



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH AND APPLIED SCIENCES

DEPARTMENT OF HEALTH SCIENCES

QUALIFICATION: BACHELOR OF MEDICAL LABORATORY SCIENCES	
QUALIFICATION CODE: 08BMLS	LEVEL: 7
COURSE CODE: CLC711S	COURSE NAME: CLINICAL CHEMISTRY 3
SESSION: JULY 2019	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SUPPLEMENTARY / SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
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INSTRUCTIONS
<ol style="list-style-type: none">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 FIVE PAGES (Including this front page)

SECTION A [20]

QUESTION 1

[20]

Write short notes on the following:

- 1.1 Calcium mediated hormone action (5)
- 1.2 Feedback mechanisms, using cortisol as an example. (5)
- 1.3 Importance of monitoring serum levels of therapeutic drugs in the elderly. (5)
- 1.4 Creatinine clearance (5)

SECTION B [80]

QUESTION 2

[10]

A 66 year old male with known Chronic Lymphocytic Leukaemia is admitted to ICU with severe lung infection and pleural effusion. Blood, sputum and pleural fluid samples are submitted to the laboratory for analysis. The following are some of the results obtained:

Chemistry	Microbiology – Sputum MC&S
<u>Serum concentration (Reference range)</u>	
Total bilirubin: 22 µmol/L (10-40)	
Direct bilirubin: 5 µmol/L (1-10)	<i>Klebsiella pneumoniae</i> isolated
Total protein: 65 g/L (65-85)	
Albumin: 31 g/L (35-55)	
AST: 35 U/L (5-50)	
ALT: 42 U/L (4-50)	
GGT: 22 U/L (5-50)	
ALP: 166 U/L (60-110)	
LDH: 488 U/L (100-200)	
Total calcium: 2.68 mmol/L (2.25-2.70)	
UA: 0.67 mmol/L (0.13-0.28)	
<u>Pleural effusion</u>	
LDH: 421 U/L	
Total protein: 45 g/L	
<u>ABG</u>	
pH: 7.31	
pCO ₂ : 7.2 kPA (4.67-6.00 kPA)	
HCO ₃ : 24 mmol/L (22-29 mmol/L)	

- 2.1 Comment on the patient's serum LDH, UA and calcium levels. (3)
- 2.2 Calculate the corrected calcium. (2)
- 2.3 Classify the fluid either as a transudate or exudate. Motivate your answer. (4)
- 2.4 State the patient's acid base status. (1)

QUESTION 3

[15]

The following are results of a patient generated from the laboratory. Review the results and answer the questions below.

ANALYTE	RESULT	REFERENCE RANGE
Calcium	1.86	2.20-2.70 mmol/L
Albumin	38	35-55 g/L
PO4	4.70	2.5-4.5 mmol/L
PTH	17.7	1.2-8.5 pmol/L

- 3.1 Comment on each of the results above and give a brief explanation on the potential cause(s) of the result. (5)
- 3.2 Briefly discuss the hormones involved in calcium regulation. (10)

QUESTION 4

[10]

A 22 year old woman consulted her GP because she was embarrassed about the amount of hair that was growing on her face, abdomen, arms and legs. She told the doctor that her period had stopped in the last 2 years (menarche age 13).

The following hormones were measured:

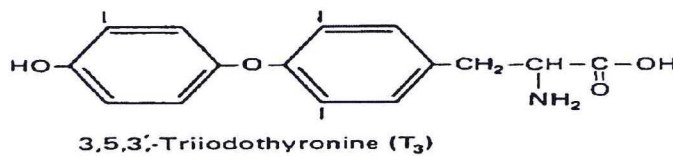
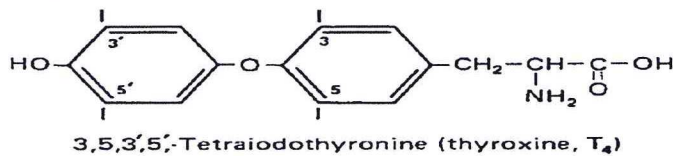
ANALYTE	RESULT	REFERENCE RANGE
Prolactin	550	<500 mU/L
LH	23	2.5-9.0 U/L
FSH	20.0	3-15 U/L
Oestradiol	60	110-180 pmol/L
Testosterone	3.7	0.8-2.8 nmol/L
SHBG	27	30-120 nmol/L
DHEAS	11	1.8-11.7 μ mol/L
TSH	0.4	0.2-4.5 mU/L

- 4.1 Calculate the Free androgen Index (FAI) (1)
- 4.2 Propose the most likely diagnosis in this patient. (1)
- 4.3 Justify the choice of each test performed on this patient. (8)

QUESTION 5

[10]

Below is an image of thyroid hormones:



- 5.1 Briefly explain how these hormones are produced from dietary iodide. (10)

QUESTION 6

[10]

A 35 year old woman became severely depressed after the sudden death of her husband. Two months later she was brought to the emergency room by her friend because of extreme weakness and lethargy. She appeared thin and pale. Questioning revealed she had not eaten for several weeks. Analysis of a plasma sample revealed elevated levels of acetoacetate, B hydroxy butyrate and urea. However, her blood glucose level was low. She was hospitalised, given intravenous feeding and antidepressant medication. Her recovery was uneventful.

- 6.1 Explain how the patient was able to obtain energy during the time she was not eating. (5)
- 6.2 Why is plasma urea concentration elevated? (2)
- 6.3 What causes elevated plasma levels of acetoacetate and B hydroxy butyrate in starvation? (3)

QUESTION 7

[10]

A fluid was send to the laboratory for analysis and it is thought to be an exudate. Briefly describe the tests you would perform on it and give the expected results. Explain the significance of the results.

QUESTION 8

[15]

The laboratory manager has asked you to introduce a new method in the laboratory. Describe the managerial information you would consider in the method selection process.

TOTAL 100 MARKS

END OF EXAMINATION