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(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017 ACADEMIC YEAR

SECOND YEAR 2ND SEMESTER SPECIAL/SUPPLEMENTARY EXAMINATION

**FOR THE DEGREE OF BACHELOR OF SCIENCE AGRICULTURE AND
BIOTECHNOLOGY**

COURSE CODE: SAB 213
COURSE TITLE: SOIL CHEMISTRY

DATE: 22ND SEPT. 2017 **TIME: 8 AM – 10 AM**

INSTRUCTIONS TO CANDIDATES

Answer Question ONE and any other TWO Questions.

TIME: 2 Hours

This paper consists of 3 printed pages. Please Turn Over



KIBU observes ZERO tolerance to examination cheating

QUESTION ONE = 30 MARKS (COMPULSORY)

- a) Define the following terms:
- i) Soil (2 Marks)
 - ii) 2:1:1 clay type (2 Marks)
 - iii) Humus (2 Marks)
 - iv) Cation Exchange Capacity (2 Marks)
 - v) Micelle (2 Marks)
- b) Differentiate between 1:1 and 2:1 clay mineral (2 Marks)
- c) Define sorption isotherm (2 Marks)
- d) Describe the effect of soil organic matter on physical properties of soils. (7 Marks)
- e) Define ion exchange (1 Mark)
- f) What are the advantages and disadvantages of the following liming materials?
- i) CaO (2 Marks)
 - ii) Ca(OH)₂ (2 Marks)
 - iii) CaCO₃ (2 Marks)
 - iv) CaCO₃.MgCO₃ (2 Marks)

QUESTION TWO = 20 MARKS

- a) List two materials used to lower the soil pH (1 Mark)
- b) Describe the procedure for soil pH analysis (Water Method) (6 Marks)
- c) Explain factors that influence the effectiveness of liming material (8 Marks)
- d) State various ways of determining Lime requirement of acid soil (5 Marks)

QUESTION THREE = 20 MARKS

- a) State the formulae of Exchangeable Sodium Percentage (ESP) (3 Marks)
- b) Describe the various types of Soil acidity (6 Marks)
- c) Briefly discuss any 2 conditions under which Saline soils form (6 Marks)
- d) Explain the sources of soluble salts in Saline soils (5 Marks)

QUESTION FOUR = 20 MARKS

- a) State the significance of C: N ratio (2 Marks)
- b) Differentiate between Saline and Sodic soils (8 Marks)
- c) Describe the sources of H^+ ions in the soil (5 Marks)
- d) With chemical equations, describe chemical weathering reactions in the soil. (5 Marks)