90

(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(MAIN CAMPUS)

UNIVERSITY EXAMINATIONS (MAIN PAPER) 2021/2022 ACADEMIC YEAR

THIRD YEAR SECOND SEMESTEREXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE, MEDICAL LABORATORY SCIENCES

COURSE CODE: BML 322

COURSE TITLE: SYSTEMIC CLINICAL CHEMISTRY

DATE: 25/04/2022 **TIME:** 8.00 -10.00 AM

INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections, **A B** and **C,** carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**). **Answer all questions. DO NOT WRITE ON THE QUESTION PAPER.**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 5 Printed Pages. Please Turn Over

SECTION A: Multiple Choice Questions (20 marks).

1. Which of the following enzyme pattern is most diagnostic of Duchenne type muscular dystrophy?
   a. Total CK level that is 5 to 10 times the upper limit of normal
   b. Total CK level that is 25 times the upper limit of normal
   c. Total CK level that is 50 to 100 times the upper limit of normal
   d. Total CK level that is 1,000 times the upper limit of normal
2. Elevation of serum amylase and lipase is:
   a. Acute pancreatitis
   b. Acute appendicitis
   c. Gallbladder disease
   d. Acid reflux disease
3. Which CK isoenzyme is elevated in muscle:
   a. CK – MM
   b. CK – BB
   c. CK – MB
   d. CK - NN
4. Which one of the following is not an NPN substance?
   a. Allantoin
   b. Ammonia
   c. Creatinine
   d. Urea
5. Elevated blood urea concentration is termed:
   a. Azotemia
   b. BUN
   c. Uremia
   d. Uremic syndrome
6. A technologist obtains a urea N value of 61 mg/dL and serum creatinine value of 2.5 mg/dL on a patient. These results indicate:
   a. Congestive heart failure
   b. Dehydration
   c. Glomerular nephritis
   d. Urinary tract infection
7. Sources of error in measurement of uric acid include:
   a. Assay interference
   b. Competition from alternate purine substrates
   c. Narrow spectrophotometer bandwidth
   d. Nonspecific enzyme activity
8. Complete deficiency of hypoxanthine – guanine phosphoribosyltransferase results in which disease?
   a. Allantoism
   b. Glycogen storage disease
   c. Lesch – Nyhan syndrome
   d. Megaloblastic anemia
9. Which statement describes creatinine biosynthesis accurately?
   a. Creatinine is phosphorylated in the liver to form phosphocreatinine
   b. Creatinine phosphate undergoes spontaneous cyclization to form creatinine
   c. Creatinine is formed from creatine and creatine phosphate in the liver
   d. Creatinine is synthesized from arginine, glycine and methionine in the liver
10. in the Jaffe reaction, a red orange chromogen is formed when creatinine reacts with:
    a. Aluminium magnesium silicate

b. Creatinase
c. Phosphocreatine
d. Picric acid

11. Use of serum creatinine to calculate GFR:
    a. Is discouraged because the calculations are complex
    b. Is encouraged as a means to identify kidney disease and improve patient care
    c. Requires hospitalization of the patient for specimen collection
    d. Requires simultaneous measurement of creatinine in a 24 hour urine collection
12. Which situation would be expected to falsely increase measured blood ammonia concentration?
    a. The patient smoked two cigarettes 15 minutes prior to phlebotomy
    b. The patient was fasting for 8 hours before blood collection
    c. The patient ate a steak dinner the night before the specimen was collected
    d. The specimen was placed on ice immediately after collection
13. Toxic effects of elevated blood ammonia concentration include:
    a. Decreased renal function
    b. Hemorrhage and dehydration
    c. Mental status changes and coma
    d. Pain and inflammation of peripheral joints
14. Ammonia concentration correlates with disease severity and prognosis for:
    a. Astrocytosis
    b. Inherited deficiencies of urea cycle enzymes
    c. Neurological deterioration
    d. Reye's syndrome
15. Monitoring the levels of ketone bodies in the urine is:
    a. Considered essential on a daily basis for all diabetic patients
    b. A reliable method of assessing long – term glycemic control
    c. Recommended for patients with type 1 diabetes on sick day
    d. Not recommended for diabetic cases
16. Which of the following statements concerning chylomicrons is FALSE?
    a. The major lipid transported by this lipoprotein is cholesterol
    b. This lipoprotein is produced in the intestinal mucosa
    c. The primary function is to carry dietary (exogenous) lipid to the liver.
    d. It remains at the origin (point of application) during lipoprotein electrophoresis
17. The most likely cause of serum/plasma to appear "milk" is the presence of;
    a. Chylomicrons
    b. VLDL
    c. LDL
    d. VLDL
18. What is the major intracellular cation?
    a. Potassium
    b. Calcium
    c. Magnesium
    d. Sodium
19. Hyponatremia may be caused by each of the following EXCEPT:
    a. Hypomagnesia
    b. Aldosterone deficiency
    c. Prolonged vomiting or diarrhea
    d. Acute or chronic renal failure
20. hyperkalemia may be caused by each of the following EXCEPT:
    a. alkalosis
    b. acute or chronic renal failure
    c. hypoaldosteronism
    d. sample hemolysis

SECTION B: Short Answer Questions (40 marks).

1. What is the value of measuring proteins in the urine?(8 marks)

2. Enumerate the characteristic of an ideal turmor marker (8 marks)

3. Why is the value of the anion gap not equal to zero? What is the value of calculating the anion gap?(8 marks)

4. Discuss the clinical significance of four (4) parameters analyzed in lipid profile (8 marks)
5. Discuss various biochemical parameters involved in diagnosis of secondary hypothyroidism (8 marks)

SECTION C: Long Answer Questions (60 marks).

1. A 55 – year old woman presented to casualty in coma. On examination, she was noted to be jaundiced, and multiple spider naevi were present on her trunk. Her husband said that she was a heavy drinker, and had previously had liver trouble. She had begun to vomit blood the previous day. Blood was taken for emergency investigations which showed: Na^+ 129mmol/l (135 – 145), K^+ 4.5 mmol/l (3.5 – 5.0), urea 7.1mmol/l (1.7 – 6.7), creatinine 120µmol/l (50 – 100), glucose 1.5mmol/l (3.9 – 5.6) acid – base: pH 7.54, pCO_2 6.5kPa, standard biocarbonate (SBC) 35mmol/l ammonia 240µmol/l (<40) total protein 80g/l (60 – 80) albumin 23g/l (35 – 50) total bilirubin 345µmol/l (<17) conjugated bilirubin 290µmol/l (<4) ALT 60U/l (1 – 41) alkaline phosphatase 445U/l (39 – 117) GGT 190 U/l (7 – 49).

   a. Suggest a diagnosis (3 marks)
   b. Explain the hypoglycaemia. Does this require treatment? (5 marks)
   c. Comment on the other biochemical findings (4 marks)
   d. Would a lumbar puncture be informative? Why? (4 marks)
   e. What life – threatening complications may occur? (4 marks)

2. Citing examples, discuss the role of hormones in clinical screening, diagnosis and prognosis of diseases (20 marks)

3. Discus the causes and chemical pathology diagnosis of chronic pancreatitis. (20 marks)