



NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES
SCHOOL OF HEALTH SCIENCES
DEPARTMENT OF CLINICAL HEALTH SCIENCES

QUALIFICATION: BACHELOR OF MEDICAL LABORATORY SCIENCES	
QUALIFICATION CODE: 08BMLS	LEVEL: 7
COURSE CODE: CLC711S	COURSE NAME: CLINICAL CHEMISTRY 3
SESSION: JULY 23	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	MS CARA MIA DUNAISKI
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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. CALCULATOR

THIS QUESTION PAPER CONSISTS OF 5 PAGES (Including this front page)

QUESTION 1**[10]**

An 18-year-old woman is referred for investigation of distressing hirsutism. She shaves daily and has noticed deepening of her voice and scalp hair loss. On questioning she admits to irregular menstrual periods. On examination she is clearly hirsute with male-pattern distribution of body hair; temporal balding and deep voice are confirmed.

Provide a differential diagnosis for androgen excess in an adult female patient and laboratory/ clinical investigations that will aid in this diagnosis.

QUESTION 2**[15]**

Discuss the laboratory investigations necessary to assist in the diagnosis and management of diseases of the joints.

QUESTION 3**[20]**

An 18-year-old university student who lives in the campus dormitory presents to the emergency department (ED) with fever and a stiff neck that began a few hours earlier. He also describes a headache and nausea that started at the same time. Past medical history is non-contributory. He has not seen a physician since the age of 13. His social history reveals recreational marijuana use and periodic alcohol ingestion.

Physical examination reveals a well-nourished individual who is confused and in moderate distress. A petechial rash is noted on his trunk. His skin is cold and clammy. Kernig and Brudzinski signs are positive. He is oriented to person and place but not time and has no focal neurological deficits. The remaining examination is within normal limits.

Following an unremarkable CT scan of the head, a lumbar puncture (LP) is performed with an opening pressure of 250 mm H₂O (70-180 mm H₂O). The CSF has a yellowish, cloudy appearance. Results of the CSF analysis are shown in Table 1.

Table 1. Laboratory findings

WBC count	10,000 cells/mm ³ (0-5 cells/mm ³)
Neutrophils	99%
Protein	2.0 g/L (0.2-0.45)
Glucose	1.0 mmol/L (2.3-3.3)
CSF gram stain	Gram-negative diplococci

Given the patient's age and laboratory results, provide the most likely diagnosis and give a detailed description of the significance of collecting a CSF sample in this particular patient, and how it will aid in the diagnosis of disease.

Three marks will be allocated to the most likely diagnosis, ten marks will be allocated to CSF description and specimen significance and seven marks will be allocated to importance in CSF analysis in the diagnosis of disease.

QUESTION 4

[20]

A 77 year old patient with a history of congestive heart failure presented to the Emergency Department with confusion. An electrocardiogram (ECG) was completed before blood was collected. The patient was questioned, and it was discovered that the patient was unclear if he took double dosage of digoxin or forgot to take the medication. Results of the laboratory analysis are shown in Table 2.

Table 2. Laboratory findings

Digoxin	2.4 ng/mL (0.5-1.5)
Albumin	12 g/L (35-55)
Total protein	56 g/L (65-85)
ALT	112 U/L (5-45)
Urea	23.6 mmol/L (2.3-8.5)
Creatinine	234 μ mol/L (60-120)
BNP	257 pg/mL (< 100)

Recite the purpose and mechanism of action of digoxin. Discuss the route of administration, absorption, distribution of drug within the body, and the elimination of the drug. Given the patient's and laboratory results, review the results and provide a potential explanation and demonstrate how the application of therapeutic drug monitoring can provide recommendations on the patient's current digoxin dosage.

Five marks will be allocated to the purpose and mechanism of action of digoxin. Five marks will be allocated to the route of administration, absorption, distribution of drug within the body, and the elimination of the drug. Five marks will be allocated to the review of the patient results, and five marks will be allocated to the application of therapeutic drug monitoring and the recommendations on the patient's current digoxin dosage.

QUESTION 5**[15]**

A 58-year-old man, while travelling, experienced chest pain radiating to the left arm accompanied with sweating. The pain passed within a few hours and he did not seek medical advice. He returned home after a couple of days and made an appointment to see his GP, who carried out an ECG and requested Troponin-T (TnT) along with routine blood tests. The ECG showed non-specific ST wave changes. The blood test results were as follows (table 3):

Table 3. Laboratory findings

Na+	144 mmol/L (135-145)
K+	4.6 mmol/L (3.4-4.9)
Urea	7.8 mmol/L (2.5-8.0)
Creatinine	108 µmol/L (40-130)
Bilirubin	19 µmol/L (3-22)
ALT	100 U/L (3-55)
ALP	200 U/L (80-280)
Albumin	38 g/L (40-52)
Troponin – T	0.78 µg/L (<0.01)

Given the patient's age, the clinical and laboratory data, provide the most likely diagnosis. Provide a detailed description of the pathophysiology and laboratory analysis of this disease.

Two marks will be allocated to the most likely diagnosis, eight marks will be allocated to disease's pathophysiology and five marks will be allocated to the laboratory analysis of this disease.

QUESTION 6**[20]**

The following laboratory results (table 4) are obtained from a 19-year-old college student who consulted the Student Health Service because of fatigue and lack of appetite. She adds that she recently ate food prepared at a street market and noted that her sclera appears somewhat yellowish and that her urine has become dark.

Table 4. Laboratory findings

ALT (SGPT)	3806 U/L 3-55)
AST (SGOT)	2238 U/L (<31)

Table 4. Laboratory findings

Alkaline phosphatase	484 U/L (80-280)
LDH	550 U/L (4-280)
Total bilirubin	5 mg/dL (0.2–1.0)
Urine bilirubin	Increased

Provide a definitive diagnosis by analysing the clinical and laboratory results. Provide a detailed description of the pathophysiology and laboratory analysis of this disease. Discuss additional tests to confirm diagnosis.

Three marks will be allocated to the most likely diagnosis, seven marks will be allocated to disease's pathophysiology, seven marks will be allocated to the laboratory analysis of this disease, and three marks will be allocated to additional laboratory tests.

END OF EXAMINATION