SYLLABUS

CLINICAL CHEMISTRY
MEDICAL TECHNOLOGISTS
MEDICAL LABORATORY SCIENTISTS

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Effective from March 2024 for Medical Technologist examinations

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CONTENTS

1. INTRODUCTION

The objective of this syllabus is to provide the intern/ student medical technologist (MT) or laboratory scientists (MLS) with a guideline on the essential aspects that must be covered in order to adequately prepare themselves for the HPCSA's Professional Board of Medical Technology, Clinical Chemistry (Chemical Pathology) examination or the MLS final assessment. **The candidates are expected to be able to correlate their Practical knowledge and laboratory testing with the Clinical condition.**

The HPCSA's Professional Board of Medical Technology examination is in the form of two, three hour, written theoretical and practical papers which will be based on the contents of this syllabus.

Candidates are required to attain a minimum of 50% in each paper. Emphasis will be placed on the ability to relate practical and theoretical knowledge to clinical conditions with particular reference to those listed in Section 7.

Please refer to:

Section 8: Reference material/ textbooks

Section 9: Definitions of acronyms contained in the syllabus

HPCSA regulations require that accredited training laboratories perform a minimum of 80% of the tests identified in this syllabus. Laboratories are required to ensure that students receive appropriate training in the tests contained within the syllabus but which are not routinely performed on site. (Where practical training at an alternate training facility is not feasible, minimum of theoretical and written assessments are compulsory)

2. STATUTORY REGULATIONS AND ETHICS

Objective

Provide the student / intern with information on the regulations and ethical principles which apply to the practice of medical technology.

Specified outcomes

On completion of this section the student / intern should be able to:

a. Demonstrate knowledge of the structure and function of the Health Professions Council of South Africa.
b. Demonstrate knowledge of the structure and function of the Professional Board for Medical Technology.
c. Discuss the regulations relating to the scope of practice for Medical Technologists.
d. Describe the legal and ethical standards related to the professional practice of medical technology.
e. Demonstrate knowledge of how confidentiality applies to his/her workplace and all the results obtained.
f. Demonstrate knowledge of the National Health Act 2004: no. 61 of 2003
g. Demonstrate knowledge of the requirements for the acquisition of continual education units (CEUs).

3. TOTAL QUALITY MANAGEMENT SYSTEM

3.1 LABORATORY SAFETY

Objective

Provide knowledge of all safety procedures that must be applied in the workplace and an understanding of the relevant legislation.

Specified outcomes

On completion of this section the student / intern should be able to:

a. Explain and apply the fundamental concepts of the relevant legislation pertaining to laboratory safety.
   Range: Occupational Health and Safety Act; Compensation for Occupational Injuries and Diseases Act; Hazardous Substances Act.
b. Demonstrate knowledge of the protocols to follow in the event of injuries on duty including needle-stick injury.
c. Demonstrate knowledge of the procedures to follow in the event of laboratory accident or emergency and the use of all safety and emergency equipment.
d. **Range:** Chemical or bio-hazardous spill; fire; flood; bomb threat.
e. Demonstrate knowledge of the procedures to follow when handling a suspected case of any of the Viral Haemorrhagic Fevers
f. Describe procedures to follow for the prevention, control and management of laboratory acquired infections including general housekeeping and decontamination of equipment.
g. Describe the application of laboratory safety procedures to the collection, packaging, transport, storage and analysis of biological specimens, including IATA regulations
h. Describe the purpose and basic content of the material safety data sheets (MSDS).
i. Describe the basic principles for the storage, handling and disposal of chemicals; poisons; flammable substances; gases and infectious material.
j. Describe the correct procedures for the storage, handling and disposal of laboratory waste.
   Range: biological specimens; human tissue; solid and liquid bio-hazardous waste; radioactive waste and sharps.
   j. Define the role of the designated safety personnel.
   Range: First aid officer; fire marshal; safety representative.
k. Recognize the international safety symbols used in the laboratory environment.
l. Understanding the use of Personal Protective Equipment (PPE) in the Laboratory environment.

3.2 SPECIMENS

Objective

Provide an understanding of the optimal specimen requirements for the maintenance of the integrity and suitability for all types of laboratory analysis with particular reference to the test specified throughout this syllabus.

Specified Outcomes

On completion of this section the student / intern should be able to:

a. Demonstrate knowledge of any required patient preparation for the collection of specimens for individual tests.
b. Collect specimens as defined within current statutory requirements and limitations.
c. Describe the mode of action of the various anticoagulants / preservatives.
d. Select the correct anticoagulant / preservative for the analysis to be performed.
e. Describe the optimal specimen requirements for the individual tests.
f. Describe the conditions under which the specimens must be transported to the laboratory.
g. Display knowledge of the optimal storage conditions should testing be delayed and the stability of the specimen for the individual testing process.
h. Capture the data and patient demographics that are required for the registration of the specimens at the laboratory accurately.
i. Explain the principle of continuous identification of the specimen, aliquots and documentation.
j. Describe the process for the rejection of unsuitable specimens.
k. Conduct the pre-analytical processes required for specimen type and test requested.

3.3 LABORATORY EQUIPMENT

Objective

Provide details of the correct use, principle of operation, maintenance of laboratory equipment and the appropriate troubleshooting procedures to apply when indicated.

Range: All glassware – volumetric and graduated; pipettes (glass, automated and disposable); dispensers; balances (top pan and fine chemical); stirrers; hotplates; pH meters; rotators; shakers; roller, flat bed and vortex mixers; pro-pipettes, rubber teats, pipette aids; fume cupboards; bio-hazardous safety cabinets (Class I and II); centrifuges (including micro haematocrit, safety, temperature controlled, ultra-); water-baths; Fridges, Freezers, stopwatches and or timers; spectrophotometers; thermometers; hot-air ovens; filtration; desiccators.
Laboratory instrumentation and automated analyzers are included in this range – knowledge of the principles and applications of instruments in use in the current workplace is required.

Specified outcomes – applicable to all equipment/instruments and analyzers

On completion of this section the student / intern should be able to:

a. Describe the principle of operation where applicable.
b. Operate all equipment optimally in accordance with recommended operating procedures.
c. Apply the correct safety precautions during the operation and maintenance of equipment.
d. Demonstrate full knowledge of, and apply, the correct maintenance, service and calibration requirements.
e. Differentiate between calibration, validation and verification.

f. Conduct applicable decontamination procedures in accordance to manufacturers recommendations/ SOP's.
g. Apply the appropriate functional checks to ensure optimal operation.
h. Describe and implement troubleshooting procedures when optimal operation is not demonstrated by the functional checks.
i. Demonstrate an understanding of the approach to the validation and/or verification of new equipment, reagents and testing kits (Qualitative and Quantitative).
j. Demonstrate full knowledge of, and maintain, all equipment records and documentation required for good laboratory practice.

3.4 LABORATORY REAGENTS

Objective

Provide details of the correct preparation, storage and disposal of laboratory reagents.

Range: Stock solutions; working solutions; working reagents; controls; calibrators; reagent kits.

Specified outcomes

On completion of this section the student / intern should be able to:

a. Differentiate between controls and calibrators.
b. Demonstrate knowledge of the objective, use and retention of package inserts/ instructions for use (IFU's).
c. Prepare, store, and safely dispose of laboratory reagents:
Range - Stock solutions; Working reagents; Controls; Working solutions; Calibrators; Reagent kits
d. Define terms and solutions used in the laboratory:
Range - Physiologically normal saline; Buffer; Molar and Molal solutions; SG; Calibrators; Controls

Note: In addition refer to **Section 4**: Laboratory related mathematics.

3.5 STOCK CONTROL

Objective

Provide details of the processes involved in good stock management**.**

Specified outcomes

On completion of this section the student / intern should be able to:

a. Demonstrate an understanding of the receipt of stock including the required records regarding condition of goods, expiry dates and lot numbers.
b. Demonstrate an understanding of stock rotation with particular reference to expiry dates.
c. Describe the correct storage conditions of stock.
d. Differentiate between open vial stability and expiry date.
e. Demonstrate knowledge of company policy with regard to the use of expired reagents, controls and calibrators.
f. Demonstrate knowledge of the basic principles to apply when managing merchandise stock.

3.6 QUALITY ASSURANCE / ACCREDITATION

Objective

Expose the student / intern to all aspects of quality assurance and accreditation.

Specified outcomes

On completion of this section the intern/student should be able to:

a. Discuss quality assurance and quality control in the correct context.
b. Define and apply the appropriate processes of quality assurance in the pre-analytical, analytical and post analytical areas of specimen handling.
c. Identify the need for releasing, communicating and reporting urgent/critical/panic value laboratory results, following prescribed protocols.
d. Discuss the correct protocol to be followed when erroneous laboratory reports are released and amended reports are issued.
e. Demonstrate general knowledge on the terms accreditation, International Organisation for Standardisation (ISO).
f. Demonstrate general knowledge on the use, performance and evaluation of RISK assessments.
g. Demonstrate a basic knowledge of Lean principals and Six Sigma
h. Define and explain all quality assurance terminology. Range:

- Non-conformance
- Corrective action
- Preventive action
- Root cause analysis
- Continual improvement of quality assurance and quality control processes
- Audits – Internal & External
- Onsite, virtual, desktop, horizontal, vertical, witnessing etc.

3.7 QUALITY CONTROL

Objective

Expose the student to all aspects of quality control

Specified outcomes

On completion of this section the student/ intern should be able to:

a. Describe and apply the appropriate quality control processes which must be performed in the analysis of all analytes, equipment and analyzer operation, reagent and reagent preparation where applicable as contained within this syllabus.
b. Explain the principles of internal (daily / inter lab correlation / pooled sera) and external quality control procedures in the context of the tests performed.
c. Apply a sound knowledge of all the principles, procedures, calculations and interpretation of all related internal and external, ***quantitative*** quality control data. – Maths
d. Apply a sound knowledge of all the procedures, principles and interpretation of internal and external ***qualitative*** quality control data.
e. Describe the potential causes and apply appropriate troubleshooting procedures in the event of failed Internal and external, quantitative and qualitative quality control.
f. Define all terminology used in the assessment of quality control results.
Range: Westgard rules; shift; trend; outlier; positive and negative bias; specificity; sensitivity; systemic error; random error; delta difference; control limits / acceptable range; linearity; reportable range / analytical range, %CV, SD, LJ Charts, %Error, %D, accuracy, precision.
g. Demonstrate a basic understanding of the term 'Uncertainty of Measurement' and its' application to laboratory results.
h. Describe and apply the appropriate quality control for all testing procedures included in this syllabus.

Note: In addition refer to **Section 4**: Laboratory related mathematics.

3.8 METHOD VALIDATION

Objective

Expose the student / intern to all aspects of method validation.

Specified outcomes

On completion of this section the student / intern should be able to:

a. Demonstrate knowledge of Validation and verification requirements in terms of relevant ISO standards. Differentiate between validation and verifications.
b. Differentiate between quantitative, semi-quantitative and qualitative validation and verifications.
c. Statistical analysis
Range: Bias (proportional and constant), TE%, Biological variation, T-Test, Slope, Intercept, r-value, Upper and Lower limit of acceptance, reference range / normal range; analytical range / reportable range; linearity, specificity; sensitivity, within run and between run precision studies, correlation

3.9 PERSONNEL

Objective

Provide knowledge of basic requirements for personnel in terms of relevant ISO standards.

Specified outcomes

On completion of this section the student / intern should be able to:

a. Describe the personal documents and records which are required for all personnel.
b. Demonstrate an understanding of the terms 'competency' and 'ongoing competency' in terms of the training of all laboratory personnel.

3.10 DOCUMENTATION

Objective

Provide knowledge of basic requirements of documentation in terms of relevant ISO standards.

Range: Policies; SOPs; equipment records; quality control records; personnel records; package inserts; patient records

Specified outcomes

On completion of this section the intern/student should be able to:

a) Demonstrate knowledge of document control requirements in terms of relevant ISO standards.
   Range: Issue of new documents; frequency of review; process for obsolete documentation; document retention and disposal.
b) Demonstrate knowledge of the required content of SOP's including the minimum content of the cover page.
c) Identify the minimum required content of a laboratory report according to ISO standards.
d) Know the process on how to render documents obsolete.
e) Demonstrate knowledge on the retention and disposal of this documentation.
f) Demonstrate knowledge on document control and regular review of prescribed documentation.
g) Differentiate between a record and document.

   Range - *Policies; Procedures(SOPs); Working instructions; Raw data; Equipment records; Quality control records; Personnel records; Package inserts/ IFU's*

4. LABORATORY RELATED MATHEMATICS

Objective

Provide the student /intern with instruction on the application of the correct mathematical formulae to relevant calculations.

Specified outcomes

a. Demonstrate proficiency in the use of the correct formula used in the calculation of patient results.
Range: Calculated osmolality; LDL ; Unconjugated Bilirubin ;anion gap; globulin estimation; corrected calcium; uncorrected and corrected creatinine clearance; 24hr Urine (DU); % Iron saturation; unit conversions; calculations for timed urine analysis, GFR, delta difference, Manual test calculations.
b. Demonstrate proficiency in the calculations required for the preparation of solutions or patient samples.
Range: Physiological normal solutions; percentage solutions; molar solutions; titrations; serum dilutions; serial and doubling dilutions.
c. Calculate parameters used in the assessment of quantitative quality control results.
Range: %CV; SD; %Error; %D, Coefficient of Variation Ratio (CVR); Standard Deviation Index (SDI); mean; median; Bias (proportional and constant), TE%, T-Test, Slope, Intercept, r-value, Upper and Lower limit of acceptance, specificity; sensitivity.

5. MOLECULAR BIOLOGY

Objective
Provide student / intern with an introductory knowledge of basic molecular biology as applied to techniques throughout the disciplines.

Specified outcomes

At the end of this training the student / intern will be able to:

Describe workflow dynamics in a molecular biology laboratory.

- Demonstrate and apply knowledge of the methods used for the prevention of contamination in a molecular laboratory.
- Demonstrate a fundamental knowledge of the function of DNA in terms of structure, replication, transcription and translation.
- Discuss the principle of the polymerase chain reaction (PCR) and the steps involved.
  - Range - *Denaturation; Annealing; Extension*
- List the components of a PCR master mix and explain the purpose and action of each component.
- Discuss the role of primers used within a PCR laboratory.
- Demonstrate knowledge of the quality controls used in the assay procedure.
- Identify the potential causes of false positive and negative results.
- Identify potential causes of interference in the PCR process.
- A basic understanding of what probes are and how they are used in real-time PCR.
- A basic understanding of the PCR graph and Ct values (how the Ct values are used in quantitative and semi-quantitative PCR's).
- Understand the difference between conventional PCR and real-time PCR.

- Understand the principle and purpose of reverse transcription PCR (cDNA synthesis).
- Understand the difference between multiplex and single-plex PCR's.
- Demonstrate basic practical knowledge of the techniques utilised for the automated extraction, amplification and detection.
- Explain the principle and basic introductory level information of agarose gel electrophoresis.

6. MODULES

6.1 QUANTITATIVE ANALYSIS

Objective

Provide in depth theoretical and practical knowledge of the quantitative analytical processes used in the testing of specimens in Clinical Chemistry.
Range: Blood / Serum / Plasma: timed, fasting and random; Urine; CSF; body fluids; aspirates; Faeces.

Specified outcomes
On completion of this section the student / intern should be able to:

a. Demonstrate knowledge of any preparation steps required for the analytes listed below on all appropriate specimen types, either on automated instruments or by manual methods.
b. Process samples in accordance with documented laboratory procedures.
c. Describe the principles of the methods
Range: Colorimetry, Enzymology, Turbidimetry, Potentiometry, Nephlometry, HPLC / GLC, TLC, FPIA / MEIA, ELISA, Mass Spectrometry, Chemiluminescence, Electrophoresis and RIA
d. Demonstrate knowledge of limitations of the methods including interfering substances, detection limits / analytical range, dilutions.
e. Apply any calculations that may be required
f. Demonstrate knowledge of units reported, reference ranges, critical results, clinical significance of results and procedures to follow when abnormal and life-threatening results are obtained.
g. Demonstrate the ability to correlate laboratory results with physiological and pathological conditions.
h. Understand the concept of Turn Around Time (TAT).

i. Knowledge of calibrators and controls configuration in the instrument

Range of Analytes:

- ✓ ***Renal/ other related analytes*:** Sodium, potassium, chloride, TCO2, anion gap (calculated), urea, creatinine, uncorrected and corrected creatinine clearance (calculated), uric acid, calcium, Corrected Calcium, (calculated) magnesium, inorganic phosphate, Cystatin C
- ✓ ***Lung / Acid Base*:** pH, PCO2, PO2, TCO2, O_2 Sat, actual and standard bicarbonate and base excess, Co-oximetry, Ionized Calcium.
- ✓ ***Diabetes*:** Glucose, Glucose Tolerance Test, Ketones, HbA1c (Glycated Hemoglobin), Fructosamine and MAU (Microalbumin).
- ✓ ***Lipids*:** Total Cholesterol, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL) (measured and calculated), Triglyceride, Lipoprotein (a) and Apolipoprotein A & B.
- ✓ ***Liver*:** Total Protein, Albumin, Globulin, Total Bilirubin, Conjugated and Unconjugated Bilirubin (calculated), ALP, GGT, AST, ALT and LDH.
- ✓ ***Pancreas*:** Amylase, Lipase, faecal Elastase,
- ✓ ***Cardiac*:** CK, CKMB (mass), Troponin (T/I), Myoglobin, Pro-BNP/ BNP, Ultra/ high-sensitive/ CRP and Homocysteine.
- ✓ ***Iron Studies*:** Ferritin, Iron and Transferrin, %Iron saturation (calculated), Vit B12 and Folate (serum and red cell)
- ✓ ***Poisoning*:** Cholinesterase (serum & red cell).
- ✓ ***Therapeutic Drugs***: Digoxin, Phenytoin, Phenobarbital, Carbamazapine, Theophylline, Valproic Acid, Lithium, Paracetamol, Salicylates, Tricyclic Antidepressants, Cyclosporin, Tacrolimus
- ✓ ***Antibiotic Assays***: Amikacin, Gentamycin and Vancomycin.
- ✓ ***Endocrine*:** TSH, T3, T4 (Free and Total), Quantitative βhCG, FSH, LH, Estradiol (E2), Growth Hormone, Testosterone, Progesterone, Prolactin, Aldosterone, Cortisol, Gastrin, Insulin, Renin,, PTH, ACTH and 17 OH Progesterone, Thyroid Antibodies.
- ✓ ***CA markers***: PSA, Free PSA, AFP, CEA, CA-125, CA-153 and CA-199.
- ✓ ***Septicaemia and Inflammation*:** CRP, PCT (procalcitonin).
- ✓ ***Fluids*:** Differentiation between exudates and transudates
- ✓ ***Malabsorption*:** Xylose Tolerance Test, Steatocrit, Fat Loading Test
- ✓ ***Miscellaneous***:

Lactate, Pyruvate, Ammonia, Phenylalanine and Ascorbic Acid,

IgE, IgM, IgG, IgA, β2 Microglobulin, C3 and C4, Haptoglobins, SACE, Caeruloplasmin,

Osmolality (measured and calculated), Neonatal Bilirubin, Catecholamines (NMA & MA), 5HIAA, 17 Hydroxycorticosteroids, ADA, FLM, Sweat analysis, Vitamin D

6.2 QUALITATIVE AND SEMI-QUANTITATIVE ANALYSIS

Objective

Provide in depth theoretical and practical knowledge of the qualitative and semi-qualitative screening processes used in the testing of specimens in Clinical Chemistry.

Range: Blood: Serum and plasma; Urine; Faeces, Calculi and CSF.

Specified outcomes

On completion of this section the student should be able to:

a. Demonstrate knowledge of patient preparation, specimen requirements and precautions for the qualitative chemistry tests.

b. Perform the qualitative and semi-quantitative chemistry tests according to documented laboratory procedures.

c. Describe the principles of the qualitative and semi-quantitative chemistry tests.

d. Demonstrate knowledge of the limitations of the methods including interfering substances.

e. Demonstrate knowledge with regards to the reporting of results, interpretation and clinical significance of abnormal results.

Range of Analytes:

- ✓ ***Electrophoresis*:** Serum and urine Protein Electrophoresis, IFE and or Kappa and Lambda free light chains.
- ✓ ***Drugs of Abuse screen*:** Urine Benzodiazepine, Cannabis, Amphetamine, Methamphetamine, Barbiturate, Cocaine, Methadone, Methaqualone, Opiate, Ethanol and PCP
- ✓ ***Miscellaneous*:** Urine βhCG and Dry Chemistry (dipstick and ketostix),
  Faecal and urine reducing substances,
  Porphobilinogen, Porphyrin,
  Occult Blood / Faecal Haemoglobin
  Calculus analysis, renal / biliary

7. CLINICAL APPLICATIONS

Objective

Provide knowledge of the relevance of the profiles listed below:

Specified outcomes:

The student / intern should be able to understand and explain the following knowledge of the profiles listed below:-

- The relevance/ association of the test to the specified organ.
- The association/ correlation/ interaction between the tests.
- The significance of abnormal results and expected combinations thereof.
- Procedure to follow when results do not concur with clinical picture.

Range:

- ✓ ***Renal disease***: renal failure; nephritis; nephrotic syndrome
- ✓ ***Cardiac disease***: myocardial infarction; ischaemia; angina.
- ✓ ***Liver disease***: obstructive jaundice; haemolytic jaundice, cirrhosis; infective hepatitis.
- ✓ ***Acid Base disturbances***
- ✓ ***Pancreatic disease***
- ✓ ***Bone diseases***
- ✓ ***Lipid disorders***
- ✓ **Diabetes** – Type 1 & Type 2; ketoacidosis
- ✓ ***Organophosphate poisoning***
- ✓ ***Menopausal Screen***
- ✓ ***Thyroid disorders***

8. REFERENCE MATERIAL

- Clinical Chemistry: Principles, Techniques, and Correlations. Michael L. Bishop, Edward P. Fody, Larry E. Schoeff
- Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. Carl A. Burtis, Edward R. Ashwood, David E. Bruns, Norbert W. Tietz
- Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics. Carl A. Burtis, David E. Bruns
- Clinical Chemistry: Theory, Analysis, Correlation. Lawrence A. Kaplan, Amadeo J. Pesce
- Clinical Chemistry in Diagnosis and Treatment, 6Ed. Andrew Day, Philip Mayne
- Practical Clinical Biochemistry: Harold Varley
- Clinical Chemistry in Diagnosis and Treatment: Zilva and Pannall
- QUALITY CONTROL AND ACCREDITATION REFERENCE SITES:

  www.iso.org, www.clsi.org, www.sanas.co.za; www.westgard.com
- HEALTH PROFESSIONS COUNCIL OF SOUTH AFRICA (HPCSA):

  www.hpcsa.co.za
- SOCIETY OF MEDICAL LABORATORY TECHNOLOGISTS OF SOUTH AFRICA (SMLTSA):

  www.smltsa.org.za

9. NOMENCLATURE / ACRONYMS

- **5-HIAA:** 5-Hydroxyindoleacetic acid
- **ACTH:** Adrenocorticotropic hormone
- **ADA:** adenosine-deaminase
- **ALT**: Alanine Transaminase
- **ALP:** Alkaline Phosphatase
- **AST:** Aspartate Transaminase
- **AFP:** alpha-fetoprotein; α-fetoprotein
- **βhCG:** Beta Human Chorionic Gonadotrophin
- **BE:** Base excess
- **BNP:** B-type natriuretic peptide
- **BV:** Biological Variation
- **CA-125:** Tumor marker protein is present in greater concentration in ovarian cancer
- **CA 1-53:** CA-Breast; Cancer Antigen-Breast
- **CA 19-9:** Carbohydrate Antigen 19-9; Cancer Antigen-GI; CA-GI
- **C3:** human complement C3
- **C4:** human complement C4
- **CEA:** Carcinoembryonic Antigen
- **CK:** Creatine Kinase
- **CKMB:** Creatine kinase MB
- **CLSI:** Clinical and Laboratory Standards Institute
- **CRP:** C-reactive protein
- **CSF:** Cerebrospinal Fluid
- **CV:** Coefficient of variation
- **CVR:** Coefficient of variation Ratio
- **COIDA:** Compensation for Occupational Injuries and Diseases Act
- **DNA:** deoxyribonucleic acid
- **DOA/ DAU:** Drugs of Abuse/ Drugs of Abuse in Urine
- **E2:** Estradiol
- **ELISA:** Enzyme Linked Immunosorbent Assay
- **FSH:** Follicle Stimulating Hormone
- **FLM:** Fetal Lung Maturity
- **FPIA:** Florescence Polarization Immunoassay
- **GGT:** Gamma Glutamyl Transferase
- **GLC:** Gas Liquid Chromatography
- **GLP:** Good Laboratory Practice
- **GFR:** Glomerular filtration rate
- **GTT:** Glucose Tolerance Test
- **HbA1c:** Hemoglobin A1c
- **HDL:** High density Lipoprotein
- **HPCSA:** Health Professions Council of South Africa
- **HPLC:** High Performance Liquid Chromatography
- **IATA:** International Air Transport Association
- **IFE:** immunofixation electrophoresis
- **IgA:** Immunoglobulin A
- **IgE:** Immunoglobulin E
- **IgG:** Immunoglobulin G
- **IgM:** Immunoglobulin M
- **ISO:** International Organization for Standardization

- **kPa** Kilopascal
- **LDL:** Low density lipoprotein
- **LDH:** Lactate Dehydrogenase
- **LH:** Luteinizing Hormone
- **LJ:** Levy-Jennings
- **MA:** Metadrenaline
- **MAU:** Microalbumin
- **MEIA:** Microparticle Enzyme Immunoassay
- **MSDS:** Material Safety Data Sheet
- **NHA:** National Health Act
- **NMA:** Normetadrenaline
- **O2:** Oxygen
- **OSHACT:** Occupational Safety and Health Act
- **PCO2:** Partial Pressure Carbon Dioxide
- **PCP:** Phencyclidine
- **PCR:** Polymerase Chain Reaction
- **PCT:** Procalcitonin
- **PO2:** Partial Pressure Oxygen
- **PSA:** Prostate-specific antigen
- **PTH:** Parathyroid Stimulating Hormone/ Parathormone
- **%D:** Percentage Deviation
- **Q.A**.: Quality Assurance
- **Q.C:** Quality Control
- **RIA:** Radioimmunoassay
- **SABS:** South African Bureau of Standards
- **SACE:** Serum Angiotensin-converting enzyme
- **SANAS:** South African National Accreditation System
- **SMLTSA:** Society of Medical Laboratory Technologists of South Africa
- **SOP:** Standard operating procedure
- **SD:** Standard deviation
- **SDI:** Standard deviation Index
- **TEa% :** Total Allowable Error
- **T3:** Triiodothyronine
- **T4:** Thyroxine
- **TCO2:** Total CO2
- **TLC:** Thin-Layer Chromatography
- **TQM:** Total Quality Management
- **TSH:** Thyroid Stimulating Hormone
- **VHF:** Viral Haemorrhagic Fever
- **WHO:** World Health Organisation

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