

2407/302
HAEMATOLOGY AND
IMMUNO-HAEMATOLOGY
Oct./Nov. 2022
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY
HAEMATOLOGY AND IMMUNO-HAEMATOLOGY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Battery operated scientific calculator.

This paper consists of TWO sections; A and B.

Answer ALL the questions in section A and any THREE questions from section B.

Each question in section A carries 4 marks while each question in section B carries 20 marks.

Maximum marks for each part of a question are indicated.

Candidates should answer the questions in English.

This paper consists of 4 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A (40 marks)

Answer ALL the questions in this section.

1. (a) Give two characteristics of HbF. (2 marks)
- (b) Distinguish between carbaminohaemoglobin and carboxyhaemoglobin. (2 marks)
2. State two distinguishing features of each of the following cells: (2 marks)
 - (a) metamyelocyte; (2 marks)
 - (b) small lymphocyte. (2 marks)
3. State any two precautions to be taken when:
 - (a) using a neubauer chamber; (2 marks)
 - (b) performing slide method of ABO grouping. (2 marks)
4. (a) Calculate the Mean Cell Haemoglobin Concentration (MCHC) given: (3 marks)

PCV = 42%
Haemoglobin concentration = 145 g/l
RBC count = 5×10^6 /ul
- (b) State the normal ranges of MCHC. (1 mark)
5. (a) Name the two Lewis blood group system antigens. (1 mark)
- (b) Explain the following statements:
 - (i) IgM antibodies are able to agglutinate red cells suspended in saline. (1 mark)
 - (ii) Platelet concentration is stored in agitating manner. (1 mark)
 - (iii) Haemolytic disease of the newborn due to rhesus incompatibility does not affect the first child. (1 mark)
6. Explain the importance of each of the following tests:
 - (a) Total iron binding capacity. (2 marks)
 - (b) Indirect Coomb's test. (2 marks)

7. (a) List any two methods of leukaemia diagnosis. (2 marks)
- (b) Name two supravital stains used in haematology. (2 marks)
8. Outline four factors considered when selecting a blood bank anticoagulant. (4 marks)
9. State the:
- (a) use of Perl's Prussian blue in bone marrow smears. (1 mark)
- (b) significance of reticulocytes count. (1 mark)
- (c) use of sodium metabisulphate in sickle cell slide test. (1 mark)
- (d) use of 1% ammonium oxalate in a haematology laboratory. (1 mark)
10. (a) Give two reasons why heparin is not recommended as an anticoagulant for routine haematological tests. (2 marks)
- (b) State one clinical use of each of the following:
- (i) Fresh frozen plasma. (1 mark)
- (ii) Leucocyte poor blood. (1 mark)

SECTION B (60 marks)

Answer any THREE questions from this section.

11. (a) (i) Calculate the total red blood cells count per litre of blood given: (3 marks)
- | | | |
|------------------|---|---------------------|
| Cells counted | = | 500 |
| Dilution factor | = | 201 |
| Area | = | 0.2 mm ² |
| Depth of chamber | = | 0.1 mm |
- (ii) Name two diluting fluid used in manual red blood cells count. (1 mark)
- (b) You are provided with a cyanmet haemoglobin standard of 18 g/dl. Illustrate how to make 6 mls of each of the following haemoglobin concentrations from the 18 g/dl. Show your working.
- (i) 15 g/dl; (4 marks)
- (ii) 9 g/dl. (3 marks)
- (c) Outline the procedure of preparing a haemoglobin calibration curve using a cyanmet standard of 15 g/dl. (9 marks)

12. (a) Outline the remedy taken when a haematoma occurs during collection of blood from a donor. (5 marks)
- (b) (i) Explain rouleaux formation as a cause of false positive results in ABO grouping. (2 marks)
- (ii) Outline a confirmatory test for rouleaux formation. (3 marks)
- (c) State ten characteristics of rhesus antibodies. (10 marks)
13. (a) Using a flow diagram, illustrate the intrinsic pathway of blood coagulation mechanism. (10 marks)
- (b) (i) Outline the principle and procedure of Lee and White clotting time test. (6 marks)
- (ii) Give four causes of prolonged clotting time. (4 marks)
14. (a) Outline the procedure of major crossmatch. (12 marks)
- (b) Explain the importance of each tube in the major crossmatch procedure. (8 marks)
15. (a) Describe the three stages of Erythrocyte Sedimentation Rate (ESR). (9 marks)
- (b) Discuss iron deficiency anaemia with respect to:
- (i) causes; (5 marks)
- (ii) laboratory diagnosis. (6 marks)

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