UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION

OCTOBER 2025 SEMESTER

COURSE CODE	:	HDD21003
COURSE TITLE	:	HEMATOLOGY 2
PROGRAMME NAME	:	DIPLOMA OF MEDICAL LABORATORY TECHNOLOGY
DATE	:	27 JANUARY 2026
TIME	:	2:00PM - 5:00PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Section A consist total of 60 marks. Answer ALL questions.
5. Section B consist of three questions. Answer TWO (2) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

THERE ARE 7 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 60 marks)

Answer ALL questions.

Please use the answer booklet provided.

Question 1

Describe the normal morphology of 5 types of white blood cells and their functions.

(10 marks)

Question 2

A whole blood specimen was processed according to the standard protocol to determine the total white blood cells count by using an improved Neubauer chamber, with a dilution factor of 1:20. The number of cells counted in top chamber = 116 and bottom chamber = 120. Based on this information, calculate the total white blood cells count per µL blood. Show your calculation and the formula used.

(10 marks)

Question 3

Describe the Philadelphia chromosome in chronic myeloid leukemia and support your explanation with a labeled diagram.

(10 marks)

Question 4

Describe the platelet events in primary hemostasis upon blood vessel injury until the formation of a platelet plug.

(10 marks)

Question 5

Discuss the requirements of specimen collection and handling for hemostasis evaluation in terms of blood collection tube, rule of collection, specimen storage and specimen thawing.

(10 marks)

Question 6

The following figure illustrates the setting up of a blood coagulation analyzer that used a steel ball for determination of the clotting time. Explain how the clotting time is determined by this method.

Refer Below - Figure1 : Coagulation Analyzer .

(10 marks)

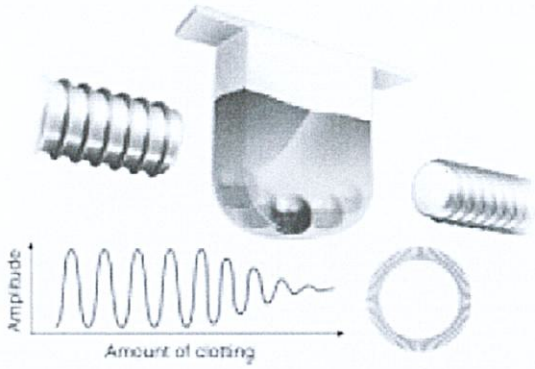

Figure 1: Coagulation Analyzer

SECTION B (Total: 40 marks)

Answer TWO (2) questions only.

Please use the answer booklet provided.

Question 1

Differential leukocyte count (DLC) is part of a complete blood count (CBC) and plays an essential role in the diagnosis of infections, inflammation, and other hematological disorders. DLC measures the percentage of each type of white blood cell in the blood and provides valuable information about a person's cellular condition.

Answer all of the following questions.

Refer Below - Table1 : Differential Leukocyte Count .

Table 1: Differential Leukocyte Count

L	P	P	L	P	L	P	P	L	P
P	L	P	P	L	P	P	L	P	P
P	P	P	L	P	P	L	P	P	L
P	P	P	L	P	P	P	L	P	P
L	P	L	P	M	L	L	P	M	P
P	B	E	P	P	L	P	E	P	P
P	M	P	L	L	P	L	P	L	L
L	P	E	P	P	P	L	L	P	P
P	P	P	L	P	L	P	P	L	B
P	L	L	P	P	M	P	L	P	L

(a) Using the data from the DLC table, calculate the relative proportion of each type of white blood cell in the given blood sample.

(10 marks)

(b) Based on the relative counts obtained in (a), calculate the absolute count of each type of white blood cell, assuming the total WBC count of the blood sample is 7,000 cells/μL.

(10 marks)

Question 2

The following figure illustrates the schematic diagram set-up of principle Y used in an automated blood cell counting analyzer. Answer the following questions on blood cell counting and its analyzer.

Refer Below - Figure2 : Automated blood cell counting analyzer .

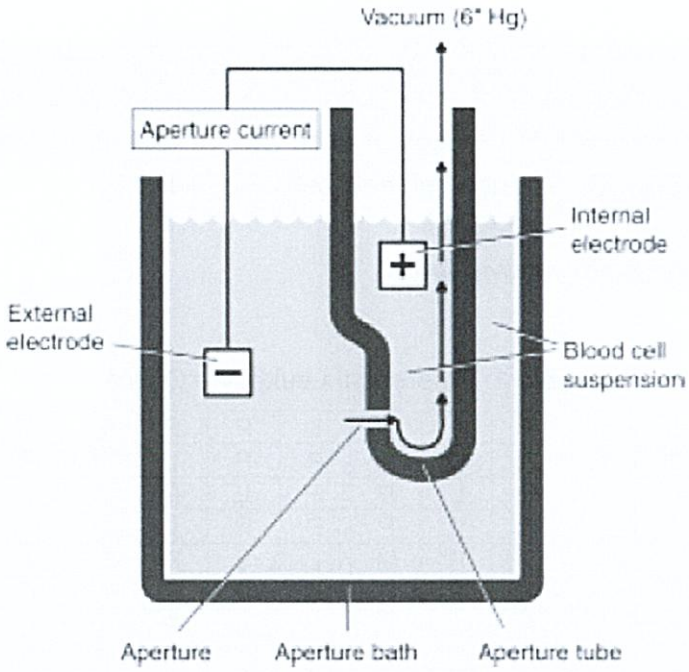

Figure 2: Automated blood cell counting analyzer

(a) Name the principle used and explain how the blood cells are counted by this method.

(9 marks)

(b) Illustrate the distribution curve of red blood cells, platelets and white blood cells in a normal individual.

(5 marks)

(c) List down the differences between 3-part and 5-part differential cell counter of an automated blood analyzer.

(6 marks)

Question 3

Zulaikha, a 7-year-old girl is brought to the clinic by her parents due to frequent nosebleeds over the past month. The nosebleeds often last more than 20 minutes and sometimes require medical attention. Her parents also report that she bruises easily, even with minimal trauma, and she has experienced prolonged bleeding after minor cuts. The child has no history of hemarthrosis or deep muscle bleeding. On physical examination, multiple petechiae and small ecchymoses are noted on her arms and legs. No joint swelling or organ enlargement is observed. Her laboratory test findings are shown in the table below.

Based on the information given, answer the following questions:
Refer Below - Figure3 : Laboratory investigation results .

Test	Result
Hemoglobin	11.8 g/dL
Platelets	Normal count
Prothrombin time (PT)	Normal
Activated partial Thromboplastin time (aPTT)	Normal
Bleeding time	Prolonged
Platelet aggregation test	• Reduced aggregation with ADP, collagen, epinephrine. • Normal aggregation of ristocetin
Platelet GP IIb/IIIa level	Reduced

Figure 3: Laboratory investigation results

(a) Identify the most likely diagnosis of this patient.

(2 marks)

(b) Explain the pathogenesis of the disease identified in (a).

(4 marks)

(c) State three common clinical manifestations of the disease identified in (a).

(6 marks)

(d) Explain why the patient has experiences prolonged bleeding despite having a normal platelet count.

(6 marks)