CANDIDATE NUMBER.....

"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES

BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS DEGREE

NSLS403: CHEMICAL PATHOLOGY

END OF SECOND SEMESTER FINAL EXAMINATIONS

APRIL/MAY 2023

LECTURER: MR G. MALUNGA

DURATION: 3 HOURS

INSTRUCTIONS

1. Write your candidate number on the space provided on top of each page
2. Answer **all** questions in sections A on the question paper.
3. Answer **all** questions in section B on separate answer sheets provided.
4. Answer any **3** questions in section C on separate answer sheets provided
5. Mark allocation for each question is indicated at the end of the question
6. Credit will be given for logical, systematic and neat presentations in sections B and C

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SECTION A: MULTIPLE CHOICE [40MARKS]

- **Answer all questions by encircling the correct response T for TRUE or F for FALSE for each statement in all the questions**
- **Each correct response is allocated half mark**

1. The following are symptoms of Type 1 Diabetes

T F a) Ketoacidosis

T F b) Polyuria

T F c) Haematuria

T F d) Nausea

2. Examples of positive acute phase proteins are

T F a) Albumin

T F b) C3

T F c) Haptoglobulin

T F d) Transferrin

3. Generalised oedema results from the following disorders

T F a) systemic hypertension

T F b) hyperaldosteronism

T F c) cirrhosis

T F d) nephrotic syndrome

4. Causes of a predominantly unconjugated hyperbilirubinaemia include the following

T F a) haemolytic anaemia

T F b) viral hepatitis

T F c) primary biliary cirrhosis

T F d) Crigler Najar Syndrome Type II

5. Dehydration can be caused by

T F a) Burns

T F b) Cardiovascular disease

T F c) Malaria

T F d) Diabetes

6. Which of the following acid-base disturbances is/are associated with an abnormally low pH and abnormally high K+ value in a blood sample

T F a) Metabolic acidosis

T F b) Diabetic ketoacidosis

T F c) Respiratory acidosis

T F d) Metabolic alkalosis

7. Levels of serum calcium can be affected by

T F a) Vitamin D

T F b) Parathyroid hormone

T F c) Albumin

T F d) Magnesium

8. The following laboratory findings are associated with hypophosphataemia

T F a) Serum calcium

T F b) Calcitriol

T F c) ALP

T F d) Hyperphosphaturia

9. The following are inborn errors of carbohydrate metabolism

T F a) Galactosemia

T F b) Fructose intolerance

T F c) Lactic acidosis

T F d) Pyruvate kinase deficiencies

10. Symptoms of untreated phenylketonuria include

T F a) Eczema

T F b) Lethargy

T F c) Hyperactivity

T F d) Dark pigment

11. Crohn's disease

T F a) incidence peaks in fourth decade

T F b) involves the small intestine alone in 10% of sufferers

T F c) involves the colon alone in 30% of sufferers

T F d) affects men more commonly than women

12. Jaundice can be caused by

T F a) Decreased conjugation of bilirubin by liver cells

T F b) Biliary obstruction

T F c) Malaria

T F d) Hepatitis A

13. Biochemical markers of Folate deficiency include

T F a) LDH

T F b) Vitamin B12

T F c) Folic acid

T F d) Serum iron

14. Screening tests for malabsorption include

T F a) Serum Vitamin B12

T F b) Serum Albumin

T F c) MCV

T F d) Hb

15. Which of the following is associated with high acid output in the GIT

T F a) Duodenal ulcer

T F b) Gastric ulcer

T F c) Colon cancer

T F d) Zollinger Ellison Syndrome

16. Prolactinoma can present with

T F a) increased menstrual bleeding

T F b) galactorrhoea

T F c) infertility

T F d) hypogonadism in women

17. The following tests are part of the laboratory investigation of amenorrhoea

T F (a) TSH

T F (b) FSH

T F (c) LH

T F (d) BhCG

18. The following tests can be used in the diagnosis of thyroid disorders

T F (a) TRH stimulation test

T F (b) TSH

T F (c) T3

T F (d) fT3

19. Osteoporosis may be secondary to

T F a) pregnancy

T F b) hypopituitarism

T F c) warfarin therapy

T F d) thyrotoxicosis

20. The following are secondary causes of hyperlipidaemia

T F a) Monoclonal gammopathy

T F b) Nephrotic syndrome

T F c) Osteoporosis

T F d) Hypothyroidism

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SECTION B [20 MARKS]

Answer all questions on separate answer sheets provided

1. State any 5 uses of tumour markers. [5]
2. What are the causes of hyperalbuminaemia? [5]
3. State the main laboratory findings associated with nephrotic syndrome.[5]
4. State any 5 secondary causes of hyperlipidaemia. [5]

SECTION C [75 marks]

Answer any 3 questions from this section on separate answer sheets provided

1. Discuss the pathophysiology and laboratory diagnosis of the following conditions.

a) Metabolic alkalosis [10]

b) Phenylketonuria [15]

2. A 60-year old female presented to an outpatient department at Parirenyatwa Hospital with the following symptoms: tiredness and weakness developing over a long period of time. Several years previously she had developed backache due to a car accident and had habitually consumed large quantities of paracetamol tablets. Blood and urine samples were collected for laboratory analysis and the results were as shown in Table 1.

Table 1: Serum results

Test	**Result**	**Reference Ranges**
Na^+	140 mmol/l	135-145
K^+	5.5 mmol/	3.5-5.0
Urea	25 mmol/l	1.7-6.7
Creatinine	810 µmol/ l	50-100
HCO_3^-	16 mmol/l	22 - 29
Albumin	40 g/l	35-50
Calcium	1.9 mmol/l	2.1 – 2.6
P_i	4.2 mmol/l	0.8 – 1.4
Urate	0.57 mmol/l	0.12 – 0.5

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Urine results

Test	**Result**
Na^+	50 mmol/l
K^+	30 mmol/l
Urea	120 mmol/l
Creatinine	4.0 mmol/l (4000 µmoles/l)
Osmol.	330 mosm/kg
Urine output:	3 litres/24h

a) Calculate the creatinine clearance and comment on its value (Reference ranges for females is 85 - 125 ml/min). **[2]**

b) Explain all the biochemical findings**. [5]**

c) Suggest the most probable diagnosis of this patient and support your answer. **[10]**

d) Explain the other diagnostic laboratory tests which can be carried out to have a definite diagnosis. **[5]**

e) Comment on the plasma K^+. Is it important to monitor this regularly? **[3]**

3. Describe and explain the long term complications of Diabetes Mellitus. **[25]**

4. Discuss the clinical applications of the following tumour markers

a) CEA [10]

b) AFP [10]

c) CA-125 [5]

5. Discuss the pathophysiology and laboratory investigations of male hypogonadism. [25]