"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE & NATURAL SCIENCES
DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES

BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS

END OF SEMESTER EXAMINATIONS

NSLS202: HEMATOLOGY THEORY

NOVEMBER 2024

LECTURER: PROF. EMMANUEL OBEAGU

DURATION: 3 HOURS

INSTRUCTIONS

1. Write your candidate number on the space provided on top of each page
2. Answer **all** questions in sections A on the question paper.
3. Answer **all** questions in section B on separate answer sheets provided.
4. Answer any **3** questions in section C on separate answer sheets provided
5. Mark allocation for each question is indicated at the end of the question
6. Credit will be given for logical, systematic and neat presentations in sections B and C

SECTION A: MULTIPLE CHOICE QUESTIONS (30 MARKS)

Instruction: Answer all questions by encircling the correct response T for TRUE or F for FALSE for each statement in all the questions

1. What is the primary function of red blood cells?

A. Oxygen transport **T or F**

B. Immune defense **T or F**

C. Hormone production **T or F**

D. Clot formation **T or F**

E. Blood pressure regulation **T or F**

2. Which component is NOT found in plasma?

A. Water **T or F**

B. Platelets **T or F**

C. Proteins **T or F**

D. Electrolytes **T or F**

E. Waste products **T or F**

3. Haematopoiesis occurs primarily in which organ after birth?

A. Liver **T or F**

B. Spleen **T or F**

C. Bone marrow **T or F**

D. Thymus **T or F**

E. Lymph nodes **T or F**

4. What is the main humoral component of blood?

A. Red blood cells **T or F**

B. White blood cells **T or F**

C. Platelets **T or F**

D. Plasma **T or F**

E. Bone marrow **T or F**

5. Which of the following stains is commonly used in hematology?

A. Hematoxylin **T or F**

B. Leishman stain **T or F**

C. Methylene blue **T or F**

D. Gram stain **T or F**

E. Eosin **T or F**

6. **Where does hemopoiesis occur in the fetus during the first trimester?**

    A. Bone marrow **T or F**

    B. Thymus **T or F**

    C. Liver **T or F**

    D. Spleen **T or F**

    E. Yolk sac **T or F**

7. **Which blood component is responsible for blood clotting?**

    A. Erythrocytes **T or F**

    B. Leukocytes **T or F**

    C. Plasma **T or F**

    D. Platelets **T or F**

E. Hemoglobin **T or F**

8. **Maturation of red blood cells ends with which cell type?**

   A. Reticulocyte **T or F**

   B. Erythrocyte **T or F**

   C. Proerythroblast **T or F**

   D. Normoblast **T or F**

   E. Myelocyte **T or F**

9. **Which cell type is the precursor to platelets?**

   A. Megakaryoblast **T or F**

   B. Lymphoblast **T or F**

   C. Erythroblast **T or F**

   D. Myeloblast **T or F**

   E. Monocyte **T or F**

10. **Which component comprises 55% of blood volume?**

   A. Red blood cells **T or F**

   B. White blood cells **T or F**

   C. Platelets **T or F**

   D. Plasma **T or F**

   E. Iron **T or F**

11. **Which abnormality is characterized by crescent-shaped red blood cells?**

   A. Thalassemia **T or F**

   B. Sickle cell anemia **T or F**

C. Iron deficiency anemia **T or F**

D. Aplastic anemia **T or F**

E. Megaloblastic anemia **T or F**

12. **Hemoglobin is primarily responsible for carrying which molecule?**

A. Nitrogen **T or F**

B. Carbon dioxide **T or F**

C. Oxygen **T or F**

D. Hormones **T or F**

E. Glucose **T or F**

13. **A deficiency in which nutrient commonly causes megaloblastic anemia?**

A. Iron **T or F**

B. Vitamin B12 **T or F**

C. Vitamin C **T or F**

D. Vitamin D **T or F**

E. Potassium **T or F**

14. **Iron is transported in blood bound to which protein?**

A. Hemoglobin **T or F**

B. Albumin **T or F**

C. Transferrin **T or F**

D. Ferritin **T or F**

E. Myoglobin **T or F**

15. **What is the life span of a typical red blood cell?**

A. 30 days **T or F**

B. 60 days **T or F**

C. 90 days **T or F**

D. 120 days **T or F**

E. 150 days **T or F**

16. **Which stain is NOT used for blood smear staining?**

A. Leishman stain **T or F**

B. Wright stain **T or F**

C. Giemsa stain **T or F**

D. Field stain **T or F**

E. Gram stain **T or F**

17. **Drabkin's reagent is used to determine which parameter?**

A. Hemoglobin concentration **T or F**

B. Platelet count **T or F**

C. White cell count **T or F**

D. Clotting time **T or F**

E. ESR **T or F**

18. **What does MCV measure in a complete blood count?**

A. Mean corpuscular volume **T or F**

B. Mean corpuscular hemoglobin **T or F**

C. Mean platelet volume **T or F**

D. Mean white cell volume **T or F**

E. Mean corpuscular thickness **T or F**

19. **Which abnormal cell type appears as target cells in a blood smear?**

A. Lymphocytes **T or F**

B. Monocytes **T or F**

C. Erythrocytes **T or F**

D. Granulocytes **T or F**

E. Platelets **T or F**

20. **The reference range for erythrocyte sedimentation rate (ESR) in adults is:**

A. 1-5 mm/hr **T or F**

B. 5-15 mm/hr **T or F**

C. 10-20 mm/hr **T or F**

D. 20-30 mm/hr **T or F**

E. 25-40 mm/hr **T or F**

21. **Which is NOT a common cause of anemia?**

A. Blood loss **T or F**

B. Iron deficiency **T or F**

C. Vitamin B12 deficiency **T or F**

D. Low blood sugar **T or F**

E. Chronic disease **T or F**

22. **Aplastic anemia is associated with which problem in the bone marrow?**

A. Excessive cell production **T or F**

B. Lack of cell production **T or F**

C. Abnormal RBC shape **T or F**

D. Excess iron stores **T or F**

E. High platelet count **T or F**

23. **What is the most common form of hemoglobin in adults?**

A. HbA **T or F**

B. HbF **T or F**

C. HbS **T or F**

D. HbC **T or F**

E. HbE **T or F**

24. **Prothrombin time is measured to assess which blood pathway?**

A. Intrinsic pathway **T or F**

B. Extrinsic pathway **T or F**

C. Fibrinolytic pathway **T or F**

D. Platelet aggregation **T or F**

E. Immunologic pathway **T or F**

25. **In hematology, CD4 cell counts are significant in monitoring which disease?**

A. Tuberculosis **T or F**

B. HIV/AIDS **T or F**

C. Anemia **T or F**

D. Leukemia **T or F**

E. Malaria **T or F**

26. **Which test is used to detect sickle cell anemia?**

A. Serum ferritin **T or F**

B. Reticulocyte count **T or F**

C. Sickle cell screening test **T or F**

D. ESR **T or F**

E. Platelet count **T or F**

27. **Which organ is primarily involved in iron storage?**

A. Heart **T or F**

B. Pancreas **T or F**

C. Liver **T or F**

D. Lungs **T or F**

E. Kidneys **T or F**

28. **Iron deficiency anemia is primarily caused by a deficiency in:**

A. Vitamin B12 **T or F**

B. Folic acid **T or F**

C. Iron **T or F**

D. Vitamin D **T or F**

E. Calcium **T or F**

29. **What is a characteristic feature of thalassemia on a blood smear?**

A. Target cells **T or F**

B. Macrocytes **T or F**

C. Acanthocytes **T or F**

D. Basophilic stippling **T or F**

E. Howell-Jolly bodies **T or F**

30. **What is the main function of hemoglobin?**

A. Carry carbon dioxide **T or F**

B. Transport glucose **T or F**

C. Bind to oxygen **T or F**

D. Maintain cell shape **T or F**

E. Protect cells from infections **T or F**

SECTION B (10 MARKS)

Instruction: Answer all questions on separate answer sheets provided

1. Define erythropoiesis **5marks**
2. State the principles behind Romanowsky staining in haematology **5marks**

SECTION C (60 MARKS)

Instruction: Answer any 3 questions from this section on separate answer sheets provided

1. Describe the main components of blood and their functions **20marks**
2. Explain haemopoiesis after birth **20marks**
3. Discuss Cynmeth method for hemoglobin estimation and measurement **20marks**
4. Describe iron deficiency anemia and its diagnosis **20marks**
5. Discuss megaloblastic anemia and its causes **20marks**
6. How is sickle cell anemia diagnosed? **20marks**
7. What is CD4 count, and why is it clinically significant in HIV? **20marks**