

**Postgraduate Spring 2023
TOS NUMS Entry Test
PhD Pathology (Chemical Pathology)**

Sr. No	Topic
1.	Clinical Chemistry Pathophysiology- I including following topics: <ul style="list-style-type: none"> ○ Electrolytes and Acid Base Disorders ○ Liver Function Tests ○ Renal Function Tests
2.	Clinical Chemistry Pathophysiology- II including following topics: <ul style="list-style-type: none"> ○ Cardiac biomarkers ○ Lipid Disorders ○ Iron Disorders ○ Disorders of Bones ○ Others
3.	Basic Laboratory Principles <ul style="list-style-type: none"> ○ Quality Management ○ Laboratory Water ○ Basic Instrument Handling <ul style="list-style-type: none"> ● Centrifuge ● Water Bath ● Pipettes ● Glass ware ● Refrigerators ● Osmometers ● Analytical Balance ● pH Meter
4.	Analytical Techniques /Lab instruments <ul style="list-style-type: none"> ○ Optical Techniques ○ Electrochemistry ○ Electrophoresis ○ Lab Automation ○ ELISA ○ HPLC ○ GC/MS
5.	Special Clinical Chemistry Pathophysiology I including following topics: <ul style="list-style-type: none"> ○ Diabetes Mellitus ○ Thyroid Disorders ○ Parathyroid Disorders ○ Adrenal Disorders ○ Pituitary Disorders
6.	Special Clinical Chemistry Pathophysiology II including following topics: <ol style="list-style-type: none"> a. Tumour Markers b. Paediatric Metabolic Disorder c. Therapeutic Drug Monitoring d. Toxicology

7.	<p>Laboratory Management</p> <ul style="list-style-type: none"> ○ Clinical evaluation of methods ○ Establishment and use of reference values ○ Preanalytical variables and biological variation ○ Laboratory Information System
8.	<p>Molecular Biology</p> <ul style="list-style-type: none"> ○ DNA: Structure and Function ○ RNA: Structure and Function & Types ○ Protein: Structure and Function ○ DNA regulatory sequences and regulatory protein ○ DNA Replication, Damage and Repair ○ Transcription/ Translation in Prokaryotes & Eukaryotes
9.	<p><i>Techniques</i></p> <ul style="list-style-type: none"> ○ PCR types and procedure ○ DNA/RNA Extractions ○ Restriction Endonucleases ○ Recombinant DNA technology <p>Gel Electrophoresis</p>
10.	<ul style="list-style-type: none"> ○ Research Methodology ○ Biostatistics/Analytical ○ Medical writing/Bioethics

**Postgraduate Spring 2023
TOS NUMS Entry Test
PhD Pathology (Microbiology)**

Sr. No	Topics
1.	<p>Bacterial cell structure including following topics:</p> <ul style="list-style-type: none"> ○ Structure of cell wall and its components. ○ Cytoplasmic structures ○ Nucleus <p>Pathophysiology of bacterial growth and disease including following topics:</p> <ul style="list-style-type: none"> ○ Bacterial growth phases ○ Bacterial cell metabolism ○ Bacterial normal flora ○ Virulence factors
2.	<p>Sterilization & Disinfection principles applicable in Microbiology</p> <ul style="list-style-type: none"> ○ Autoclave use and principle ○ Monitoring of autoclave ○ Disinfectants types and uses <p>Sample collection for microbiology including following topics</p> <ul style="list-style-type: none"> ○ Recommended Blood culture collection technique ○ Recommended Urine culture collection technique ○ Recommended respiratory specimen culture collection technique ○ Recommended CSF culture collection technique ○ Other body fluids
3.	<p>Types of culture media and their use including</p> <ul style="list-style-type: none"> • Liquid and solid media • Basic, enriched, differential and selective media • Transport media <p>Specimen dealing for culture and susceptibility</p> <ul style="list-style-type: none"> • Recommended guidelines for each specimen • Clinical laboratory standard institute (CLSI)
4.	<p>Staining techniques used in Microbiology:</p> <ul style="list-style-type: none"> ○ Gram stain and its principle ○ ZN stain and its principle ○ Albert's stain <p>Common instruments used in Microbiology</p> <ul style="list-style-type: none"> • Centrifuges • Water bath • Incubators • ELISA • Media pouring machines • Automated culture like BACTEC

5.	<p>Classification of bacteria and biochemical tests for identification:</p> <ul style="list-style-type: none"> a. Gram positive bacteria and common biochemical tests b. Gram negative bacteria and common biochemical tests c. Analytical profile Index (API)
6.	<p>Microbiology specific Laboratory Management</p> <ul style="list-style-type: none"> ○ Biosafety and biosecurity principles ○ Quality control procedures in microbiology ○ Principles of infection control in hospital ○ Laboratory information management system (LIMS)
7.	<p>Molecular Biology</p> <ul style="list-style-type: none"> ○ DNA: Structure and Function ○ RNA: Structure and Function & Types ○ Protein: Structure and Function ○ DNA regulatory sequences and regulatory protein ○ DNA Replication, Damage and Repair ○ Transcription/ Translation in Prokaryotes & Eukaryotes
8.	<p>Techniques</p> <ul style="list-style-type: none"> ○ PCR types and procedure ○ DNA/RNA Extractions ○ Restriction Endonucleases ○ Recombinant DNA technology <p>Gel Electrophoresis</p>
9.	<p>Mycology including classification of yeasts and moulds</p> <p>Mycobacteriology including modalities of TB diagnostics specific to microbiology</p>
10.	<ul style="list-style-type: none"> ○ Research Methodology ○ Biostatistics/Analytical ○ Medical writing/Bioethics