

Manmohan Technical University
Service Commission

**Curriculum of Open Competitive Examination
For the Post of Assistant Instructor [5th Level]**

Description of the Post:

Service: Teaching Level: 5 th	Group: Pharmacy Post: Assistant Instructor	Sub group: Medical Lab Technology [MLT]
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Framework of the Curriculum

The examinations will be conducted in three phases:

(a) First Phase: Written Exam	Full Marks: 150
(b) Second Phase: Practical Examination	Full Marks: 30
(c) Third Phase: Interview	Full Marks: 25
Documents Evaluation	Full Marks: 45
	Total Marks: 250

First Phase: Written Examination Scheme:

Full Mark: 150

Paper/ Subject	Subject Matters	Full Marks	Pass Marks	Examination System	Number of Questions	Time
First Paper: Legal Provision and Subject Related Contents	Constitution of Nepal, 2072, Health related Acts and Regulations, MTU related Acts and Regulations	75	30	MCQs	25	75 Minutes
	Subject Related Contents			MCQs	50	
Second Paper: Service Related Subject	Service Related Contents	75	30	<ul style="list-style-type: none"> • Short answer type questions • Long answer type questions 	9×5 = 45 3×10 = 30	2 Hours 30 Minutes
	Total	150				

Second Phase: Practical Examination**Full Marks: 30**

Subject	Full Marks	Examination System	Remarks
Job Skill Test	30	Practical works	
Total	30		

Third Phase: Evaluation of Documents and Interview**Full Marks: 70**

Subject	Full Marks	Examination System	Remarks
• Interview	25	Oral	
• Evaluation of Academic Qualification	40	Observation	
• Training	5		
Total	70		

पाठ्यक्रमसम्बन्धी सामान्य जानकारी:

१. यो पाठ्यक्रमको योजनालाई प्रथम चरण, द्वितीय चरण र तृतीय चरण गरी तीन भागमा विभाजन गरिएको छ ।
२. लिखित परीक्षाको माध्यम भाषा नेपाली वा अंग्रेजी अथवा नेपाली र अंग्रेजी दुबै हुनेछ ।
३. वस्तुगत बहुवैकल्पिक प्रश्नहरूको गलत उत्तर दिएमा प्रत्येक गलत उत्तरवापत सही उत्तर दिँदा पाउने अंकको २० प्रतिशत अङ्क कट्टा गरिनेछ । तर उत्तर नदिएमा अङ्क कट्टा गरिने छैन ।
४. विषयगत प्रश्नका हकमा तोकिएको अंकका लागि एउटा प्रश्न वा एउटै प्रश्नका दुई वा दुईभन्दा बढी भाग वा दुई वा बढी प्रश्नहरू सोध्न सकिनेछ ।
५. परीक्षामा सोधिने प्रश्नसंख्या, अंक र अङ्कभार सम्बन्धित प्रश्नपत्रमा दिइएअनुसार हुनेछ ।
६. परीक्षार्थीले मोबाइल, प्रोग्रामेवल क्यालकुलेटर, स्मार्टवाच वा यस्तै प्रकारका विद्युतीय उपकरण परीक्षा हलमा लैजान पाइने छैन ।
७. प्रथम चरणको लिखित परीक्षाबाट छनौट भएका उम्मेदवारहरूलाई मात्र द्वितीय चरणको प्रयोगात्मक परीक्षा र तृतीय चरणको अन्तर्वार्तामा सम्मिलित गराइनेछ साथै अन्तिम नतिजाका लागि प्रयोगात्मक परीक्षामा उत्तीर्ण हुन अनिवार्य छ ।
८. प्रथम चरणको लिखित परीक्षामा छनौट भएका उम्मेदवारहरूको प्राप्ताङ्क र द्वितीय चरणको प्रयोगात्मक परीक्षा तथा तृतीय चरणको अन्तर्वार्ताको अंक र शैक्षिक योग्यता तथा तालिमको कूल योगका आधारमा अन्तिम परीक्षाफल प्रकाशित गरिनेछ ।
९. यो पाठ्यक्रम मिति: २०८२/०३/२० देखि लागु हुनेछ ।

Curriculum of Written Examination:

First Paper: Legal Provision and Subject Related Contents

Subject: Medical Lab Technology [MLT]
Service: Teaching
Group: Pharmacy
Level: 5th
Post: Assistant Instructor

Full Marks: 75
Pass Marks: 30
Time: 1 hours 15 minutes

- खण्ड (१): सेवासम्बन्धी कानुनी व्यवस्था (बहुवैकल्पिक प्रश्न) २५ × १ = २५
- (क) नेपालको संविधान (भाग १,२,३,५ र सम्बन्धित अनुसूचीहरू)
- (ख) Nepal Pharmacy Council Act, 2057
- (ग) National Health Policy, 2076
- (घ) National Health Laboratory Policy, 2069
- (ङ) मनमोहन प्राविधिक विश्वविद्यालय ऐन, २०७६
- (च) मनमोहन प्राविधिक विश्वविद्यालय शिक्षक तथा कर्मचारी सेवाका सर्त र सुविधासम्बन्धी नियमावली, २०७८
- (छ) मनमोहन प्राविधिक विश्वविद्यालय सेवा आयोगसम्बन्धी नियमावली, २०७८

द्रष्टव्यः माथि उल्लेखित ऐन, नियम तथा नीतिहरू संशोधन भएको अवस्थामा सो समेत भन्ने बुझ्नु पर्दछ।

- खण्ड (२): सेवासम्बन्धी विषय (बहुवैकल्पिक प्रश्न) ५० × १ = ५०
- द्वितीय पत्रको सेवासम्बन्धी विषयको पाठ्यक्रम नै पहिलो पत्रको खण्ड “ख” को पाठ्यक्रम हुनेछ।

Sample Multiple Choice Questions (MCQs)

First Paper: Legal Provision and Subject Related Contents
Subject: Medical Lab Technology [MLT]

Full Marks: 75
Pass Marks: 30
Time: 1 hours 15 minutes

Encircle (○) the alphabet of the best answer for following questions:

- Who was the first person to describe microorganisms?
 - Louis Pasteur
 - Robert Koch
 - Paul Ehrlich
 - Antony van Leeuwenhoek**
- Which one of the following agents simultaneously contains both DNA and RNA?
 - Bacteria**
 - Viruses
 - Plasmids
 - Prions
- Sterilization technique was introduced by
 - Edward Jenner
 - Robert Koch
 - Joseph Lister
 - Louis Pasteur**
- Which one of the following bacteria is cell wall deficient?
 - Escherichia coli*
 - Salmonella typhi*
 - Mycoplasma***
 - Treponema pallidum*
- Which bacteria is the human pathogen but does not fulfill Koch's postulates criteria?
 - Staphylococcus aureus*
 - Bacillus anthracis*
 - Mycobacterium leprae***
 - Pseudomonas aeruginosa*
- The first immunoglobulin to appear in response to an antigen is:
 - IgG
 - IgM**
 - IgA
 - IgD

7. The growth rate of bacteria during the exponential phase of growth is:
- a. Zero
 - b. Increasing
 - c. Constant**
 - d. Decreasing
8. Which one of the following agents lacks nucleic acid?
- a. Bacteria
 - b. Viruses
 - c. Protozoa
 - d. Prions**
9. Peptidoglycan layer of cell wall is thicker in:
- a. Gram-positive bacteria**
 - b. Gram-negative bacteria
 - c. Fungi
 - d. Parasites
10. Resistance transfer factor can be transferred from one bacterium to another by fimbriae is:
- a. Transformation
 - b. Transduction
 - c. Conjugation**
 - d. Translation

Curriculum of Open Competitive Examination
Second Paper: Service Related Subject

Full Marks: 75
 Pass Marks: 30
 Time: 2 hours
 30 minutes

Subject: Medical Lab Technology [MLT]
 Service: Teaching
 Group: Pharmacy
 Level: 5th
 Post: Assistant Instructor

Course Content Area:

Subject	Paper	Content Area	Weightage	Post
CMLT	Second:	1. Clinical Microbiology, Parasitology and Immunology [15]	75	Assistant Instructor (Level 5 th)
		2. Hematology and blood banking [15] 3. Clinical Biochemistry [15] 4. Clinical Pathology (Histopathology and Cytopathology) [10] 5. Public Health and first Aid [10] 6. Automation in Clinical Laboratory and Clinical Laboratory Management [10]		
		Full Marks	75	

Course Contents Detail

Unit-1: Clinical Microbiology, Parasitology and Immunology: [15 Marks]

- 1.1 General concept of Microbiology: Definition, Objectives and its Applications.
- 1.2 Bacteriology: Bacterial cell structure (Morphology and Bacterial Growth)
- 1.3 Normal flora of human body.
- 1.4 Sterilization and disinfectant (Classification and application in laboratory)
- 1.5 Different type of sample collection, culture media, culture techniques, various methods of identification, antimicrobial susceptibility testing, laboratory diagnosis of bacteria from clinical samples, their preventive measures and quality control in microbiology laboratory.
- 1.6 Mycology: Classification of medically important fungi based on their morphology, various clinical samples collection and laboratory diagnosis of fungal infection.
- 1.7 Virology: Structure, classification of viruses and common viral diseases and lab diagnosis

- 1.8 Immunology: Introduction of (Immunity, Antigen, antibody) Common serological technique used for the diagnosis of infection.
- 1.9 Hospital acquired Infection
- 1.10 Medical Parasitology: Definition, Objectives and its Applications.
- 1.11 Introduction, definition and terminologies use in Parasitology
- 1.12 Protozoa (Blood and GIT)
- 1.13 Helminthes (Nematodes, Cestodes and Trematodes)
- 1.14 Laboratory techniques (specimen collection, procedure for lab investigations of different clinical samples of stool, urine, blood, sputum, exudates, swabs and aspirates)
- 1.15 Semen analysis
- 1.16 The universal precaution in microbiology laboratory handling and safe disposal of waste products and infected materials

Unit – 2: Hematology and Blood Banking

[15 Marks]

- 2.1 Introduction to Hematology
- 2.2 Blood: definition, properties, composition, functions of each cells. Normal structure, shapes, sizes, life span and normal reference (values) of blood cells
- 2.3 Haematopoiesis
- 2.4 Hemoglobin
- 2.5 Red Blood Cell, White Blood Cell and Platelet Disorders
- 2.6 Coagulation mechanism
- 2.7 Hematological Techniques
- 2.8 Blood Parasites
- 2.9 Immunohematology and Blood Banking
- 2.10 Quality control in the hematology laboratory

Unit-3: Clinical Biochemistry:

[15 Marks]

- 3.1 Introduction to Biochemistry
- 3.2 Elementary chemistry and Physical chemistry
- 3.3 Identification and use of common glass wares and plastic wares
- 3.4 Preparation of percentage: Molar, Normal and Buffer solutions
- 3.5 Bio-molecules: Carbohydrate, Proteins, Lipids, Plasma Proteins, Enzymes, Vitamins, Minerals, Hormones, Tumor Markers and Basic concept of nucleic acids
- 3.6 Overview of intermediary metabolism of biomolecules
- 3.7 Estimations of different biochemical analytes (Various methods, Principle, Procedure, Reference Range, Clinical significance)
- 3.8 Quality control in clinical chemistry laboratory
- 3.9 The lab hazards and precautions to be taken while working in clinical biochemistry lab

Unit-4: Clinical Pathology (Histopathology and Cytopathology): [10 Marks]

- 4.1 General Pathology
- 4.2 Cell injury and cellular adaptation (Definition of common terminologies)
- 4.3 Inflammation and Infection
- 4.4 Neoplasia
- 4.5 Specific specimen examination for Laboratory diagnosis
- 4.6 Histopathology and Cytopathology: Definition, Objectives and its Applications.
- 4.7 Histopathology (General concept of Histology, Histopathology. Common terminologies)
- 4.8 Histopathology laboratory Procedures
 - a. Basic concept of Immuno-histochemistry
 - b. Cytopathology: Spectrum of health

Unit-5: Public Health and First Aid: [10 Marks]

- 5.1 Public Health: Definition and Concept of Community health, Maternal and Child Health (MCH)
- 5.2 Epidemiology: Basic Concept
- 5.3 Nutrition: Definition and Concept
- 5.4 Basic hygiene, Sanitation and Waste disposal system
- 5.5 Health education, Health promotion and Primary Health Care
- 5.6 Public Health and First Aid

Unit- 6: Instrumentation, Automation and Clinical Laboratory Management: [10 Marks]

- 6.1 Hi-Tech Medical Lab Instruments and Technology
- 6.2 Immunochemical Techniques
- 6.3 Automation
- 6.4 Clinical Laboratory Management: Implement appropriate quality assurance program, Implement of bio-safety and waste management measures
- 6.5 Department /section of clinical laboratory: Different sections, corresponding services and their applications
- 6.6 Laboratory design: Basic concept of laboratory organization
- 6.7 Laboratory work flow
- 6.8 Personnel management and Clinical Laboratory Inventory Management (CLIM)
 - a. Lab hazards and lab safety
 - b. Standard operating procedures (SOPs)
- 6.9 Total quality management (TQM) and Quality Assurances (QAs)
- 6.10 Bio-safety and bio-security

The end

Sample Questions [long and short answer type]

Second Paper: Service Related Subject
Subject: Medical Lab Technology [MLT]

Full Marks: 75
Pass Marks: 30
Time: 2 hours 30 minutes

Attempt all questions

Group: A - Long answer type questions: [3 x 10 = 30]

1. Describe etiopathogenesis, clinical features and complications of Infective Endocarditis. [10]
2. Describe the pathogenesis and laboratory diagnosis of enteric fever. [5+5= 10]
3.

Group: A - Short answer type questions: [9 x 5= 45]

1. Write the differentiating features of Lepromatous and Tuberculoid Leprosy. [2.5+2.5= 5]
2. Write down the clinical features and laboratory diagnosis of Multiple myeloma [2.5+2.5 = 5]
3. Define Pancytopenia. Enlist its pathogenesis. [1+4 = 5]
4. Write down the step of glycolysis in detail. [5]
5. What are the steps in process of cholesterol biosynthesis? [5]
6.
7.
8.
9.

Sample Questions for practical Examination

Subject: Medical Lab Technology [MLT]

Perform the following activities: [30 Marks]

Full Marks: 30
Pass Marks: 12
Time: 30
Minutes

1. Perform the Gram stain from the given specimen and write your interpretation.
2. Prepare and submit at least one culture media from the given media. (e.g. nutrient agar, molten agar etc.)
3. Perform the glucose estimation of urine sample by the given materials. write the procedures of this test.
4. Determine the blood group from the given sample and name the identified blood group.
5. Make the thin blood smear for the RBC count.
6. Clean the given equipment and glassware such as conical flask, pipette, test tube etc. with the SOP (Standard Operating Procedure) by using appropriate available equipment like autoclave, centrifuge, BOD incubator, hot air oven etc.

Note: One/two/three questions can be asked to each candidate to perform the given activities on the basis of the weightage of question. Essential instruments, chemical, model and lab will be available.