CANDIDATE NUMBER.....

AFRICA UNIVERSITY
A United Methodist-Related Institution

"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 2024

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. Credit will be given for logical, systematic and neat presentations in sections B and C

SECTION A : MULTIPLE CHOICE [40 MARKS]

- **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. Plasma levels of calcium are influenced by

T F a) Lymphoma
T F b) Diabetic ketoacidosis
T F c) Calcitonin
T F d) Hypothyroidism

2. The following acute phase plasma proteins are likely to be increased a few days following injury

T F a) Fibrinogen
T F b) Transferrin
T F c) C-Reactive protein
T F d) Alpha-1 antitrypsin

3. The following primary lipid disorders present with pancreatitis and elevated triglycerides

T F a) Familial hyperchylomicronemia
T F b) Familial hypercholesterolemia
T F c) Familial hypertriglyceridemia
T F d) Mixed hyperlipoproteinemia

4. Regarding the role of parathyroid hormone, it

T F a) Stimulates renal reabsorption of calcium
T F b) Inhibits renal reabsorption of phosphate
T F c) Suppresses bone resorption
T F d) Inhibits synthesis of calcitriol

5. The following ketone bodies are found in excess in the blood of a person suffering from phenylketonuria

T F a) Acetone
T F b) Tyrosine
T F c) Phenylalanine
T F d) Phenylpyruvate

6. Glycosylated haemoglobin

T F a) Is produced by enzymatic glycosylation of haemoglobin
T F b) Level in blood is inversely proportional to average plasma glucose
T F c) Measurement is not reliable in haemolytic anaemia
T F d) Is mainly used in the diagnosis of diabetes

7. Pre-hepatic jaundice is associated with the following biochemical results

T F a) Elevated serum gamma-glutamyl transferase
T F b) Positive urine urobilinogen
T F c) Normal serum conjugated bilirubin
T F d) Elevated serum indirect bilirubin

8. An ideal tumor marker should be

T F a) a substance that is released directly into the bloodstream
T F b) easily cleared from the body
T F c) tumor specific
T F d) readily detectable in body fluids

9. Inborn errors of metabolism

T F a) include a wide range of unrelated disorders
T F b) are always sex-linked
T F c) usually affect multiple organ systems
T F d) may progress rapidly with life-threatening deterioration over hours

10. Hypokalemia is caused by

T F a) Diarrhoea
T F b) Dehydration
T F c) Burns
T F d) Haemorrhage

11. Changes in plasma protein concentrations can be due to:

T F a) Liver failure
T F b) Renal disease
T F c) Changes in rate of protein synthesis
T F d) Changes in volume of blood distribution

12. The following substances are elevated in a patient with phenylketonuria

T F a) leucine
T F b) homocysteine
T F c) lactate
T F d) phenylalanine

13. The following are negative acute phase reactants

T F a) haptoglobin
T F b) transferrin
T F c) albumin
T F d) alpha1 antitrypsin

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14. The following cause fasting hypoglycaemia

T F a) Insulin overdose in diabetic patients
T F b) Glycogen storage diseases
T F c) Perinatal stress
T F d) Hypothermia

15. In-born errors of carbohydrate metabolism include

T F a) Fructose intolerance
T F b) Tay-Sachs disease
T F c) Gaucher's disease
T F d) Branched chain ketoaciduria

16. The following biochemical changes are associated with acute renal failure

T F a) Decreased Glomerular Filtration Rate
T F b) Elevated Urea
T F c) Elevated Creatinine
T F d) Decreased K^+

17. Metabolic alkalosis is associated with the following serum results

T F a) Elevated pH
T F b) Decreased K
T F c) Decreased HCO_3^-
T F d) Elevated pCO_2

18. The following laboratory investigations can be used to identify some metabolic complications of malabsorption

T F a) Serum Na^+
T F b) Serum Vitamin B12
T F c) Plasma Cholesterol
T F d) Plasma Bicarbonate

19. The given cancer markers are used for the diagnosis of the indicated cancers

			Cancer marker	**Cancer**
T	F	a)	CEA	Colon
T	F	b)	CA-125	Cervical
T	F	c)	pALP	Prostate
T	F	d)	AFP	Germ cell tumour

20. Cirrhosis is associated with

T F a) Hypoglycaemia
T F b) Hyperalbuminaemia
T F c) Vitamin K deficiency
T F d) Significant elevations of ALT and AST

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SECTION B: [20 MARKS]

Answer all questions on separate answer sheets provided

1. Name any 6 secondary causes of hyperlipidemia. [6]
2. State 4 main biochemical differences between metabolic acidosis and respiratory acidosis. [4]
3. What are the 5 main laboratory findings associated with nephrotic syndrome.[5]
4. Give one clinical feature associated with deficiency of each of the following hormones
   (a) Prolactin
   (b) Antidiuretic hormone
   (c) Thyroid stimulating hormone
   (d) Adrenocorticotropic hormone
   (e) Testosterone [5]

SECTION C: [60 marks]

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

1. Describe and explain the complications of diabetes. [20]
2. Outline the laboratory investigation of dyslipidaemia. [20]
3. Describe the biochemical features associated with cirrhosis. [20]
4. Give a detailed analysis of the metabolic diseases of the bone. [20]
5. Describe the laboratory diagnosis of malabsorption. [20]