



MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)

University Examinations 2015/2016

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF ENVIRONMENTAL STUDIES

FIRST SEMESTER EXAMINATION FOR DIPLOMA IN AGRICULTURAL
EDUCATION AND EXTENSION

KRM 0200: SOIL FERTILITY AND PLANT NUTRITION

Date: 26/4/2016

Time: 8:30 – 10:30 AM

INSTRUCTIONS

This Paper Consists of FIVE Questions

Answer Question One and Any Other Two Questions in Section B

Section A: 30 MARKS

Question 1:

- a) Define the following terms (5 marks)
 - i. Soil fertility
 - ii. Soil productivity
 - iii. Plant nutrition
 - iv. Soil chemistry
 - v. Plant growth
- b) List five major areas where research in soil science has focused on in the past (5 marks)
- c) Explain briefly three methods of fertilizer application (6 marks)
- d) Differentiate between an essential element and beneficial element (4 marks)
- e) Explain five methods used in classification of fertilizers (10 marks)

SECTION B: 40 MARKS

QUESTION TWO

- a) Discuss five environmental factors affecting plant growth. (10 marks)
- b) Discuss five factors affecting quantity of soil organic matter. (10 marks)

QUESTION THREE

- a) State the functions of the following plant elements
 - i. Nitrogen (5 marks)
 - ii. Phosphorus (5 marks)
- b) Outline the deficiency symptoms of the following plant elements as observed in plants
 - i. Nitrogen (5 marks)
 - ii. Phosphorus (5 marks)

QUESTION FOUR

- a) Define nutrient uptake (1 mark)
- b) Describe the three mechanisms by which nutrients move from the soil to the surface of the plant root. (6 marks)
- c) State three forms in which nutrients occur in soil. (3 marks)
- d) Discuss the factors affecting nitrification of ammonium nitrogen ($\text{NH}_4^+\text{-N}$) in soils. (10 marks)

QUESTION FIVE

- a) Differentiate between mineralization and immobilization (2 marks)
- b) Differentiate between phototropism and photoperiodism (2 marks)
- c) Describe three types of plants with respect to photoperiodism (6 marks)
- d) Discuss five soil factors affecting plant growth (10 marks)