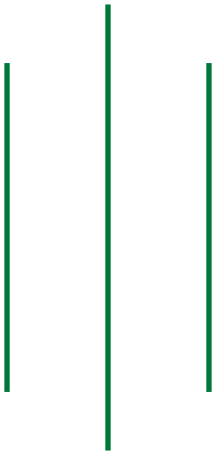
Syllabus for Licensing Examination of B.Sc. MLT/ BMLT 2021



Nepal Health Professional Council

Bansbari, Kathmandu

Table of Content

1. Medical Microbiology

1.1 Bacteriology

1. Historical background, scope and importance, branches and applications of microbiology
2. Safety measures, infection control practices and biomedical waste disposal
3. Importance and applications of sterilization and disinfection
4. Composition, preparation, storage, uses, types and quality control of culture media
5. Techniques and applications of different staining procedures
6. Antimicrobial drugs and their mode of actions, antimicrobial susceptibility test and drug resistance , evaluation of antimicrobial agents, detection of drug resistance
7. Organization, management and quality control of microbiology laboratory for the district and zonal hospital
8. Collection, transport. Preservation and processing of different clinical specimens for aerobic, microaerophilic and anaerobic culture
9. Taxonomy, Morphology, Metabolism, Cultural Characteristics, Pathogenesis, laboratory diagnosis, Prevention and control of different clinically important bacteria
    - Aerobic and anaerobic Gram positive cocci
    - Gram negative cocci
    - Aerobic and anaerobic Gram negative bacilli
    - Gram positive bacilli
    - Other Gram variable bacteria
10. Epidemiology, mode of transmission, pathogenesis, laboratory diagnosis, prevention and control of systemic infectious diseases.
11. Investigation and control of community outbreaks and hospital associated outbreaks and epidemiological markers.
12. Need of Care, handling and use of laboratory animals in microbiological investigations
13. Rapid diagnosis of infectious diseases by use of conventional and molecular techniques

1.2 Parasitology

1. Taxonomy, classification, morphology, life cycle, pathogenesis, laboratory diagnosis, prevention and control of different types of Protozoal and Helminthic parasites
2. Collection and preservation of clinical specimens for parasitic investigations
3. Urine routine analysis and special test
4. Semen Analysis and Interpretation

5. Stool analysis by various techniques
6. Parasitic culture and egg counting technique
7. Blood parasites and their lab diagnosis

1.3 Virology

1. Morphology, taxonomy, replication, culture techniques, pathogenesis, laboratory diagnosis, prevention and control of clinically important viruses
2. Virus culture techniques
   - Biological host
   - Embryonated egg inoculation
   - Cell culture
3. Emerging and re-emerging viruses
4. Development, standardization and use of vaccines and antisera

1.4 Mycology

1. Taxonomy, classification, Morphology, Cultural Characteristics, Pathogenesis, laboratory diagnosis, Prevention and control of different clinically important yeasts and moulds.
2. Mycological procedures for identification of moulds and yeasts

1.5 Immunology

1. Structure, organization, function and disorders of human immune system
2. Principle, procedure, application of different immunological techniques

2. Clinical Biochemistry

2.1 Fundamental of Biochemistry

1. Glasswares, different types and uses, Cleaning of glasswares
2. Chemical Kinetics and Reaction Mechanism
3. Acid-base homeostasis, buffers, blood gas analysis
4. Analytical methods and instrumentations
5. Enzymes and their classification
6. Safety measures in biochemistry
7. Quality management of biochemistry laboratory

2.2 Nutritional Biochemistry

1. Structure, classification and biological significance of Carbohydrates, Proteins/amino

acids, Lipids and Nucleic Acids

2. Synthesis, function, measurements of vitamins and minerals

2.3 Metabolism

1. Carbohydrate metabolism
   - Glycolysis, Glycogenesis ,Glycogenolysis, Pentose phosphate pathway ,Kreb's cycle, Gluconeogenesis
2. Protein metabolism
   - Transamination, Deamination , Urea cycle , Nitrogen balance, Creatinine and creatinine formation
3. Lipid metabolism.
   - Alpha, beta, gamma- oxidation
   - Ketosis & Ketone bodies formation and their utilization
   - Cholesterol and triglycerides synthesis
4. Nucleotide metabolism
   - Purine and pyrimidine biosynthesis and its regulation
5. Inborn error of metabolism

2.4 Organ function tests and their clinical significance

1. Liver function tests
2. Cardiac function tests
3. Pancreas function tests
4. Renal function tests
5. Gastric function tests
6. Biochemistry of different body fluids

2.5. Endocrinology

1. Synthesis, functions, metabolic disorders of different types of body hormones
2. Laboratory measurement of hormones by different methods

2.6 Molecular Biology and Molecular Techniques

1. Basic concept of cellular and molecular biology and molecular technique
2. Cancer biology and tumor markers
3. Recent advances in clinical biochemistry

3. Hematology And Transfusion Medicine

1. Collection of blood from various sites
2. Hematopoietic system and Blood Composition
3. Synthesis, structure and composition of hemoglobin
4. Anemia: Definition , classification and laboratory approaches for diagnosis
5. Leukemia: Defination , classification and laboratory diagnosis
6. Routine hematological test (Hemoglobin estimation, Total RBC count, Total WBC count, Differential count, Total Platelet count, Hematocrit, Red blood cell indices, ESR, Reticulocyte count, Absolute cell count)
7. Special hematological test: (Plasma hemoglobin, Antihuman globulin test, Osmotic fragility test, Sickling test, Glucose 6 Phosphate dehydrogenase deficiency test, Foetal hemoglobin, hemoglobin electrophoresis, HAM's test and Methemoglobin test)
8. Routine and special stains for blood and bone marrow smear
9. Flow Cytometry and Coulter counter: Principles and applications
10. Application of Flow cytometry and cytogenetic in hematology
11. Hemoparasites and its laboratory diagnosis
12. Normal Hemostasis and Fibrinolysis
13. Acquired and Inherited Bleeding disorder
14. Screening and confirmatory test for bleeding disorder
15. Transfusion Medicine and Blood Banking Techniques
    - Blood group systems
    - Techniques of Blood Grouping
    - Blood Collection, Processing and component preparation technique
    - Compatibility testing for blood transfusion.
    - Types of blood components, indication and their storage
    - Complications and hazards of blood transfusion
16. Quality control in hematology and transfusion medicine

4. Subject: Histopathology & Cytopathology

1. Basic and systemic pathology
2. Preparation of different types of fixatives and their uses
3. Procedural steps, reagents, and possible errors of tissue processing

4. Description of different types of microtome, their principles and methods of cutting section from the paraffin block tissue
5. Methods of decalcification
6. FNAC, fluid cytology and uses.
7. Preparation of routine and special histological and cytological stains and staining procedure
8. Principles and methods of staining and mounting the tissue section on the glass slides
9. Different types of microscope
10. Immunohistochemistry and immunofluorescence.

5.Human Anatomy & Physiology

1. Overview of organization and structure of various types of human cells, tissues, organs and systems: Skeletal, Muscular, Nervous, Cardiovascular, Respiratory, Gastrointestinal, Genitourinary, Reticuloendothelial, Sensory organs and integumentary system.
2. Endocrinology and Hormones
3. Mechanism of regulation of various organs systems and their functions in human body

6. Subject: Health Policy And Health System

1. Health systems and health policies of Nepal
2. Evolution of health services in Nepal
3. History of laboratory services in Nepal
4. Main features of National Health Policy
5. Health service delivery mechanisms in Nepal
   - Public sector
   - Private sector
   - Informal sector
3. Organizational structure of health service delivery in Nepal (central, regional, district, village and community level)
4. Functions and facilities at each level, roles and responsibilities of health service providers at different levels
5. Goals and targets of health sector a. Five year plans
   - Second Long Term Health Plan
   - Second Nepal Health Sector Programme

6. National Health Programmes of Government of Nepal
7. Major partners in health sector (NGO/INGO, donors, multilateral agencies)
8. Rules and regulations related to health in Nepal

7. Research Methodology & Biostatistics

1. Description of research, types of research and its use in medical and laboratory sciences
2. Research tools, bioinformatics
3. Role of seminar and conference, literature on research.
4. Measures of central tendency (Mean, Median, Mode, Weighted Average and Geometric mean), Measures of dispersion (Range, Quartile deviation, Standard deviation, Coefficient of variation)
5. Correlation and regression analysis; Scatter diagram, Cause and effect relationship between two variables; Least square method for estimating regression parameters and prediction
6. Hypothesis and tests of significance, Z test, t-test, Chi-square test
7. Sampling theory; Probability and non-probability; Selecting an appropriate sampling design; sampling errors and the sample size

8. Pharmacology

1. Basic introduction to Pharmacokinetics. & Pharmacodynamics.
2. Drugs that affect Renal parameters, Liver enzymes , Lipid function and Blood Glucose estimation
3. Different antimicrobials belonging to: Antibacterials, Antivirals, Antifungals, Antimalarials, Anti Kala-azar

9. NHPC and Code of ethics

1. Codes of ethics with medical laboratory profession.
2. Salient features of Nepal Health Professional Council.
3. Duties of a registered laboratory practitioner.
4. Legal procedures in medico-legal cases (Inquest, witness, medical evidence).
5. Laboratory tests for various analyses of medico-legal aspects.

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