



**PAMIBIA UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

**FACULTY OF HEALTH AND APPLIED SCIENCES**

**DEPARTMENT OF HEALTH SCIENCES**

<b>QUALIFICATION:</b> BACHELOR OF MEDICAL LABORATORY SCIENCES	
<b>QUALIFICATION CODE:</b> 08BMLS	<b>LEVEL:</b> 6
<b>COURSE CODE:</b> CLC621S	<b>COURSE NAME:</b> CLINICAL CHEMISTRY 2B
<b>SESSION:</b> JANUARY 2020	<b>PAPER:</b> THEORY
<b>DURATION:</b> 3 HOURS	<b>MARKS:</b> 100

<b>SUPPLEMENTARY / SECOND OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER(S)</b>	DR MUNYARADZI MUKESI
<b>MODERATOR:</b>	MR MAURICE NYAMBUYA

<b>INSTRUCTIONS</b>
<ol style="list-style-type: none"><li>1. Answer ALL the questions.</li><li>2. Write clearly and neatly.</li><li>3. Number the answers clearly.</li></ol>

**PERMISSIBLE MATERIALS**

1. NON PROGRAMMABLE CALCULATOR

**THIS QUESTION PAPER CONSISTS OF FOUR PAGES** (Including this front page)



## SECTION A [30]

### QUESTION 1

[10]

- 1.0 State the principles of the following assays as used in clinical chemistry:
- 1.1 Electrophoresis (2)
- 1.2 Ion selective electrodes (2)
- 1.3 The Biuret test (2)
- 1.4 Osmometer (2)
- 1.5 Estimation of Low Density Lipoprotein (LDL) using the Friedewald equation (2)

### QUESTION 2

[10]

- 2.0 A student performed an experiment on a urea samples and obtained the following results presented in Table 1:

Table 1: Absorbance readings for urea measurements

Sample	Absorbance
Standard (10.0 mmol/L)	0.45
Control (Range: 10.0-15.0 mmol/L)	0.52
Patient sample (Ref Range: 2.5-8.3 mmol/L)	0.71

- 2.1 Calculate the urea concentration of the control and patient. (4)
- 2.2 Comment on the results of both the control and patient. (2)
- 2.3 Identify FOUR clinical uses of serum urea measurements. (4)

**QUESTION 3****[10]**

3.0 A patient presents with the following serum measurements:

Total protein            140 g/L            (RR: 65-85)

Albumin                    29 g/L            (RR: 35-55)

- a. Suggest TWO possible causes of such a presentation. (2)
- b. Propose further testing you would perform to help in making a diagnosis. Justify your choice of test. (2)
- c. Illustrate the expected presentation of your analysis proposed in (b). (6)

**SECTION B [70]****QUESTION 4****[10]**

4.0 A patient's lipogram has the following results:

Total cholesterol        7.1 mmol/L

HDL cholesterol         1.1 mmol/L

Triglyceride              2.63 mmol/L

- 4.1 Calculate LDL using the Friedewald method (1 decimal place). (2)
- 4.2 Describe the FOUR major classes of lipoproteins. (8)

**QUESTION 5****[10]**

5.0 Discuss the significance of measuring serum and urine osmolality.

**QUESTION 6****[15]**

6.0 Discuss the collection and handling conditions of blood gas samples in the clinical chemistry laboratory.

**QUESTION 7**

**[10]**

- 7.0 Briefly describe the composition of total serum protein. Categorize the major protein fractions and give examples of proteins in each of the different categories. (10)

**QUESTION 8**

**[10]**

- 8.0 Give a brief description of how porphyrias develop. Use relevant examples to illustrate your answer. (10)

**QUESTION 9**

**[15]**

- 9.0 A patient presents at her Physician with general body malaise, spells of dizziness over a long period and pronounced parlour. The Physician notices that the patient generally looks unwell and collects blood samples for analysis by the Laboratory. He strongly feels the patient has anaemia of chronic disease. Identify the tests which are likely to be performed in the clinical chemistry laboratory. State the expected results which may support the Physician's provisional diagnosis. Justify the choice of your tests and expected results. Only give relevant tests. (15)

**END OF EXAMINATION**

**TOTAL 100 MARKS**