

Name: _____ Index No: _____ / _____

1408/314
BIOLOGY TECHNIQUES
June/July 2014
Time: 3 hours

Candidate's Signature: _____

Date: _____



THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN SCIENCE LABORATORY TECHNOLOGY

BIOLOGY TECHNIQUES

3 hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided above.

Sign and write the date of the examination in the spaces provided above.

You should have a Scientific calculator (battery operated) for this examination.

This paper consists of TWO sections: A and B.

Answer ALL the questions in section A in the spaces provided, and any TWO questions from section B in the spaces provided after question 19.

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

Candidates should answer the questions in English.

For Examiner's Use Only

Section A

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total Score
Candidate's Score																

Section B

Question	16	17	18	19	Total Score
Candidate's Score					

**GRAND
TOTAL**

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This paper consists of 16 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 (60 marks)

Answer ALL the questions in this section in the spaces provided.

1. (a) State the principle of darkfield microscopy. (2 marks)

- (b) Distinguish between magnification and resolution of a lens. (2 marks)

2. (a) Compare and contrast endocytosis and exocytosis. (3 marks)

- (b) State specific examples where each of the processes named in (a) above are used in living things. (1 mark)

3. State the difference in preparation of material for the light and electron microscopy with respect to the following:

(a) fixation; (1 mark)

(b) staining; (1 mark)

(c) sectioning. (2 marks)

4. (a) Name the monosaccharides that make up each of the following disaccharides:

(i) maltose; (1 mark)

(ii) sucrose. (1 mark)

(b) State the building units for each of the following:

(i) carbohydrates; (1 mark)

(ii) proteins. (1 mark)

5. Explain the isolation technique of an organism from the soil that uses atmospheric nitrogen as its only source of nitrogen. (4 marks)

6. Draw and label each of the following cells:

(a) neutrophil;

(2 marks)

(b) monocyte.

(2 marks)

7. Figure 1 below shows a display of a dissected rat. Identify the organs labelled (i) to (viii).

(4 marks)

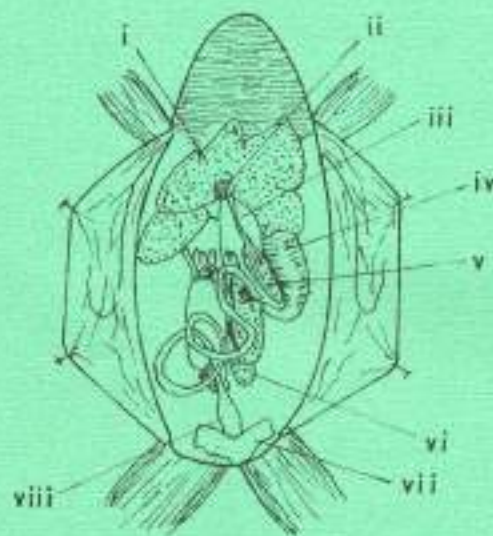


Figure 1

8. (a) Name **four** types of traps used to collect insects for museum purposes. (2 marks)

- (b) State **four** techniques used in the preservation of mammalian species in a museum. (2 marks)

9. 100 g of a fresh soil sample produced the following data on analysis: After heating at 115 °C and cooling in a dessicator, consistent readings of dry mass of 85 g were obtained. The dry soil was heated repeatedly to red-heat in a crucible, cooled in a dessicator and weighed. The mass was now found to be 50 g. Calculate the percentage water content and organic content of the fresh soil sample. (4 marks)

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10. (a) Differentiate between density-dependent and density-independent factors of population control. (2 marks)

- (b) Give specific examples of each of the population controls in 10 (a) above. (2 marks)

11. Outline the precautions taken during collection of specimen for herbarium. (4 marks)

12. If bacteria of types (i) to (iv) below were mixed with nutrient agar in four separate test tubes, show by means of dots the distribution that would be expected for each type of bacteria

- (a) aerobic;
- (b) anaerobic;
- (c) facultative;
- (d) microaerobic.

(4 marks)

13. Two stream water samples were each inoculated into petridishes containing Mac Conkey's agar. The samples were labelled A and B and were incubated at 37 °C. Petridish A produced red colonies while in B, the colonies were colourless. Explain. (4 marks)

14. (a) Outline the preparation of 100 cm³ of 10% glucose solution. (2 marks)

- (b) Explain how the concentration of ascorbic acid is determined in an unknown sample. (2 marks)

15. Explain the effect of increasing substrate concentration in the following enzymatic reactions:

- (a) competitive inhibition; (2 marks)

- (b) non-competitive inhibition. (2 marks)

SECTION B (40 marks)

Answer any **TWO** questions from this section in the spaces provided after question 19.

16. (a) Figure 2 below is a diagram of a compound light microscope.

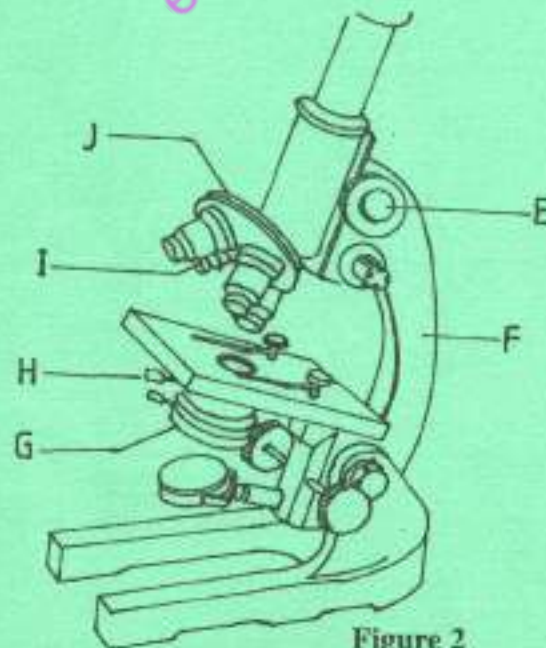


Figure 2

- (i) Identify the parts labelled E to J. (6 marks)
- (ii) State the functions of parts E to H. (6 marks)

