

Name: _____ Index No. _____ / _____

2425/101

Candidate's Signature: _____

**PRINCIPLES OF CROP PRODUCTION I
AND SOIL SCIENCE**

Oct./Nov. 2013

Date: _____

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***Write your name and index number in the spaces provided above.**Sign and write the date of the examination in the spaces provided above.**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 spaces provided in this question paper.**All questions carry equal marks.**Maximum marks for each part of a question is as shown.**Do **NOT** remove any pages from this booklet.**Candidates should answer the questions in English.***For Examiner's Use Only**

Question	1	2	3	4	5	6	7	8	TOTAL SCORE
Candidate's Score									

This paper consists of 16 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

Answer any **THREE** questions from this section in the spaces provided.

1. (a) Explain how the following environmental factors influence crop production.
- (i) Light; (10 marks)
 - (ii) Temperature. (5 marks)
- (b) (i) Outline the establishment procedure of a grass pasture. (5 marks)
- (ii) State any **five** ways of improving crop yields in arid and semi-arid (ASAL) areas. (5 marks)
2. (a) Describe the following practices in crop production.
- (i) Improved fallow system; (5 marks)
 - (ii) Cultural control of pests. (12 marks)
- (c) Explain the importance of seed dormancy. (3 marks)
3. (a) Explain the aspects of seed viability. (7 marks)
- (b) Using illustrations, differentiate between a single cross from a double cross in plant breeding. (5 marks)
- (c) Outline **eight** factors to consider in the choice of forage crop for planting. (8 marks)
4. (a) Name the materials used in vegetative propagation of the following crops.
- (i) Yam;
 - (ii) Lily;
 - (iii) Irish potato;
 - (iv) Kikuyu grass;
 - (v) Banana. (5 marks)
- (b) Outline **five** external and **four** internal factors that may influence seed germination. (9 marks)
- (c) Describe **three** components that constitute yield in grain crops. (6 marks)

5. (a) Outline the role of Kenya plant health inspection services (KEPHIS) in seed trade. (4 marks)
- (b) Discuss the effects of weeds in crop production. (8 marks)
- (c) Discuss benefits of breeding for pest resistance. (8 marks)

SECTION B

Answer any TWO questions from this section in the spaces provided.

6. (a) Outline the properties of soil rich in:
- (i) Hydrous oxides;
- (ii) Vertisols. (12 marks)
- (b) Explain how the following microfauna are beneficial to crop production.
- (i) Root nodule bacteria;
- (ii) Arbuscular mycorrhizal fungi. (8 marks)
7. (a) Explain the difference between horizon A and lower horizons in a soil profile. (8 marks)
- (b) Highlight the factors that influence cation exchange capacity (CEC) of the soil. (8 marks)
- (c) Differentiate between particle density and bulk density of soil. (4 marks)
8. (a) Outline the features of residual parent material in soils. (4 marks)
- (b) Explain how climate influences the profile of residual parent material in soils. (6 marks)
- (c) Describe the properties of 2:1 silicate clays. (10 marks)