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: DECEMBER 2025	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION PAPER	
EXAMINER(S)	**Ms EDWIG SHINGENGE**
MODERATOR:	**Ms BELINDA ROSELIN 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: [28 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 appropriate sequence of the monocytic lineage? (1)

A) Monoblast, macrophage, promonocyte, monocyte
B) Monoblast, monocyte, promonocyte, macrophage
C) Monoblast, promonocyte, monocyte, macrophage
D) Monoblast, promonocyte, macrophage, monocyte

1.2 Neutrophils seen in acute infections have the following characteristics: (1)

A) Hypersegmentation, large granules & Döhle bodies
B) Toxic granulation, hypersegmented nuclei & blue cytoplasm
C) Toxic granulation, bi-lobed nuclei & Chediak higashi granules
D) Dohle bodies, vacuolation and toxic granulation

1.3 A patient has a platelet count of $700x10^9$ with abnormally shaped platelets in size and granularity. The white cell count is $12x10^9/l$ and the haemoglobin is 11g/dl. Philadelphia chromosome was absent although they did find a JAK2 mutation. What is the likely diagnosis? (1)

A) Reactive thrombocytosis
B) Essential Thrombocythemia
C) Myelofibrosis
D) Chromic Myeloid Leukaemia

1.4 The expression of cell surface markers is determined in the flow cytometer by which of these? (1)

A) chemiluminescence
B) radioactivity
C) fluorescence
D) scatter

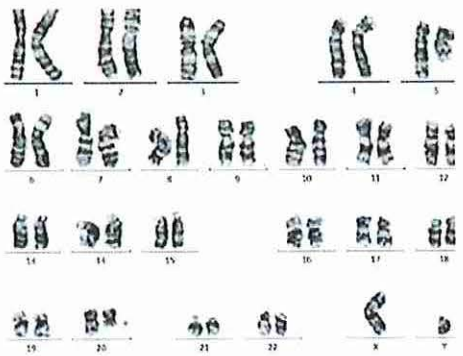
1.5 Non-specific esterases are usually a good cytochemistry stain for malignancies from which linage? (1)

A) Erythrocytic
B) Basophilic
C) Lymphocytic
D) Monocytic

1.6 Which of the following leukaemia symptoms are a result of a release of cytokines? (1)

A) Bleeding
B) Fever
C) Infections
D) Bone pain

1.7 Identify the abnormality associated with the following set of chromosomes: (1)



A) 5q syndrome
B) Philadelphia chromosome
C) Hyperdiploidy
D) Hypodiploidy

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 viral agent causes infectious mononucleosis? (1)

A) Human Immunodeficiency Virus
B) Rubella
C) Epstein Barr Virus
D) Herpes Simplex Virus

1.10 A Large, pale blue, with foamy fibrillar cytoplasm cells from the monocytic lineage are indicative of: (1)

A) Acute myeloid leukaemia
B) Acute monoblastic leukaemia
C) Chronic Myelomonocytic Leukaemia
D) Gaucher's disease

QUESTION 2 **[18]**

2.1 Identify the granulocytic cells which make up the following pools: (4)

a) Miotic Pool
b) Post Miotic
c) Storage
(1/2 marks)

2.2 Answer the following questions regarding leukaemia and its origins: (2)

2.2.1 Briefly describe the term leukaemia. (2)

2.2.2 Leukaemia is attributed to a mutated..... and .....

2.2.3 There are several host and environmental risk factors associated with the development of leukaemia. List four environmental and four host factors. (4)

2.2.4 The term clonal progression refers to how diseases may gain new.....accompanied by new.....changes. (2)

2.2.5 Suggest at least four general symptoms presenting in leukaemia patients attributed to cytopenia's. (4)

SECTION B: **[41 MARKS]**

[24]

QUESTION 3

3.1 Compare myeloproliferative disorders and myelodysplastic syndromes by completing the following table. (14)

Parameter	Myeloproliferative disorder	Myelodysplasia	Marks
White cell count			(2)
Platelet count			(2)
Morphology			(4)
Bone Marrow			(2)
Genetic Abnormality			(4)

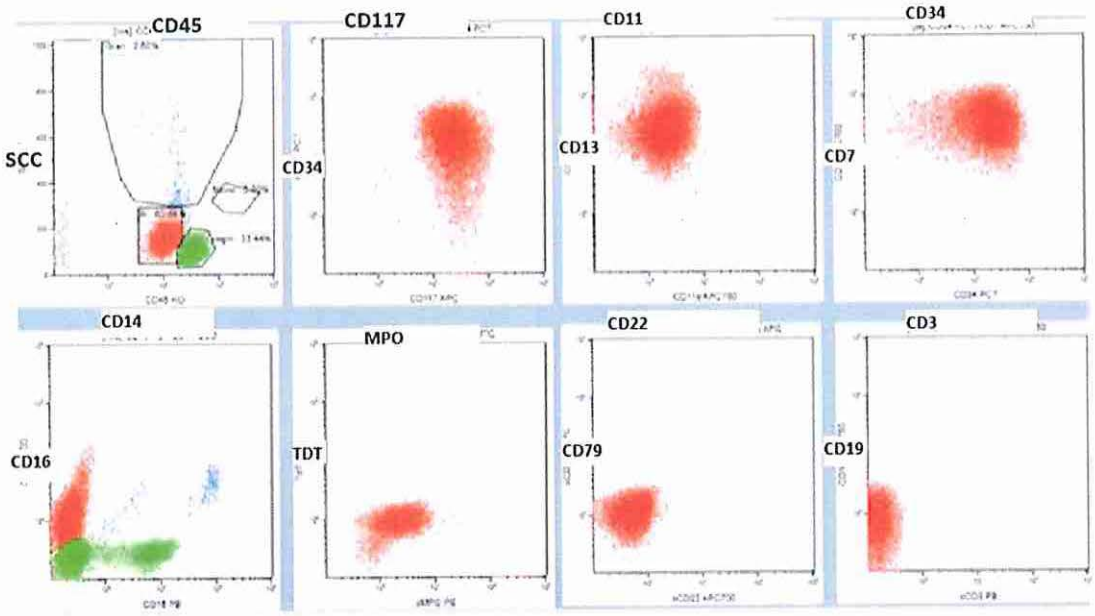
3.2 Describe the criteria used to distinguish polycythaemia vera from secondary form of erythrocytosis? (4)

3.3 Describe the three subcategories of Chronic Myelomonocytic Leukaemia. (6)

QUESTION 4

[17]

4.0 Below is a sample received for a patient suspected to have Acute Myeloid Leukaemia and flow cytometry was requested. Examine the following plots and answer the questions that follow.



4.1 Interpret the scatter plots represented by the red population by stating its immunophenotype. (8)

4.2 What cell lineage is represented by this population, explain your answer? (3)

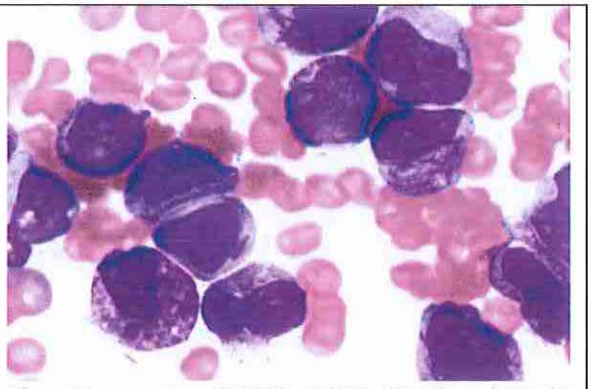
4.3 CD45 gating was used in this analysis and not forward and side scatter, explain why. (3)

4.4 Describe the criteria for selecting fluorochromes for analysis such as this? (3)

SECTION C: [31 MARKS]

QUESTION 5 **[21]**
(Print in colour)

A 36-year-old man presented to his local emergency department with a history of intermittent fevers lasting seven days. He reported peak temperatures of over 39°C as well as a tight chest and cough. He also pointed out repeated antibiotic treatment for recurrent strep throat. She had splenomegaly and coagulation tests revealed high fibrin degradation products indicating possible disseminated intravascular coagulation.

WBC: 179x10x10^9/L RBC: 4.2x10^{12}/L HB: 8.9g/dL Platelets: 32 Neutrophils:15% Lymphocytes:5% Eosinophils: 0% Basophils: 0% Promyelocytes: 8% Blasts: 0%	 **Flow Cytometry: CD117, CD33, CD13 and CD 64**

5.1 Analyse and briefly discuss the laboratory results. (4)

5.2 Describe the significance of the markers that were found positive in this patient. (4)

5.3 Suggest possible diagnosis and support your answer. (6)

5.4 Cytogenetics were performed for this patient and a translocation 5:17. Explain the importance of this translocation in the development of the disorder above by clearly stipulating the gene products expressed. (4)

5.5 Discuss the pathogenesis of the DIC presenting in this patient. (3)

QUESTION 6 **[10]**

6.1 Discuss the pathogenesis of Infectious mononucleosis as well as the laboratory findings. (10)

THE END [100 MARKS TOTAL]