UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION

MARCH 2025 SEMESTER

COURSE CODE	:	HDD21003
COURSE TITLE	:	HEMATOLOGY 2
PROGRAMME NAME	:	DIPLOMA OF MEDICAL LABORATORY TECHNOLOGY
DATE	:	03 JULY 2025
TIME	:	9:00AM - 12:00PM
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*

SECTION A (Total: 60 marks)

Answer ALL questions.

Please use the answer booklet provided.

Question 1

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)

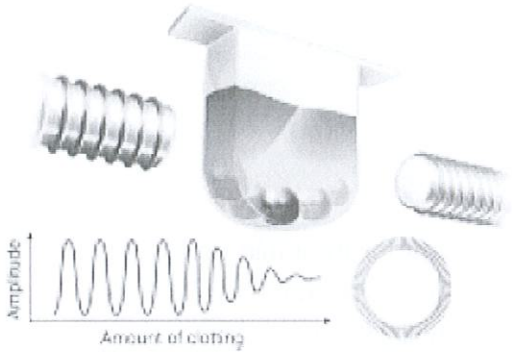

Figure 1: Coagulation Analyzer

Question 2

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 3

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

(10 marks)

Question 4

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 5

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

(10 marks)

Question 6

Secondary hemostasis is important for thrombin generation and subsequent formation of fibrin clot. With the help of a diagram, describe the key steps involved in the coagulation pathway upon exposed subendothelial tissue.

(10 marks)

SECTION B (Total: 40 marks)

Answer TWO (2) questions only.

Please use the answer booklet provided.

Question 1

A 17-year-old girl was admitted to the emergency room after a car accident, presented with several superficial cuts and bruises to the head and arms. She was bleeding profusely, having more severe bleeding than would be expected from the nature of her wounds. Petechiae were also noted. When asked if she had had bleeding problems in the past, she recounted having petechiae, lots of bruises on and off since childhood and frequent nosebleeds. With these symptoms, a platelet disorder is most likely.
Based on the given information, answer the following questions.

(a) Differentiate the signs and symptoms between platelet disorder and hemorrhagic coagulation disorder.

(6 marks)

(b) List 3 screening laboratory tests that would be most informative in identifying the cause of the patient's condition.

(3 marks)

(c) Explain how the laboratory tests specified in (b), may indicate that the bleeding is related to a defect in primary hemostasis rather than a secondary hemostasis?

(8 marks)

(d) State a specific laboratory test for confirmation of platelet disorder and briefly describe its principle.

(3 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 .

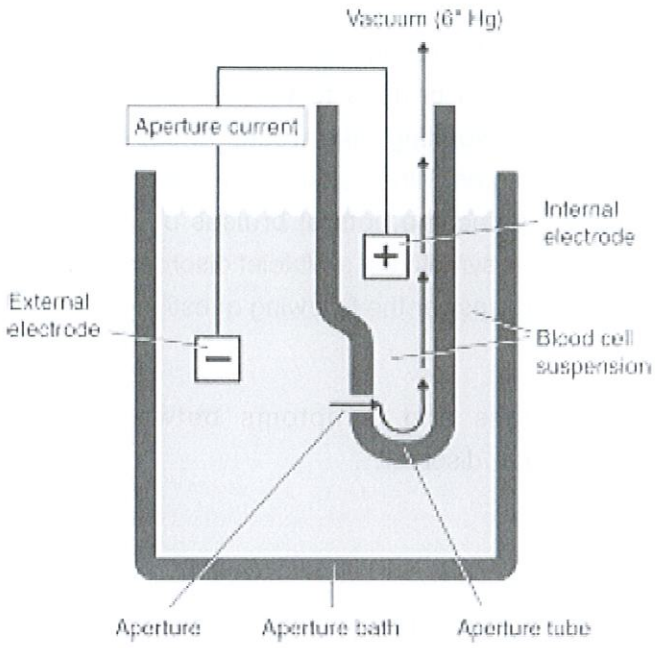

Figure 2: Automated blood cell counting analyzer

(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

A 3-year-old boy was presented to the emergency room with severe bleeding in the knee joint and history of frequent recurrent bleeding from small cuts. The table below shows the partial results of the laboratory investigations of the boy. Mixing studies were then requested. Based on the given information, answer the following questions.

Refer Below - Table1 : Laboratory results .

Table 1: Laboratory results

Parameter	Results	
Erythrocyte count	4.5×10^{12}/L	Normal
Hemoglobin	12.0 g/dL	Normal
Hematocrit	38 %	Normal
Total leukocyte count	5.25×10^{9}/L	Normal
Platelet count	250×10^{9}/L	Normal
Prothrombin time	12 sec	Normal
Activated partial thromboplastin time	95 sec	Prolonged

(a) Identify which coagulation pathway is impaired in the boy. Justify your answer.

(4 marks)

(b) Explain the purpose of mixing studies in this situation and the principles used.

(10 marks)

(c) If the boy is later diagnosed as having Hemophilia A, state the cause of the disorder and explain which mixing studies results would be expected. Indicate the test to confirm his condition.

(6 marks)

END OF EXAMINATION PAPER