1408/314
BIOLOGY TECHNIQUES
June/July 2017
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

SCIENCE LABORATORY TECHNOLOGY CRAFT

BIOLOGY TECHNIQUES

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
Answer booklet;
Scientific calculator (battery operated).
*This paper consists of **TWO** sections; **A** and **B**.*
*Answer **ALL** the questions in section **A** and any **TWO** questions from section **B** in the answer booklet provided.*
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 ad that no pages are missing.

Turn over

SECTION A (60 marks)

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

1. State the function(s) of each of the following parts of a compound microscope:

   (a) draw tube; (1 mark)
   (b) aperture adjustment; (1 mark)
   (c) mechanical stage; (1 mark)
   (d) objective. (1 mark)

2. Distinguish between rough endoplasmic and small endoplasmic reticulum. (4 marks)

3. Describe the purpose of subjecting tissues through fixation process. (4 marks)

4. (a) Name any **two** types of pentoses found in animals. (1 mark)

   (b) Give any **three** functions of pentoses in living things. (3 marks)

5. Explain how the shape of an enzyme is related to its functions. (4 marks)

6. (a) List the functions of the following bacterial structures:

   (i) capsule; (1 mark)
   (ii) cell wall. (1 mark)

   (b) Classify bacteria according to the mode of production of energy for their metabolism. (2 marks)

7. Explain the differential characteristics of the following agar media:

   (a) blood agar; (2 marks)
   (b) MacConkey agar. (2 marks)

8. (a) Outline the **three** general steps through which antigen-antibody reactions occur. (3 marks)

   (b) Name any **two** types of antigen-antibody reactions. (1 mark)

9. State the methods used in mice euthanasia during laboratory dissection. (4 marks)

10. Outline the procedure of using a 100% formalin as a fluid preservative for museum specimen. (4 marks)

11. Identify the use of the following equipment in ecological studies:

(a) quedrat; (4 marks)
(b) geographical;
(c) Seechi disc;
(d) barometer.

12. Outline the collection of specimen in herbarium techniques. (4 marks)

13. List the effects of the following environmental phenomenons:

(a) greenhouse effect;
(b) acid rain;
(c) ozone depletion;
(d) photochemical smog. (4 marks)

14. Describe the **two** types of surface soil erosion. (4 marks)

15. List any **four** characteristics of an ideal mounting media in histological techniques. (4 marks)

SECTION B (40 marks)

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

16. (a) Describe:

(i) **four** biological activities in which osmosis plays an important role. (8 marks)

(ii) endocytosis. (8 marks)

(b) Explain cell inclusions giving specific examples. (4 marks)

17. (a) Illustrate by use of a suitable diagram the essential requirements for fluorescence microscopy. (14 marks)

(b) Explain the significance of meiosis. (6 marks)

18. (a) Describe the sharpening of microtome knives. (12 marks)

(b) Outline the procedure for preparing a wet mount in slide preparation. (8 marks)

19. (a) Discuss dry heat sterilization as used in microbiology and indicators to assure quality in sterilization. (16 marks)

(b) Distinguish between the physical properties of monosaccharides from those of polysaccharides. (4 marks)

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