

To ... 10/10/10

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)

NO MORE HEADS

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.

soil class
clay
silt

Take an empty bowl and soil caps

1000
- empty bottle weight
- put some soil



Soil + bowl = 7
2

Continuous

Continuous

x-x

x-x

- (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)

KA CEC = $\frac{\text{Amount of displaced cation}}{\text{1 g of Hydrogen ion}}$

CEC =

MH = 270 ppm

20g = 200ml KCl

100g = 1

$\frac{100 \times 270}{20} = 1350$
 $\frac{1350}{2} = 675$

Milli equivalent = $\frac{\text{RMM}}{\text{Val}}$

$\frac{77.5}{2}$

= 38.75g

20g = 38.75g K

100g = 100

100 x 2 =

20g = 38.75

100

$\frac{100 \times 38.75}{20}$

= 193.75g

MH = 270

$\frac{193.75}{270}$

= 0.7



- 35.0
- 17.5
- 17
- 16
- 15
- 14
- 13
- 12
- 11
- 10
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1

$\frac{19}{2} = 9.5$