



(University of Choice)

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

**UNIVERSITY EXAMINATIONS  
2022/2023 ACADEMIC YEAR**

**FIRST YEAR SECOND TRIMESTER EXAMINATION**

**FOR THE DEGREE  
OF  
BACHELOR OF SCIENCE IN MIDWIFERY**

**COURSE CODE:** NCD 132

**COURSE TITLE:** HEMATOLOGY

**DATE:** THURSDAY 13<sup>TH</sup> APRIL, 2023

**TIME:** 11.30 AM TO 2.30 PM

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**INSTRUCTIONS TO CANDIDATES**

All Questions Are Compulsory

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over. ►

**PART ONE: MULTIPLE CHOICE QUESTIONS MCQ (20 MARKS)**

1. A person who has greater-than normal number of Eosinophils is most likely suffering from:
  - A. Anemia
  - B. Polycythemia
  - C. An allergy or intestinal parasites
  - D. Infectious bacteria
2. The biconcave shape of RBCs is beneficial because it:
  - A. Makes the RBCs more flexible so they can pass and bend through the smaller blood vessels more easily.
  - B. Allows more space for the mature rbc's to accommodate the nucleus.
  - C. Prevents diapedesis of RBCs through the walls of the blood capillaries.
  - D. Both A and B.
3. Which of the following conditions can stimulate erythropoietin secretion?
  - A. Low levels of oxygen in blood.
  - B. Normal levels of hemoglobin in RBCs
  - C. A high RBC count
  - D. An increased blood flow through the kidneys
4. What is serum? It is:
  - A. Whole blood sample from which all cells are removed
  - B. Plasma from which fibrinogen and clotting factors are removed
  - C. Portion of the blood that is composed of red blood cells
  - D. Plasma from which only albumin and globulins are removed.
5. Which of the following is correct for a person with Type A blood? The person:
  - A. Can safely donate blood to a person with type O blood group
  - B. Can safely donate blood to a person with type AB blood group
  - C. Must have anti-A antibodies in his plasma
  - D. Must be a Rh positive person
6. Polycythemia, or erythrocytosis, is a failure of the body to produce enough red blood cells.
  - A. True
  - B. False
7. Excess iron has a significant affinity for specific organs, particularly:
  - A. The heart, liver and endocrine glands
  - B. The heart, kidney and endocrine glands
  - C. The brain, liver and endocrine glands
  - D. The lungs, liver and endocrine glands
8. What percentage of plasma is there in the blood?
  - A. 55%
  - B. 45%
  - C. 35%
  - D. 65%
9. Sickle cell disease is:
  - A. An autosomal recessively inherited condition, affecting the hemoglobin
  - B. A non-autosomal recessively inherited condition, affecting the hemoglobin
  - C. An autosomal recessively inherited condition, affecting the plasma

- D. An autosomal recessively inherited condition, affecting the white cells
10. Which of the following white blood cells is capable of phagocytosis?
    - A. Basophil
    - B. Eosinophil
    - C. Lymphocyte
    - D. Neutrophil
  11. The hormone erythropoietin stimulates red blood cell production in the red bone marrow. Where in the body is erythropoietin produced?
    - A. Spleen
    - B. Kidney
    - C. Liver
    - D. Thyroid
  12. Where does hematopoiesis take place?
    - A. Lungs
    - B. Pancreas
    - C. Liver
    - D. Bone marrow
  13. The formation of a blood clot is known as which of the following?
    - A. Coagulation
    - B. Chemotaxis
    - C. Leucopoiesis
    - D. Erythropoiesis
  14. Platelets are formed from what type of cell?
    - A. Melanocytes
    - B. Macrophages
    - C. Astrocytes
    - D. Megakaryocytes
  15. Which of the following is the function of white blood cells?
    - A. Transport oxygen
    - B. Maintain homeostasis
    - C. Defend against infection
    - D. Produce hemoglobin
  16. An increased white blood cell count is indicative of which disease?
    - A. Lupus
    - B. Leukemia
    - C. Anemia
    - D. Melanoma
  17. Which of the following statements about red blood cells (RBCs) is incorrect?
    - A. RBCs contain hemoglobin
    - B. Mature RBCs lack nuclei
    - C. Mature RBCs lack ribosomes
    - D. The lifespan of RBCs is about 30 days
  18. All of the following facts about macrophages are correct except:
    - A. They can recognize bacteria by using their pattern recognition receptors
    - B. They present foreign antigens on major histocompatibility II (MHC II) complex molecules
    - C. They originate in the blood as monocytes

D. They can only express foreign antigens on MHC I complex molecules

19. Blood platelets are also known as
- A. Lymphocytes
  - B. Phagocytes
  - C. Monocytes
  - D. Thrombocytes
20. Which of these leukocytes is an agranulocyte?
- A. Basophil
  - B. Eosinophil
  - C. Neutrophil
  - D. Lymphocyte

**SECTION B; SHORT ANSWER QUESTION, SAQs (40 MARKS)**

1. Describe the three classical pathways of coagulation (6 marks)
2. Name the organs involved in blood cell formation according to the ages (8 marks)
3. Describe the proportionate components of blood (8 marks)
4. Explain five (5) types of transfusion (10 marks)
5. Define the following: PCV, MCV, MCH, and MCHC (8 marks)

**SECTION C: LONG ANSWER QUESTION, LAQs (40 MARKS)**

1. Describe the formation of bilirubin (20 marks)
2. During a class of hematology, students were taught about oxygen dissociation.
  - a. With the aid of a well labeled diagram, describe the oxygen dissociation curve (10 marks)
  - b. Explain the factors that affect oxygen dissociation curve (10 marks)