



MACHAKOS UNIVERSITY

University Examinations for 2017/2018 Academic Year

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

**FOURTH YEAR FIRST SEMESTER EXAMINATION FOR BACHELOR OF
EDUCATION (SCIENCE)**

KRM 401: GENERAL SOIL MANAGEMENT

DATE: 6/12/2017

TIME: 11.00-1.00 PM

Instructions:

Answer ALL questions in section A and ANY TWO questions in section B

SECTION A: 30 MARKS (COMPULSORY)

QUESTION ONE (30 MARKS)

- a) Explain the two basic building blocks that result in the formation of a clay soil structure (4 marks)
- b) A laboratory test of the soils in Machakos University farm greenhouse indicated that they contain high levels of salts. Explain three ways how this condition can lead to reduced crop productivity. (6 marks)
- c) Analysis of soils collected from KARLO – Kiboko farm indicated low values of exchangeable potassium. Explain three possible ways which could have contributed to potassium (K^+) loss from the soil (6 marks)
- d) Explain the following terms
 - i. Humus (2 marks)
 - ii. Aggregate stability (2 marks)
 - iii. Photo-autotrophs (2 marks)

- e) Explain two ways timing of application of nitrogenous fertilizers can be used to reduce leaching losses (2 marks)
- f) Explain the importance of relief/topography in soil formation (2 marks)
- g) Differentiate permanent charge and variable charge found on soil colloidal surfaces (2 marks)
- h) Highlight two methods that can be used to determine the cation exchange capacity of a soil (2 marks)

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION TWO (20 MARKS)

- a) A laboratory test of soils collected in a farm near Lake Naivasha indicated low microbial population. Discuss five reasons which could have contributed to this (10 marks)
- b) Discuss five benefits of soil organic matter (10 marks)

QUESTION THREE (20 MARKS)

- a) Discuss five factors which influence soil structure (10 marks)
- b) Explain five soil forming factors (10 marks)

QUESTION FOUR (20 MARKS)

- a) During mineralization, ammonium is produced. Discuss five possible fate of the ammonium produced. (10 marks)
- b) Explain five factors affecting denitrification. (10 marks)

QUESTION FIVE (20 MARKS)

- a) Discuss four characteristics of heavy metal contamination of soils. (12 marks)
- b) Soil compaction inhibits soil aeration. Discuss four ways to prevent soil compaction. (8 marks)