

## **SEMESTER-I**

### **POST GRADUATE DIPLOMA IN MEDICAL LABORATORY TECHNIQUES**

#### **PAPER DLTC 01: LABORATORY EQUIPMENTS AND INSTRUMENTS**

**Learning Objective:** To provide students with theoretical and practical understanding of Laboratory equipment and techniques

**Learning Outcome:** The student should be able to understand structure and functions of laboratory equipments and instruments.

#### **THEORY**

**Duration: 36 Hrs**

#### **Module 1: (Laboratory Equipments & Instruments)**

1. Pipettes- Thoma pipettes (RBC, W.B.C.), Sahli's pipette, Westergren's pipette, pasteur pipettes, Graduated pipettes, Micropipettes etc.
2. Hemocytometer/Improved Neubauer Chamber Fuchs/Rosenthal Ruling etc.
3. Colorimeter/Spectrophotometer – Principle, parts, working
4. Hematology analyzer – 3 part/5 part differential counters (Cell Counter, Semi – automated/fully automated
5. Flow Cytometry and applications
6. Coagulometers
7. Hemoglobin Electrophoresis – Agar gel, C.A.M, HPLC, Capillary Electrophoresis method etc
8. Needles: Lumbar Puncture needle, Vim- Silverman needle, Bone- marrow aspiration biopsy needle, Trepine biopsy needle etc.
9. Urinometer, Esbach's Albuminometer, Automated Urine Analysers, Dipstick Reader etc.
10. Microscopes: Compound, Dark ground illumination, Phase contrast, Fluorescent Microscopy, Polarizing Microscope
11. Microtome: Base Sledge, Rocking type (Cambridge), Rotary microtome, Sliding microtome etc
12. Autotechnics on Automated tissue processor, principle, working; paraffin embedding bath etc.,
13. Refrigerated microtome, Freezing microtome, cryostat etc.
14. Automated Knife Sharpeners
15. Equipments for blood component separation in BB. Refrigerated centrifuge, Plasma expressers, Refrigerated water bath, Laminar Air flow bench, etc
16. Cytocentrifugation & applications
17. Quality Control in Pathology lab.

## **Module 2 (Chemicals, solutions, stains etc.,)**

- 1) Preparation of Fixatives: Neutral Formalin, Buffered formalin, Mercuric – Zenker’s Solution , Schaudinns Solution, K-dichromate – Orth’s Solution, Regaud’s Solution, Picric Acid, Bouins Solution; Hollande’s Solution. Decalcifying fluids: Formic Acid – Gooding and Stewarts fluid, Nitric Acid – Aqueous nitric acid
- 2) Stains: Composition and technique, preparation and application of Iron Hematoxylin Weigert’s iron hematoxylin, Heidenhains iron hematoxylin, Tungsten Hematoxylin, PTAH, Molybdenum Hematoxylin, Phosphomolybdic acid hematoxylin
- 3) Connective tissue stains: History of connective tissue: composition; preparation & application of Masson trichrome, Von – Gieson, Reticulin stain Gomori’s Silver methanamine. Elastic tissue stains: Verhoeff’s method, Weigert’s method
- 4) Carbohydrate Stains and Glycoconjugates, P.A.S technique, Alcian blue technique, combined Alcian blue–PAS, Mucicarmine, Colloidal iron, High iron diamine.
- 5) Lipid Stains: Oil Red O, Sudan Black B.
- 6) Pigments and Minerals: Perl’s Prussian blue for ferric iron, Masson – Fontana method for melanin, Von – Kossa for Calcium
- 7) Micro-organisms: Gram’s method & Modified methods, Ziehl – Neelsen ((ZN) stains for mycobacteria, Fluorescent method for mycobacterium, Modified Fite method for Mycobacteria Lopez, Cresyl violet stain for Helicobacter sp., Grocott methanamine Silver for fungi, Mc Manus PAS method for glycogen a fungal wall
- 8) Amyloid – Congo – Red Technique
- 9). Enzyme Histochemistry and its diagnostic Applications
- 10). Immunohistochemical techniques
- 11). Tissue Microarray
- 12). Molecular Pathology Techniques: in Situ Hybridization / F.I.S.H

## **Module 3: Applied Pathology**

1. Laboratory diagnosis of Anemias
2. Laboratory diagnosis & C.S.F picture in different types of Meningitis
3. Laboratory diagnosis of Hemorrhagic disorders
4. Laboratory diagnosis & L.F.T. findings in different types of jaundice.
5. Laboratory diagnosis/Urine/Blood findings in Kidney disorders.

6. Automation in Laboratory
7. Administration and medico-legal aspects; Accreditation of Laboratory

**PRACTICALS**

**15 x 3Hrs**

1. Demonstration and use of pipettes
2. Demonstration of needles & procedures
3. Demonstration of working of Rotary Microtome; Section cutting.
4. Demonstration of working of Automated cell counters ( 3 part and 5 part ) differential counts
5. Demonstration of Blood component separation in Blood Bank.
6. Demonstration of Lab workup of Hemorrhagic disorders
7. Laboratory diagnosis of Anemias – Charts
8. Laboratory diagnosis of Meningitis – Charts
9. Laboratory diagnosis of Jaundice – Charts
10. Laboratory diagnosis of Renal diseases – Charts

**Text –Book Reference Books**

1. John D. Bancroft, Marilyn Gamble, Churchill, Livingstone: Theory and Practice of Histological techniques, Elsevier Publication
2. C. F. A. Culling : Handbook of Histopathological technique (including Museum technique) Butterworth & CO (Publishers) Ltd. London
3. Sood Ramnik: Medical Laboratory Technology, Jaypee Brothers, Medical Publishers (P) Ltd. Delhi
4. John Bernard Henry (Ed): Clinical diagnosis and management by laboratory methods.
5. Praful Godkar: Textbook of Medical laboratory Technology
6. R. N. Makroo: Compendium of Transfusion Medicine

### **Examination Pattern (THEORY)**

Total Marks: 50

All Questions are compulsory:

Number of Questions: 4

Question No:1

- Marks 14
- From Module 1,2,3
- Seven Sub questions
- No Choice
- 2 Marks for each sub question
- To be answered briefly

Question No: 2

- Marks 12
- From Module 1
- Four Sub Questions
- Attempt Any Three
- Four Marks for each sub question

Question No: 3

- Marks 12
- From Module 2
- Four sub questions
- Attempt Any Three
- Four Marks for each Sub question

Question No:4

- Marks 12
- From module 3
- Four sub questions
- Attempt Any Three
- Four Marks for each sub question

**Format of Examination (Theory Paper)**

P.G. Diploma in Medical laboratory Technology Examination  
Month, Year  
DLTC 01: Laboratory Equipments & Applied Pathology

Duration: 2 Hours

Total Marks: 50

---

Instruction: 1. All questions are compulsory  
2. Draw diagrams wherever necessary

Q.1: Answer briefly

{7x2=14}

- a)
- b)
- c)
- d)
- e)
- f)
- g)

Q.2 Give an account of the following ANY THREE

{4x3=12}

- a)
- b)
- c)
- d)

Q.3 Write briefly on the following ANY THREE

{4x3=12}

- a)
- b)
- c)
- d)

Q.4 Write short notes on the following ANY THREE

{4x3 =12}

- a)
- b)
- c)
- d)

**Examination (PRACTICAL) pattern**

Total Marks: 50

Spotters: 20 Marks

Practical Exercise: 15 Marks

Viva voce: 10 Marks

Journal: 5 Marks

## SEMESTER-II

### POST GRADUATE DIPLOMA IN MEDICAL LABORATORY TECHNIQUES

#### PAPER DLTO 01: APPLIED MICROBIOLOGY

**Learning Objective:** To provide students with theoretical and practical understanding of Applied microbiology

**Learning Outcome:** The student should be able to understand theory and practical aspects of Applied Microbiology

#### **THEORY**

**Duration: 36 Hrs**

#### **MODULE 1:**

1. Microscopes – detailed account of structure, working principle, applications
2. Collection, handling and transport of samples
3. Culture methods
4. Methods for laboratory identification of bacteria
5. Maintenance of stock cultures
6. Common therapeutic agents
7. Antimicrobial susceptibility testing

#### **MODULE 2:**

1. Infection – sources, modes of transmission of infection, types of infectious diseases
2. Immunity – Innate, Acquired, Active, Passive
3. Vaccines – storage, transport, Immunization schedule
4. Hospital Acquired Infections
5. Biomedical Waste Management
6. Standard Precautions
7. Needle stick injury – Prevention and Management

#### **MODULE 3:**

1. Laboratory diagnosis of UTI
2. Laboratory diagnosis Diarrheal diseases
3. Laboratory diagnosis of Cholera
4. Laboratory diagnosis of Meningitis
5. Laboratory diagnosis of PUO
6. Laboratory diagnosis Respiratory infections
7. Laboratory diagnosis of Pyogenic infections – Superficial and Deep
8. Laboratory diagnosis of Anaerobic infections (Spore bearing and Non spore bearing bacteria)
9. Laboratory diagnosis of STIs
10. Programmatic management of Tuberculosis
11. Quality Control in Microbiology
12. Inventory / Stock Management

## **PRACTICALS**

**15 x 3 hrs**

1. Procedures for collection of samples – blood, urine, stool, swab, transport media use
2. Identification of bacteria – colony morphology, biochemical tests
3. Antimicrobial susceptibility testing
4. Demonstration of vaccines
5. Biomedical Waste Management
6. Standard Precautions
7. Laboratory diagnosis of UTI – Practical aspects
8. Laboratory diagnosis Diarrheal diseases – Practical aspects
9. Laboratory diagnosis of Meningitis – Practical aspects
10. Laboratory diagnosis of PUO – Practical aspects
11. Anaerobic culture methods
12. Laboratory diagnosis of STIs – Practical aspects
13. Practical aspects of Management of Tuberculosis

### **Reference Books:**

1. Kanungo (2017) Ananthanarayan and Paniker's. textbook of Microbiology, Universities Press
2. Baveja, C. P. and V.Baveja. (2015) Textbook of Microbiology for Medical Laboratory Technicians, Arya Publications
3. Baveja C.P. (2018) Textbook of Microbiology, Arya Publications
4. Apurba Sankar Sastry and Sandhya Bhat K.(2018) Essentials of Medical Microbiology, Jaypee Publications

**FORMAT OF EXAMINATION (THEORY PAPER)**

**P.G. Diploma in Medical Laboratory Techniques Examination  
Month, Year  
DLTO 01: APPLIED MICROBIOLOGY**

Duration: 2 Hours

Total Marks: 50

---

***Instructions: 1. All Questions are compulsory  
2. Draw diagrams wherever required***

- |  |           |
|--|-----------|
| 1. Answer briefly (2 marks each)   | <b>14</b> |
| a)   |           |
| b)   |           |
| c)   |           |
| d)   |           |
| e)   |           |
| f)   |           |
| g)   |           |
| 2. Give an account of <b>any two</b> of the following (6 Marks each) :   | <b>12</b> |
| a)   |           |
| b)   |           |
| c)   |           |
| 3. Write on <b>any two</b> of the following (6 Marks each) :             | <b>12</b> |
| a)   |           |
| b)   |           |
| c)   |           |
| 4. Write short notes on <b>any two</b> of the following (6 marks each) : | <b>12</b> |
| a)   |           |
| b)   |           |
| c)   |           |

**SCHEME OF THEORY EXAMINATION**

Total Marks: 50

All Questions are compulsory

Number of Questions: 4

**Question No. 1:**

- Marks : 14
- From Modules 1, 2 and 3
- Seven sub questions
- Two marks for each sub question
- No choice
- To be answered briefly



### **Question No. 2**

- Marks : 12
- From Module 1
- Three sub questions
- Any two sub questions to be attempted
- Six marks for each sub question

### **Question No. 3**

- Marks : 12
- From Module 2
- Three sub questions
- Any two sub questions to be attempted
- Six marks for each sub question

### **Question No. 4**

- Marks : 12
- From Module 3
- Three sub questions
- Any two sub questions to be attempted
- Six marks for each sub question

### **PRACTICAL EXAMINATION PATTERN**

Total Marks: 50

Spotters: 20 marks

Practical Exercise: 15 marks

Viva Voce: 10 marks

Journal: 5 marks