1904/105
BIOLOGY TECHNIQUES I
Oct./Nov. 2022
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN SCIENCE LABORATORY TECHNOLOGY

MODULE I

BIOLOGY TECHNIQUES I

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
Answer booklet;
Non-programmable scientific calculator.
*The paper consists of **TWO** sections; **A** and **B**.*
*Answer **ALL** questions in section **A** and any **TWO** 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.

Turn over

SECTION A (60 marks)

*Answer **ALL** questions in this section.*

1. (a) Distinguish between cytoplasm and nucleoplasm. (2 marks)

   (b) Define the following terms as used in microscopy:

   (i) working distance of an objective; (1 mark)

   (ii) resolving power of a lens. (1 mark)

2. Describe each of the following processes:

   (a) phagocytosis; (2 marks)

   (b) pinocytosis. (2 marks)

3. State **four** roles of mitosis. (4 marks)

4. List **four** methods of moist heat mode of sterilization. (4 marks)

5. State the fate of the following factors during photosynthesis:

   (a) water; (2 marks)

   (b) carbon dioxide. (2 marks)

6. (a) State **three** properties of disaccharides. (3 marks)

   (b) Identify **two** examples of disaccharides. (1 mark)

7. Define each of the following techniques in microbiology:

   (a) aseptic technique; (2 marks)

   (b) inoculation. (2 marks)

8. Explain the role of mammalian skin in excretion. (4 marks)

9. (a) Describe the mammalian double circulatory system. (2 marks)

   (b) Draw a labelled cross-section diagram of a capillary. (2 marks)

10. Draw a labelled diagram of a mature human ovum. (4 marks)

11. State **four** characteristics of phylum Nematoda. (4 marks)

12. (a) Define the term 'balanced diet'. (1 mark)

(b) The illustration below represents a dental formula of a mammal.

$$i\frac{0}{3},\ c\frac{0}{1},\ pm\frac{3}{3},\ m\frac{3}{3}$$

(i) Calculate the total number of teeth in the mammal. (1 mark)

(ii) Identify the mode of feeding of the mammal, giving a reason. (2 marks)

13. (a) State the importance of excretion in living organisms. (2 marks)

(b) Name **two** substances excreted through the liver. (2 marks)

14. Give any **four** functions of the mammalian kidney. (4 marks)

15. Identify the part of the reproductive system where each of the following processes take place:

(a) oogenesis; (1 mark)

(b) fertilisation; (1 mark)

(c) implantation; (1 mark)

(d) formation of sperms. (1 mark)

SECTION B (40 marks)

*Answer any **TWO** questions from this section.*

16. (a) Outline the procedure of estimating the cell size in microscopy. (8 marks)

(b) Name **four** types of light microscopes. (4 marks)

(c) Describe the care and maintenance of a compound light microscope. (8 marks)

17. (a) Relate the structure of proximal convoluted tubule to its functions. (10 marks)

(b) Explain the importance of water in the body of living organisms. (10 marks)

18. (a) Explain the process of fertilisation in a flowering plant. (16 marks)

(b) Highlight **four** functions of golgi bodies. (4 marks)

19. (a) State the functions of the following parts of a light microscope:

(i) condenser; (2 marks)

(ii) iris-diapragm. (2 marks)

(b) Describe each of the following techniques used in cell isolation for microscopic examination:

(i) teased preparation; (4 marks)

(ii) squash preparation; (4 marks)

(iii) maceration; (4 marks)

(iv) touch preparation. (4 marks)

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