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"Investing in Africa's Future"

**COLLEGE OF HEALTH, AGRICULTURE AND NATURAL
SCIENCES
DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES
BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS DEGREE**

NSLS 202: HAEMATOLOGY

END OF SEMESTER EXAMINATION

NOVEMEBR, 2025

LECTURER: DR A MARAMBA

DURATION: 3 HOURS

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SECTION A : MULTIPLE CHOICE [50MARKS]

- Answer all questions by encircling the correct response T for TRUE or F for FALSE for each statement in all the questions
- Each correct response is allocated half mark

1. Which one of the following constitute haemopoietic growth factors

- T F (a) Erythropoietin
 T F (b) Thromboxane
 T F (c) G-CSF
 T F (d) Anti-Apoptotic factor
 T F (e) IL-3

2. The following constitute red cell membrane integral proteins

- T F (a) Aquaporin
 T F (b) Ankyrin
 T F (c) Spectrin
 T F (d) Band 3 protein
 T F (e) Protein 4.1

3. Haemoglobin variants include:

- T F a. Haemoglobin S
 T F b. Sulfohaemoglobin
 T F c. Methaemoglobin
 T F d. Haemoglobin G-Philadelphia
 T F e. Fetal Haemoglobin

4. Concerning Factor Assay

- T F a) F.VII assay is indicated if the APTT and TT are both prolonged
- T F b) FV and FX can be performed using PT-based assay
- T F c) If the standard and patient lines are parallel the test should be repeated
- T F d) A dilution of 1/100 is arbitrarily assigned a value of 100%
- T F e) Adsorption of plasma by aluminum hydroxide removes activated factors and vitamin K-dependent factors.

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5. Concerning ESR:

- T F a) used in the diagnosis of leukaemia
- T F b) adult male normal value should be 0 to 20
- T F c) used in the diagnosis of giant cell syndrome
- T F d) EDTA sample is used
- T F e) values are increased in anaemia

6. Concerning the Cyanmethaemoglobin method:

- T F a) is standard Hb method
- T F b) may be toxic due presence of cyanide
- T F c) potassium ferrocyanide is used
- T F d) only detects normal Hb
- T F e) light is absorbed at 540 nms

7. The following tests are special haematological tests:

- T F a) reticulocyte count
- T F b) Cytochemistry
- T F c) automation
- T F d) Leukocyte Alkaline Phosphatase (LAP)
- T F e) red cell indices

8. Eosinophilia is found in:

- T F a) allergies
- T F b) bacterial infection
- T F c) acute anaemia
- T F d) Tuberculosis (TB)
- T F e) Chronic myeloid leukaemia (CML)

9. In ccoagulation:

- T F a) RT is used to test factor X deficiency
- T F b) bleeding time is part of coagulation testing
- T F c) APTT is prolonged in factor III deficiency
- T F d) DIC often shortens coagulation tests
- T F e) inhibitor screen follows an abnormal clotting screening

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10. Platelet agonists include:

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|---|---|----|----------------|
| T | F | a) | collagen |
| T | F | b) | thrombin |
| T | F | c) | thromboxane A2 |
| T | F | d) | aspirin |
| T | F | e) | epinephrine |

11. Which tests are done in routine haematology:

- | | | | |
|---|---|----|----------------------------------|
| T | F | a) | BM examination |
| T | F | b) | full blood count |
| T | F | c) | differential white cell counting |
| T | F | d) | immunophenotyping |
| T | F | e) | red cell enzyme assays |

12. The following statements are true about white blood cells

- | | | | |
|---|---|-----|--|
| T | F | (a) | Neutrophils are capable of surviving in an anaerobic environment |
| T | F | (b) | The nucleus of a basophil is bilobed |
| T | F | (c) | Neutrophils, eosinophils and basophils are also known as mononuclear cells |
| T | F | (d) | B-Cells can express CD2, CD5, CD13 and CD19 |
| T | F | (e) | T-Cells can express CD3, CD5, CD7 and CD8 |

13. Granulocytes constitute of:

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|---|---|-----|-------------|
| T | F | (a) | Lymphocytes |
| T | F | (b) | Monocytes |
| T | F | (c) | Neutrophils |
| T | F | (d) | Basophils |
| T | F | (e) | Macrophages |

14. Which of the following are fetal haemoglobins

- | | | | |
|---|---|-----|-------------|
| T | F | (a) | HbE |
| T | F | (b) | HbA2 |
| T | F | (c) | HbF |
| T | F | (d) | HbS |
| T | F | (e) | Hb Gower II |

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15. The following constitute red marrow parenchyma:

- T F (a) Basophils
- T F (b) Osteoblasts
- T F (c) Erythrocytes
- T F (d) Fibroblasts
- T F (e) Osteoclasts

16. The following statements are true about the lifespan of white blood cells

- T F (a) Neutrophils survive for 6hrs to a few days in circulation
- T F (b) Monocytes survive for hours to days
- T F (c) Eosinophils survive for 8-12 months
- T F (d) Basophils survive for a few hours to a few days
- T F (e) Lymphocytes survive for years in circulation

17. Concerning haematopoiesis:

- T F (a) The bone marrow is the major site for adult haemopoiesis
- T F (b) Erythrocytes are formed in the Kidney
- T F (c) Erythropoietin is synthesized in the Kidney
- T F (d) Erythropoietin is also synthesized in the liver
- T F (e) Myeloblasts precede promyelocytes

18. The following statements are true concerning blood formation

- T F (a) The bone marrow is the major site of haemopoiesis during the first trimester of fetal life
- T F (b) The lifespan of white cells ranges from hours to years
- T F (c) The Erythroid, T and B cells are specialized types of a prototypic myeloid HSC
- T F (d) The Myeloid-based model of haemopoiesis proposes that a common lymphoid progenitor (CLP) produces only T or B cells.
- T F (e) Platelets make up 7-10% of the blood cells in humans

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|---|---|----|---------------------|
| T | F | a) | APTT |
| T | F | b) | bleeding time |
| T | F | c) | INR |
| T | F | d) | immunocytochemistry |
| T | F | e) | FBC |

20. Aged serum contains:

- | | | | |
|---|---|----|-------------|
| T | F | a) | factor VIII |
| T | F | b) | factor VI |
| T | F | c) | factor XII |
| T | F | d) | factor X |
| T | F | e) | factor XI |

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SECTION B: [20 MARKS]

I. Answer all questions on separate answer sheets provided.

1. State how international normalized ratio (INR) is determined [5]
2. State the six maturation sequence stages of the neutrophil [6]
3. List the 4 inner and outer bilayer lipids [4]
4. List any 5 platelet agonists [5]

SECTION C: ESSAY QUESTIONS [75 Marks]

Instructions

i) Answer 3 questions out of 5 in this section.

ii) Each question carries 25 *marks*.

1. With the aid of a diagram and stating the proteins involved, describe the red cell membrane skeleton
2. Describe the processes involved during haemoglobin synthesis
3. Discuss how the **haemoglobin derivatives** arise and how they are managed.
4. Explain how you would identify the **defective coagulation factors** if the screening were abnormal
5. Describe the principle employed in flow cytometry and how this technique is used in haematology