



**PAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES**

**DEPARTMENT OF CLINICAL HEALTH SCIENCES**

<b>QUALIFICATION : BACHELOR OF MEDICAL LABORATORY SCIENCES</b>	
<b>QUALIFICATION CODE: 08BMLS</b>	<b>LEVEL: 6</b>
<b>COURSE CODE: HAM621S</b>	<b>COURSE NAME: HAEMATOLOGY 2B</b>
<b>SESSION: NOVEMBER 2025</b>	<b>PAPER: THEORY</b>
<b>DURATION: 3 HOURS</b>	<b>MARKS: 100</b>

<b>FIRST OPPORTUNITY EXAMINATION PAPER</b>	
<b>EXAMINER(S)</b>	<b>Ms EDWIG SHINGENGE</b>
<b>MODERATOR:</b>	<b>Ms BELINDA ROSELIN TSAUSES</b>

<b>INSTRUCTIONS</b>	
<ol style="list-style-type: none"><li>1. Answer ALL the questions.</li><li>2. Write clearly and neatly.</li><li>3. Number the answers clearly.</li><li>4. Non-programmable calculators allowed.</li></ol>	

**THIS QUESTION PAPER CONSISTS OF 5 PAGES (Including this front page)**

## 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 P53 is a.....?

(1)

- A) Oncogene
- B) Transcription factor
- C) Tumour suppressor gene
- D) Proto-Oncogene

1.2 Cytopenia's are a typical pentation in?

(1)

- A) Polycythaemia vera
- B) Myelodysplastic syndrome
- C) Acute myeloid leukaemia
- D) Giant platelets

1.3 DNA methylation is an example of:

(1)

- A) A translocation
- B) A point mutation
- C) An epigenetic change
- D) A mutation

1.4 Secondary granules start to appear at which stage of the neutrophil maturation?

(1)

- A) Blast
- B) Band Cell
- C) Myelocyte
- D) Metamyelocyte

1.5 Which of the following is closely associated with Acute Promyelocytic leukaemia?

(1)

- A) Philadelphia Chromosome
- B) Disseminated intravascular coagulation
- C) Giant Platelets
- D) Increased sphingomyelin

1.6 A 27-year-old woman presents with acute bleeding to the emergency department and is found to have a white count of  $32.7 \times 10^9/L$  with pancytopenia: haematocrit 25%, platelet count  $30 \times 10^9 /L$ , and absolute neutrophil count  $0.8 \times 10^9 /L$ . She has a combination of 93% blasts and abnormal promyelocytes in her peripheral blood; some of these cells contain stacked Auer rods. What form of leukaemia does she most likely have? (1)

- A) Acute myeloid with t(15;17)
- B) Chronic myeloid leukaemia
- C) Acute monoblastic leukaemia
- D) Polycythaemia Vera

1.7 Identify the component of a flow cytometer responsible for delivering the sample: (1)

- A) Fluidics
- B) Sample pipes
- C) Optics
- D) Electronics

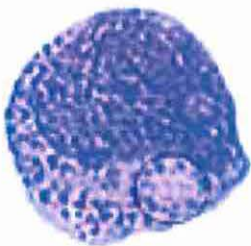
1.8 In Polycythaemia vera, the erythropoietin level is.....? (1)

- A) Normal
- B) Increased
- C) Low
- D) Variable

1.9 The French American British (FAB) classification of Acute Myeloblastic Leukaemia (AML) is based on? (1)

- A) Cytogenetic abnormalities
- B) Morphology and cytochemistry of blasts
- C) Immunophenotyping of blasts
- D) Molecular genetic abnormalities

1.10 Identify the following cell: (1)



- A) Promyelocytes
- B) Myelocyte
- C) Blast
- D) Lymphocyte

**QUESTION 2**

[15]

2.1 Complete the following table by determining the which component is stained, reagent used, appearance of positive cells as well cells that are positive and negative with the following cytochemistry stains:

(15)

Stain	Component Stained	Reagent	Appearance	Positivity	Negative
Myeloperoxidase					
Sudan Black					
Periodic Acid-Schiff					

**SECTION B:**

[ 45 MARKS]

**QUESTION 3**

[25]

3.1 Myeloblast and promyelocytes are stages of the neutrophil that are morphologically similar. Describe the morphological appearance of these two stages.

(10)

3.2 List the four developmental pools of the granulocyte including the cells found in each.

(9)

3.3 Describe the opsonization function of the neutrophil.

(4)

3.4 By means of the absolute count, define eosinophilia.

(2)

**QUESTION 4**

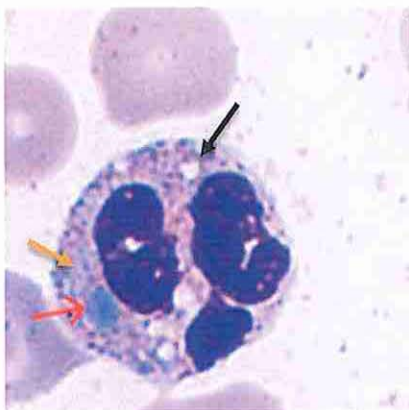
[20]

4.1 Describe the classification of benign disorders of the neutrophil.

(4)

4.2 Using the following image, describe the three morphological changes that accompany neutrophilia represented by the different arrows.

(6)



4.2.1 Red:

4.2.2 Orange:

4.2.3 Black:

- 4.3 Why is it important to account for age when investigating lymphocytosis? (5)
- 4.4 Describe the haematological findings in Infectious Mononucleosis. (5)

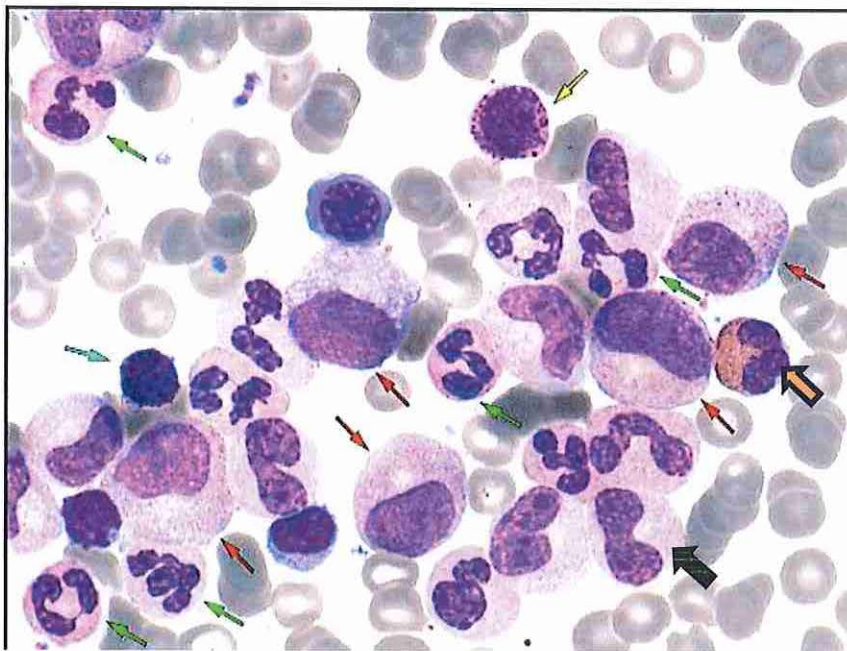
**SECTION C: APPLICATION BASED**

**[ 30 MARKS]**

**QUESTION 5**

**[20]**

A 54-year-old woman reported to the physician with a two-month history of weakness and a cough as well as fever. She lost significant weight over the past months. The cough was treated with antibiotics however she continued to get weaker and lose weight. She also had splenomegaly. Her laboratory results are as follows: WCC:  $53 \times 10^9/l$ , HB-9.5g/dL, HCT-26 %, Platelets 93 and an NAP score of 13.



- 5.1 Identify the cells represented by the different arrows. (6)
- 5.2 Suggest diagnosis and explain your answer. (5)
- 5.3 Interpret and discuss the significance of the LAP/ NAP result in this scenario? (4)
- 5.4 Cytogenetics were ordered, describe the expected results and how they contribute to the development of this disorder. (5)

**QUESTION 6**

**[10]**

- 6.1 Discuss the pathogenesis of essential thrombocythemia. (10)

**[100 MARKS TOTAL]**