



W1-2-60-1-6

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
UNIVERSITY EXAMINATIONS 2015/2016
YEAR II SEMESTER I EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE
IN LAND RESOURCE PLANNING AND MANAGEMENT
AHS 2204: SOIL CHEMISTRY

DATE: DECEMBER 2015

TIME: 2 HOURS

INSTRUCTIONS: Answer question one (compulsory) and any other two questions.

QUESTION ONE

a. Define the following terms

i. Mineral

ii. Tetrahedron.

iii. Isomorphous substitution

iv. Expanding Minerals.

v. Cation exchange capacity.

(10 marks)

b. Differentiate between the following using examples where appropriate.

i. Dioctahedral and trioctahedral minerals.

ii. 2:1 and 2:1:1 minerals.

(4 marks)

c. Discuss four properties of soil colloids and their effects on soil chemical properties.
(8 marks)

d. Briefly explain why the vermiculites swell and shrink less than the smectites.

(8 marks)

QUESTION TWO

e. Using illustrations explain what pH dependent charge in the soil is. (10 marks)

- b. Discuss giving examples the factors affecting soil pH. (10 marks)

QUESTION THREE

- a. Discuss as to whether determining of soil cation exchange capacity of highly weathered soil in the laboratory using ammonium acetate (pH 7) methods is an appropriate method. (10 marks)

- b. what are the factors that influence the cation exchange capacity of a soil? (5 marks)

- c. Calculate the gypsum requirement in kg per hectare of reclaiming sodic soil with properties given below.

(Initial ESP = 30, Final ESP = 10, Depth of reclamation = 30cm, CEC = 24 cmol/kg, Bulk density = 1.2 g cm⁻³) (5 marks)

QUESTION FOUR

- a. Discuss the role of soil organisms on soil properties. (10 marks)

- b. Discuss the factors that influence decomposition of soil organic matter. (10 marks)