



**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

SECOND YEAR FIRST SEMESTER EXAMINATIONS

**FOR THE DIPLOMA
IN
MEDICAL LABORATORY SCIENCE
DIRECT ENTRY**

MAIN EXAM

COURSE CODE: BMD 224

COURSE TITLE: CLINICAL CHEMISTRY I

DATE: 8TH DECEMBER 2020

TIME: 2.00 -4.00PM

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**).

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

SECTION A

Attempt all questions.

1. The following are types of samples used in the clinical chemistry lab for determination of glucose **EXCEPT**?
 - A. Plasma.
 - B. Urine.
 - C. Cerebrospinal fluid.
 - D. Amniotic fluid.
2. The lithium heparin additive is used in the vacutainer stopper with the colour _____
 - A. Yellow.
 - B. Green.
 - C. Black
 - D. Lavender.
3. Which one of the following is **NOT** a component of the Electrophoresis apparatus?
 - A. Power supply
 - B. Agarose gel
 - C. Buffer
 - D. Monochromator
4. Which of the following disorders cause an elevation in the levels of lactate dehydrogenase?
 - A. Myocardial ischemia.
 - B. Lung cancer.
 - C. Diabetes mellitus.
 - D. Hyperkalemia.
5. The non ketotic hyperosmolar state is associated with?
 - A. Hepatitis.
 - B. Liver cirrhosis.
 - C. Type I diabetes.
 - D. Type II diabetes.
6. Which of the following tests is used in monitoring the response to treatment among diabetic patients?
 - A. Oral Glucose Tolerance Test.
 - B. Glycosylated Hemoglobin (HbA1c) test.
 - C. Random blood glucose.
 - D. Fasting blood glucose.
7. The PH of the body is maintained within a narrow optimal PH of?
 - A. 7.00 to 7.80
 - B. 7.10 to 7.40
 - C. 7.35 to 7.45
 - D. 7.45 to 8.45

8. Which of the following enzymes Is greatly elevated when there is biliary obstruction?
 - A. Creatines kinase.
 - B. Lactate dehydrogenase.
 - C. Gamma glutamyl transferase.
 - D. Aspartate aminotransferase.
9. Dark brown serum may indicate intravascular hemolysis due to all of the following conditions except?
 - A. Sickle cell disease.
 - B. Severe malaria.
 - C. Incompatible blood transfusion.

- D. Jaundice
10. All the following are safety equipment used in the Clinical Chemistry Laboratory **EXCEPT?**
- A. Safety showers.
 - B. Eyewash stations.
 - C. Radiation detectors.
 - D. Biosafety cabinets.
11. The following are functions of sodium **EXCEPT?**
- A. Regulating ECF volume and distribution
 - B. Maintaining blood volume
 - C. Maintaining intracellular fluid osmolality
 - D. Transmitting nerve impulses and contracting muscles
12. The normal reference range for sodium concentration in serum is?
- A. 135 - 145 mmol/l
 - B. 3.5 - 5.2 mmol/l
 - C. 97 - 105 mmol/l
 - D. 3.4 - 8.0 mmol/l
13. The following are all functions of chloride **EXCEPT?**
- A. Hydrochloric acid (HCL) production
 - B. Regulating cardiac impulse transmission and muscle contraction
 - C. Regulating ECF balance and vascular volume
 - D. Regulating acid-base balance
14. Which of the following methods is?
- A. Flame photometry.
 - B. Ion selective electrodes (ISE).
 - C. Spectrophotometry.
 - D. Calorimetric method.
15. Which of the following molecule plays a major role in oxygen transport to the tissue and CO₂ transport back to the lungs?
- A. Myoglobin
 - B. Hemoglobin
 - C. Bilirubin
 - D. Albumin
16. The phagocytic cells found in the following organs are involved in the degradation of hemoglobin **EXCEPT?**
- A. Spleen
 - B. Adrenal glands
 - C. Liver
 - D. Bone marrow
17. The form of bilirubin that is water insoluble and cannot be excreted in urine is referred to as?
- A. Direct bilirubin
 - B. Unconjugated bilirubin
 - C. Conjugated bilirubin
 - D. Biliverdin.
18. Which of the following organs is involved in the reduction of bilirubin to urobilinogen and stercobilin?
- A. Colon
 - B. Pancreas
 - C. Liver
 - D. stomach
19. The following are all functions of potassium **EXCEPT?**
- A. Maintaining intracellular fluid osmolality
 - B. Transmitting nerve and other chemical impulses
 - C. Buffer in oxygen-carbon dioxide exchange in red blood cells
 - D. Regulating cardiac impulse transmission and muscle contraction

20. The glycosylated Hemoglobin test normally measures?
- A. Amount of glucose in serum.
 - B. Amount of oxygen in the red blood cells.
 - C. Amount of Hemoglobin bound to glucose.
 - D. Amount of Hemoglobin in blood.

SECTION B

Answer all questions.

1. Hemolysis is a source of unreliable clinical chemistry results, list down **EIGHT** precautions that can be taken to avoid hemolysis (8 marks)
2. Briefly discuss the diagnostic significance and assay for enzyme activity for
 - a) Alanine aminotransferase (4 marks)
 - b) Aspartate aminotransferase (4 marks)
3. Describe the functions of the following components of a spectrophotometer
 - a) Light source (2 marks)
 - b) Monochromator (2 marks)
 - c) Cuvette (2 marks)
 - d) Photodetector (2 marks)
4. List down the criteria for specimen rejection in the clinical chemistry laboratory (5 marks)
5. Describe the routine examination of a Cerebrospinal fluid specimen (5 marks)
6. Briefly discuss the tissue sources, diagnostic significance and the principle of Lactate dehydrogenase (LDH) determination. (6 marks)

SECTION C

Answer all questions.

1. Discuss quality assurance in the pre-analytical, analytical and post analytical stages of tests done in the clinical chemistry lab stating the possible sources of error in each stage and precautions necessary to avoid such errors (20 marks)
2. Discuss the classification, symptoms, diagnostic criteria of Diabetes mellitus and methods of glucose determination in the clinical chemistry laboratory (20 marks)
3. Discuss the regulation of acid base balance by the lungs and kidneys (20 marks)