

2913/104  
AGRICULTURAL PRODUCTION  
AND GENERAL MICROBIOLOGY  
June/July 2023  
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN FOOD SCIENCE AND PROCESSING TECHNOLOGY

MODULE I

AGRICULTURAL PRODUCTION AND GENERAL 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 TWO questions from section B in the answer booklet provided.*

*Each question in section A carries 15 marks while each question in section B carries 20 marks.*

*Maximum marks for each part of a question are as shown.*

*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 (60 marks)**

*Answer ALL the questions in this section.*

1. (a) State the **five** differential microbiological staining techniques. (5 marks)
- (b) Describe **five** types of light microscopes used in microbiology. (10 marks)
2. (a) Differentiate between a nursery bed and a seed bed. (4 marks)  
*A seed bed is a piece of land small or big prepared ready to accept planting material while nursery bed is a small piece prepared for raising seedlings.*
- (b) State **five** care and maintenance practices carried out on the nursery. (5 marks)
- (c) State **six** reasons of crop rotation in agricultural production. (6 marks)
3. (a) Name **five** methods of culturing micro-organisms in a microbiology laboratory. (5 marks)
- (b) With the aid of a diagram, describe the four stages of bacterial growth. (10 marks)
4. (a) State **four** roles of agricultural extension agents in the Kenyan agricultural sector. (4 marks)
- (b) Name the causative agents of each of the following livestock diseases:
- (i) bovine tuberculosis; (1 mark)
  - (ii) anthrax; (1 mark)
  - (iii) trypanosomiasis; (1 mark)
  - (iv) east coast fever. (1 mark)
- (c) Explain each of the following tertiary operations in crop production:
- (i) ridging; (3 marks)
  - (ii) rolling; (2 marks)
  - (iii) levelling. (2 marks)

**SECTION B (40 marks)**

*Answer any TWO questions from this section.*

5. (a) Describe **four** types of culture media in microbiology based on use. (8 marks)
- (b) Explain the significance of micro-organisms to the environment and human activities. (12 marks)
6. (a) State **four** advantages of using seeds as planting material. (4 marks)
- (b) State **six** reasons for pruning in crop production. (6 marks)
- (c) Describe the following types of planting materials for crop propagation:
- (i) cuttings and sets; (5 marks)
- (ii) tubers. (5 marks)
7. (a) Define each of the following:
- (i) micro-organism; (2 marks)
- (ii) microbiology; (2 marks)
- (iii) colony forming unit. (2 marks)
- (b) State **four** precautionary measures observed when handling a light microscope. (4 marks)
- (c) Explain **five** factors which affect the effectiveness of an antimicrobial agent. (10 marks)
8. (a) Define the term harvesting. (2 marks) \*
- (b) State **four** factors which determine the method of harvesting applied in crop production. (4 marks)
- (c) Differentiate between gapping and roguing. (4 marks)
- (d) Describe the post-harvest handling practices carried out in rice production. (10 marks)

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