2914/104
TAXONOMY, CYTOLOGY
AND MICROBIOLOGY
Oct./Nov. 2018
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN APPLIED BIOLOGY

MODULE I

TAXONOMY, CYTOLOGY AND MICROBIOLOGY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have an answer booklet and scientific calculator for this examination.
*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 3 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) Define the following terms used in microscopy:

   (i) resolving power of a lens; (1 mark)

   (ii) working distance of an objective. (1 mark)

   (b) Calculate the magnification of a microscope with an objective x40, eye-piece x10 and working tube length 180 mm. (2 marks)

2. State the general characteristics of kingdom *monera* in terms of:

   (a) movement; (1 mark)

   (b) reproduction. (3 marks)

3. Differentiate between prokaryotes and eukaryotes in terms of:

   (a) flagella; (2 marks)

   (b) ribosomes. (2 marks)

4. Compare and contrast between phyla zygomycota and ascomycota. (4 marks)

5. Explain why active transport is affected by changes in oxygen concentration but diffusion is not. (4 marks)

6. Describe cytokinesis in plants. (4 marks)

7. Compare and contrast between a plant and an animal cell as seen under a compound microscope. (4 marks)

8. Classify laboratories biosafety levels. (4 marks)

9. (a) Name any **four** dry heat sterilization methods. (2 marks)

   (b) Explain why depth filters are suitable for sterilization. (2 marks)

10. Explain the role of differential media in microbiology. Give any **two** specific examples. (4 marks)

SECTION B (60 marks)

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

11. (a) Describe streak culture inoculation method. (8 marks)

(b) Explain the use of each of the following inoculation methods:

(i) lawn cultures;
(ii) stroke cultures;
(iii) stab cultures.

(12 marks)

12. (a) Draw a labelled diagram of the generalized structure of bacteria. (8 marks)

(b) Using illustrations, classify bacteria according to the shapes of their bacterial cells. (12 marks)

13. Outline the process of meiosis in cell divisions. (20 marks)

14. (a) Explain how the adaptation in animals facilitate the process of diffusion in their bodies. (14 marks)

(b) State the function of each of the following parts of a light microscope:

(i) tube;
(ii) nose piece;
(iii) low power objective;
(iv) stage clips;
(v) diaphragm;
(vi) arm.

(6 marks)

15. (a) Outline the preparation of a wet-mount slide. (4 marks)

(b) Describe the focussing of the light microscope. (13 marks)

(c) The field diameter of a microscope using low power magnification is 1500 μm. A paramecium is estimated to occupy 1.5 divisions out of 10 imaginary divisions. Calculate the magnification of this paramecium as viewed on this microscope on the low power magnification. (3 marks)

THIS IS THE LAST PRINTED PAGE.