



**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> NOVEMBER 2019	<b>PAPER:</b> THEORY
<b>DURATION:</b> 3 HOURS	<b>MARKS:</b> 100

<b>FIRST 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 FIVE PAGES** (Including this front page)



## SECTION A [30]

### QUESTION 1

[10]

1.0 Write short notes on the following:

1.1 Faecal fat analysis

(5)

1.2 Special considerations when measuring serum ammonia.

(5)

### QUESTION 2

[10]

2.0 Review the following sets of results and answer the questions that follow:

<u>Patient A</u>	<u>Patient B</u>
Total Bilirubin: 230umol/L	Total Bilirubin: 45umol/L
Direct Bilirubin: 1umol/L	Direct Bilirubin: 22umol/L
Total Protein: 63g/L	Total Protein: 55g/L
Albumin: 42g/L	Albumin: 30g/L
ALT: 5U/L	ALT: 800U/L
AST: 88U/L	AST: 390U/L
GGT: 40U/L	GGT: 133U/L
ALP: 80U/L (Ref range:0-249U/L)	ALP: 66U/L (Ref range:40-130U/L)

2.1 Indicate which patient is more likely to suffer from haemolytic disease of the newborn. Motivate your answer. (2)

2.2 Which patient is more likely to produce pale stools? Motivate your answer. (2)

2.3 Indicate whether the following will be increased, normal, decreased or absent for each of patient A and B. (2)

a. Urine urobilinogen

b. Urine bilirubin

2.4 Comment on the AST/ALT ratio of patient A. (2)

2.5 Assuming that your laboratory performs ionised Ca<sup>++</sup> measurements only, would you correct your calcium measurement? Motivate your answer. (2)

### **QUESTION 3**

**[10]**

3.0 Manual total protein assays were performed and the following absorbance readings were obtained:

Patient A: Absorbance = 0.163

Patient B (1/3 dilution): Absorbance = 0.125

Control Absorbance = 0.291

Standard Absorbance = 0.235 Concentration = 75g/L

3.1 Calculate the concentration of total protein for Patient A and B. Round off your final answers to 2 decimal places. (4)

3.2 Which patient's result (A or B) is most likely to be observed in a case of: (2)

a. Multiple myeloma

b. Nephrotic syndrome

3.3 The package insert of the control states a mean of 72.5g/L and SD=6.25. Showing all calculations, motivate whether or not patient A and B's results can be accepted. (4)

## **SECTION B [30]**

### **QUESTION 4**

**[30]**

4.0 The following are laboratory results for an adult male patient from the clinical chemistry department. Review the results and answer the questions which follow.

ANALYTE	CONCENTRATION	REFERENCE RANGE
Serum/Plasma		
Sodium	141	136-146 mmol/L
Potassium	7.7	3.0-5.5 mmol/L
Chloride	107	90-110 mmol/L
CO <sub>2</sub>	22	20-30 mmol/L
Urea	28.9	2.7-8.3 mmol/L
Creatinine	645	90-115 μmol/L
Glucose	19.8	3.5-5.5 mmol/L
Total protein	66	65-80 g/L
Albumin	28	35-50 g/L
Calcium	2.03	2.15-2.45 mmol/L
Osmolality	280	mOsm/kg
Serum Iron	11.2	11-17 μmol/L
Transferrin	3.5	2.0-3.6 g/L
Cholesterol	6.3	<5.2 mmol/L
Triglyceride (fasting)	3.53	<2.26 mmol/L
HDL	0.9	>1.2 mmol/L
24hr Urine		
Volume	1.3 L	
Creatinine	6	mmol/L

Enumerate the following (Show all working):

- 4.1 Anion gap (2)
- 4.2 Corrected calcium (2)
- 4.3 Albumin/globulin ratio (2)
- 4.4 Osmolal gap (2)

- 4.5 Creatinine clearance (3)
- 4.6 TIBC (2)
- 4.7 % transferrin saturation (2)
- 4.8 LDL (3)
- 4.9 Comment on the patient's renal status (2)
- 4.10 Briefly explain the causes of a low serum sodium (5)
- 4.11 Discuss the causes of a raised serum potassium (5)

## SECTION C [40]

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

- 5.0 Discuss the tests used for short, medium and long term monitoring of diabetes. (10)

### **QUESTION 6** [10]

- 6.0 Blood gas samples are very delicate and are to be treated as 'urgent samples'. Outline the special conditions considered during arterial blood gas analysis. (10)

### **QUESTION 7** [10]

- 7.0 Give a detailed description of how the body degrades haemoglobin and the fate of molecules produced during the catabolic process. (10)

### **QUESTION 8** [10]

- 8.0 Using relevant examples illustrate how enzymes are used as reagents in the clinical chemistry laboratory. (10)

END OF EXAMINATION

TOTAL 100 MARKS