

Candidate Number.....



AFRICA
UNIVERSITY
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"Investing in Africa's Future"

**COLLEGE OF HEALTH, AGRICULTURE AND NATURAL
SCIENCES
DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES**

**MLS 1202: CLINICAL CHEMISTRY
END OF SEMESTER FINAL EXAMINATIONS**

APRIL 2026

LECTURER: MR G. MALUNGA

DURATION: 3 HOURS

INSTRUCTIONS

1. Write your candidate number on the space provided on top of each page
2. Answer **all** questions in sections A on the question paper.
3. Answer **all** questions in section B on separate answer sheets provided.
4. Answer any **3** questions in section C on separate answer sheets provided
5. Mark allocation for each question is indicated at the end of the question
6. Credit will be given for logical, systematic and neat presentations in sections B and C

Candidate Number.....

SECTION A : MULTIPLE CHOICE [40MARKS]

- **Answer all questions by encircling the correct response T for TRUE or F for FALSE for each statement in all the questions**
- **Each correct response is allocated half mark**

1. Which of the following are lipids

- | | | |
|---|---|-------------------|
| T | F | a) Cholesterol |
| T | F | b) Phospholipids |
| T | F | c) Glucagon |
| T | F | d) Prostaglandins |

2. Methods for determining proteins include

- | | | |
|---|---|------------------------|
| T | F | a) Spectrophotometry |
| T | F | b) Biuret assay |
| T | F | c) Immunoprecipitation |
| T | F | d) Western blot |

3. Regarding uncompetitive enzyme inhibition

- | | | |
|---|---|--|
| T | F | a) Inhibitor binds to enzyme |
| T | F | b) $V_{\max}$ is increased |
| T | F | c) K_m is increased |
| T | F | d) Inhibitor binds to enzyme substrate complex |

4. Measurement of albumin may be used to

- | | | |
|---|---|--|
| T | F | a) evaluate liver function |
| T | F | b) assess nutrition status |
| T | F | c) determine phosphate balance |
| T | F | d) aid in the diagnosis of heart disease |

5. The following factors influence rate of enzymatic reactions

- | | | |
|---|---|----------------------------|
| T | F | a) Substrate Concentration |
| T | F | b) Enzyme Concentration |
| T | F | c) pH |
| T | F | d) Temperature |

6. Which of the following are anticoagulants in sample collection tubes?

- | | | |
|---|---|--------------------|
| T | F | a) sodium chloride |
| T | F | b) EDTA |
| T | F | c) sodium acetate |
| T | F | d) heparin |

7. The following principles are mainly used in clinical chemistry tests

- | | | |
|---|---|----------------------|
| T | F | a) Spectrophotometry |
| T | F | b) Flow cytometry |
| T | F | c) Turbidimetry |

Candidate Number.....

T F d) Agglutination

8. Blood glucose concentration is affected by

T F a) Deamination
T F b) Glycogenesis
T F c) Lipolysis
T F d) Transamination

9. The following are positive acute phase proteins

T F a) Haptoglobin
T F b) Ceruloplasmin
T F c) α 1-antitrypsin
T F d) C-reactive protein

10. A Liver Function Test panel consists of

T F a) LDH
T F b) ALP
T F c) AST
T F d) Transferrin

11. With regards to plasma calcium,

T F (a) Approximately 50% of the plasma calcium is present in the ionized form
T F (b) Approximately 90% of the plasma calcium is bound to proteins
T F (c) Approximately 10% of the plasma calcium is complexed with anions
T F (d) A negative balance may be found in children due to bone growth

12. Both VLDL and LDL contain the following apolipoproteins

T F a) B100
T F b) B48
T F c) C
T F d) E

13. Fat soluble Vitamins include

T F a) Vitamin D
T F b) Vitamin K
T F c) Vitamin B
T F d) Vitamin C

14. The following refers to unconjugated bilirubin:

T F (a) It is found in very high amounts in urine
T F (b) It is water soluble and easily excreted by the kidney
T F (c) gives the stool the characteristic dark brown color

Candidate Number.....

- T F (d) At high concentrations it deposits in cell membranes causing kernicterus.

15. A renal tubule can secrete

- T F a) H^+
T F b) HCO_3^-
T F c) K^+
T F d) Ca^{2+}

16. In blood gas analysis,

- T F (a) Actual HCO_3^- is calculated using the measured pH and pCO_2
T F (b) pCO_2 is measured with a CO_2 electrode.
T F (c) pH is calculated using the measured H^+ ions
T F (d) O_2 is measured by an O_2 electrode

17. The following hormones are produced by the kidneys:

- T F a) Renin
T F b) Erythropoietin
T F c) Prostaglandin
T F d) Antidiuretic hormone

18. A urine dipstick detects the following

- T F a) Leucocytes
T F b) Blood
T F c) Urine casts
T F d) Nitrite

19. In metabolic acidosis there is

- T F a) decrease in the blood pH caused by a decrease in the bicarbonate concentration.
T F b) decrease in the bicarbonate concentration due to accumulation of hydrogen ions.
T F c) there is an increase in the bicarbonate concentration
T F d) there is always an increase in the pCO_2
T F a) there is a decrease in hydrogen ion concentration

20. The following laboratory methods are used for the measurement of urea

- T F a) Jaffe chemical method
T F b) Diacetyl monoxime method
T F c) Fearon chemical method
T F d) Enzymatic method using uricase

Candidate Number.....

SECTION B [20 MARKS]

Answer all questions on separate answer sheets provided

1. State one major use of the following lipoproteins
 - a) Chylomicrons
 - b) HDL-C
 - c) VLDL-C
 - d) LDL-C
 - e) IDL-C [5]
2. List any 5 causes of hypoglycaemia. [5]
3. State 5 tests which can be used to assess iron status in the body. [5]
4. Give one example of each of the following classes of enzymes
 - a) Transferases
 - b) Oxidoreductases
 - c) Hydrolases
 - d) Lyases
 - e) Isomerases [5]

SECTION C [75 marks]

Answer any 3 questions from this section on separate answer sheets provided. Each question carries 25 marks.

1. Write a detailed account of the laboratory investigation of dyslipidemia. [25 Marks]
2. Describe the Glucose oxidase and Hexokinase methods for measurement of blood Glucose. [25 Marks]
3. Give a detailed account of electrophoretic separation of proteins. [25 Marks]
4. Discuss bilirubin metabolism. [25 Marks]
5. Discuss the methods that are used to measure serum creatinine in the laboratory. [25 Marks]