

2425/101
PRINCIPLES OF CROP PRODUCTION I
AND SOIL SCIENCE
June/ July 2022
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN AGRICULTURE

MODULE I

PRINCIPLES OF CROP PRODUCTION I AND SOIL SCIENCE

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet;

Non-programmable calculator.

This paper consists of EIGHT questions in TWO sections; A and B.

Answer any THREE questions from section A and any TWO questions from section B in the answer booklet provided.

ALL questions carry equal 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 (60 marks)

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

1. (a) Differentiate between budding and grafting. (6 marks)
- (b) Explain self pollination with respect to:
- (i) types;
- (ii) significance. (14 marks)
2. (a) Distinguish between vertical and horizontal disease resistance. (5 marks)
- (b) Highlight **seven** measures that reduce pests and diseases in stored grains. (7 marks)
- (c) The fertilizer recommendation for a given crop is given as 100 kg P_2O_5 /ha. Determine the amount of di-ammonium phosphate (18:46:0) that can be applied in one acre of land. (8 marks)
3. (a) Describe striga weed (*Striga hermonthica*) under the following:
- (i) characteristics;
- (ii) control measures. (10 marks)
- (b) Outline the procedure of transplanting agroforestry seedlings. (10 marks)
4. (a) Explain **four** benefits of determining plant population in crops. (8 marks)
- (b) Highlight the conditions that should be observed during seed certification. (12 marks)
5. (a) Explain **five** losses that are incurred during silage making process. (10 marks)
- (b) Highlight **ten** causes of low crop production in Kenya. (10 marks)

SECTION B (40 marks)

Answer any TWO questions from this section.

6. (a) Explain **five** roles of living organisms in soil formation. (10 marks)
- (b) Explain **five** factors that influence availability and utilization of soil moisture. (10 marks)
7. (a) Highlight **six** effects of climate on soil formation. (6 marks)
- (b) A soil sample has a bulk density of 1.40 g/cm^3 and porosity of 45%. Determine the particle density. (7 marks)
- (c) Highlight **seven** properties of solonchak soils. (7 marks)
8. (a) The following equation shows a chemical weathering process:
- $$\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{X} \rightleftharpoons 2\text{H}^+ + \text{Y} \rightleftharpoons \text{H}^+ + \text{Z}$$
- (i) Identify the substances denoted by the letters X, Y and Z.
- (ii) Explain the process represented by the equation. (8 marks)
- (b) Explain **six** principles of cation exchange. (12 marks)

THIS IS THE LAST PRINTED PAGE.