

SCHEME OF EXAMINATION & SYLLABUS  
OF  
**DIPLOMA IN X-RAY TECHNICIAN (DXRT):**

**2 Years Diploma Course**



Academic Session 2021-22 onwards

## -: REGULATION:-

### REGULATION FOR VARIOUS DIPLOMA COURSES (2 YEARS) IN PARAMEDICAL SUBJECTS

#### The objective of the courses

1. The training of the candidate registering for various diploma (2 years) courses are aimed to carry out all routine diagnostic / therapeutic test on modern hospital laboratory
2. The Diploma course is of two years
3. Eligibility for admission in all Para medical Diploma courses except Perfusionist
  - a) The candidate must have passed 10+2 with at least 40% marks in aggregate of Physics Chemistry and Biology (P C B ) and for DMLT 10 + 2 ( P C B ) or 10 + 2 vocational (M L T ) course with at least 40% marks will also be eligible
  - b) For Diploma in Perfusion Technology (perfusionist 2 years course) The candidate shall have passed B. Sc. ( BIOLOGY group) with minimum 45% marks, The University will award P G Diploma in perfusion technology
4. In case of SC/ST/OBC candidates, 5% marks relaxation will be given for the admission in above said courses
5. Weight age will be given as per university rules
6. Number of seats will be 100
7. The minimum age for admission shall be 17 years on 31 December of the Academic year of admission
8. The selection of candidate will be on the basis of the entrance examination or in the absence of entrance exam, purely on merit list prepared on the basis of marks obtained in qualifying examination
9. The admissions of students into various programs should be completed by 30th November. There shall be minimum 240 teaching days in one academic year.
10. **Attendance of students:** The student should have 75% attendance in theory and 75% attendance in practical to be eligible to appear in university examination. However, only Dean/ Principal of the college are empowered to condone 10% of attendance on valid grounds. Monthly attendance of students has to be sent to the university
11. **Total Course Duration:** A student has to complete the course that he/she has joined within the double the duration of the actual time taken for the completion of the course i.e.- Four Years for all Diploma Courses.

12. **Medium of instruction and examination:** In case of diploma courses the medium of instruction will be bilingual (English or Hindi) and the medium of examination will be either English or Hindi as per the convenience of the student.

13. There will be two University Examinations in one academic session.

14. For all the Diploma courses (which is of two years duration) at the end of first year, an Internal examination will be conducted at the college level itself and the result has to be sent to the University as per the scheduled notification. (These marks will be included in the Final Transcripts), and the students are eligible to appear their final year examination at MPMSU, subject to passing in first year internal examination conducted at college level. University examination will be held at the end of Two years only.

**15. Passing Marks of Examination:**

- The passing marks of examination would be 50% for each subject and also in total marks obtained for both Diploma and Degree courses. The candidate has to pass in theory and practical examination separately. For theory paper the internal assessment marks, viva-voce and theory examination marks will be counted.
- The candidate should pass separately in two heads i.e In Theory (Theory plus Viva voce plus Internal Assessment) and also in Practical (with 50% marks).
- The candidate has to pass separately in each subject in internal assessment examination (with 50% marks) in order to be eligible to appear in university examinations.
- Regarding Grace marks it was decided that total weightage of grace marks would be 5 (five), and that grace marks can be split between the subjects. There will not be any grace marks for the Practical examination.
- Grace marks will not be added to total marks of the candidate. In Supplementary examination also similar pattern of grace marks will be followed.

16. Re-totaling & Re-valuation (Review) both should be allowed as per the university rules

17. Other rules regarding conduct of examination will be as per the university REGULATION/notifications

18. Permission will be given to start the courses after the permission from M P Paramedical council (Department of Medical education, Government of M. P. )

19. Syllabus and scheme of examination shall be decided by the board of studies and Academic council of the university from time to time as per guidelines from M P Paramedical council

20. In order to be an examiner a faculty member should have minimum three years of teaching experience and not below the rank of the Assit. Professor and /or. Demonstrator / Tutor
21. The examination papers (Theory) will be evaluated centrally at the university
22. The examiner who evaluates the theory copy preferably be appointed as the external for practical examinations for the said course.
23. Diploma students will be eligible for supplementary examination.
24. Various Diploma courses:
  1. Anesthesia Technician
  2. X-ray Technician
  3. Gamma camera technician / Radiotherapy technician
  4. Optometrist refractonist
  5. Optometrist contract lens
  6. Human nutrition
  7. Dialysis technician
  8. Hospital record science
  9. Compounder ( Allopathy)
  10. Diploma in clinical Biochemistry.
  11. Microbiology
  12. Optometric refraction
  13. Paramedical Ophthalmic Assistant
  14. Cath. Lab. Technician
  15. Medical Lab technology
  16. Perfusion Technology (Per fusionist) ( P G Diploma )

**Note: FOR OTHER PROVISION WHICH ARE NOT COVERED IN THIS CURRICULUM & SYLLABUS WILL BE APPLICABLE AS PER THE UNIVERSITY REGULATION.**

**SCHEME OF EXAMINATION:  
Diploma in Medical Lab Technician (DMLT)  
FIRST YEAR D.M.L.T. EXAMINATION**

| S.No. | Paper       | Subject   | Max. Marks | Min. Passing Marks |
|-------|-------------|---|------------|--------------------|
| 1     | Paper - I   | Human Anatomy & Physiology  | 100        | 50                 |
| 2     | Paper - II  | Biochemistry  | 100        | 50                 |
| 3     | Paper - III | Pathology –I : Haematology & Blood Banking, Clinical Pathology & Parasitology | 100        | 50                 |
| 4     | Paper - IV  | Pathology-II : Microbiology & Serology Histology & Cytology                   | 100        | 50                 |

(There shall be Institutional /College level theory examination as per university notification, marks to be send to University for internal assessment purposes of university examination)

**SCHEME OF EXAMINATION FOR 2<sup>ND</sup> YEAR (UNIVERSITY EXAMINATION):  
DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)**

There shall be university examination at the end of 2<sup>nd</sup> year curriculum of Diploma in Medical Lab Technician (DMLT)

| S.No. | Paper       | Subject   | Theory | Internal Assessment | Practical | Total |
|-------|-------------|---|--------|---------------------|-----------|-------|
| 1     | Paper - I   | Human Anatomy & Physiology  | 100    | 100                 | 100       | 300   |
| 2     | Paper - II  | Biochemistry  | 100    | 100                 | 100       | 300   |
| 3     | Paper - III | Pathology –I : Haematology & Blood Banking, Clinical Pathology & Parasitology | 100    | 100                 | 100       | 300   |
| 4     | Paper - IV  | Pathology-II : Microbiology & Serology Histology & Cytology                   | 100    | 100                 | 100       | 300   |
| Total |             |   | 400    | 400                 | 400       | 1200  |

N.B.- 1. First year institutional /college level theory examination's awarded marks would be consider as Internal assessment marks and candidate have to get min. 50% marks in university theory examination in addition to Internal assessment marks i.e. 100 marks collectively for passing the examination.

2. University Practical examination of 100 max. marks is inclusive of viva and candidate should get separate 50% marks i.e. 50 marks to get pass.

**SYLLABUS & SCHEME OF EXAMINATION**  
**DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)**  
**PAPER-I: HUMAN ANATOMY & PHYSIOLOGY**  
**SCHEME OF EXAMINATION**

| <b>Paper</b> | <b>Subject</b>             | <b>Theory</b> | <b>Internal Assessment</b> | <b>Practical</b> | <b>Total</b> |
|--------------|----------------------------|---------------|----------------------------|------------------|--------------|
| Paper - I    | Human Anatomy & Physiology | 100           | 100                        | 100              | 300          |

**INSTRUCTION FOR THE PAPER SETTER**

The theory examination shall be of 100 marks with **Section – A: Anatomy** and **Section – B : Physiology**.

The theory examination marks for Anatomy shall be 50 and for Physiology 50 marks respectively.

There shall be two paper setters / evaluators, one from Anatomy and one from Physiology .

Section- A, which will be set by Anatomy examiner (50 marks) and Section-B, by Physiology (50 marks) examiner. Recognized teachers in Anatomy and Physiology with five years of experience shall be on the panel of examiners; 50% shall be the minimum passing marks.

The pattern of theory examination for each section (A and B) will be as under for **50 Max. Marks**.

| <b>No. and Type of Questions</b>  | <b>Marks for each Question</b> | <b>Total Marks</b> |
|---|--------------------------------|--------------------|
| <b>05</b> Very short answer Questions<br><i>Answer to be given in 50-60 words</i> | <b>02</b>                      | <b>10</b>          |
| <b>03</b> Short answer Questions<br><i>Answer to be given in 250-300 words</i>    | <b>08</b>                      | <b>24</b>          |
| <b>01</b> Essay type Questions<br><i>Answer to be given in 450-500 words</i>      | <b>16</b>                      | <b>16</b>          |
| Total Marks   |                                | <b>50</b>          |

**INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.**

The paper consists of two different subjects, so two separate answer sheets of 20 pages each will be provided. No additional sheets would be provided to the student.

## **DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)**

### **PAPER-I: HUMAN ANATOMY & PHYSIOLOGY**

#### **Syllabus Contents**

##### **A) Applied Anatomy & Physiology:**

- Study of the structure of a cell.  
Normal anatomical structure, Histology & Functions (Physiology) of the following systems.
- The circulatory system (Heart & Blood Vessels)  
The Respiratory system  
The Digestive system  
Liver & Pancreas  
Lymphatic system  
Urinary system  
Reproductive system – Male & Female  
Endocrine system  
Central nervous system (Brain & Spinal cord)

#### **PRACTICAL**

##### **Anatomy & Physiology**

**M.M. 100 Marks**

##### **ANATOMY: -**

- (1) Demonstration of parts of body and land marks on the surface.
- (2) The skeletal system, Head & Neck.

##### **Thorex And Abdomen: -**

- Demonstration of various organs within torex & abdomen.
- Respiratory systems, pleurae, heart, liver, gall bladder, peritoneum stomach & intestine.
- Spleen, pancreas & parts of urinary system
- **GENERAL NERVOUS SYSTEM: -**
- Spinal level and site of lumber puncture.
- Surface anatomy of important organs & blood vessels.
- Identification of models like those of Brain, Heart, embryology, Kidney.

##### **DEMONSTRATION: -**

- Fixing, labeling & storage of specimens.
- Drawing diagrams & labeling.
- Demonstration of models, specimens & skeleton.

**PHYSIOLOGY: -**

- The microscope, its usage, cleaning & maintenance.
- Identification of blood cells under Microscope. RBC, various types of WBC, pallets, Reticulocytes.
- Preparation of anti coagulants.
- Collection of blood samples to obtain plasma & serum samples.
- Ruling area of Neubaur chamber.
- Usage of RBC & WBC pipettes & wintergreen Pipette & Win robe tube.
- Estimation ofHb, preparation of blood smears, staining.
- Demonstration of blood pressure recording and pulse.
- Determination of bleeding, clotting & prothrombin Time.

**Note:-**

- All theory topics scheduled followed by practicals.
- Minimum 100 Hrs. of posting should be in Biochemistry

Minimum 100 Hrs. of posting should be in pathology in 1<sup>st</sup> years to get accustomed with pathology Dept.



**SYLLABUS & SCHEME OF EXAMINATION**  
**DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)**

**PAPER- II: BIOCHEMISTRY**

**SCHEME OF EXAMINATION**

| <b>Paper</b> | <b>Subject</b> | <b>Theory</b> | <b>Internal Assessment</b> | <b>Practical</b> | <b>Total</b> |
|--------------|----------------|---------------|----------------------------|------------------|--------------|
| PAPER- II    | BIOCHEMISTRY   | 100           | 100                        | 100              | 300          |

**INSTRUCTION FOR THE PAPER SETTER**

The University theory examination shall be of 100 marks and question paper will be set by Astd. Professor, Biochemistry, who shall be on the panel of examiners, 50% shall be the minimum passing marks. Internal assessment will be of 100 marks, which would be counted in theory marks for passing university examination. For practical examination; there will be two examiner (Astd. Professor, Biochemistry) - one internal Examiner ; from the institute /college and one from other college /institute of the university from the panel of University examiners.

The pattern of University theory examination will be as under for **100 Max. Marks in question paper** and distribution of marks for questions will be as under

| <b>No. and Type of Questions</b>   | <b>Marks for each Question</b> | <b>Total Marks</b> |
|--|--------------------------------|--------------------|
| <b>10</b> very short answer Questions<br>Answer to be given in 50-60 words | <b>02</b>                      | <b>20</b>          |
| <b>5</b> short answer Questions<br>Answer to be given in 250-300 words     | <b>10</b>                      | <b>50</b>          |
| <b>2</b> essay type Questions<br>Answer to be given in 450-500 words       | <b>15</b>                      | <b>30</b>          |
| Total Marks  |                                | <b>100</b>         |

**INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.**

There will be only 1 single answer sheet containing 40 pages and no additional sheets would be provided to the student.

## DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)

### PAPER- II: BIOCHEMISTRY

#### SYLLABUS CONTENTS

Total No. of Hrs.:- 60

Practical:-

#### Biochemistry:

- **Biochemistrical structure of the following: (20 Hrs.)**
  - a. Carbohydrates (4 Hrs.)
  - b. Proteins (6 Hrs.)
  - c. Lipids (5 Hrs.)
  - d. Enzymes (5 Hrs.)
- **Clinical Biochemistry: (20 Hrs.)**
  - a. Kidney function tests (Renal profile) (5 Hrs.)
  - b. Liver functions tests (Hepatic profile) (5 Hrs.)
  - c. Cardiac profile (5 Hrs.)
  - d. Lipid profile (5 Hrs.)
- **Estimation of: (20 Hrs.)**
  - a. Blood sugar
  - b. Blood Urea
  - c. S. Cholesterol
  - d. S. Uric Acid
  - e. S. Creatinine
  - f. Diff. S. Enzymes

#### **PRACTICAL**

**M.M.100**

- (1) Demonstration of Kidney function test. Gastric function test & liver function test.
- (2) Demonstration of Enzyme Analysis - Acid and Alkaline phosphates, **SGOT/SGPT**. Lacticdehydrogenase, CPK.
- (3) Lipid profile.
- (4) Estimation of Blood/ serum- Glucose, **G.T.T.** Urea, creatinine, uric Acid, Cholesterol. Bill Rubin. protin & A/G Ratio, Glycosylated Hb.
- (5) demostration of semi automated, Fully automated Biochemical Analyzers.
- (6) Demonstration/ Exposure to Radioimmuno assay laboratory.
- (7) Visit to Laboratory of National Importance.)

## SYLLABUS & SCHEME OF EXAMINATION

### DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)

#### PAPER- III: Pathology –I : HAEMATOLOGY & BLOOD BANKING,

#### CLINICAL PATHOLOGY & PARASITOLOGY

### SCHEME OF EXAMINATION

| Paper      | Subject  | Theory | Internal Assessment | Practical | Total |
|------------|--|--------|---------------------|-----------|-------|
| PAPER- III | Pathology –I :<br>Haematology & Blood<br>Banking, Clinical<br>Pathology & parasitology | 100    | 100                 | 100       | 300   |

#### INSTRUCTION FOR THE PAPER SETTER

The University theory examination shall be of 100 marks and question paper will be set by qualified examiner M.D. Pathology, who shall be on the panel of examiners, 50% shall be the minimum passing marks. Internal assessment will be of 100 marks, which would be counted in theory marks for passing university examination. For practical examination; there will be two examiner M.D. Pathology - one internal Examiner; from the institute /college and one from other college /institute of the university from the panel of University examiners.

The pattern of University theory examination will be as under for **100 Max. Marks in question paper** and distribution of marks for questions will be as under

| No. and Type of Questions   | Marks for each Question | Total Marks |
|---|-------------------------|-------------|
| 10 very short answer Questions<br>Answer to be given in 50-60 words | 02                      | 20          |
| 5 short answer Questions<br>Answer to be given in 250-300 words     | 10                      | 50          |
| 2 essay type Questions<br>Answer to be given in 450-500 words       | 15                      | 30          |
| Total Marks   |                         | 100         |

#### INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.

There will be only 1 single answer sheet containing 40 pages and no additional sheets would be provided to the student.

**DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)**

**PAPER- III: Pathology –I : HAEMATOLOGY & BLOOD BANKING,**

**CLINICAL PATHOLOGY & PARASITOLOGY**

**SYLLABUS CONTENTS**

**Total No. of Hrs.:-60**

**HAEMATOLOGY:**

**(15 Hrs.)**

- a. Composition of blood
- b. Collection of blood & anticoagulants
- c. Hb estimation, TRBC count – ANAEMIAS
- d. Preparation & staining of blood films
- e. Development of WBCS (Leukopoiesis)
- f. TWBC & DWBC count – LEUKAEMIAS
- g. Absolute values, ESR, PCV, Reticulocyte count
- h. Platelet count BT & CT
- i. LE cell preparation, sickling test, osmotic fragility
- j. Bone marrow examination.

**BLOOD BANKING:**

**(15 Hrs.)**

- a. Blood group – ABO system, Rh typing
- b. Cross matching, Coomb's test,
- c. Donor screening
- d. Blood transfusion & transfusion reactions
- e. Blood components

**CLINICAL PATHOLOGY:**

**(15 Hrs.)**

- a. Physical, chemical & microscopic examination of urine
- b. Stool examination
- c. Semen examination
- d. CSF exam. & other body fluids

**PARASITOLOGY:**

**(15 Hrs.)**

- a. Introduction
- b. Parasites in Blood, stool & Urine

**SYLLABUS & SCHEME OF EXAMINATION**  
**DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)**  
**PAPER- IV: Pathology-II : MICROBIOLOGY & SEROLOGY**  
**HISTOLOGY & CYTOLOGY**  
**SCHEME OF EXAMINATION**

| Paper      | Subject   | Theory | Internal Assessment | Practical | Total |
|------------|---|--------|---------------------|-----------|-------|
| PAPER- III | Pathology-II :<br>Microbiology & Serology<br>Histology & Cytology | 100    | 100                 | 100       | 300   |

**INSTRUCTION FOR THE PAPER SETTER**

The University theory examination shall be of 100 marks and question paper will be set by qualified examiner M.D. Pathology , who shall be on the panel of examiners of internal or external , 50% shall be the minimum passing marks. Internal assessment will be of 100 marks, which would be counted in theory marks for passing university examination. For practical examination; there will be two examiner M.D. Pathology - one internal Examiner ; from the institute /college and one from other college /institute of the university from the panel of University examiners.

The pattern of University theory examination will be as under for **100 Max. Marks in question paper** and distribution of marks for questions will be as under

| No. and Type of Questions  | Marks for each Question | Total Marks |
|--|-------------------------|-------------|
| <b>10</b> very short answer Questions<br>Answer to be given in 50-60 words | <b>02</b>               | <b>20</b>   |
| <b>5</b> short answer Questions<br>Answer to be given in 250-300 words     | <b>10</b>               | <b>50</b>   |
| <b>2</b> essay type Questions<br>Answer to be given in 450-500 words       | <b>15</b>               | <b>30</b>   |
| Total Marks  |                         | <b>100</b>  |

**INSTRUCTIONS FOR THE CANDIDATES: Answer all questions only in required word.**

- There will be only 1 single answer sheet containing 40 pages and no additional sheets would be provided to the student.

**DIPLOMA IN MEDICAL LAB TECHNICIAN (DMLT)**  
**PAPER- IV: Pathology-II : MICROBIOLOGY & SEROLOGY**  
**HISTOLOGY & CYTOLOGY**  
**SYLLABUS CONTENTS**

**Total No. of Hrs.:-60**

**Microbiology:**

**(15 Hrs.)**

- a. Classification
- b. Morphology of Bacteria
- c. Culture & isolation of bacteria
- d. Gram positive & gram negative cocci
- e. Gram positive & Gram negative bacilli
- f. Anaerobic spore bearing bacilli

**Serology:**

**(15 Hrs.)**

- a. Antigen & Antibodies
- b. Diagnosis of syphilis – VDRL test
- c. RA test
- d. Diagnosis of Typhoid – Widal test
- e. Elisa test

**HISTOLOGY:**

**(15 Hrs.)**

- a. Fixatives
- b. Tissue processing, impregnation
- c. Block making
- d. Section cutting
- e. Types of Microtomes
- f. Basic staining of sections
- g. Collection of tissue for histology
- h. Method of Decalcification

**CYTOLOGY:**

**(15 Hrs.)**

- a. Techniques & equipments required
- b. Fixatives & staining procedure
- c. FNAC technique
- d. Pap's staining