

THE OPEN UNIVERSITY OF SRI LANKA  
FACULTY OF HEALTH SCIENCES  
DEPARTMENT OF MEDICAL LABORATORY SCIENCES  
ACADEMIC YEAR 2018/2019 – SEMESTER II



BACHELOR OF MEDICAL LABORATORY SCIENCES (BMLS) HONOURS  
MDU5401 – ADVANCED HEMATOLOGY – LEVEL 5  
NBT I

DURATION: 1 HOUR AND 30 MINUTES

DATE: 15<sup>TH</sup> JULY 2019

TIME: 11.00 AM – 12.30 PM

Registration No: .....

**IMPORTANT INSTRUCTIONS/ INFORMATIONS TO CANDIDATES**

- This question paper consists of 14 pages with 10 Multiple Choice Questions (Part A), 04 Structured Essay Questions (Part B) and 01 Essay Question (Part C).
- Write your Registration Number in the space provided.
- Answer ALL questions.
- **Multiple Choice Questions (Part A):** Indicate the best answer for each question in the answer sheet provided by placing a cross (X) in **INK** in the relevant cage. (Answers in pencil will **NOT** be marked)
- **Structured Essay Questions (Part B):** Write answers within the space provided.
- **Essay Questions (Part C):** Write answers in the given booklet.
- Do not remove any page/part of this question paper from the examination hall.
- Mobile phones and any other electronic equipment are **NOT** allowed. Leave them outside.

**PART A – Multiple Choice Questions**

- 1) High White Blood Cell (WBC) count and low Hemoglobin often associate with,
  - A) acute leukemia, multiple myeloma and chronic leukemia.
  - B) acute leukemia, chronic leukemia and bacterial infections.
  - C) chronic leukemia, multiple myeloma and polycythemia vera.
  - D) acute leukemia and chronic leukemia, idiopathic myelofibrosis.
  
- 2) Thrombocytopenia is common in,
  - A) all types of acute leukemia.
  - B) chronic leukemia and multiple myeloma.
  - C) leukemia in post chemotherapy.
  - D) acute leukemia and multiple myeloma.
  
- 3) Severe anemia may occur,
  - A) with the absolutely increased WBCs in peripheral blood.
  - B) with increased WBCs in peripheral blood.
  - C) with increased platelets in peripheral blood.
  - D) with increased red blood cells in peripheral blood.
  
- 4) Increased myeloid: erythroid ratio in bone marrow is seen in,
  - A) multiple myeloma and polycythemia vera.
  - B) polycythemia vera and severe viral infections.
  - C) chronic myeloid leukemia and leukemoid reactions.
  - D) chronic myeloid leukemia and polycythemia vera.
  
- 5) In cytochemical staining,
  - A) Lymphoid cells are negative for both Periodic Acid Schiff and Sudan Black B.
  - B) Myeloid cells are positive for Sudan Black B and Myeloperoxidase.
  - C) Myeloid cells and monocytoid cells are positive for Sudan Black B.
  - D) Myeloid cells and monocytoid cells are negative for Double Esterase.

- 6) Myeloproliferative Neoplasms (MPNs) frequently consists of,
- A) patients with JAK2 mutation negative and Philadelphia chromosome positive.
  - B) patients with JAK2 mutation negative and Philadelphia chromosome negative.
  - C) patients with JAK2 mutation positive and Philadelphia chromosome negative.
  - D) patients with JAK2 mutation positive and Philadelphia chromosome positive.
- 7) Immunophenotyping,
- A) is commonly used in the diagnosis of acute leukemia and its sub types.
  - B) is commonly used in the diagnosis of chronic leukemia and its sub types.
  - C) is commonly used in the diagnosis of multiple myeloma and its related disorders.
  - D) is commonly used in the diagnosis of myeloproliferative neoplasms.
- 8) Immunomarkers such as CD 19, CD 20, CD 22 and CD 10
- A) are used in the diagnosis of malignancies in myeloid lineage.
  - B) are used in the diagnosis of malignancies in granulocytic lineage.
  - C) are used in the diagnosis of malignancies in lymphoid lineage.
  - D) are used in the diagnosis of malignancies in erythroid lineage.
- 9) Acute myeloid leukemia (AML) and chronic myeloid leukemia (CML) are,
- A) common in both adults and children.
  - B) less common in adults.
  - C) less common in children.
  - D) are always age dependent.
- 10) Immunocompromising,
- A) can be associated with patients of multiple myeloma and chronic lymphatic leukemia (CLL).
  - B) can be associated with patients of acute lymphoblastic leukemia (ALL) and chronic lymphatic leukemia (CLL).
  - C) can be associated with patients of acute lymphoblastic leukemia (ALL) and multiple myeloma.
  - D) can be associated with patients of acute myeloid leukemia (AML) and chronic lymphatic leukemia (CLL).

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**PART B – Structured Essay Questions**

**1. Early screening of leukemic conditions in patients those who attend base hospital clinics is an absolute need today as the delay may cause progressing of the disease. In the laboratory, total white cell count (WBC) and platelet count play a pivotal role in the screening of leukemia conditions.**

1.1. Name **two (02)** other hematological investigations that could use to screen leukemic conditions in the laboratory. (10 marks)

- I. ....
- II. ....

1.2. Explain how total WBC and platelet count contribute to screen acute leukemia in the laboratory. (20 marks)

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1.3. How do you use peripheral blood white cell cytomorphology to screen acute myeloid leukemia (AML)? (20 marks)

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1.4. List **five (05)** special laboratory investigations that are used to confirm the diagnosis as AML. (30 marks)

- I. ....
- II. ....
- III. ....
- IV. ....
- V. ....

1.5. Describe the expected major findings of **one (01)** investigation that you mentioned in 1.4. (20 marks)

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**(Total: 20 marks)**

2. A 47 years old man presented with symptoms of mild fever, anemia and mild bone pains. His further investigations revealed hepatosplenomegally. Results of few of the laboratory investigations are as follows.

WBC -  $97 \times 10^9/L$                       Hb - 103 g/L                      Platelet Count -  $337 \times 10^9/L$

Hypercellular bone marrow myelogram showing,

Blast cells-07%, Promyelocytes-06%, Myelocytes -18, Metamyelocytes-20%,

Neutrophils-35%,                      Lymphocytes-06%, Eosinophils-03%, Monocytes-03%,

Basophils-02%.

2.1. Giving reasons state the most probable disease or condition. (50 marks)

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2.2. Suggest the white cell abnormalities that may present in the peripheral blood. (20 marks)

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2.3. Name **one (01)** other disease or condition that may associate with similar laboratory findings. (5 marks)

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2.4. How do you differentiate the diseases or conditions mentioned in 2.1 & 2.3? (25 marks)

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**(Total: 100 marks)**





3.2 Similar findings were obtained from the repeated analysis of the sample using the same analyzer and also with the fresh blood sample of the same patient.

3.2.1 What laboratory test you would perform immediately to accept or reject the results mentioned in 3.1? Describe the expected results. (20 marks)

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3.2.2 Name **four (04)** other special investigations that could use to establish the diagnosis according to the clinical findings. (20 marks)

I.....  
II.....  
III.....  
IV.....

3.2.3 Describe the expected major findings of **one (01)** investigation that you mentioned in 3.2.2. (20 marks)

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(Total: 100 marks)

4 Multiple myeloma is a fatal hematological disorder that associates with pathological fractures, infections and anemia. It is common among adults.

4.1 Name **four (04)** type of myeloma and name the most frequent type. (25 marks)

- I. ....
- II. ....
- III. ....
- IV. ....

4.2 Describe the role of plasma cells in multiple myeloma. (30 marks)

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4.3 Name **three (03)** laboratory findings used in the diagnosis of multiple myeloma. (15 marks)

- I. ....
- II. ....
- III. ....



**PART C – Essay Question**

1) Explain the pathological basis of the followings

- 1.1 Appearance of late normoblasts in the peripheral blood of chronic myeloid leukemia (CML). (30 marks)
- 1.2 Presence of paraproteins in the blood in multiple myeloma. (40 marks)
- 1.3 Anemia in chronic lymphocytic leukemia – B cell type (B-CLL). (30 marks)

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**BACHELOR OF MEDICAL LABORATORY SCIENCES (BMLS) HONOURS****MDU5401 – ADVANCED HEMATOLOGY – LEVEL 5****NBT I****REGISTRATION NO: .....****ANSWER SHEET FOR PART A**

Q. No.	(A)	(B)	(C)	(D)
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