

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

DEPARTMENT OF BIOMEDICAL AND MEDICAL LABORATORY SCIENCES

BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS DEGREE

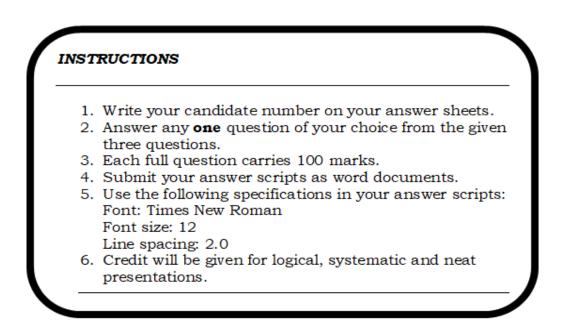
NSLS202: HAEMATOLOGY 1

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 ¹² /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 ⁹ /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