

## M.Phil-MLS Chemical Pathology Major (Part-I)

### Paper-I

#### Table of Specifications

The areas of the courses which require in depth analysis and detail interpretation shall be used for forming SEQ's, which may be split into two parts if necessary; attempts shall be made to avoid duplication between MCQ & SEQ.

| TOPIC   | MCQ | SEQ |
|---|-----|-----|
| <b>Paper-I</b>  |     |     |
| <b>General Laboratory Techniques and Procedures</b><br>a) Concept of solute and solvents(molal normal solutions dilutions, PH)<br>b) Units of measurement<br>c) Chemicals and reference material<br>d) Types of waters and water purification techniques<br>e) Laboratory safety<br>f) Laboratory hazards<br>g) Waste management  | 10  | 01  |
| <b>Specimen Collection and Processing</b><br>a) Precollection variables(diet, exercise posture etc)<br>b) Specimen collection of blood, urine body fluids<br>c) Blood collection techniques<br>d) Anticoagulents and additives<br>e) Blood collection devices<br>f) Common interferences (in vivo & in vitro)<br>g) Maintenance of specimen identification<br>h) Preservation & storage of specimen<br>i) Transport of specimen<br>j) Separation and proceeding of specimen | 10  | 01  |
| <b>Analytical Techniques and Instrumentation</b><br>a) Types of thermometer<br>b) Water bath<br>c) Heating blocks & dry baths including ovens and incubators<br>d) Pipettes<br><br>e) Centrifuges<br>f) Balances<br>g) Osmometer  | 20  | 01  |

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| <ul style="list-style-type: none"> <li>f) Balances</li> <li>g) Osmometer</li> <li>h) Ph meter</li> <li>i) Spectrophotometry</li> <li>j) Atomic Absorption Spectrophotometry</li> <li>k) Flame Emission Spectrophotometry</li> <li>l) Fluorometry, Nephelometry &amp; Turbidimetry</li> <li>m) Electrophoresis principle, parts, types</li> <li>n) Protein Electrophoresis, Applications of Electrophoresis</li> <li>o) Mass Spectrometry</li> <li>p) Chromatography</li> <li>q) Automation in clinical laboratory</li> <li>r) Immunochemical Techniques</li> </ul> |    |    |
| <p><b>Quality Assurance</b></p> <ul style="list-style-type: none"> <li>a) Total quality Assurance of clinical laboratory</li> <li>b) Laboratory errors and six sigma</li> <li>c) Elements of quality assurance</li> <li>d) Control of preanalytical, analytical and post analytical variables</li> <li>e) Control materials and control charts</li> <li>f) External quality assurance and proficiency testing</li> <li>g) Lab statistics</li> </ul>  | 10 | 01 |
| <p><b>Lab Management</b></p> <ol style="list-style-type: none"> <li>1. Introduction to laboratory management and administration</li> <li>2. Space organization and work flow.</li> <li>3. Personnel training.</li> <li>4. Laboratory equipments, maintenance</li> <li>5. Purchase of reagents, consumables.</li> <li>6. Laboratory forms, communication skills, and Laboratory information systems.</li> <li>7. Policies planning and applications.</li> <li>8. Financial aspect of clinical laboratories</li> <li>9. Ethical and legal aspects.</li> </ol>        | 5  |    |
| <p><b>Proteins</b></p> <ul style="list-style-type: none"> <li>a) Names of Plasma Proteins</li> <li>b) Methods of Protein detection and quantification in serum, CSF and urine</li> <li>c) Principles, Interferences and interpretation</li> </ul>  | 5  | 01 |

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| d) Significance of urinary proteins  |           |          |
| <b>Clinical Enzymology</b><br>a) General properties of enzymes<br>b) Inhibition of enzymes<br>c) Enzyme kinetics<br>d) Measurement of rate of reaction<br>e) Optimization standardization and quality control<br>f) Factors affecting enzyme levels in plasma or serum<br>g) Specific enzymes (LDH, acid phosphatase. Angiotencin Converting Enzyme) | 6         | 01       |
| <b>Inborn errors of metabolism</b><br>a) Biochemical diagnosis<br>b) Disorder of amino acid metabolism<br>c) Disorder of Carbohydrate metabolism<br>d) Glycogen storage diseases   | 4         |          |
| <b>Trace Elements</b><br>a) Functions, deficiency and toxicity<br>b) Methods for determination of Trace Elements   | 1         |          |
| <b>Tumor Markers</b><br>a) Introduction and functional classification of Tumor Markers<br>b) Clinical Applications of Tumor Markers<br>c) Individual tumor markers<br>d) Tests for the determination of tumor markers  | 4         | 01       |
| <b>Toxicology</b><br>a) Basic Concepts<br>b) Basic techniques for Detection of Drugs in serum and urine<br>c) drugs of abuse<br>d) therapeutic drud monitoring<br>e) toxins and acute poisoning  | 5         |          |
|  | <b>80</b> | <b>7</b> |

## M.Phil-MLS Chemical Pathology Major (Part-I)

### Paper-II

#### Table of Specifications

The areas of the courses which require in depth analysis and detail interpretation shall be used for forming SEQ's, which may be split into two parts if necessary; attempts shall be made to avoid duplication between MCQ & SEQ.

| Topic   | MCQ | SEQ |
|---|-----|-----|
| <b>Paper-II</b>   |     |     |
| <b>Non protein nitrogenous compounds</b><br>Biochemistry and physiology and clinical significance of<br>a) Urea<br>b) Uric acid<br>c) Creatinine<br>d) Ammonia<br>e) Methods of determination and interferences   | 5   |     |
| <b>Evaluation of renal functions</b><br>Screening of kidney diseases (urinalysis)<br>Biomarkers of acute kidney injury<br>Assessment of glomerular permeability<br>a) Proteinuria<br>Estimation of glomerular filtration rate<br>a) The concepts of clearance<br>b) Markers used for clearance<br>c) Recommendations and reference intervals<br>d) Fractional excretion of sodium         | 5   | 01  |
| <b>Electrolytes &amp; Blood gases</b><br><br>a) Introduction to common Electrolytes and their disorders<br>b) Acid base physiology<br>c) Conditions associated with abnormal acid base status<br>d) Methods for determination of electrolytes,<br>e) Determination of plasma and Urine Osmolality,<br>f) Sweat Testing<br>g) principle of methods for determination of Blood Gases and pH | 6   | 01  |

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| <b>Carbohydrates</b><br>a) Functions of endocrine pancreas<br>b) Glucose measurement (specimen consideration & estimation)<br>c) Diabetes Mellitus<br>d) Diabetic ketoacidosis<br>e) Ketone bodies testing Glycated proteins<br>f) Hypoglycaemia<br>g) Lab diagnosis of hypoglycaemia            | 10 | 01 |
| <b>Lipids &amp; lipoproteins</b><br>a) Basic biochemistry<br>b) Types of lipoproteins and apolipoproteins<br>c) Clinical significance<br>d) Measurement of lipids and lipoproteins<br>e) Disorders of lipids and lipoproteins  | 5  |    |
| <b>Cardiac functions</b><br>a) Markers of myocardial damage<br>b) Markers of coronary risk<br>c) Markers of congestive cardiac failure<br>d) Clinical utility<br>e) Analytical methodologies   | 5  | 01 |
| <b>Liver functions</b><br>a) Biochemical functions of the liver<br>b) Tests of liver injury<br>c) Diagnosis of liver disease   | 10 | 01 |
| <b>Mineral &amp; bone metabolism</b><br>a) Biochemistry physiology and clinical significance of calcium phosphate, magnesium<br>b) Disorders of mineral metabolism<br>c) Analytical techniques and reference intervals<br>d) Hormones regulating mineral metabolism<br>e) Metabolic bone disease | 5  | 01 |
| <b>General endocrinology</b><br>a) Actions of Hormones<br>b) Regulation of Hormone Secretion<br>c) Biorhythms<br>d) Hormone Receptors<br>e) Principles of different techniques of hormone measurement  | 3  |    |
| <b>Body fluids</b>   | 2  |    |

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| <ul style="list-style-type: none"> <li>a) CSF</li> <li>b) Pleural fluid</li> <li>c) Ascitic Fluid</li> </ul>   |   |    |
| <b>Haem Metabolism &amp; Porphyrias</b>  | 1 |    |
| <b>Pituitary gland</b><br><b>Adenohypophysis</b><br>Biochemistry, physiology, clinical significance and<br>Specific diagnostic tests of <ul style="list-style-type: none"> <li>a) Growth hormone</li> <li>b) Prolactin</li> <li>c) Corticotrophin</li> <li>d) FSH</li> <li>e) LH</li> </ul> <b>Neurohypophysis</b> <ul style="list-style-type: none"> <li>a) ADH</li> <li>b) Oxytocin</li> </ul>   | 5 |    |
| <b>Thyroid gland</b> <ul style="list-style-type: none"> <li>a) Thyroid hormones</li> <li>b) Thyroid dysfunction</li> <li>c) analytical measurements</li> <li>d) Specific diagnostic tests</li> </ul>   | 5 | 01 |
| <b>PTH gland</b> <ul style="list-style-type: none"> <li>a) Biochemistry and physiology</li> <li>b) Regulation of calcium metabolism</li> <li>c) Disorders of PTH Gland</li> </ul>  | 3 |    |
| <b>Adrenal gland</b> <ol style="list-style-type: none"> <li><b>1. Adrenal cortex</b> <ul style="list-style-type: none"> <li>a) General biochemistry of adrenocortical steroids</li> <li>b) Disorders of adrenal cortex</li> <li>c) Analytical methodologies</li> <li>d) Specific diagnostic tests</li> </ul> </li> <li><b>2. Adrenal Medulla</b> <ul style="list-style-type: none"> <li>a) General biochemistry</li> <li>b) Disorders of adrenal Medulla</li> <li>c) Analytical methodologies</li> <li>e) Specific diagnostic tests</li> <li>d)</li> </ul> </li> </ol> | 5 |    |
| <b>Reproductive profile</b> <ul style="list-style-type: none"> <li>a)</li> <li>b) Normal physiology</li> <li>c) Male infertility</li> <li>d) Female infertility</li> </ul>   | 5 |    |

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| e) Lab evaluation of reproductive function<br>f) Analytical methodologies |    |   |
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