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(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

(MAIN CAMPUS)

UNIVERSITY EXAMINATIONS (MAIN PAPER) 2022/2023 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE OF MASTER OF MEDICAL LABORATORY SCIENCES (CLINICAL CHEMISTRY)/MASTER OF SCIENCE IN BIOMEDICAL SCIENCES AND TECHNOLOGY (MEDICAL BIOCHEMISTRY)

COURSE CODE: **BMC 823**

COURSE TITLE: **CURRENT ADVANCES AND EMERGING ISSUES IN CHEMICAL PATHOLOGY**

DATE: 20TH APRIL 2023 **TIME: 08.00 – 11.00AM**

INSTRUCTIONS TO CANDIDATES

Answer **ANY** Four questions. **DO NOT WRITE ON THE QUESTION PAPER.**

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over

1. A newborn infant was born with a bilirubin level of 7 mg/dL (mostly unconjugated) that rose to 10 mg/dL by the third day of life. The infant was breastfed normally and the bilirubin levels returned to normal values within 2 weeks without treatment.
   a. Explain the most likely diagnosis? Are there likely to be any long – term adverse health effect? Explain (8 marks).

   b. What is the most likely biochemical cause of the elevated bilirubin level? Explain. (8 marks).
   c. Discuss other disorders can cause increased levels of unconjugated bilirubin in neonates? (9 marks).

2. A 5 year old boy is taken to his pediatrician because of growth delay. He was below the third percentile in height and weight. There was no history of trauma and any other pertinent family history or clinical findings. A randomly obtained growth hormone level was well below the normal value for this patient's age.
   a. Explain the conditions that may be associated with growth delay (8 marks).

   b. Does the single growth hormone result confirm a diagnosis of growth hormone deficiency? Explain. If not, what additional testing should be performed to confirm a diagnosis? Explain (12 marks).
   c. If further testing reveals a deficiency in growth hormone, is the patient likely to respond to therapy? Explain (5 marks).

3. An infant presented to the pediatrician with failure to thrive, steatorrhoea (foul – smelling, fatty stool), and persistent respiratory infections. An older sibling with the same clinical presentation has a confirmed genetic disease.
   a. What is the likely diagnosis? Explain. (5 marks).

   b. Explain how the disease is inherited (8 marks).

   c. What is the molecular mechanism of this disease? (8 marks).

   d. What is the gold standard diagnostic test? (4 marks).

4. Identify the age – related changes in clinical chemistry analytes (25 marks).

5. A healthy 65 year old man entered the hospital to have appendix removed. Preoperative laboratory are as indicated below

Test	Result	Reference range
Albumin	25 g/L	35 - 50 g/L
BUN	35 mg/dL	8 – 26 mg/dL
Creatinine	1.7 mg/dL	0.9 – 1.5 mg/dL
Serum osmolality	280 mOsm/kg	275 – 295 mOsm/kg
Sodium	140 mmol/L	135 – 145 mmol/L

   a. What is the BUN/creatinine ratio for this patient? (5 marks).

   b. What do these data suggest? Explain (10 marks).

   c. Which test results support this conclusion? (10 marks).