2425/101
PRINCIPLES OF CROP PRODUCTION I
AND SOIL SCIENCE
Oct./Nov. 2010
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
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**.*
Maximum marks for each part of a question are 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.

SECTION A: (CROP PRODUCTION)

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

1. (a) State **six** advantages of intercropping. (6 marks)

   (b) Describe the factors that determine the quality of seed maize. (14 marks)

2. (a) Explain the stages of disease development in crop production. (6 marks)

   (b) Discuss the ways in which food production can be increased in Kenya. (14 marks)

3. (a) Explain the sources of genetic variation in plant breeding. (8 marks)

   (b) Describe the characteristics of an ideal agroforestry species. (12 marks)

4. (a) Describe the factors that determine plants nutrient availability. (10 marks)

   (b) Discuss the effects of pests in crop production. (10 marks)

5. (a) Describe the factors that influence nitrogen fixation in leguminous fodder crops. (10 marks)

   (b) Discuss the factors that limit the use of organic manures in agriculture. (10 marks)

SECTION B: SOIL SCIENCE

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

6. (a) Describe the factors that influence cation exchange capacity. (8 marks)

   (b) Outline the stages involved in the formation of sedimentary rocks. (12 marks)

7. (a) Describe the procedure for determining moisture content of a soil sample using oven drying method. (8 marks)

   (b) Explain the factors that determine land use capability classification. (12 marks)

8. (a) Describe ferralsols soils under the following headings:

   (i) properties;
   (ii) agricultural uses;
   (iii) distribution. (8 marks)

(b) In an experiment, 20 grammes of a soil sample was extracted using 200 ml of potassium chloride. The concentration of ammonium ions was found to be 270 ppm. Calculate the cation exchange capacity in me/100g of soil. (12 marks)

KCl CEC = Amount of ... / 1g of Hydrogen ion

CEC =

NH = 270 ppm

20g = 200mL KCl

100g = ?

$\frac{100 \times 10}{20} = \frac{1000}{270}$ g

35.5 / 42 / 77.5

KCl =

milli equivalent = RMM / Val.

$\frac{77.5}{2} = 38.75$g.

20g = 38.75g K

100 = 100

100 × 20

20 g = 38.75

100

$\frac{100 \times 38.75}{20} = 193.75$ g

NH = 270

$\frac{193.75}{270} = 0.7$