

2528/203
2922/203
ENVIRONMENTAL MICROBIOLOGY
June/July 2021
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY

MODULE II

ENVIRONMENTAL MICROBIOLOGY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have an answer booklet 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 in the answer booklet provided.

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

Maximum marks for each part of a question are as 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. List **four** classes of microbes. (4 marks)
2. Distinguish between a simple microscope and a compound microscope. (4 marks)
3. Describe the structure of plasmid in a bacterial cell. (4 marks)
4. Distinguish between common pili and sex pili in bacteria. (4 marks)
5. State **four** functions of bacterial cell wall in *Escherichia coli*. (4 marks)
6. State **four** essential requirements of a culture media. (4 marks)
7. Outline the procedure for culturing a fungi using a suitable media. (4 marks)
8. State **four** characteristics of moulds. (4 marks)
9. Draw a labelled diagram of a *penisillium notatum*. (4 marks)
10. Describe any **two** methods of clarifying wine during production. (4 marks)

SECTION B (60 marks)

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

11. (a) Table 1 shows the magnifying powers of three light microscope lenses.

Table 1

Lenses	Objective lens magnification	Ocular lens magnification	Total magnification
Scanning	4X	10X	<u>C</u>
Low power	<u>A</u>	10X	100X
High power	40X	<u>B</u>	400X

- (i) Write the magnifications labelled A, B and C. (3 marks)
 - (ii) Name any **three** types of light microscopes. (3 marks)
- (b) State **seven** differences between a light microscope and an electron microscope. (14 marks)

12. (a) Describe the structure of a flagella in bacteria. (5 marks)
- (b) With the aid of diagrams, describe five classes of flagella found in bacterial cells. (15 marks)
13. (a) With the aid of a diagram, describe the cycle of spore formation to germination. (16 marks)
- (b) State four important features used in identifying bacterial colonies. (4 marks)
14. (a) (i) Draw a labelled diagram describing bacteriophage. (6 marks)
- (ii) Describe the structure of the bacteriophage. (4 marks)
- (b) Draw a labelled lytic pathway of bacteriophage replication cycle. (10 marks)
15. (a) List the importance of fungi to man. (6 marks)
- (b) State six characteristics of bacteria. (6 marks)
- (c) Describe four differences between white wine production process and red wine production process. (8 marks)

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