MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya.
Tel: +254 (0)799529958, +254 (0)799529959, +254 (0)712524293
Website: www.must.ac.ke Email: info@must.ac.ke

University Examinations 2024/2025

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRIBUSINESS MANAGEMENT, BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION, BACHELOR OF SCIENCE IN EDUCATION SCIENCE

AAA 3201: SOIL FORMATION AND CLASSIFICATION

DATE: JANUARY 2025 **TIME: 2 HOURS**

INSTRUCTIONS:

1. Answer Question ONE, and any other TWO

QUESTION ONE (30 MARKS)

a) Define the term "soil colloid" and its significance in crop production. (2 Marks)
b) Using an illustration, describe soil as a Two, Three and Four spheres system (6 marks)
c) Calculate the bulk density of a rectangular soil sample with dimensions 12 cm by 6 cm by 4 cm that has 15% moisture content and weighs 320 g. (4 marks)
d) Discuss the soil parent materials and topography as soil forming factors and show how they influence soil formation. (5 marks)
e) Describe the anthropedogenic horizons and relate each with their morphometrics. (5 marks)
f) Discuss how the soil survey system is used in soil classification (3 marks)
g) Explain how frost actions influence the physical weathering of rocks (5 marks)

QUESTION TWO (20 MARKS)

a) Explain how climate influences the development of soil profile (4 marks)
b) With examples, explain how the primary and secondary rock minerals are formed (4 marks)
c) Explain the importance of organic matter in soil formation. (6 marks)
d) Compare and contrast the physical features of the following rocks:
   i. Granite and gneiss rocks (2 marks)
   ii. Limestone and dolomite (2 marks)
   iii. Shale and slate (2 marks)

QUESTION THREE (20 MARKS)

a) Explain how chemical weathering of rocks differ from mechanical weathering (4 marks)
b) Explain how you would differentiate the capability subclass from the capability unity in land classification system. (4 marks)
c) Discuss illuviation and eluviations in relation to the development of soil profile. (5 marks)
d) Explain how soil is classified according to USDA soil taxonomy system. (7 marks)

QUESTION FOUR (20 MARKS)

a) Describe the following soil textural classes:
   i. Loamy sand (1 mark)
   ii. Silt loam (1 mark)
   iii. Clay loam (1 mark)
   iv. Clay (1 mark)
b) After conducting a soil texture analysis, a student observed the following measurements: height of soil aggregates - 8.2 cm, sand - 3.7 cm, and clay - 2.5 cm. Using a provided soil texture triangle, determine the soil texture of the sample. (8 marks)
c) Describe five soil structures and show how each influences soil drainage. (8 marks)

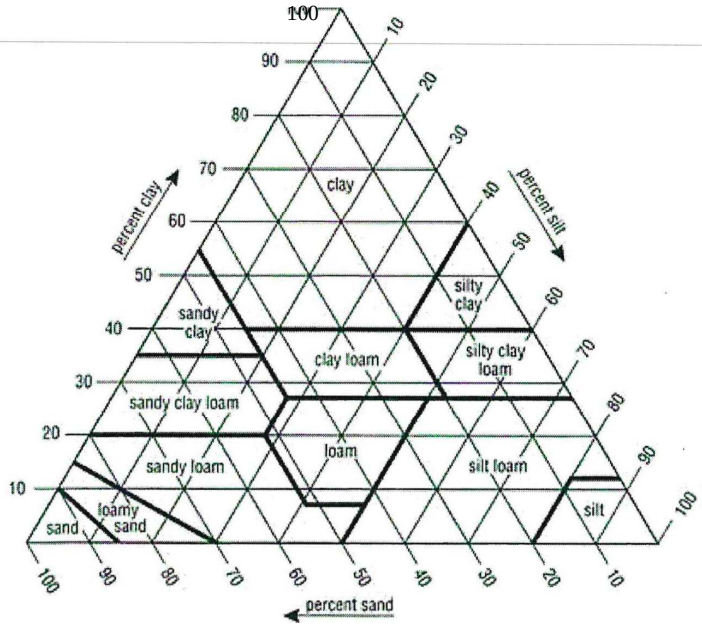

Chart showing the percentages 01 clay, silt, attd sand in the basit textural classe¶