AFRICA UNIVERSITY
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COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

DEPARTMENT OF BIOMEDICAL AND MEDICAL LABORATORY SCIENCES

BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS DEGREE

NSLS202: HAEMATOLOGY 1

SUPPLEMENTARY EXAMINATIONS

21 JANUARY 2021

LECTURER: MR MENARD MUTENHERWA

DURATION: 24 HOURS

INSTRUCTIONS

1. Write your candidate number on your answer sheets.
2. Answer any **one** question of your choice from the given three questions.
3. Each full question carries 100 marks.
4. Submit your answer scripts as word documents.
5. Use the following specifications in your answer scripts:
   Font: Times New Roman
   Font size: 12
   Line spacing: 2.0
6. Credit will be given for logical, systematic and neat presentations.

Question 1

A 40-year-old male telephoned his physician, **Dr Pim,** and complained of fatigue, shortness of breath on exertion, and general malaise. He requested to be urgently injected with vitamin B12 to make him get relief. **Dr Pim** asked the patient to schedule an appointment so that he could determine the cause of the symptoms before offering treatment. Haemoglobin was measured at **Dr Pim**`s office and found to be 6.3 g/dL. **Dr Pim** then requested additional laboratory tests, including a complete blood count (CBC) with a peripheral blood white blood cells differential count and a reticulocyte count.

a) Why was it necessary for **Dr Pim** to request the patient to come to his office before prescribing therapy? **[35 marks]**

b) How do the mean cell volume (MCV) and reticulocyte count help determine the classification of the anaemia? **[35 marks]**

c) Why is the examination of the peripheral blood film important in the investigation of an anaemia? **[25marks]**

d) **Dr Pim** took a bone marrow biopsy specimen from the patient. The red blood cell precursors were estimated to account for 45% of the cells in the marrow, and the other 55% were granulocyte precursors. Calculate the Myeloid to Erythroid ratio? **[5 marks]**

Question 2

a) List the following full blood count measurements generated by **Coulter counter** hematology profiling instruments.

- **i.** Red blood cell parameters **[16marks]**
- **ii.** White blood cell parameters **[10 marks]**
- **iii.** Platelet parameters **[4 marks]**

b) Describe how haemoglobin is assembled. Support your description with diagrams. **[70 marks]**

Question 3

A healthy-looking 42-year-old woman, **Mrs Ber**, had an automated full blood count (FBC) performed in preparation for total hip replacement. The haematology test results are provided in table 1.

Table 1: FBC results for Mrs Ber

Parameter	**Results**	**Reference ranges**		
WBC	15.8 $X10^9$/L	**Male**	**female**	**male and female**
RBC	4.91 $x10^{12}$/L	4.20-6.0	3.80-5.20	
HGB	14.6 g/dl	13.5-18.0	12.0-15.0	
HCT	45.11%	40-54	35-49	
MCV	91.5Fl			80-100
MCH	31pg			26-34
MCHC	32.7g/dl			32-36
RDW	14.20%			11.5-14.5
PLT	34 x 10^9/L			150-450
MPV	6.6fL			7.0-12.0

a) Describe the blood picture, using proper haematology terminology for erythrocytes, leucocytes, and platelets. **[30 marks]**

b) Explain the automated results in Table 1 which should be questioned? **[30 marks]**

c) Describe the intrinsic pathway of the coagulation cascade **[30marks]**

d) Calculate the expected haematocrit value by using the rule of three for the red blood cell indices in the Table 1. Display calculations. **[10 marks]**

The End