



*(University of Choice)*

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

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS  
2019/2020 ACADEMIC YEAR**

**SECOND YEAR SECOND SEMESTER EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF MEDICAL LABORATORY SCIENCES  
DIRECT ENTRY/UPGRADING**

**MAIN EXAM**

**COURSE CODE: BML 223:**

**COURSE TITLE: CLINICAL HAEMATOLOGY**

**DATE: 8<sup>TH</sup> DECEMBER 2020**

**TIME: 8.00 -10.00 AM**

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**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: 2 Hours

MMUST observes ZERO tolerance to examination cheating

**SECTION A: SHORT ANSWER QUESTIONS (20 Marks)**

1. The cell membrane's *major* components are
  - A. carbohydrates and proteins
  - B. proteins and lipids
  - C. lipids and glycoproteins
  - D. polysaccharides and lipids
  
2. Molecular techniques are being used to detect abnormalities of
  - A. erythrocytes
  - B. leukocytes
  - C. some coagulation factors
  - D. All of the above
  
3. The maturational sequence of the thrombocyte (platelet) is
  - A. megakaryoblast—promegakaryocyte—megakaryocyte—metamegakaryocyte—thrombocyte
  - B. promegakaryocyte—megakaryocyte—metamegakaryocyte—thrombocyte
  - C. megakaryoblast—promegakaryocyte—megakaryocyte—thrombocyte
  - D. megakaryoblast—promegakaryocyte—metamegakaryocyte—thrombocyte
  
4. As a blood cell matures, the ratio of nucleus to cytoplasm (N: C) in most cases
  - A. increases
  - B. decreases
  - C. remains the same
  
5. The cell maturation sequence of the segmented neutrophil is
  - A. promyelocyte—myeloblast—myelocyte—metamyelocyte—band or stab—segmented neutrophil (PMN)
  - B. myeloblast—promyelocyte—myelocyte—metamyelocyte—band or stab—segmented neutrophil (PMN)
  - C. monoblast—promyelocyte—myelocyte—metamyelocyte—band or stab—segmented neutrophil (PMN)
  - D. promyelocyte—myelocyte—metamyelocyte—band or stab—segmented neutrophil (PMN)
  
6. The progression of erythropoiesis from prenatal life to adulthood is
  - A. yolk sac—red bone marrow—liver and spleen
  - B. yolk sac—liver and spleen—red bone marrow
  - C. red bone marrow—liver and spleen—yolk sac
  - D. liver and spleen—yolk sac—red bone marrow
  
7. Which of the following is (are) characteristic(s) of erythropoietin?
  - A. Glycoprotein
  - B. Secreted by the liver
  - C. Secreted by the kidneys
  - D. All of the above
  
8. The normal range for reticulocytes in adults is
  - A. 0% to 0.5%
  - B. 0.5% to 1.0%
  - C. 0.5% to 2.0%
  - D. 1.5% to 2.5%
  
9. Heme is synthesized predominantly in the
  - A. liver
  - B. red bone marrow
  - C. mature erythrocytes
  - D. both A and B
  
10. Relative polycythemia exists when
  - A. increased erythropoietin is produced
  - B. the total blood volume is expanded
  - C. the plasma volume is increased
  - D. the plasma volume is decreased

11. Which of the following haemoglobin types is the major type present in a normal adult?  
A. A  
B. S  
C. A2  
D. Bart

12. The end product of the Embden-Meyerhof pathway of glucose metabolism in the erythrocyte is  
A. pyruvate  
B. lactate  
C. glucose-6-phosphate  
D. the trioses

13. The bevel of the needle should be held \_\_\_\_\_ in the performance of a venipuncture.  
A. sideways  
B. upward  
C. downward  
D. in any direction

Questions 14 through 17: Match the conventional color-coded stopper with the appropriate anticoagulant.  
A. Red B. Lavender C. Blue D. Green

14. \_\_\_\_\_ EDTA  
15. \_\_\_\_\_ Heparin  
16. \_\_\_\_\_ Sodium citrate  
17. \_\_\_\_\_ No anticoagulant

18. Megaloblastic anemias can be caused by  
A. tapeworm infestation  
B. gastric resection  
C. nutritional deficiency  
D. all of the above

19. Most unstable haemoglobins  
A. are inherited autosomal dominant disorders  
B. result from amino acid substitutions or deletions  
C. are haemoglobin variants  
D. all of the above

20. The principal leukocyte type involved in phagocytosis is the  
A. monocyte  
B. neutrophil  
C. eosinophil  
D. basophil

#### **SECTION B: SHORT ANSWER QUESTIONS (40 Marks)**

1. Explain any **FIVE** variations in erythrocyte shape including their associated disorders (10 marks)
2. Describe the laboratory findings in bone marrow failure syndrome 5 marks
3. Describe **FIVE** major causes of iron deficiency anaemia 5 marks
4. Define the following haematologic terms 3 marks
  - i. Anisochromia (1mark)
  - ii. Poikilocytosis (1mark)
  - iii. Anisocytosis (1mark)
5. State abnormalities associated with the following erythrocyte inclusions
  - i. Heinz bodies (1mark)
  - ii. Pappenheimer bodies (1mark)
  - iii. Howell-Jolly bodies (1mark)
6. State any **FOUR** symptoms **FOUR** signs of anaemia (4 marks)
7. List **FIVE** laboratory findings in Chronic Myeloid Leukaemia CML (5 marks)
8. List any **FIVE** commonly used anticoagulants and their mode of action (5 marks)

#### **SECTION C: LONG ANSWER QUESTIONS (40 MARKS)**

1. Describe intrinsic and extrinsic coagulation pathways (20 Marks)

2. Discuss the synthesis of the heme and globin moieties of haemoglobin (20 Marks)
3. Discuss any **FIVE** morphologic abnormalities of mature granulocytes 20 Marks