NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF HEALTH SCIENCES

QUALIFICATION : MEDICAL LABORATORY SCIENCES	
QUALIFICATION CODE: 08BMLS	**LEVEL:** 6
COURSE CODE: HAM611S	**COURSE NAME:** HAEMATOLOGY 2A
SESSION: JULY 2022	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

SUPPLEMENTARY/SECOND OPPORTUNITY PAPER	
EXAMINER(S)	**Ms EDWIG HAUWANGA**
MODERATOR:	**Dr MAURICE NYAMBUYA**

INSTRUCTIONS
1. Answer ALL the questions. 2. Write clearly and neatly. 3. Number the answers clearly.

THIS QUESTION PAPER CONSISTS OF 7 PAGES (Including this front page)

SECTION A (20 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 The following cells all stem from the myeloid progenitor except: (1)

A) Neutrophils
B) Lymphocytes
C) Platelets
D) Megakaryocytes

1.2 Identify the term in which bone marrow becomes sole site for haemopoiesis? (1)

A) First few weeks of gestation
B) First few weeks post-natal
C) 2-3 moths pre-natal
D) 6-7 months post-natal

1.3 Describe a pro-normoblast: (1)

A) 14-25um big, with 1:8 N:C ratio, 1-2 nucleoli, deep blue cytoplasm
B) 12-17um, 75% nucleus, 1-2 nucleoli, blue cytoplasm with reddish tint
C) 10-15um, 25-50% nucleus, no nucleoli, nucleus eccentric location, blue-grey cytoplasm
D) 10-15um, 25% nucleus, pyknotic nucleus, blue-grey nucleus

1.4 Which of the following cells are not part of the bone marrow stroma: (1)

A) Adipocytes
B) Fibroblasts
C) Erythroblast
D) Macrophage

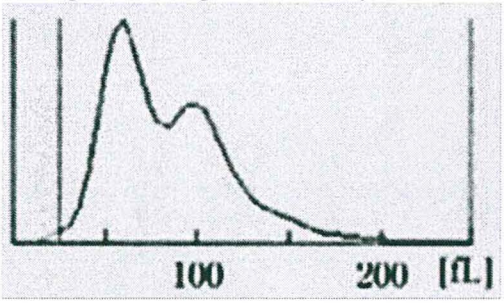
1.5 Bending twisted chain into a 3 dimensional "pretzel" shape describes the: (1)

A) Primary HB structure
B) Secondary HB structure
C) Tertiary HB structure
D) Quaternary HB structure

1.6 The red cell inclusion that is consistent with a defect in the hexose monophosphate shunt is: (1)

A) Heinz body
B) Cabot ring
C) Pappenheimer body
D) Howell Jolly body

1.7 Using the histogram below, predict the most likely RBC morphology. (1)

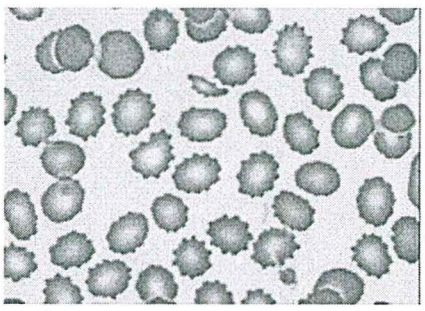


A) Normocytic
B) Microcytic
C) Normocytic and Microcytic
D) Macrocytic

1.8 How would you best describe the Histogram in 1.7 (1)

A) Left shift
B) Right shift
C) Dual population
D) Dual shift

1.9 Which off the following statements is accurate concerning the blood picture (1)



A) There was a delay in processing the sample
B) It is from an alcoholic individual
C) It is from an anaemic patient
D) The red cells have been exposed to water

1.10 Identify the anaemia that is classified under decreased production (1)

A) Megaloblastic
B) Aplastic
C) Iron deficiency
D) All of the above

QUESTION 2 [10]

For each of the following phrases, give the appropriate technical/scientific term:

2.1 Increased rate of red cell destruction (1)

2.2. When red cells stain diffusely basophilic/ blue grey with routine haematological stains (1)

2.3 Another term for haemopoietic growth factors (1)

2.4 Non-functional haemoglobin molecule with ferrous iron molecules (1)

2.5 The site in which the first stem cells are observed during foetal life (1)

2.6 The shape of a red cell (1)

2.7 Haemoglobin with all four alpha chains missing/deleted (1)

2.8 Bone marrow with loss of haemopoietic tissues and mainly fatty tissues only present (1)

2.9 Receptor of Vitamin B12 on the gastric parietal cells whose deficiency leads to pernicious anaemia (1)

2.10 Disorder whereby there is a lack of haemoglobin beta chains resulting in excess alpha chains (1)

SECTION B (38 MARKS)

QUESTION 3 **[20]**

3.1 Use the values provided from an adult male to calculate all red cell indices, mean cell volume, mean cell haemoglobin and Mean Cell Haemoglobin concentration. Show your workings: (12)

Haemoglobin	11.1	g/dl
Hct	31.9	%
Rbc	3.79	x 10^{12} /l
MCV	A	
MCH	B	
MCHC	C	

3.2 List all parameters that are out of range. (2)

3.3 State reasons for falsely decreased and falsely increased platelet values: (6)

QUESTION 4 **[18]**

Micronutrients such as iron and vitamin B12 are a very import part of our daily diets and can lead to unpleasant consequences such as anaemia when deficient. Clearly outline importance of these two micronutrients under the following headings:

4.1 Haemopoietic function. (4)

4.2 Morphologically classify the types of anaemia they cause. (2)

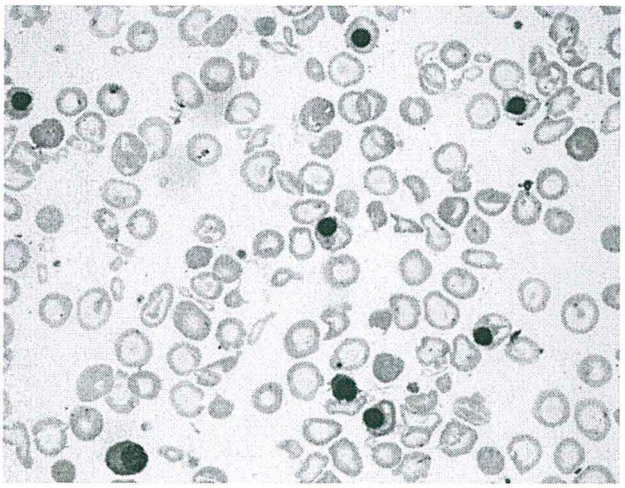
4.3 Outline the most common haematological findings in these anaemias. (6)

4.4 Mention other non-haematological tests one can use to investigate anaemias resulting from deficiency of these micronutrients. (6)

SECTION C (42 MARKS)

QUESTION 5 **[22]**

2-year-old girl from the Maldives in the Mediterranean Islands, presents with cough, dyspnoea, and fatigue. She had an enlarged liver, and her x-rays reveal maxillary expansions. Her FBC revealed an HB of 3.6g/dL and her peripheral blood smear was as follows.



5.1 Attempt diagnosis and support your answer. (5)

5.2 Comment on the red cell morphology (6)

5.3 The doctor requests an HB electrophoresis, draw the expected results of the HB electrophoresis with clear labels. (6)

5.4 What is the principle of the HB electrophoresis and what is its main purpose? (3)

5.5 These patients are usually treated with blood transfusion; however, this is without consequence. What are the consequences of repeated blood transfusions and how can they be countered? (2)

QUESTION 6 [20]

6.1 Identify and explain the two mechanisms in which red cells can be broken down? (10)

6.2 What is the major differentiating findings between the two mechanisms (2)

6.3 List the common laboratory findings in haemolytic anaemia. (6)

6.4 What test can be used to differentiate immune from non-Immune haemolytic anaemia? (2)

END OF PAPER (TOTAL MARKS 100)