

2425/101
PRINCIPLES OF CROP PRODUCTION
AND SOIL SCIENCE
June/July 2010
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL
DIPLOMA IN AGRICULTURE
MODULE I
PRINCIPLES OF CROP PRODUCTION AND SOIL SCIENCE
3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

Answer booklet

*This paper consists of TWO sections; A and B.
Answer any THREE questions in section A and any TWO questions from section B.
All questions carry equal marks.
Maximum marks for each part of a question are as shown.*



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.

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SECTION A

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

1. (a) Outline **five** economic importance of weeds in agriculture. (5 marks)
- (b) Explain why green manure is not commonly used by farmers to enrich the soil. (5 marks)
- (c) Discuss the establishment and management practices of a nursery. (10 marks)
2. (a) Explain ways in which soil fertility is lost. (10 marks)
- (b) Explain the factors that limit crop production in Kenya. (10 marks)
3. (a) State **eight** benefits of practising agroforestry. (4 marks)
- (b) Discuss the roles of Kenya Plant Health Inspectorate Service (KEPHIS) under the following sub-headings:
 - (i) seed certification;
 - (ii) plant variety protection;
 - (iii) plant quarantine;
 - (iv) inspection of export/imports. (16 marks)
4. (a) Plant breeding has contributed significantly to the improvement of crop plants. Discuss the objectives of plant breeding. (10 marks)
- (b) Charles Darwin's theory of evolution has contributed to the understanding of evolution of crops. Explain the role of natural selection in crop plants. (10 marks)
5. (a) Explain the role of polyembryony in crop production. (10 marks)
- (b) (i) Describe the bulk method of breeding in self-pollinated crops. (5 marks)
- (ii) Artificial selection in plants is based on phenotypic value of a given trait. Distinguish between qualitative and quantitative traits giving one example in each case. (5 marks)



SECTION B

Answer any TWO questions from this section.

6. During a soil auguring practical lesson, a trainee identified two layers of soil. One layer was lighter while the other one was darker in colour;
- (a) name the dark coloured layer of soil in relation to the soil profile and account for the possible cause of the dark colour; (5 marks)
 - upper layer of top soil
 - high humidity
 - many roots bound
 - (b) explain five factors that influence soil formation and development. (15 marks)
 - parent material
 - topography
 - climate
 - time
 - biotic
7. (a) Identify the six levels of soil classification according to the United States Department of Agriculture (U.S.D.A.). (6 marks)
- Order
 - sub-order
 - soil type
 - family & series
 - phases
- (b) Describe characteristics of vertisols. (14 marks)
8. (a) Describe the formation of silicate clays.
- (b) Describe the following silicate clay structures: (6 marks)
- (i) 1:1
 - (ii) 2:1
 - (iii) 2:1:1 or 2:2. (6 marks)
- (c) Describe the process of freeze-thaw action in weathering. (8 marks)

