



MACHAKOS UNIVERSITY

University Examinations for 2017/2018 Academic Year

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

AUGUST SESSION EXAMINATION FOR BACHELOR OF EDUCATION (SCIENCE)

KRM 401: GENERAL SOIL MANAGEMENT

DATE: SCHOOL BASED

TIME

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 following terms
 - i. Isomorphous substitution (2 marks)
 - ii. Calcification (2 marks)
 - iii. Mineralization (2 marks)
 - iv. Calcareous soils (2 marks)
- b) Laboratory analysis of soil samples collected from Kathonzwi farm in Makueni County indicated presence of carbonates. Explain three different ways such finding can affect crop productivity in the farm. (3 marks)
- c) Loss of soil materials leads to formation of different type of soil. Explain three ways such materials can be lost. (3 marks)
- d) Explain the four basic soil forming processes. (4 marks)
- e) A soil profile examination in Kakamega forest showed that the top soil was rich in soil organic matter. Explain three possible organic layers which could have been observed (3 marks)

- f) Discuss three different soil water regimes (6 marks)
- g) Continued irrigation using bore-hole water in semi-arid lands of ukambani can lead to salts accumulation in the soils. Highlight three possible types of salt-affected soils that can be found in such areas (3 marks)

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION TWO (20 MARKS)

- a) Laboratory analysis of soil samples collected near Athi River was found to contain heavy metals. Discuss four possible sources of the heavy metals. (12 marks)
- b) Discuss four factors affecting mineralization and immobilization. (8 marks)

QUESTION THREE (20 MARKS)

- a) Explain five factors affecting soil aggregate stability. (10 marks)
- b) Soil samples collected from Green Africa farm in Makueni were found to contain low quantity of soil organic matter. Give five reasons which could lead to this. (10 marks)

QUESTION FOUR (20 MARKS)

- a) Plant growth and yields vary with different soils. Explain five soil factors affecting plant growth. (10 marks)
- b) Explain five soil physical properties (10 marks)

QUESTION FIVE (20 MARKS)

- a) Discuss five soil management measures which should be done to manage soil compaction. (10 marks)
- b) Explain five factors which influence the water holding capacity of a soil. (10 marks)