AFRICA UNIVERSITY
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"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

DEPARTMENT OF BIOMEDICAL AND MEDICAL LABORATORY SCIENCES

BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS DEGREE

NSLS202: HAEMATOLOGY 1

END OF FIRST SEMESTER FINAL EXAMINATIONS

26 NOVEMBER 2020

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 48-year-old female telephoned her physician, **Dr Tit,** and complained of fatigue, shortness of breath on exertion, and general malaise. She requested to be urgently injected with vitamin B12 to make her feel better. **Dr Tit** asked the patient to schedule an appointment so that he could determine the cause of the symptoms before offering treatment. A point-of-care haemoglobin determination performed in **Dr Tit`s** office was 6.0 g/dL using Hemocue. **Dr Tit** then requested additional laboratory tests, including a full blood count (FBC) with a peripheral blood film examination and a reticulocyte count.

a) Why did **Dr Tit** require the patient to come to the office before prescribing therapy? **[40 marks]**

b) How do the mean cell volume (MCV) and reticulocyte count help determine the classification of the anaemia? **[30 marks]**

c) Why is the examination of the peripheral blood film important in the investigation of an anaemia? **[20marks]**

d) **Dr Tit** took a bone marrow biopsy specimen from the patient. The red blood cell precursors were estimated to account for 40% of the cells in the marrow, and the other 60% were granulocyte precursors. What is the M : E ratio? **[10 marks]**

Question 2

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

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

b) With the use of diagrams, describe how haemoglobin is assembled. **[70 marks]**

Question 3

A healthy-looking 45-year-old woman, **Mrs Jit**, had an automated complete blood count (CBC) performed as part of a preoperative evaluation. Results are shown in table 1.

Table 1: CBC results for Mrs Jit

		Reference ranges		
WBC	**15.8X109/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) Briefly describe the blood picture, using proper haematology terminology for red blood cells, white blood cells, and platelets. **[30 marks]**

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

c) With the aid of diagrams, describe the extrinsic pathway of the coagulation cascade **[30marks]**

d) Using the rule of three, given the hemoglobin concentration in the Table 1, what is the expected value for the haematoctrit? Show calculation. **[10 marks]**

The End