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University Examinations 2013/2014

SECOND YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN HORTICULTURE

AHS 2204: SOIL CHEMISTRY

DATE: DECEMBER 2013

TIME: 2 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE – (30 MARKS)

- a) Explain four (4) types of soil colloids. (8 Marks)
- b) Explain the difference between mineral colloids and the organic (humus) colloids. (6 Marks)
- c) Distinguish between a 1:1, 2:1 and 2:1:1 layer of silicate clays. (9 Marks)
- d) Differentiate between the following:
 - i. Dioctahedral and Trioctahedral mineral.
 - ii. Permanent charges and pH – dependent charges.
 - iii. Ectomycorrhizas and Arbutoid mycorrhizas. (7 Marks)

QUESTION TWO (20 MARKS)

- a) Describe the characteristics of Kaolinite 1:1 type of silicate clays. (10 Marks)
- b) Explain the expanding nature of the smectite and vermiculite 2:1 type of silicate clays. (10 Marks)

QUESTION THREE (20 MARKS)

- a) Explain the structural characteristics of humus and show the humus hydrophilic sites. (10 Marks)
- b) What do you understand by the following:
 - i. Soil pH.
 - ii. Isomorphous substitution
 - iii. Humification

- iv. Mineralization
- v. Mineral mobilization. (10 Marks)

QUESTION FOUR (20 MARKS)

- a) Explain what is cation exchange capacity (CEC) and explain how it is measured and its units of expression. (4 Marks)
- b) By using an equation, explain how calcium carbonate (CaCO_3) liming reaction neutralizes soil acidity. (10 Marks)
- c) What are the commonly used liming materials? (6 Marks)

QUESTION FIVE (20 MARKS)

- a) Distinguish between saline soils, sodic soils and saline-sodic soils. (6 Marks)
- b) Explain the agricultural practices that can be used to reduce and manage salted soils. (9 Marks)
- c) Explain the influence of micro-organisms in the soil rhizosphere. (5 Marks)