

# **COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES**

### DEPARTMENT OF BIOMEDICAL AND MEDICAL LABORATORY SCIENCES

**BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS DEGREE** 

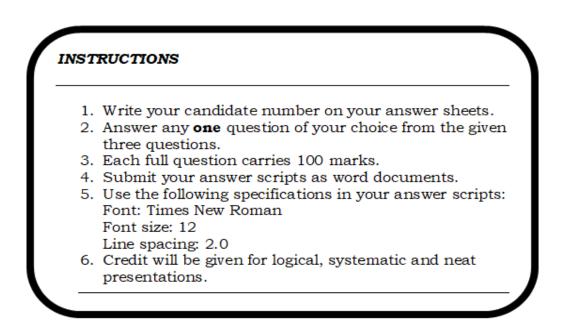
## NSLS202: HAEMATOLOGY 1

### END OF FIRST SEMESTER FINAL EXAMINATIONS

#### **26 NOVEMBER 2020**

### LECTURER: MR MENARD MUTENHERWA

### **DURATION: 24 HOURS**



#### **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.

		Reference ranges		
WBC	15.8X109/L	Male	female	male and female
RBC	4.91 x10 <sup>12</sup> /L	4.20-6.0	3.80-	
			5.20	
HGB	14.6 g/dl	13.5-18.0	12.0-	
			15.0	
НСТ	45.11%	40-54	35-49	
MCV	91.5Fl			80-100
МСН	31pg			26-34
МСНС	32.7g/dl			32-36
RDW	14.20%			11.5-14.5
PLT	34 x 10 <sup>9</sup> /L			150-450
MPV	6.6fL			7.0-12.0

#### Table 1: CBC results for Mrs Jit

- 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