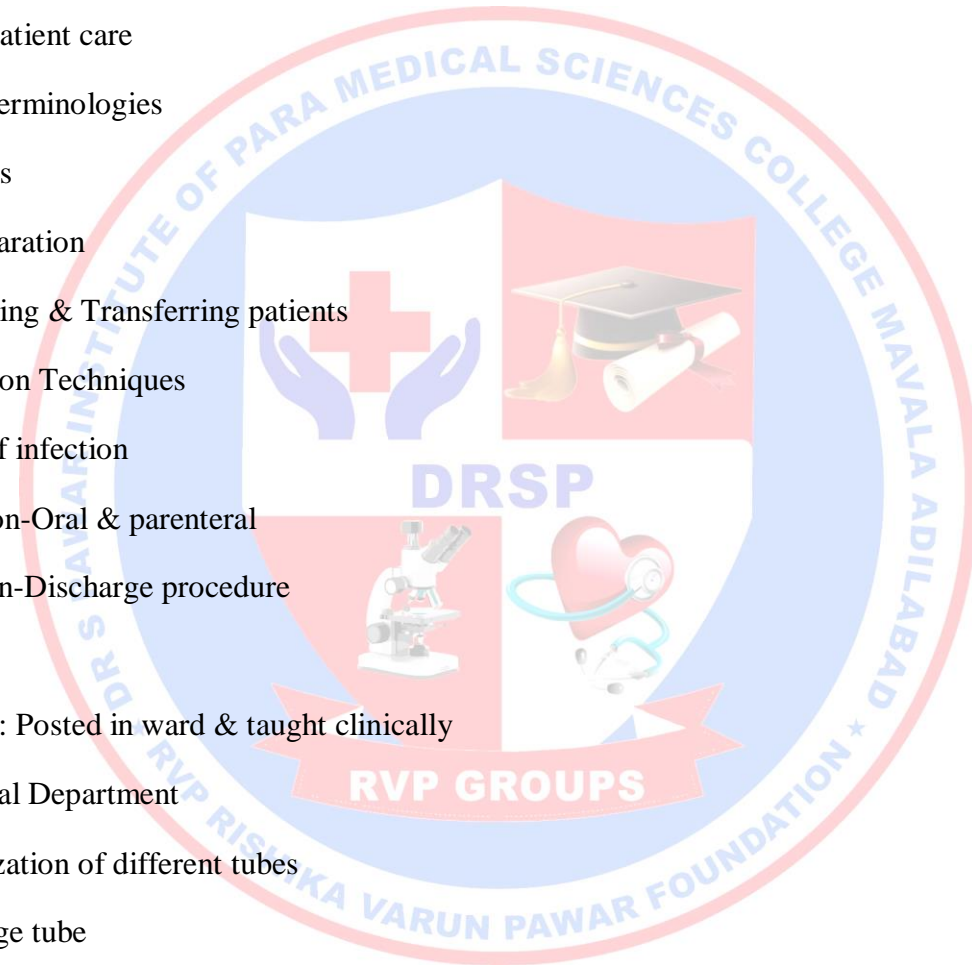
1. Drainage tube

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 theatres
4. Supplying of articles
5. Specific area practices

As scrubnurse, As circulating nurse 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

INTERNET CONCEPTS: Computer : basic MS-Office MS-Word, MS-Excel, MS-Power Paint, Browsing, Down-Loading, Use Projector of Slide Projector .

Reference Books:

1. Hospital administration and management – joyfeep Das Gupta
2. Hospital administration – DC Joshi
3. A handbook for understanding hospital services – mishra & kaushik
4. Hospital and patient care management – Dr. Vidhta srinivasan

5. Principles of hospital administration & planning

Part-C: Patient Related Services (10 Periods)

1. Patient Care System
2. Information Management in Patient Care.
3. Concept of Patient Care.
4. Information to Support Patient Care.
5. Historical Evolution
6. Society and Influences
7. Professional practice model
8. Techniques of Patient Care.
9. Development & Innovative implimentation of patient Care.
10. Types, functions, Uses pr Patients & HHospitals Reference Books:
 1. Principles of hospital practice and patient care – P Srinivasulu Reddy
 2. Patient care technician – kimberly townsend little
 3. Hospital supporting services and systems- Dr. M. A. George

Part D: Basics of central sterilization (7 Periods)

1. Introduction of sterilization
2. Functions of Sterilization
3. Types of Sterilization
4. Classification of Sterilization
5. Advantages & Disadvantages
6. Details of CSSD& its function & activity
7. Activities of CCSSD

Reference Books:

1. Disinfection , sterilization and preservation
2. Instrumentation and control systems – Y J Reddy
3. Hand book of biomedical instrumentation – R S Khandpur
4. Biomedical waste disposal – jaypee
5. Sterile processing – karen davis

Paper-III

A).Techniques of Biochemistry

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

Carbohydrate Structure. properties,, chemical reactions & functions. Amino Acids Essential & non Essential amino acids with structure & function. Proteins Primary, Secondary, tertiary & quaternary (Overview).

Lipids Structure, Classification & properties. Enzymes: Classification, enzyme action & their mechanism.

Section-3 Carbohydrates

Carbohydrates intermediate metabolism, glycogenesis, glycogenolysis, gluconeogenesis & glycolysis. TCA. HMP, and its regulations Disorders of carbohydrates metabolism related to each cycle (inborn error of metabolism).

Proteins

Different metabolic pathway of amino acid.

The flow sheet of amino acids oxidation.

Transamination, oxidative deamination 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, flaimphotometers. 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,

PLASMALIPOO PROTIENS-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.

Paper III – Practicals;

1. General patient care and maintainance of records
2. Control of infection
3. Changing surgical dressing
4. Preoperative preparation of patient
5. Preanesthetic preparation
6. Historical evolution in patient services
7. Techniques of patient care
8. Blood pressure measurement using sphygmomanometer
9. Study of Phonocardiogram (PCG)

10. Quantitative estimation of

a) Serum bilirubin estimation

b) Phosphorus estimation

c) calcium estimation

11. Renal clearance test

12. SGOT and SGPT estimation

13. ALP and ACP estimation

14. Estimation of HDL and calculation of VLDL and LDL

15. Analysis of urine for sugar and proteins

16. Detection of haematuria

17. Detection of Bile pigments , Bile salts and urobilinogen

18. Demonstration of electrophoresis and chromatography

Lab equipment:



Blenders and vortexes



Bottles and Flasks



Cell sorters



Centrifuges



French press



Homogenizers



Needles and syringes



Pipettes



Pressurized vessels



Rubber stoppers



Shakers



Sonicators



Vacuum and aspirating equipment



Dr S Pawar Institute of Paramedical Sciences College

**Chairman/Director
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2. Admission Helpline - 040 49534410,8074507008,8008297414,9701270981

3. Route Map :-

