P

NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF CLINICAL HEALTH SCIENCES

QUALIFICATION : BACHELOR OF MEDICAL LABORATORY SCIENCES	
QUALIFICATION CODE: 08BMLS	**LEVEL:** 6
COURSE CODE: HAM621S	**COURSE NAME:** HAEMATOLOGY 2B
SESSION: **JANUARY** 2025	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION PAPER	
EXAMINER(S)	**Ms EDWIG SHINGENGE**
MODERATOR:	**Ms BELINDA ROSELINE TSAUSES**

INSTRUCTIONS
1. Answer ALL the questions.
2. Write clearly and neatly.
3. Number the answers clearly.
4. Non-programmable calculator allowed

THIS QUESTION PAPER CONSISTS OF 6 PAGES (Including this front page)

SECTION A: SHORT QUESTIONS [32 MARKS]

QUESTION 1 [10]

Evaluate the statements in each numbered section and select the most appropriate answer or phrase from the given possibilities. Write the appropriate letter next to the number of the statement/phrase.

1.1 What is the sequence for the maturation pools of granulocyte production? (1)

A) Maturation, proliferation, storage, functional (or marginated) pool
B) Proliferation, maturation, storage, functional (or marginated) pool
C) Storage, maturation, proliferation, functional (or marginated) pool
D) Functional (or marginated) pool, storage, proliferation, maturation

1.2 Which granulocytic cell has a kidney-shaped nucleus with clumped chromatin and small, pink, secondary granules with a few primary dark granules? (1)

A) Band
B) Myelocyte
C) Promyelocyte
D) Metamyelocyte

1.3 Primary granules also known as azurophilic granules contain: (1)

A) Myeloperoxidase
B) Lactoferrin
C) Iron
D) Collagenase

1.4 A neutrophil precursor with 10-18um in diameter, with round or oval nucleus, no nucleoli, prominent primary granules and a few secondary granules bests describes: (1)

A) Blast
B) Band cells
C) Myelocyte
D) Metamyelocyte

1.5 Which cytokine is responsible for the maintenance of the haemopoietic stem cell tissue? (1)

A) G-CSF
B) SCF
C) IL-1
D) IL-2

1.6 . Marrow stem cells are capable of which of the following? (1)

A) Differentiating into any cellular line
B) Producing antibodies
C) Stimulating the hemostasis system

D) Initiating the complement system

1.7 Which cellular components are represented by the M:E ratio? (1)

A) Myeloid:Eosinophils
B) Myeloid:Erythroid
C) Megakaryocytes:Erythroid
D) Monoblasts:Eosinophils

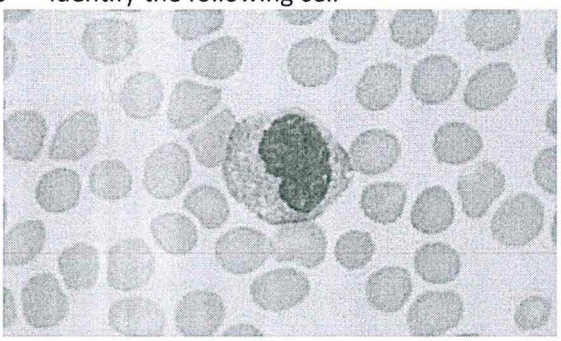
1.8 Identify the number of blasts in bone marrow necessary to diagnose acute myeloid leukaemia according to WHO criteria. (1)

A) 30%
B) 10%
C) 15%
D) 20%

1.9 What is the most frequent cause of a heterophile (Monospot) negative mononucleosis-like syndrome? (1)

A) HIV
B) CMV
C) Hepatitis C
D) Toxoplasma gondii

1.10 Identify the following cell (1)

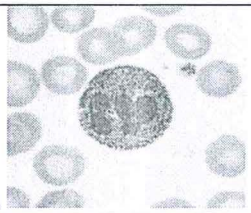
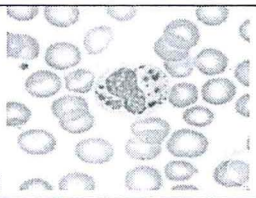
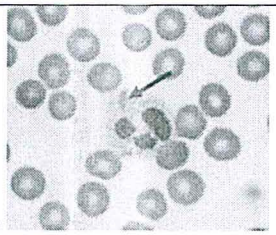
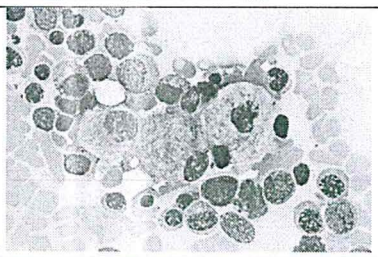
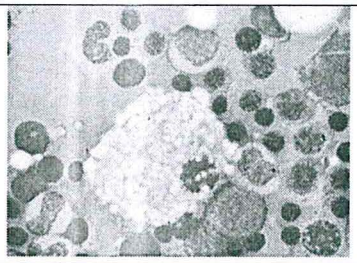


A) Monocyte
B) Myelocyte
C) Band Cell
D) Metamyelocyte

QUESTION 2 **[22]**

2.1 Briefly discuss three ways in which qualitative neutrophilic disorders can affect the function of the neutrophils. (6)

2.2 Identify the benign conditions of the white cells represented by the following morphologies: **(Print in colour)** (5)

Morphology	Disorder
2.2.1 	
2.2.2 	
2.2.3 	
2.2.4 	
2.2.5 	

2.3 Neutrophils react to bacterial infections not only by increasing in numbers but change of morphology as well. Identify the morphological changes found in a reactive neutrophil. (3)

2.4 Discuss any four characteristics of a macrophage. (4)

2.5 Outline the haematological findings in HIV patients. (4)

SECTION B: SHORT & LONG QUESTIONS [43 MARKS]

QUESTION 3 [22]

3.1 Malignant transformation occurs because of the accumulation of genetic mutations in cellular genes. With examples, discuss how mutated proto-oncogenes and tumour suppressor genes result in the development of cancer. (8)

3.2 Briefly describe what epigenetics is and give three examples. (5)

3.3 Discuss the most common full blood count results in leukaemia. (1/2 mark per answer) (5)

3.4 What are the benefits of using cytogenetics and molecular testing in the diagnosis of haematological malignancies. (4)

QUESTION 4 [21]

4.1 Although blast lineage identification requires flow cytometry, there are some morphological differences between a lymphoblast and myeloblast. Tabulate these differences. (1/2 mark per answer) (6)

4.2 Classify the six major categories of Acute Myeloid Leukaemia as classified by WHO. (6)

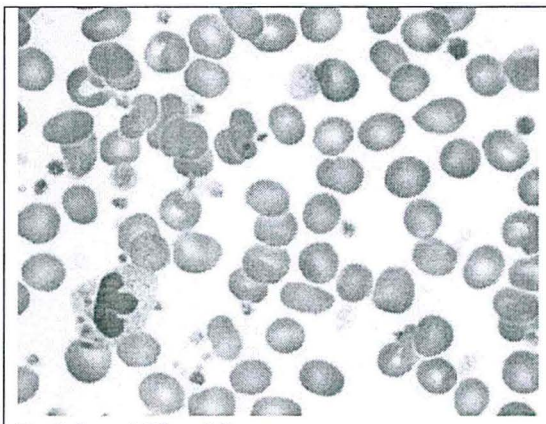
4.3 Discuss the role of tyrosine kinase in the development of myeloproliferative disorders and how this is mitigated during treatment. (6)

4.4 Patients with promyelocytic leukaemia often present with disseminated intravascular coagulation. Briefly explain the underlying cause of Disseminated Intravascular Coagulation in these patients. (3)

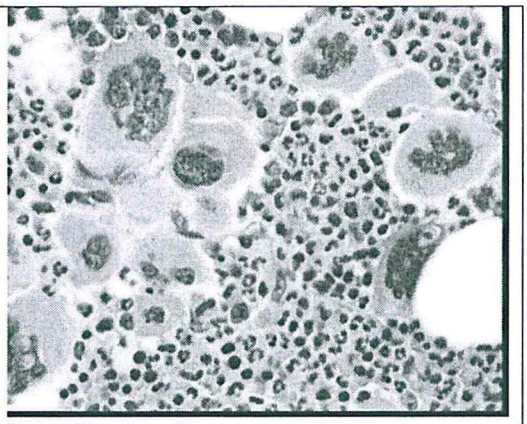
SECTION C: APPLICATION [25 MARKS]

QUESTION 5 [13]

Here we have a 26-year-old woman that is complaining of headaches and dizziness, she also noticed that her menstrual bleeding has become heavy. Her laboratory results were as follows: **RBC: $3.2x10^{12}$, WCC $17x10^{9}$, Platelets $823x10^{9}$, HB 9.9g/dL**. Below are her bone marrow and peripheral blood smear morphologies. **(Print in colour).**



Peripheral Blood Smear



Bone Marrow Smear

5.1 Analyse and discuss the laboratory results. (6)

5.2 What is the most likely diagnosis and underlying cause? Explain your answer. (4)

5.3 Suggest further tests and expected results to confirm the diagnosis. (3)

QUESTION 6 [12]

6.1 Myelodysplastic syndromes are characterised by dysplastic changes in morphology and function of myeloid cells. Outline the myelodysplastic morphological changes that occur in the red cell lineage (dyserythropoeisis), granulocytes (dysgranulopoiesis) and platelet lineage (dysmegakaryopoiesis) in both the bone marrow and peripheral blood. (12)
(at least 2 points per category)

THE END [100 MARKS TOTAL]