NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF HEALTH SCIENCES

QUALIFICATION: BACHELOR OF MEDICAL LABORATORY SCIENCES	
QUALIFICATION CODE: 08BMLS	**LEVEL:** 6
COURSE CODE: CLC621S	**COURSE NAME:** CLINICAL CHEMISTRY 2B
SESSION: NOVEMBER 2022	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	MR NOEL RUKANDA
MODERATOR:	DR MAURICE NYAMBUYA

INSTRUCTIONS
1. Answer ALL the questions. 2. Write clearly and neatly. 3. Number the answers clearly.

PERMISSIBLE MATERIALS

1. NON PROGRAMMABLE CALCULATOR

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

SECTION A [20 MARKS]

Question 1 **[10]**

1. Judge the following statements whether they are TRUE or FALSE and only write the question number and the corresponding response.

1.1 Calcium is reabsorbed under the influence of

a. ADH 1

b. PTH 1

c. Aldosterone 1

d. Phosphate 1

e. Glucagon 1

1.2 The following substances are osmotically active and are reflected in the osmolal gap

a. Sodium 1

b. Urea 1

c. Glucose 1

d. Ethanol 1

e. Lactate 1

Question 2 **[10]**

2. Evaluate the following statements and select the most appropriate/correct or the phrase to best describe the statement given. Write only the number of the question and the letter of the statement/word. Each correct answer earns 1 mark.

2.1 The sweat test for chloride is used as screening test for:

a. Parkinson's disease

b. Reyes Syndrome

c. Hyper –or hypochloremia

d. Cystic fibrosis

2.2 Which of the following tissues is important in Vitamin D metabolism:

a. Spleen
b. Pancreas
c. Thyroid
d. Skin
e. Adrenal Cortex

2.3 Organophosphate poisoning will inhibit the function of the following enzyme:

a. Hexokinase
b. CK
c. Amylase
d. PCHE
e. G-6-PD

2.4 Conversion of glucose to glycogen for storage is called:

a. Glycolysis
b. Glucogenolysis
c. Gluconeogeneis
d. Glycogenesis
e. All of the above

2.5 Bile acids that are synthesized in the liver are derived from what substance:

a. Bilirubin
b. Fatty acids
c. Triglycerides
d. Cholesterol
e. Uric acid

2.6 Common clinical laboratory methods for measurement of serum albumin are based on the properties of albumin an:

a. Enzyme
b. Antibody
c. Glycoprotein
d. Homogenous protein
e. Binding protein

2.7 A urine screening test for porphobilinogen is positive. The MOST likely disease state is:

a. Lead poisoning
b. Porphyria cutanea farad
c. Acute porphyria
d. Erythrocytic protoporphyria
e. All of the above

2.8 A patient is admitted to the emergency room in a state of metabolic alkalosis. Which of the following would most likely be consistent with this diagnosis:

a. High pCO2;Increased HCO_3
b. Low pCO2; increased HCO_3
c. High pCO2; decreased HCO_3
d. Low pCO2; decreased HCO_3
e. None of the above

2.9 One cause of DECREASED anion gap is:

a. A decrease in albumin
b. A decrease in calcium
c. An increase in organic acids
d. An increase in phosphate
e. An increase in uric acid

2.10 Aspartate Aminotransferase (AST) and Alanine Aminotransferase (ALT) are both elevated in which of the following disease:

a. Muscular dystrophy
b. Viral hepatitis
c. Myocardial infarction
d. Obstructive liver disease
e. Renal failure

SECTION B [50 MARKS]

Question 3 **[30]**

Review the following Laboratory results and answer the questions below.

Analyte	Result	Reference range
Sodium	134	136-146mmol/l
Potassium	7.1	3.0-5.0mmol/l
Chloride	99	90-110mmol/l
CO2	22.0	20.25mmol/l
Urea	18.3	2.5-8.3mmol/l
Creatinine	323	60-120 µmol/l
Total Calcium	1.97	2.05-2.20mmol/l
Magnesium	0.80	1.0-1.10mmol/l
Total protein	66	70-85g/l
Albumin	31	35-45g/l
Total iron	9.0	10.7-26.9 µmol/l
Ferritin	22.0	30-400µg/l
Transferrin	2.2	2.0-3.6g/l
Urine creatinine	3.0mmo/l Collection time-24hours Volume-980ml Body surface area-2.2	

3.1 Enumerate the following

3.1.1	Anion gap	2
3.1.2	Albumin globulin ratio	4
3.1.3	Corrected calcium	2
3.1.4	Total iron binding capacity	2
3.1.5	% transferrin saturation	2
3.1.6	Corrected Creatinine clearance	4

3.2 Explain the potential causes of the following abnormal parameters in this patient.

3.2.1	Sodium	2
3.2.2	Potassium	2
3.2.3	Creatinine	2
3.2.4	Calcium	2
3.2.5	Magnesium	2
3.2.6	Total protein	2
3.2.7	Albumin	2

Question 4 **[20]**

4.0 Analyse the following blood gas measurements for **EACH** patient A and B and answer the questions that follow.

	A	**B**	
ANALYTE	RESULT	RESULT	Reference range
pH	7.30	7.56	7.35 - 7.45
HCO_3	26	38	35 - 45mmol/L
PCO_2	71	56	22 – 26mmHg

4.1 Determine the acid base disorder for **EACH** patient. 10

4.2 Predict the compensation status of **EACH** patient and provide reasons for your answer. 10

SECTION C [30 MARKS]

Question 5 **[10]**

Explain how each of the following conditions leads to decreased serum protein levels:

5.1 Burns 2

5.2 Malnutrition 2

5.3 Liver disease 2

5.4 Renal disease 2

5.5 Malabsorption. 2

Question 6 **[10]**

Discuss the following statement:" Decreased blood volume triggers the RAA system".

Question 7 **[10]**

With aid of a diagram, illustrate how hemoglobin buffers pH.

END OF EXAMINATION

Total marks 100