Intermediate Education

Vocational Curriculum – 2012

(With effect from the academic year 2012-2013)

Curriculum of Intermediate Vocational Course

For

THE MEDICAL LAB TECHNICIAN

State Institute of Vocational Education

O/o the Commissioner of Intermediate Education,
Andhra Pradesh, Hyderabad

&

Board of Intermediate Education,

Andhra Pradesh, Hyderabad

Contents

Introduction

Diagnostics play an important and vital role in the field of medicine. Without the aid of proper diagnostics, accurate conclusions cannot be drawn and suitable medical or surgical treatment cannot be given. Preparation of reagents of the purest quality also needs special attention and care. Thus Medical Lab Technology Courses is gaining greater importance. Clinical advances & studies in the fields of medicine, surgery, Pharmaceutical industries and nutrition also require technicians.

The Medical Laboratory Technician course is designed to train man power to effectively carry out medical Laboratory Technical work in various departments of medical, dental, pharmacy colleges, peripheral laboratories, research and diagnostic centers and also to set up and run own clinical laboratories.

II. Objectives of the Course

1. To train the students to work in diagnostic labs.
2. To train the students to work in manufacturing units of diagnostic regents.
3. To train the students to assist the qualified experts in these fields.
4. To train the students to understand the organization of Hospitals, Research Laboratories etc.
5. To train the students to attend to analytical work and Research & Development [R&D] work in drug labs and pharmaceutical industries.

III. Skills to be provided.

1. Handling of the Apparatus.
2. Accurate measuring, weighing etc.
3. Cleaning and sterilization of the apparatus.
4. Accurate analysis.
5. Accurate processing and storage of specimens.
6. Accurate Reporting and storage of clinical data and material.
7. Understand the Clinical significance.
8. Know Limitation of the Tests.

IV. Job Opportunities.

A. Wage Employment

1. Laboratory technicians in various departments in diagnostic centers.
2. Laboratory technicians in hospitals of various sectors.
3. Laboratory technicians in various departments in medical and pharmacy Colleges.
4. Laboratory Technicians in Clinical studies in various laboratories like
   i) National Institute of Nutrition.
   ii) Central Drug Research Laboratory
   iii) Molecular Biology Labs.
5. Laboratory Technicians in Quality Control, R&D Sectors of Drug Manufacturing units.

B. Self Employment

1. Setting of Diagnostic Labs
2. Preparation and sale of readymade reagent kits and media.
3. Distribution of Lab Chemicals, Glassware, Lab Instruments and their spare parts etc.

V. SCHEME OF INSTRUCTION AND EXAMINATION

5.1 ANNUAL SCHEME OF INSTRUCTION AND EXAMINATION FOR 1ST YEAR MEDICAL LAB TECHNOLOGY COURSE

Part-A		Theory		Practicals		Total	
		Periods	Marks	Periods	Marks	Periods	Marks
1.	English	150	50	-	-	150	50
2.	General Foundation course	150	50	-	-	150	50
Part-B							
3.	**Paper-1** Bio-Chemistry -I	135	50	135	50	270	100
4.	**Paper-II** Microbiology & Pathology	135	50	135	50	270	100
5.	**Paper-III** Anatomy & Physiology	135	50	135	50	270	100
	OJT	-	-	365	100	365	100
	TOTAL	**705**	**250**	**770**	**250**	**1475**	**500**

***** On the Job Training for 1st year from 1st August to 30 th January at any recognized hospitals by 9.00AM to 12.00 NOON

II. YEAR MEDICAL LAB TECHNOLOGY COURSE

Part-A		Theory		Practicals		Total	
		Periods	Marks	Periods	Marks	Periods	Marks
1.	English	150	50	-	-	150	50
2.	General Foundation course	150	50	-	-	150	50
Part-B							
3.	**Paper-1** Bio-chemistry-11	110	50	115	50	225	100
4.	**Paper-II** Micro-biology	110	50	115	50	225	100
5.	**Paper-III** Pathology	110	50	115	50	225	100
6.	**OJT**	-	-	450	100	450	100
7.	**Total**	**630**	**250**	**795**	**250**	**1425**	**500**
						I+II+III	**1000**

***On the job tranining for 2nd year from June to January at any recognized hospitals by 9.00AM to 12.00 Noon.**

EVALUATION OF ON THE JOB TRAINING:

The "On the Job Training" shall carry 100 marks for each year and pass marks is 50. During on the job training the candidate shall put in a minimum of 90 % of attendance.

The evaluation shall be done in the last week of January.

Marks allotted for evaluation:

S.No	Name of the activity	Max. Marks allotted for each activity
1	Attendance and punctuality	30
2	Familiarity with technical terms	05
3	Familiarity with tools and material	05
4	Manual skills	05
5	Application of knowledge	10
6	Problem solving skills	10
7	Comprehension and observation	10
8	Human relations	05
9	Ability to communicate	10
10	Maintenance of diary	10
	Total	100

NOTE: The On the Job Training mentioned is tentative. The spirit of On the Job training is to be maintained. The colleges are at liberty to conduct on the job training according to their local feasibility of institutions & industries. They may conduct the entire on the job training periods of (363) I year and (450) II year **either by conducting classes in morning session and send the students for OJT in afternoon session or two days in week or weekly or monthly or by any mode which is feasible for both the college and the institution**. However, the total assigned periods for on the job training should be completed. The institutions are at liberty to conduct On the Job training during summer also, however there will not be any financial commitment to the department.

SCHEME OF INSTRUCTION PER WEEK

	Part-A	**Theory**	**Practicals**	**Total**
1.	English	4	-	4
2.	General Foundation Course	4	-	4
	Part-B			
3.	Paper –I	4	4	8
	Paper-II	4	4	8
	Paper-III	4	4	8
	Total	**20**	**12**	**32**

MEDICAL LAB TECHNOLOGY

I YEAR

PART B – VOCATIONAL SUBJECTS

PAPER – I : BIO - CHEMISTRY (THEORY)

PERIODS/WEEK: 04 PERIODS/YEAR: 135

S.No	NAME OF THE UNIT		No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
I	Introduction to Bio-Chemistry including code of ethics for Medical Lab Technicians and Medical Lab Organizations.		10	2	1	
2.	Reception, Registration and Bio-Chemical parameters investigated.		10	2	1	
3.	Glassware and plastic ware used in bio-chemical laboratory.		08	8	1	1
	I.	**Glass ware:**				
	a)	Types of glass and composition.				
	b)	Types of glassware, their identification, applications and uses.				
	c)	Cleaning, drying, maintenance and storage of glassware.				
	II.	**Plastic ware:** Brief outline.				
4.	Instrumental methods of Bio-Chemical analysis:		08	8	1	1
	I.	**Colorimetry:**				
		Visual and photoelectric methods, instrumentation, principles and laws involved construction, operation, applications, care and maintenance.				
	II.	**Spectrophotometry:**				
		Principle, theory, types, construction, operation and applications.				
5.	Basic lab operations like-		08	6		1
	I.	Separation of solids from liquids.				
	a)	Centrifugation: Principle, Different types of centrifuges, construction of electrical centrifuge, care and maintenance, applications.				
	b)	Filtration – using funnel.				
	II.	Weighing: Different types of balances – simple balance, electronic balance – operation, uses, care and maintenance.				
	III.	Evaporation				
	IV.	Distillation				
	V.	Refluxing				

S.No		NAME OF THE UNIT	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
	VI.	Drying different salts.				
6.		Water, Chemicals and related substances	08	2	1	
	I.	Purity of chemicals				
	II.	Corrosives.				
	III.	hygroscopic substances				
7.		Prevention, Safety and first aid in lab accidents.	8	6		1
8.		Collection of specimens.	08	8	1	1
	I.	Blood – Phlebotomy [How to draw the blood and precautions], types of Specimens, processing and preservation.				
	II.	Urine: Types of Specimens, Collection of 24 hours urine and preservation – Preservatives.				
9.		Urine biochemical parameters.	08			
10.		Units of measurements.	08			
11.		**Solutions.**	**08**	**6**		**1**
		Types based on solute and solvent, Types based on method of expressing concentration, calculations.				
12.		**Carbohydrates and lipids.**	**08**	**8**	**1**	**1**
	I.	Carbohydrates- Definition, Biological importance, classification, qualitative tests.				
	II.	Lipids: Definition, Biological importance, Classification and clinical importance.				
13.		**Amino Acids and proteins.**	**08**	**2**	**1**	
		Definition, Biological importance Classification, Qualitative tests.				
14.		**Diagnostic Tests:** Blood Sugar- [GOD – POD Method] Blood urea [DAM-TSC Method, Enzymatic Method] Glucose tolerance Test [GTT] Serum Uric Acid Serum Creatinine [Jaffe's method /Alkaline picrate method]	**19**	**8**	**1**	**1**
15.		**Vitamins and Minerals :**	**08**	**3**	**1**	
	I.	Vitamins classification Water soluble vitamins, Fat Soluble Vitamins, Sources, Daily requirements, Deficiency diseases.				
	II.	Minerals : Sources, Daily requirements, Deficiency diseases.				
			135			

MEDICAL LAB TECHNOLOGY

I YEAR

PART B – VOCATIONAL SUBJECTS

PAPER – I : BIO - CHEMISTRY [PRACTICALS]

PERIODS/WEEK: 04 PERIODS/YEAR: 135

S.No.	Name of the Unit.	**No. Of Periods**	Weightage in marks
1.	Reception and registration	**10**	3
2.	Collection of capillary blood	**10**	3
3.	Collection of venous blood.	**10**	4
4.	Collection of arterial blood.	**10**	4
5.	Separation of Serum and plasma from blood.	**10**	4
6.	Preparation of protein free blood filtrate.	**10**	4
7.	Lab glass ware a) Identification b) Handling c) Care and Maintenance d) Uses.	**10**	4
8.	Lab instruments a) centrifuges b) Balances c) Photo Electric Colorimeter d) Spectrophotometer	**10**	4
9.	Preparation of a) Percentage solutions b) Normal Solutions c) Molar Solutions.	**10**	4
10.	Qualitative identification tests for sugars	**10**	4
11.	Qualitative identification tests for proteins.	**10**	4
12.	Quantitative determination of Blood Sugar	**10**	3
13.	Semi Quantitative determination of Urine Sugar.	**15**	5
	Total	**135**	**50**

MEDICAL LAB TECHNOLOGY

I YEAR

PART B – VOCATIONAL SUBJECTS

PAPER – II : MICROBIOLOGY & PATHOLOGY [THEORY]

PERIODS/WEEK: 04 PERIODS/YEAR: 135

S.No.	Name of the unit	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
	MICROBIOLOGY				
I	Historical introduction to Microbiology contribution of famous Scientists in the field of Microbiology in brief.	4	2	1	
	a) Anton Von Leeuwenhoek. b) Robert Koch c) Edward Jenner d) Louis Pasteur e) Joseph Lister				
II	**Microscopy** a) Principle, working and maintenance of Compound Microscope. b) Principle of Fluorescent Microscope & Dark field Microscope.	05	6		1
III.	Sterilization and disinfection – classification and methods of sterilization	06	8	1	1
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, Tyndallisation & autoclave.				
2)	Filtration Methods – in brief.				
3.	Ionising Radiation				
4.	Disinfection – Mode of action and uses of important chemical disinfectants – phenol and phenolic compounds, alcohols, aldehydes halogens, dyes, acids and alkalies.				
5.	Gaseous methods of sterilization				
IV.	Cleaning, drying & Sterilization of Glassware, disposal of contaminated material i.e. Clinical infective material and inoculated culture media. Handling and disposal of Biomedical waste.	5	4	2	

S.No.	Name of the unit	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
V.	a) Morphology and classification of Bacteria.- Structure of Bacterial Cell, Capsule, Flagella, Spore etc. b) Anaerobic methods of cultivation of Bacteria.	10	8	1	1
VI.	**Methods of Collection of Clinical Specimen for Microbiological investigations [in detail] like:**	**5**	**4**	**2**	
	Sputum – Pettroff's method of concentration, urine, swabs, stool, blood, CSF and Aspirates.				
VII.	**Processing of clinical specimen collected for Isolation and identification of organism.**	**10**	**8**	**1**	**1**
	a) Preparation of direct smear and staining				
	b) Different Techniques of inoculation for isolation of bacteria.				
	c) Hanging drop preparation and its use.				
	d) Preparation and Inoculation of various media for Bio-Chemical reactions.				
VIII.	**Composition and preparation of staining reagents and different methods of staining.**	**10**	**8**	**1**	**1**
	a) Simple staining b) Gram's staining c) Giemsa's Staining d) Zeihl Neelson Staining. e) Albert Staining f) Negative Staining. g) Fluorescent staining.				
IX	**Culture Media – Classification of Media, Composition, preparation and uses.**	**10**	**8**	**1**	**1**
	a) Basal Media- Peptone Water, Nutrient, Agar, glucose broth. b) Enriched Media-Blood agar, Loeffler's serum slope, chocolate agar. c) Enrichment Media – Selenite Fbroth, Tetrathionate broth, Alkaline peptone water. d) Differential Media- Mac Conkey's Agar. e) Indicator & selective media – Lowenstein' Jenson Media, Potassium tellurite Media, TCBS, Wilson and Blair Media. Deoxycholate citrate agar media. f) Media for Blood culture – Brain heart				

S.No.	Name of the unit	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
	infusion broth, Typticase soya broth g) Anaerobic media – Robertson's Cooked Meat Media, Thioglycolate media h) Sugar Media for Bio-Chemical Reaction – Glucose broth, Hartley's broth, bile broth. i) Media for Biochemical reactions – Indole, MR,VP, Citrate,Urease, Oxidase, Catalase test, Nitrate reduction test, Phenyl Alkaline Deaminase test, gelatin liquefaction test j) Fungal media – Sabouraud's dextose Agar.				
	PATHOLOGY				
I	**Urine Analysis:**	10	8	1	1
a)	Collection – Collection of samples, Type of Samples, labeling & preservatives.				
b)	**Physical Examination.**				
	Color Appearance Quantity Odour Specific gravity Albumin P.H.				
c)	**Chemical Examinations**: Sugar Ketone bodies. Albumin Bile salts. Bile pigments Blood Strip method.				
d)	**Microscopic Examination – Centrifuging** Crystals. RBC & Casts WBC& Casts Epithelial cells & Casts. Hyaline casts, Granular casts. Atypical cells.				

S.No.	Name of the unit	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
II	Preparation of reagents, procedures, principles and Interpretation *	5	6	-	1
III	Sputum Analysis: Physical Examination Preparation Making a smear Staining Mounting. Microscopic Examination.	10	6		1
IV	Semen Analysis -Collection – after counseling -Physical Examination – color, quantity, nature etc. - Microscopic Examination – count, motility, morphology [normal & abnormal] - staining.	5			
V.	Body fluids – Collection, labeling. - Peritoneal fluid - pericardial fluid - pleural fluid - Cerebrospinal Fluid [C.S.F] - Diluting fluids. - Charging the improved Neubauer chamber. - Identifying & counting the cells.	10	2	1	
VI.	**Hematology:** a) Collection of blood. - Universal precautions - Methods of collection, venous puncture, finger puncture and vacutainer methods, materials required, procedures, precautions, uses of the sample and advantages of each method. POCT [Sample collection at bed side] also for children. b) Preparation of anti coagulants- Double oxalate, sodium citrate, EDTA, Heparin, action of each preparation, uses, disadvantages, quantity required. c) RBC,WBC count: Methods [Micro dilution and bulk dilution], materials required, diluting fluids, preparation, procedures, advantages of each method,	20	10	2	1

S.No.	Name of the unit	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
	precautions, formula for calculation and clinical significance. d) Platelet count: Morphology and functions of platelet, diluting fluids, procedure, formula for calculation and clinical significance. e) Reticulocyte Count: Methods [dry & wet] staining, diluting fluids, normal Morphology and values, clinical significance. f) Hemoglobin Estimation: Materials, procedure of Tallquist, Sahli's, Alkali, Haldane, Cyan meth hemoglobin and Specific Gravity [S.G] method, advantages and disadvantages and clinical significance. g) Estimation of PCV- Macro & Micro methods, procedure of filling the tube, centrifuging and reading, values advantages of each method – normal values and clinical significance. -Estimation of Erythrocyte indices-calculation and importance MCV, MCH, MCHC, RDW, color index. h) ESR- methods used, procedure, stages, factors affecting and clinical significance.				
VII.	Disposal of hospital waste- Cotton, swabs, needles, syringes, blood, urine and other material.	5	6		1
VIII.	Glass slides, cover slips – Cleaning & maintenance.	5	4	2	

MEDICAL LAB TECHNOLOGY

I YEAR

PART B – VOCATIONAL SUBJECTS

PAPER – II : MICROBIOLOGY & PATHOLOGY [PRACTICALS]

PERIODS/WEEK: 04 PERIODS/YEAR: 135

S.N.	Name of the Unit	No. of Periods	Weightage in marks
	MICROBIOLOGY		
I	Lab instructions for personal safety precautions	10	3
II	Receipt and recording a specimen in the lab and discarding after processing	10	3
III	Cleaning and care of glassware, syringes, apparatus, preparation of Pasteur pipettes.	5	2
IV.	Handling and care of Microscope.	10	3
V.	Operation of Autoclave, incubator, water bath, Seitz filter	10	3
VI.	Preparation of various media.	10	3
VII.	Preparation of stains and smears.	10	4
VIII.	Methods of collection of microbiology specimen and its importance.	10	4
	PATHOLOGY		
I	Collection of blood - Receipt of requisition forms - Receipt of samples - Labeling	10	5
II	Universal precautions	5	2
III	Preparation of anticoagulants	08	3
IV	RBC, WBC & Platelet count.	08	3
V.	ESR stands & ESR estimation.	08	3
VI.	PCV – estimation.	5	2
VII	Hb estimation by different methods.	08	3
VIII	Urine- physical examination, Chemical examination & Microscopic examination. - collection - Preservatives - Strip method.	08	4
	Total	**135**	**50**

MEDICAL LAB TECHNOLOGY

I YEAR

PART B – VOCATIONAL SUBJECTS

PAPER – III : ANATOMY & PHYSIOLOGY [THEORY]

PERIODS/WEEK: 04 PERIODS/YEAR: 135

S.No.	NAME OF THE UNIT	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
I	**Basics in Human Anatomy**				
1.	Introduction to Human Anatomy.	6	8	1	1
2.	Cell – Definition, Structure and properties.	6	4	2	-
	Tissue – Classification in brief [epithelial, connective, muscular, nervous]	6	4	2	-
3.	Respiratory system	6	4	2	-
4.	Digestive system & Hepato Biliary system	6	6	-	1
5.	Cardio-vascular system.	5	4	2	
6.	Lymphatic system.	5	4	2	
7.	Bones & Joints.	5	6	-	1
8.	Nervous system – CNS	5	4	2	-
9.	Excretory system – Urinary system	5	6	-	1
10.	Endocrine system	5	2	1	
11.	Reproductive system- male & Female	5	2	1	
12	Sense organs- Eye, ear, Skin, nose, tongue.	5	2	1	
II.	**Basics in Human physiology**				
1.	Introduction to Human Physiology.	6	4	2	
2.	Muscle physiology & Nerve physiology.	6	2	1	
3.	Blood & Lymph	5	8	1	1
4.	Respiratory system.	5	4	2	-
5.	Digestive system.	6	6	-	1
6.	Cardio – Vascular system.	5	8	1	1
7.	Excretory system – Urinary system.	08	2	1	
8.	Endocrine system	09	8	1	1

9.	Reproductive system – Male & Female.	5	6	-	1
10.	Nervous system [CNS] & Sense organs [Eye, ear, skin, nose, tongue]	10	8	1	1
	Total	135			

MEDICAL LAB TECHNOLOGY

I YEAR

PART B – VOCATIONAL SUBJECTS

PAPER – III : ANATOMY & PHYSIOLOGY [PRACTICALS]

PERIODS/WEEK: 04 PERIODS/YEAR: 135

S.No	NAME OF THE UNIT	No. Of Periods	Weightage in marks
I	**Human Skeleton**		
1.	Name of the Bones- Identification points, Surfaces of [Skull, Scapula, clavicle, humerus, radius, ulna, carpal bones, meta carpal bones, phalanges – Innominate bone, Femur, patella, tibia, fibula, tarsal bones, meta tarsal bones, Phalanges, Ribs- classification, vertebrae, sternum	30	10
2.	**Human Organs[POP Models]**	**20**	**09**
	Brain, Stomach, Lungs, Intestines, Heart, Kidney, Liver, Uterus, Spleen, Fallopian tubes.		
3.	**Human Slides [Permanent Slides]**	**30**	**10**
	Epithelial Tissue. Connective Tissue. Muscular Tissue. Nervous Tissue. Liver Kidney Spleen Pancreas Lymph nodes Skin Testes Ovary Uterus Tonsil Stomach layers Small intestine Large intestine.		
4.	**Blood pressure**	**15**	**5**
	Estimation of Blood pressure		
5.	T.P.R. [Temperature, pulse, respiration] chart	**10**	**05**
6.	TC,DLC [RBC Total Count, WBC Total Count, differential Leucocytes count]	**30**	**11**
	Total	**135**	**50**

MEDICAL LAB TECHNOLOGY

II YEAR

PART B – VOCATIONAL SUBJECTS

PAPER – I : BIO- CHEMISTRY [THEORY]

PERIODS/WEEK: 04 PERIODS/YEAR : 110

S.No	NAME OF THE UNIT	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
I	**Instrumental methods of Bio-Chemical Analysis**	**10**	**8**	**1**	**1**
	1. Flame photometry: Principle, Theory, Construction of Flame Photometer, General and Clinical applications, study of electrolytes using flame photometer, clinical importance of determination of electrolytes.				
	2. Fluorimetry: Fluorescence, Principle and theory, construction of Fluorimeter, general and Clinical applications.				
II	**Separation Techniques.**	**10**	**8**	**1**	**1**
	1. Chromatography: Definition, Basic Principles, different types and their techniques, General and Clinical applications.				
	2. Electrophoresis: Definition and basic principle involved, different types, procedures, general and clinical applications, electrophoretic fractionation of serum proteins and lipo proteins.				
III.	**Immuno Assays – Definition, Basic Principles of Immuno chemical reactions and immune assays.**	**10**	**8**	**1**	**1**
	1. Radio immune assays. Introduction to radioactivity, Radioactive substances, Safety and precautions, Hormone assays [T3,T4,TSH]				
	2. Enzyme linked immuno assays. Description of				

S.No		NAME OF THE UNIT	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
		instruments used in these assays.				
IV.		**Metabolism:**	**10**	**6**		**1**
	1.	Carbohydrate metabolism – Glycolysis and TCA Cycle.				
	2.	Lipid metabolism- β-Oxidation of Fatty Acids.				
	3.	Protein metabolism – Urea cycle.				
V.		**Titrimetric methods of quantitative determination, preparation of various solutions used in Titrimetric analysis.**	**5**			
VI.		**Liver Function Tests[LFT]:**	**10**	**8**	**1**	**1**
	1.	Classification of LFT				
	2.	Basic concepts- including normal & abnormal Bilirubin Metabolism				
	3.	Determination of Serum Bilirubin – Malloy & Evelyn method, Vandenbergh's method.				
	4.	Determination of total Serum proteins & A/G Ratio.				
	5.	Estimation of Enzymes – Transaminases [SGOT, SGPT], Alkaline Phosphatase & Acid phosphatase				
VII.		**Kidney function tests [KFT/RFT]:**	**15**	**8**	**1**	**1**
	1.	Classification of KFT				
	2.	Basic concepts				
	3.	Estimation of Blood urea [DAM-TSC & Enzymatic methods]				
	4.	Estimation of serum creatinine [Jaffe's method / Alkaline picrate]				
	5.	Clearance tests [Urea, Creatinine]				
	6.	Concentration & dilution tests.				
	7.	Urine Examination in assessing KFT – Proteins, Sugars, blood [Qualitative]				
VIII.		**Gastric Function Tests [GFT]**	**5**	**2**	**1**	
	1.	Introduction & Basic concepts.				

S.No	NAME OF THE UNIT	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
	2. Estimation of Free HCL combined Acids – Clinical significance.				
IX.	**Thyroid Function Tests [TFT]**	**10**	**2**	**1**	
	1. Introduction & Basic Concepts.				
	2. Estimation of Thyroid Hormones [T3,T4,TSH] - [RIA& Chemiluminiscence methods], Clinical significance.				
X.	**Pancreatic Function Test [PFT]**	**5**	**2**	**1**	
	1. Introduction of Basic concepts.				
	2. Determination of Serum amylase.				
XI.	**Clinical Enzymology :**	**5**	**6**	**1**	
	1. Introduction & Basic concepts of Enzymes, Co-Enzymes, Iso Enzymes.				
	2. Importance of Enzymes.				
	3. Gamma Glutamate transaminase [GGT]				
	4. Cardiac Enzymes – CPK, LDH, SGOT.				
	5. Acid Phosphatase.				
XII.	**Body Fluids:**	**5**	**2**	**1**	
	1. Outlines of formations of different body fluids				
	2. Composition & Analysis of CSF including.				
	a) CSF Sugar estimation b) CSF Proteins estimation c) CSF Chlorides estimation. Including interpretation of results.				
XIII.	**Automation of Biochemistry Labs and usage of Computers.**	**5**	**6**	**1**	
XIV	**Quality Control**	**5**			
	a) Introduction and importance of quality assurance, General principle.				

S.No	NAME OF THE UNIT		No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
		b) Internal and external quality control.				
XV		**Diagnostic Tests :**	**15**	**8**	**1**	**1**
	1.	Lipid profile – Serum Total cholesterol, HDL Cholesterol, LDL cholesterol.				
	2.	Glycosylated hemoglobin.				
	3.	Serum calcium				
	4.	Inorganic phosphate.				
	5.	Blood gas analysis [PCo2 & PO2]				
	6.	Analysis of Renal & Biliary Calculi [Stone analysis]				
			110			

MEDICAL LAB TECHNOLOGY

II YEAR

PART B – VOCATIONAL SUBJECTS

PAPER – I : BIO- CHEMISTRY [PRACTICALS]

PERIODS/WEEK: 04 PERIODS/YEAR : 115

S.No.	Name of the Unit	**No. Of Periods**	Weightage in marks
1.	Electrophoretic fractionation of serum proteins and lipo proteins – Demo.	5	2
2.	Separation of amino acids and carbohydrates by paper chromatography – Demo.	5	2
3.	Determination of plasma prothrombin time	5	2
4.	Oral glucose tolerance test [GTT]- Demo	5	2
5.	Estimation of serum calcium and inorganic phosphate.	5	2
6.	Practice and use of automated pipettes.	5	2
7.	Estimation of HDL cholesterol.	5	2
8.	Determination of urine proteins by turbidmetric method – [Sulfosalysilic Acid]	5	2
9.	CSF analysis – Pandy's test Nonne-Apelt – Sugars, Proteins	5	2
10.	Demonstration of working of Auto analysers.	10	5
11.	Training of Computer basics.	15	7
12.	Estimation of serum sodium and potassium by Flame photometry.	5	3
13.	Qualitative identification of urine sugars.	5	2
14.	Qualitative identification of urine proteins [Heat Coagulations}	5	2
15.	Qualitative identification of urine Bile Salts & Bile Pigments.	5	2
16.	Determination of Serum Bilirubin, SGPT & Alkaline Phosphatase [LFT]	10	5
17.	Determination of Blood Urea and serum creatinine [KFT]	10	4
18.	Practice and interpretation of lipid profile.	5	2
	Total	**115**	**50**

MEDICAL LAB TECHNOLOGY
II YEAR
PART B – VOCATIONAL SUBJECTS
PAPER – II: MICROBIOLOGY [THEORY]

PERIODS/WEEK: 04 PERIODS/YEAR : 110

S.No	NAME OF THE UNIT	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
I	**Normal Flora of Micro-organisms in the Human Body**	**5**	**2**	**1**	
II	**Introduction to Immunology:**	**10**	**8**	**1**	**1**
a)	Brief outline of Immunity				
b)	What are antigens?				
c)	What are antibodies?				
d)	Different types of antigen and antibody reactions, their applications in the diagnostics - agglutination, precipitation, complement fixation, Neutralisation, RIA.				
e)	Principle and method of ELISA Test.				
III	**Collection and processing of faecal samples, concentration techniques of stool for Microscopic Examination**	**10**	**8**	**1**	**1**
	Parasitology : - E - histolytica - Giardia lambia - Plasmodium spp. - Ascaris lumbricoidis - Taenia solium - Enterobius vermicularis - Wucheraria bancrofti. W.Malayi. W.Loaloa.				
IV.	**Antibiotic sensitivity Test – preparation of Antibiotic discs.**	**5**	**6**		**1**
V.	**Preservation methods of stock cultures and their importance and principle procedure.**	**5**	**4**	**2**	
VI.	**Brief outline of Morphology cultural characteristics and Lab diagnosis of imp. Pathogens.**	**25**	**16**	**2**	**2**
a)	Gram Positive – Staphylococcus, Streptococcus, Pneumococcus				
b)	Gram Negative cocci– Gonococci, Meningococci.				
c)	Gram Positive Bacilli- Corynebacterium – diphtheriae, Mycobacterium tuberculosis, Mycobacterium leprae				
d)	Gram Negative Bacilli – Enterobacteriaceae – E.coli, Klebsiella, Salmonella, Shigella.				
e)	Anaerobic Bacteria- Bacteriodes,				

S.No	NAME OF THE UNIT	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
	Clostridium spp.				
f)	Vibriocholera, Pseudomonas.				
g)	H.influenza, B.pertusis.				
h)	Spirochetes- Treponema, Leptospira.				
i)	Actinomyces & Nocardia.				
VII.	**Bacteriological Examination of Water, Milk & Food.**	**10**	**10**	**2**	**1**
VIII.	**Mycology.**	**15**	**12**	**3**	**1**
	Morphology, cultural characteristics and lab diagnosis of : Candida, Cryptococcus, Dermatophytes, Aspergillus, Penicillum.				
IX	**Virology**	**10**	**8**	**1**	**1**
	Classification, General properties and cultivation of imp.pathogenic viruses such as Polio, Hepatitis, Rabies, HIV and Dengue.				
X.	**Quality Control in Laboratory.**	**10**	**8**	**1**	**1**
XI	**Automation in Clinical Laboratories - in brief.**	**5**	**6**		**1**
	Total	**110**			

MEDICAL LAB TECHNOLOGY
II YEAR
PART B – VOCATIONAL SUBJECTS
PAPER – II : MICROBIOLOGY [PRACTICALS]

PERIODS/WEEK: 04 PERIODS/YEAR: 115

S.No	NAME OF THE UNIT	No. Of Periods	Weightage in marks
1.	Collection of clinical samples like blood, urine, stool, sputum, swabs etc.	10	5
2.	Parasitology a) Collection, preservation and transportation of faecal material for examination of parasites. b) Concentration techniques of stool for ova and cysts. c) Wet preparation of faecal sample for ova and cysts.	10	5
3.	Procedure, processing of sputum for AFB	5	2
4.	Procedure of skin clipping of leprae bacilli.	5	2
5.	Identification of organisms with Biochemical reactions of common organisms like – Staphylococcus, E.coli, Klebsiella, Shigella, Salmonella, Proteus, Pseudomonas.	10	4
6.	Antibiotic Sensitivity Tests.	5	2
7.	Preservation of Stock Cultures.	5	2
	Mycology processing.		
8.	Collection of specimen for fungal examination like skin scrapings, CSF & Nail clippings.	5	2
9.	Fungal Examination by wet preparation	5	2
10.	Fungal Culture	5	2
11.	Germ Tube Test.	5	2
	Serology		
12.	CRP, ASO, RA, VDRL, Widal, Brucella, ELISA, Western blot tests.	35	16
	Virology		
13.	Incubation of fertile eggs and inoculation by various routes.	10	4
	Total	**115**	**50**

MEDICAL LAB TECHNOLOGY
II YEAR
PART B – VOCATIONAL SUBJECTS
PAPER – III : PATHOLOGY [THEORY]

PERIODS/WEEK: 04 PERIODS/YEAR : 110

S.No	NAME OF THE UNIT	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
I	Preparation of blood smears and examination: - Thin & thick blood films. - Making an ideal blood film. - Methods – slide method, Cover slip method - Staining – composition, preparation & procedure of leishman stain. - Knowledge about Romanowsky stains. - Examination – Morphology & Identification of RBC, WBC & Platelets Counting – DLC – Counting methods, Normal values, clinical significance and limitations. - Oils used for immersion- types	08	8	1	1
II	Special stains for Bone marrow smears : - Giemsa, Wrights, Myeloperoxidase stain, Periodic Acid Schiff [PAS]- Composition, Preparation, procedure and interpretation.	5	2	1	
III	Bone Marrow Aspiration / trephine biopsy : - Setting up of tray for bone marrow aspiration - Preparing smears – methods- Imprints, crush. - Staining, clinical significance.	5	2	1	
IV	Identification of hemoparasites : - Morphology of malaria parasite, microfilaria, leishmania, trypanosomiasis. - Importance of sample collection time. - Making thick and thin smears. - Procedure of making & staining the smears. - Identification of the parasite.	5	6		1
V	Absolute Eosinophil count : - Materials required, diluting fluids, procedure, identification and counting of cells.	5	2	1	
VI	Sickle cell preparation: - Principle, procedure, methods,	5	6		1

S.No	NAME OF THE UNIT	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
	Materials required, clinical significance.				
VII	Osmotic fragility test : - Methods used, materials required, procedure, observation, reporting, Normal values, factors affecting and interpretation.	5	2	1	
VIII	Coagulation Tests: a) Bleeding time- methods- Dukes method, lvy's method – procedure, normal values and clinical significance. b) Clotting time – methods- Lee & White, capillary tube method- procedure, materials, normal values, factors affecting coagulation and clinical significance. c) Prothrombin time [PT] d) APTT	08	6		1
IX	Buffy coat preparation : L.E. cells, microfilaria and abnormal cells.	5	2	1	
X. *	L.E cell Test : - Principle, procedure, material required, reporting, clinical significance.	5	2	1	
XI.	Basics of coulter counter : - Diluting fluids - Maintenance of counter.	5	2	1	
XII.	Histopathology : - Maintenance of Registers – receiving register, gross register, Slide register and report issue register. - Biopsy & tissue specimens – Example: Thyroid, GIT, breast, soft tissue, bone etc. - Fixatives - processing - Dehydration - clearing - Impregnation - paraffin embedding and block making - Trimming of blocks. - Tissue cutting [Microtomes] - Staining of the sections. - Mounting & Mounting Media, cover slips, labeling. - Decalcification of bone & calcified tissue. - Routine Hematoxylin & Eosin staining.	13	16	2	2

S.No	NAME OF THE UNIT	No. Of Periods	Weightage in marks	Short answer questions	Essay/ Problem questions
	- Immuno histochemistry. - Special stains- PAS, Reticulin, Perls, Masson's Trichrome etc. - Filing of slides, storing of blocks etc.				
XIII.	Microtomes & Knives: - Types of Microtomes – Maintenance. - Sharpening of Knives – Honing & Stropping - Advantages and dis-advantages of frozen section cutting.	08	2	1	
XIV	Cytology : - FNAC - Guided aspiration - Pap smear - Cytospin – equipment – machine, Procedure, material, laying a tray for the procedure. - Making smears, staining & mounting cover slip, labeling. - Identification & Interpretation – basics.	08	6		1
XV	Museum techniques: - Labeling & storage of specimens - Methods of color maintenance. - Presentation of specimen. - Mounting, Labeling and cataloging the specimen - Maintenance and cleanliness of the Museum. - Disposal of waste, - Safety in the lab.	5	6		1
XVI	Autopsy : -Aims & methods of performing Autopsy, cleaning, suturing and restoring the body. Cleaning the autopsy instruments, tables and rooms, preservation of organs.	5	2	1	
XVII.	Immuno Hematology and Blood Banking: - Introduction - Human blood group antigens, their inheritance and antibodies. - ABO Blood group systems. - RH Blood group system. - Techniques of grouping and cross matching. - Blood collection, screening of donor, preservation and maintenance of records. - Coombs Test – a) Direct b) indirect.	10	6		1
	Total	**110**			

MEDICAL LAB TECHNOLOGY
II YEAR
PART B – VOCATIONAL SUBJECTS
PAPER – III : PATHOLOGY [PRACTICALS]

PERIODS/WEEK: 04 PERIODS/YEAR : 115

S.No	NAME OF THE UNIT	No. Of Periods	Weightage in marks
I	1.Maintenance, Cleaning and care about Automatic tissue processor	15	7
	2. Microtomes & knives – sharpening		
	3. Water bath- tissue floatation		
	4. Incubator.		
	5. Maintenance & Cleaning.		
	6. Care about equipment.		
II.	Maintenance & Preservation of cytology slides, histopathology blocks & slides – Histopathology specimens & Processing. - Preparation of formalin for fixation.	10	5
III.	Glass Ware - Slides, Cover slips, sample collection jars, test tubes and watch glasses.	5	2
IV.	Immuno Hematology & Blood Banking - ABO Blood grouping techniques - RH Factor - Cross matching. - Coombs test- Direct & indirect methods.	20	8
V.	Histopathology : 1. Fixation of Tissue 2. Processing 3. Dehydration 4. Clearing 5. Impregnation 6. Paraffin embedding and block making. 7. Trimming of block 8. Staining of the sections 9. Special stains – PAS, Perls, Reticulin, Masson's Trichrome. 10. Mounting & labeling 11. Decalcification – to be told separately.	20	8
VI.	Cytology : Fixatives. Cytological exam of all fluids Slide preparation , staining Pap smears – staining, labeling, mounting & preservation	15	7
VII	Sickle Cell preparation	5	2
VIII	Buffy Coat preparation	5	2
IX	Bone marrow smears- preparation & staining.	5	2
X	Coagulation tests – B.T, C.T.	15	7
	Total	**115**	**50**

LIST OF EQUIPMENTS

BIOCHEMISTRY

1.	Hot Plate	1
2.	Gas Cylinder with Burner	2
3.	Spirit Lamps	15
4.	Hand Centrifuges	2
5.	Electrical Centrifuges	1
6	Refrigerator 165 lit.	1
7.	Colorimeter	1
8.	Hot Air oven	1
9.	Water bath	1
10.	Simple balance	1
11.	Electronic balance	1
12.	Flame photometer	1
13.	Spectrophotometer	1
14.	Flourimeter	1
15.	Incubator	1
16.	Electrophoresis apparatus	1
17.	Computer with Printer	1
18.	Semi Auto Analyzer.	1

GLASSWARE

1.	Test Tubes	
	18X150mm	100
	15X150mm	100
	15X125mm	100
2.	Centrifuge Tubes	20
3.	Beakers- 250 ml	5
4.	**Pipettes**	
a)	**Volumetric Pipettes.**	
	2ml	5 No's
	5ml	5 No's
	10ml	5 No's
	20ml	5 No's
	25ml	5 No's
b)	**Serological Pipettes.**	
	1ml 1/100	5 No's
	2ml/1/100	5 No's
	5ml1/100	5 No's
	1.10 ml1/10	5 No's
	2ml 1/10 ml	5 No's
	0.1ml 1/100ml	5 No's
	02 ml 1/100	5 No's
C)	Ostwald pipettes	
	0.1ml	2
	0.2ml	2

	0.5 ml.	2
5	**Burettes**	
	25 ml	5
	50 ml	5
6	**Reagent Bottles**	
	60 ml	10
	120 ml	10
	250 ml	10
	500 ml	10
	1000 ml	10
7.	Dropper Bottles 30 ml	5
8.	Watch glass	6
9.	Volumetric Flasks	
	25ml	5
	50ml	5
	100ml	5
	250ml	5
	500ml	5
	1000ml	3
10.	Stoppaerd graduated Test Tubes	
	15ml	5
	40ml	5
	50ml	5
11.	Distillation assembly [complete set]	1
12.	Round Bottom flask 500 ml & 1000 ml	1+1
13.	Filter paper	1 Ream
14.	What man filter paper	No.1 – 20 sheets
	What man filter paper	No.2- 10 sheets.
15.	Cotton (absorbent)	1 kg.
16.	Glass slides	100
17.	Plastic wash bottles 500 ml	10
18.	Mortar and Pestle	2 no’s

MICROBIOLOGY

1.	Student Microscope	
2.	Centrifuge	
3.	Refrigerator	
4.	Autoclave	
5.	Hot air oven	
6.	Incubator	
7.	Distil water plant	
8.	Pipette washer	
9.	Anaerobic Jar	
10.	Vacuum Pump	
11.	Analytical Balance	
12.	Water Bath	
13.	VDRL Rotator	

14.	Petri dishes 100X17	100 no's
15.	Test Tubers 150X19	100
	100X12	100
16	Pipettes	
	10ml	10 Nos.
	5ml	10 Nos.
	1ml	10 Nos.
17.	Wash bottles	5
18.	Spatulas	12
19.	Reagent bottles	10
20	Measuring Cylinders 50 ml	5
21	Compound Microscope	5

PATHOLOGY

1.	Microscope	1
2.	Hot air oven	1
3.	Incubator	1
4.	Centrifuge	1
5.	Blood cell counter	2
6.	Water Bath	1
7.	Chemical balance	1
8.	Hot plate	1
9.	Stopwatch	1
10.	Haemometer	5
11.	Haemocytometer	5
12.	ESR Stand	5
13.	ESR Tubes	5
14.	Motor and pestle	5
15.	Urino meter	2
16.	Spirit lamp	2
17.	Syringes	
	20ml	10
	10ml	10
	5ml	5
	2ml	2
18.	Beaker	
	100ml	5
	250ml	5
19.	Test Tubes	
	10 ml	
	15 ml	
20	Watch glasses.	5
21	Trays	5
22	Syringe dispenser to crush needles.	1
23.	Refrigerator	1
24.	Glass slides and cover slips.	50

VIII. **A. Collaborating Institutions for Curriculum transaction**

1. All Hospitals.
2. All Medical Colleges.
3. All the National Laboratories
4. Regional Research Laboratories.
5. University Departments.
6. Pharmaceutical Companies and Educational Institutes.

B. On the Job Training Centers.

1. Government Hospitals
2. PHCs Primary Health Centers.
3. Dispensaries.
4. Medical Colleges.
5. Private Hospitals
6. Private Labs.

IX Qualification of Lecturers

1. MBBS
2. MBS Hom/BHMS
3. B. Pharmacy
4. M.Sc Microbiology / Biochemistry / MLT

X. Vertical Mobilities

A) With Bridge Course

1. B.Sc (BZC)

2. Courses through EAMCET

B) Without Bridge Course.

1. B.Sc MLT

2. B.Sc Microbiology

3. B.Sc Biochemistry

4. B.Sc Biotechnology

5. M.Sc. MLT/Biochemistry /Microbiology/ Biotechnology [at P.G. level]

XII. REFERENCE BOOKS

Biochemistry

1. Harold Varley
2. Lehninger
3. Rama Rao

Anatomy & Physiology

1. C.C. Chatterjee
2. Chowrasia

Microbiology

1. Anantha Narayana

Pathology

1. Ramnik Sood
2. Mukerjee 3 volumes
3. Talib
4. Praful Godkar
5. WHO Lab Manual
6. Harsh Mohan – Practical book.
7. Tejinder Singh – Practical book.
8. Praful – Godkar
9. K.M. Samuel.

MEDICAL LAB TECHNICIAN

MODEL QUESTION PAPER

I –Year Paper – I

BIO-CHEMISTRY (THEORY)

Time : 3 Hours **Max.Marks : 50**

SECTION-A

Note: (i) Answer all the Questions (ii) Each Question carries 2 marks 10X2=20

1. Give the normal values of Blood sugars.
2. Define solution.
3. Mention the different methods of Blood collection.
4. What are the different types of Urine specimens? Give examples of urinary preservatives.
5. Explain the terms a) Solute b) solvent.
6. What are the hygroscopic substances? Give examples.
7. Expand GTT and give the normal values of serum uric acid.
8. Write the source of Vitamin-A. And write the diseases caused by its deficiency.
9. Write the names of water soluble vitamins.
10. Give the classification of carbohydrates.

Section-B

Note : (i) Answer any five Questions (ii) Each Question carries 6 marks 5X6=30

11. Give the classification of Lipids and write the biological importance.
12. Write the determination of Blood glucose using GOD-POD method.
13. Give a note on different types of Glass ware used in Bio-chemistry lab. Write the applications.
14. Describe the prevention, safety and first- Aid in lab accidents.
15. Write the principle and construction of Electrical Centrifuge. And give the applications.
16. Define Colorimetry. Describe the construction, operation and uses of colorimeter.
17. What is Phlebotomy? Describe the collection of venous blood.
18. Write the principle, construction and applications of Spectro photometer.

MODEL QUESTION PAPER

I –Year Paper – II

MICRO-BIOLOGY & PATHOLOGY (THEORY)

Time: 3 Hours **Max.Marks : 50**

SECTION-A

Note: (i) Answer all the Questions (ii) Each Question carries 2 marks 10X2=20

1. Mention the names of different body fluids.
2. Write the physical properties of Urine.
3. Write the names of Bile salts and Bile Pigments.
4. Give the normal values of Total RBC & Platelets.
5. Write about a) Glycosurea b) Hematuria.
6. What is Liquification time of Semen?
7. Define Sterilization and disinfection.
8. Give the differences between Gram Positive & Gram Negative bacteria
9. Write the principle of Compound Micro-scope
10. Write the contributions of Antony van Leeuwenhoek &Louis Pasteur to Microbiology

SECTION-B

Note: (i) Answer any five Questions (ii) Each Question carries 6 marks 5X6=30

11. What is an Anti Coagulant? Write the uses , Quantities required and preparation of EDTA & Sodium citrate
12. Describe the Estimation of ESR. Give the normal values of and write the clinical importance.
13. Write the Qualitative determination of Urine sugar. And write the clinical importance.
14. What are the collection methods of Semen? Describe the Physical examination of Semen.
15. Describe the construction & operation of Fluorescent Microscope and write the applications.
16. What are the different methods of Sterilization? Describe the construction and operation of Autoclave
17. Write a note on Media for Blood cultures and Anaerobic media. Write the composition & preparation of Zeil Nelsons stain.
18. Estimation of Hemoglobin by Sahli's method.

MODEL QUESTION PAPER

I –Year Paper – III

ANATOMY & PHYSIOLOGY (THEORY)

Time : 3 Hours **Max.Marks : 50**

Section-A

Note : (i) Answer all the Questions (ii) Each Question carries 2 marks 10X2=20

1. Define Anatomy &physiology
2. Mention the varieties of tissues in our body
3. Write the functions of saliva
4. What is Dextro Cardia
5. List the Proximal Row Carpal Bones
6. What is Meningitis
7. What are the Exocrine Glands
8. Write the surfaces of Kidney
9. Mention the parts of Fallopian Tubes
10. Write names of the following Nerves & arteries
    a) 7^{th} Cranial nerve c) 4^{th} Cranial nerve
    b) Blood supply to liver and Heart

Section-B

Note : (i) Answer any five Questions (ii) Each Question carries 6 marks 5X6=30

11. Draw the Neat and labeled diagram of heart and explain coronary circulation
12. Write the classification of Bones with examples and mention the functions of Bones
13. Define organ write the organs present in Respiratory system and explain one in detail
14. Draw the diagram of skin and write the functions of skin
15. Draw the labeled structure of stomach and explain the functions of liver
16. Write the composition of blood and functions of blood
17. a) list the Endocrine glands
    b) Write short notes on
    1) Uterus 2) Tonsils 3) Appendix

18. Draw a neat diagram of urinary system with labeling. And explain the formation of urine.

MEDICAL LAB TECHNOLOGY

MODEL QUESTION PAPER

II –Year Paper – I

BIO-CHEMISTRY (THEORY)

Time : 3 Hours Max.Marks : 50

Section-A

Note : (i) Answer all the Questions (ii) Each Question carries 2 marks 10X2=20

1. What are transaminases? Give examples.
2. Write the clinical application of chromatography and electrophoresis
3. Write the principle of Flame photometry
4. Define a) Glycolysis b) Urea cycle
5. What is quality assurance? Explain internal quality control
6. Mention Lipid profile tests
7. What are the Thyroid Hormone assayed by RIA
8. Give the Normal values of Serum Bilirubin & Total Proteins
9. Define enzymes. Mention the unit of measurement.
10. Mention various tests done to asses renal functioning

Section-B

Note : (i) Answer any five Questions (ii) Each Question carries 6 marks 5X6=30

11. Write about determination of Glycosylated haemoglobin and its clinical importance
12. Write about enzyme. Give the classification
13. Determination of Serum total Bilirubin
14. Describe the construction, operation, application of a Flamephotometer with a neat schematic diagram
15. How do you determine serum amylase? Give the principle requirements and methods
16. Discuss about automation in a biochemical laboratory
17. Define primary standard and secondary standard classify different titrimetric methods
18. Explain separation of plant pigments by paper chromatography

MEDICAL LAB TECHNOLOGY

MODEL QUESTION PAPER

II –Year Paper – II

MICRO-BIOLOGY (THEORY)

Time : 3 Hours Max.Marks : 50

Section-A

Note : (i) Answer all the Questions (ii) Each Question carries 2 marks 10X2=20

1. Expand ELISA & RIA.
2. Name causative Organism for Cholera and Diphtheria.
3. Define Antigen and Antibody.
4. Give the importance of Vaccines.
5. Explain about Euthanasia.
6. Write difference between Gram positive & Gram negative bacteria.
7. Define Immunity
8. Principle of stock culture
9. Morphology of Gonococci
10. Importance of Mycology

Section-B

Note : (i) Answer any five Questions (ii) Each Question carries 6 marks 5X6=30

11. Write Morphology and lab diagnosis of E. histolytica
12. Antibiotic sensitivity Test
13. Explain the Normal flora of Micro-organism in Human body
14. Write about Bacteria causing food poisoning.
15. Write Short Notes on
    1) Candida
    2) Penicillin
    3) Actinomyces.
16. Write a note on Preservation, methods of stock culture and their importance
17. Write about the collection and processing of faecal samples.
18. Write morphology, cultural characteristics and lab diagnosis of E.coli

MEDICAL LAB TECHNOLOGY

MODEL QUESTION PAPER

II –Year Paper – III

PATHOLOGY (THEORY)

Time : 3 Hours Max.Marks : 50

Section-A

Note : (i) Answer all the Questions (ii) Each Question carries 2 marks 10X2=20

1. Mention specimen collection sites for Bone Marrow Examination.
2. Expand PAS and APTT.
3. Write the principle for sickle cell preparation.
4. Expand CT & BT.
5. Define Biopsy.
6. Write the names of various Microtomes.
7. Explain the characters of Blood donor.
8. What is Regressive stain?
9. What is Mordant?
10. Write the composition of Leishman stain.

Section-B

Note : (i) Answer any five Questions (ii) Each Question carries 6 marks 5X6=30

11. Explain automatic tissue processing.
12. Give blood grouping procedure and its importance.
13. Identification of Microfilaria.
14. Write the principle and clinical signification of sickle cell preparation
15. Describe the Decalcification by nitric acid method
16. Explain about the Direct & indirect comb's test. Give clinical importance
17. Write the principle, procedure & material required for L.E.Cell test
18. Give a note on preparation of Thick & Thin blood films and uses

MEDICAL LAB TECHNOLOGY

MODEL QUESTION PAPER

I –Year Paper – I

BIO-CHEMISTRY (PRACTICAL)

Time: 3 Hours Max.Marks : 50

SECTION -A

Note: Attempt any two practicals. Each question carries 15marks 2X15=30

1. Collect the Venous blood. Write the procedure. Show the result
2. Prepare 250ml of 0.9%Nacl solution. Show the preparation. write the procedure
3. Find out the Glucose in the given urine sample by Benedict's method. Write the procedure. produce the results

SECTION-B

4. Spotters 10marks

SECTION –C

5. Viva 5marks
6. Record 5marks

MEDICAL LAB TECHNOLOGY

MODEL QUESTION PAPER

I –Year Paper – II

MICRO-BIOLOGY & PATHOLOGY (PRACTICAL)

Time : 3 Hours Max.Marks : 50

SECTION -A

Note: Attempt any two practicals. Each question carries 15marks 2X15=30

1. Estimate the Hb% in the given blood sample by Sahli's method. Produce the result. Write the procedure
2. Count the Total WBC in the given sample. Show the result. Write the procedure
3. Prepare Mac Conkey's agar media. Show the preparation. Write the procedure.

SECTION-B

4. Spotters 10marks

SECTION –C

5. Viva 5marks
6. Record 5marks

MEDICAL LAB TECHNOLOGY

MODEL QUESTION PAPER

I –Year Paper –II

ANATOMY & PHYSIOLOGY (PRACTICAL)

Time: 3 Hours Max.Marks: 50

SECTION -A

Note: Attempt any two practicals. Each question carries 15marks 2X15=30

1. Count the Total RBC in the given blood sample using Neubauer counting chamber. Show the result. Write the procedure
2. Draw the neat diagrams of Skull & Humerus with labeling
3. Estimate the Blood pressure. Write the procedure

SECTION-B

4 .Spotters 10marks

SECTION –C

5. Viva 5marks

6. Record 5marks

MEDICAL LAB TECHNOLOGY

MODEL QUESTION PAPER

II –Year Paper – I

BIO-CHEMISTRY (PRACTICAL)

Time : 3 Hours **Max.Marks : 50**

SECTION -A

Note: Attempt any two practicals. Each question carries 15marks 2X15=30

1. Estimate the serum sodium in the given sample using FPM. Produce the result. write the procedure
2. Determine the serum Bilirubin in the given sample. Show the result. Write the procedure.
3. Estimate the concentration of blood urea in the given sample by DAM- TSC method. Show the result. Write the procedure

SECTION-B

4 .Spotters 10marks

SECTION –C

5.Viva 5marks

6. Record 5marks

MEDICAL LAB TECHNOLOGY

MODEL QUESTION PAPER

II –Year Paper –II

MICRO-BIOLOGY (PRACTICAL)

Time : 3 Hours **Max.Marks : 50**

SECTION -A

Note: Attempt any two practicals. Each question carries 15marks 2X15=30

1. Perform widal test with the given sample. Show the result and write the procedure.
2. To identify the Ova & Cyst in the given sample, perform concentration technique. Show the result and write the procedure
3. Put up the Biochemical reactions required to identify Escherichia coli. Write the procedure.

SECTION-B

4 .Spotters 10marks

SECTION –C

5.Viva 5marks

6. Record 5marks

MEDICAL LAB TECHNOLOGY

MODEL QUESTION PAPER

II –Year Paper –III

PATHOLOGY (PRACTICAL)

Time: 3 Hours **Max.Marks : 50**

SECTION -A

Note: Attempt any two practicals. Each question carries 15marks 2X15=30

1. Find out the Blood Group in the given sample. Show the result and write the procedure
2. Find out the Clotting time & bleeding time in your own blood. Show the result and write the procedure
3. Describe the Sharpening of Microtome Knives.

SECTION-B

4 .Spotters 10 marks

SECTION –C

5. Viva 5 marks

6. Record 5 marks

XIII. LIST OF SUBJECT COMMITTEE MEMBERS:

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