

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.**

This the distance b2n front lense
elements of the objective lens

SECTION A (40 marks)

Answer ALL the questions in this section.

180
40
working tube
objective
= 180/40
= 4.5
x=3

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;

→ Have flagella for movement locomotion

(1 mark)

(b) reproduction.

They are prokaryotes, They reproduce both sexually & asexually

(3 marks)

3. Differentiate between prokaryotes and eukaryotes in terms of:

(a) flagella;

Prokaryotes: contain flagella & movement

Eukaryotes: Have ribosomes & protein synthesis

(2 marks)

(b) ribosomes.

source of food

coggregation

(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)

This is because active transport, the molecules move across the permeable membrane which is affected by change in oxygen concentration while diffusion whose solvent molecules move from high region to a low region is not affected by concentration of oxygen

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)

lack cell wall
Have cell wall

8. Classify laboratories biosafety levels. (4 marks)

Level I biosafety cabinet
Level II " "
Level III " "

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

flaming
Hot air oven
Incineration
Infrared

(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)

They are added a differentiable group of bacteria and inhibit over growth of the bacteria.

Example DCA (Deoxy cholate Agar) and MacConkey Agar

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; - It is hollow ~~the~~ attaches to the arm.
 - (ii) nose piece;
 - (iii) low power objective;
 - (iv) stage clips; - where the specimen is viewed
 - (v) diaphragm; - to regulate the amount of light into the condenser
 - (vi) arm. - provides support of the stage, base & tube.
- (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 $1500\ \mu\text{m}$. 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)

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