

2425/101  
PRINCIPLES OF CROP PRODUCTION I  
AND SOIL SCIENCE  
June/July 2018  
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 scientific calculator.*

*This paper consists of 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: PRINCIPLES OF CROP PRODUCTION I** (60 marks)

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

1. (a) Explain ways by which crop rotation maintains soil fertility. (8 marks)
- (b) Highlight the advantages of row planting. (4 marks)
- (c) Calculate the seed rate in Kg/ha for a seed sample that has 3500 seeds per kilogram, germination percentage of 90%, field loss of 10% and the target plant population of 30 plants per square meter. (8 marks)
2. (a) Distinguish quantitative variation from qualitative variation. (4 marks)
- (b) Explain causes of variation in plant breeding. (8 marks)
- (c) Highlight the significance of apomixis in plant breeding. (8 marks)
3. (a) Explain the criteria used in classification of pastures. (8 marks)
- (b) Explain factors that contribute to successful graft union. (12 marks)
4. (a) Explain the measures that may be used to improve food production in Kenya. (12 marks)
- (b) Highlight the benefits of agroforestry system. (8 marks)
5. (a) Explain the purpose of seed legislation in Kenya. (12 marks)
- (b) Outline the stages involved in seed production. (8 marks)

**SECTION B: SOIL SCIENCE (40 marks)**

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

6. (a) Using diagrams, describe 2:1 silicate clay colloid with respect to:
- (i) structure;
  - (ii) properties. (15 marks)
- (b) Explain the importance of the negative charge on soil colloids. (5 marks)
7. (a) Outline oven method of determining soil moisture content. (8 marks)
- (b) (i) Explain the different types of soil acidity.
- (ii) Explain the ways in which ammonium fertilizers increase soil acidity. (12 marks)
8. (a) A soil sample weighing 20-g was extracted using 200 ml of potassium chloride and the concentration of ammonium ions was found to be 270 ppm. Determine the cation exchange capacity of the soil in me/100 mg of the soil. (10 marks)
- (b) Describe the solonetz soils with respect to:
- (i) properties;
  - (ii) consequence on crop production;
  - (iii) reclamation. (10 marks)

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