Government of Karnataka

PARA MEDICAL BOARD

Revised Syllabus
of
III Year Diploma in Medical Laboratory Courses

2017

III YEAR DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY

III-DMLT

SUB: BIOCHEMISTRY **Q P Code : 6101** **80 Hrs**	**MARKS**
Unit I. Photometry Definition, laws of photometry, absorbance, transmittance, absorption maxima, instruments, parts of photometer, types of photometry–colorimetry, spectrophotometry, flame photometry, fluorimetry, choice of appropriate filter, measurements of solution, calculation of formula, applications. **Unit II. Liver Functions & their Assessment** Tests for 1) Carbohydrate metabolism 2) Protein metabolism 3) Lipid metabolism 4) Measurements of serum enzyme levels, Bile pigment metabolism, Jaundice, its types and their biochemical findings. **Unit III.** Different methods of Glucose Estimation- Principle advantage and disadvantage of different methods **Unit IV. Renal Function Tests-** Various Tests, GFR & Clearance Tests **Unit V. Cardiac Profile -** In brief Hypertension, Angina, Myocardial Infarction, Pattern of Cardiac Enzymes in heart diseases Different methods of Cholesterol Estimation- Principle, advantage and disadvantage of different methods. Lipid profile. **Unit VI.** Electrophoresis Principle, Types & Applications. **Unit VII.** Immunodiffusion Techniques, Radioimmunoassay & ELISA. Principles & Applications.	**50**

Unit VII. Automation of Laboratory Services, Organization and Management Automation in clinical chemistry: Principle & Applications Instrumentation, types of analysers, benefits of automation. **Unit VII. Electrolytes, Blood Gases and pH** pH Regulation, Disturbance in acid Base Balance, Metabolic acidosis & alkalosis, Respiratory acidosis & alkalosis. Basic Principles and estimation of Blood Gases and pH, Basic principles and estimation of Electrolytes **Unit VIII. Quality control: Internal & External** Principles of quality Assurance and Standards for clinical chemistry Pre-analytical factors, analytical and post-analytical factors important in clinical chemistry Accuracy, Precision, Specificity, Sensitivity. Limits of error allowable in laboratory, Percentage error. Reference values and Interpretations,	**50**

PRACTICALS III YEAR DMLT (50 Hours)

1. Blood urea estimation
2. Serum creatinine estimation
3. Serum uric acid estimation
4. Serum total protein & A:G ratio
1. Serum glucose estimation
2. Total cholesterol estimation
3. HDL cholesterol (direct) estimation.
4. LDL cholesterol (direct) estimation
5. Triglyceride estimation
6. Estimation Serum of Direct & Total Bilirubin.
7. Estimation of serum Phosphate
8. Serum amylase estimation
9. Serum GOT (AST) estimation
10. Serum GPT (ALT) estimation
11. Alkaline phosphatase estimation
12. Acid phosphatase estimation
13. Serum sodium estimation
14. Serum potassium estimation

15. Serum chloride estimation
16. Estimation of serum calcium
22. Estimation of CK-NAC & CK MB
23. Analysis of CSF
24. Lactate dehydrogenase

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PRACTICAL EXAMINATION-100 MARKS

1. Spotters	- 10 No -	20 marks
2.Estimation of blood urea/creatinine/uric acid		10 marks
3.Estimation of cholesterol/ HDL/LDL/Triglyceride And calculation		20 marks
4.Liver function tests- Any 2		10 marks
5.Electrolytes estimation/ chart		10 marks
6.CSF analysis		10 marks
1. Records	-	10 marks
2. Viva voce	-	10 marks
Total	**-**	**100 marks**

REFERENCE BOOKS:

ii) Biochemistry:

Text Books:

1. Text book of Biochemistry for Dental Students– Pattabhiraman
2. Text book of Biochemistry for Dental Students, Harbans lal
3. Text book of Chemistry prescribed for II P.U.C. (students may need the basic knowledge of chemistry)

Practical Books:

1. Practical manual of Biochemistry – Dr. C V Yogaraje Gowda
2. Practical manual of Biochemistry – Rajagopal
3. Practical manual of Biochemistry – Shivananda Nayak
4. Practical manual of Biochemistry - Pattabhiraman

III DMLT
Subject: PATHOLOGY

Q P Code : 6103 **80 Hrs**

TOPICS	MARKS
I. Hematology • Differential Luecocyte count - DC • Bone marrow examination - a. Introduction , b. Different sites of bone marrow aspiration, c. Different Types of Bone marrow needles. d. Types of bone marrow –-1. Aspiration 2. Bone Marrow Biopsy e. Materials Required for bone marrow exam – Slides, Watch glass, Anticoagulant for collecting Bone marrow particles f. Preparation of Bone Marrow smear for Examination g. Staining of Bone marrow slides (Leishman, Giemsa, Perls stain) h. Importance of Bone marrow exam • Osmotic fragility test: Definition, Preparation, Procedure and Importance • Blood coagulation – a. Introduction to normal haemostatic mechanism or coagulation mechanism b. Investigation of bleeding disorders : a. Bleeding time – BT b. Clotting time – CT 3. Clot retraction time – CRT 4. Prothrombin time - PT 5. Activated partial Thromboplastin time – APTT • BT, CT, CRT, PT, APTT – must know - normal values & importance • Thrombin Time – TT (Optional) • Automation in Coagulation Tests. • FDP & fibrinogen estimation – Desirable to know • Foetal Hb - Desirable to know • Introduction & importance of calibration & validation of clinical laboratory instruments in pathology • Introduction to laboratory information system(LIS) & Hospital information system(HIS)	50

Blood Bank • Introduction – Blood bank & blood group, Organization of blood bank- Infrastrucutre : Building, Equipments, Human resources. Use of various Registers and their importance. • Blood grouping ABO & Rh, other Systems of Blood grouping (Mention) • Forward & Reverse grouping and their Importance • Cross matching – major / minor and Impoprtance • Methods – Saline, Albumin, Coombs cross – matching • Coombs test –Principle, Procedure and Importance of direct indirect Coomb's Test. • Selection of Donor, Counselling • Screening tests for donor • Collection & Storage of Blood • Infrastructure for Components : Space area, Equipments, manpower. • Separation & uses of various Blood components (Packed cells, Fresh Frozen Plasma(FFP), Cryoppt • Transfusion reaction – definition, importance and role of technician in transfusion reaction. • Quality control, Quality assurance & SOP (Standard Operating procedure. • Disposal of unused and expired Blood and Blood components, with special importance of disinfection • Inventory Management in Blood Bank **6. Histopathology** • Tissue processing – Completion of Fixation, Dehydration, Clearing, Impregnation in molten wax. • Instruments used for tissue processing - a. Manual method b. Automated (Histokinette) • Embedding & Section cutting - a. Manual b. Automated • Errors in section cutting & their correction • Different types of haemotoxylins, Preparation of Harris Haematoxyllin and Eosin – routine H & E • Staining technique including staining technique for rapid diagnosis – Frozen section • Special stains – Introduction Names and their Importance	50

• Microwave tissue processing – Introduction, Principle, Procedure in brief and importance • Quality check or Quality control in Histopathology 7. Mounting of museum specimens : Various Mounting solutions used in mounting, Different types of mounting jars used. Biological Hospital waste disposal & universal Precautions	

III year DMLT PATHOLOGY Practical's **60hrs**

1. Differential WBC count (DC)

2. Staining of Bone marrow smears

3. Preparation of red cell suspension
4. Osmotic fragility test
5. Sickling Test
6. Determination of ABO blood grouping & Rh typing - methods
   Slide method .
   Tube method
   Micro titer plate method & gel method
7. Cross – matching – Major cross Match
   Minor cross match
8. Coomb's test - Direct, Indirect
9. Tissue processing
10. Blocking - Observation & Demonstration
11. Section cutting
12. Staining by H & E stain
13. Frozen section Cutting & staining - Demonstration (Desirable to know)
14. Semen analysis
15. Sputum Examination
16. CSF Examination
17. Other body fluids pleural Peritoneal
18. Bleeding Time & Clotting Time
19. Clot retraction Time Observation
21. Prothrombin time(PT)
22. Activated partial thromboplastin Time(APTT)
23. Mounting of museum specimens

Proposed: Pathology 3 days in a week Includes Lecture, Lecturer Demonstration, Practical & Hospital Posting

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PRACTICAL EXAMINATION: 100 MARKS [3hrs duration]

Pattern:

1. Spotters	- 10 No	-	20 marks
2. Blood group			10 marks
3. PAP smear staining			20 marks
4. H & E staining	-		20 marks
5. WBC – DC	-		10 marks
6. Records	-		10 marks
7. Viva voce	-		10 marks
Total	-		100 marks

* Take the signature of practical-incharge on a record- Demonstrator or Tutor and counter signed by Concerned H.O.D.

* Practicals examination training can be taught by objective structured practical examination pattern(OSPE)

REFERENCE BOOKS:

1. Medical laboratory Science - Theory and Practicals by J. OCHEI, A. KOLHATKAR Tata McGraw Hill Publishing Company Ltd.
2. Practical Haematology - SIR JOHN V. DACE, S.M. LEWIS, ELBS
3. Clinical Diagnosis Management by laboratory methods. Latest (19th) Edition. (Toff Sanford D Anderson) John Bernard Henry, W.B. Saunder Company, Prism Book Pvt. Ltd.
4. Theory and Practice of Histological Technique by John D Bancraft, Alan Stevens, Churchill livingstone Publishers.
5. Hand book of Medical laboratory technology, 2nd edition by Robert H Carman, Christian Medical Association of India (publishers)
6. Ramnik sood, Text book of laboratory medicine.
7. Text book of laboratory medicine by V.H. Talib

III DMLT

Subject: MICROBIOLOGY

Q P Code : 6105 **80 Hrs**

Topics	MARKS
I. Systematic Bacteriology Gram positive cocci – Staphylococci, Streptococci, Pneumococci Gram negative cocci – Neisseria meningitides & Gonococci Gram positive bacilli – C. diphtheria Cl. tetani Gram negative bacilli – Enterobactericae, V. cholerae, Pseudomonas, Mycobacteria	15
II. Isolation & identification of micro organisms from various clinical samples a).Collection and transport of various samples b).Preservation of samples c). Processing of various samples	25
III. Quality and Biomedical waste disposal Management System. **1.**Quality control measures 2. Universal precautions **3.** Bio Medical Waste disposal and Management	10
IV. Mycology – General features, lab Diagnosis of fungal infection (KOH mount, LPCB & SDA); Candida, Cryptococci, Aspergillus	10
V.Virology – General features, HIV, HBV HCV,	5
VI.Parasitology – Protozoology – Entamoeba histolytica, Trichomonas, Giardia, Malaria,	5
VII. Helminthology – Nematodes – Ascaris, Ankylostoma, Trichuris trichura, Enterobious, Vermicularis & Cestodes – Taenia & Echinococcus	5
VIII.Serology – Widal , Typhidot., VDRL, ASLO, RA, CRP, Brucella Agg test, ELISA , Antibiogram, Preparation of antibiotic discs, Antibiotic Resistance, Automation in Serology and Cultures	25

III YEAR DMLT MICROBIOLOGY PRACTICALS **50 hrs**

Albert's stain
Gram's stain
Z-N stain
Negative stain
Leishman's stain
JSB
Lactophenol cotton blue mount
Wet mounts & KOH mount

Serology, Widal, VDRL, RA, CRP, ASO, latex agglutination ELISA
Stool examination
Clinical sample with culture sensitivity

PRACTICALS EXAM – 100 Marks

1. Spotters	-	20
2. Serology	-	20
3. Stool examination	-	20
4. Z-N stain	-	20
5. Clinical sample with culture sensitivity (Charts can be used)	-	10
6. Record	-	10
		100 Marks

REFERENCE BOOKS:

1. Bacteriology by Ananthanarayanan
2. Bacteriology by Rajesh Bhatia
3. Parasitology by Chatterjee
4. Parasitology by Jayaram and Panicker
5. Hand book of laboratory technology by Scott
6. Hand book of laboratory technology, C.M.C. Vellore - 2 copies.

Students should know- In All 3 years * (not included in practical examination)

Basic computers and Information Science-Practical

Practical on fundamentals of computers -

1. Demonstration of basic hard ware of the computers and laptops
2. Learning to use MS office: MS word, MS PowerPoint, MS Excel.
3. To install different software.
4. Data entry efficiency

DMLT- Communication and Soft Skills, Spoken English-Practical

1. Précise writing and comprehension of simple passages from a prescribed text book. The passage should be atleast100 words and students should answer a few questions based on it.
2. To practice all forms of communication i.e. drafting reports, agendas, notes, précise writing, circulars, presentations, telephonic communication, along with practice on writing resumes and applications for employment.

DMLT- Medical Terminology, Record keeping (including anatomical terms) and Orientation to Medical Laboratory Science Technology (MLT)- Practical

1. General discussion/Sensitization on career opportunities and role of MLT in Hospital Care
2. Visit to Central Sterile Supply Department (CSSD)
3. Visit to incinerator complex
4. Visit to Immunization section

DMLT- Introduction to Quality and Patient safety (including Basic emergency care and life support skills) Practical

DMLT- Environmental Science-Practical

1. Any Activity related to public awareness about the environment:
   1.1. Preparation of Charts/Models
   1.2. Visit to any effluent treatment plant
2. Effects of environmental pollution on humans through poster presentation.
3. Any activity related to biomedical waste management in a hospital or clinical laboratory

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