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# **UNIVERSITY OF KABIANGA**

**UNIVERSITY EXAMINATIONS**

**2015/2016 ACADEMIC YEAR**

**THIRD YEAR FIRST SEMESTER EXAMINATION**

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRO-FORESTRY AND RURAL DEVELOPMENT**

**COURSE CODE: FOR 313**

**COURSE TITLE: SOIL CHEMISTRY AND FERTILITY**

***DATE: 3RD DECEMBER, 2015* *TIME: 9 A.M- 12 P.M***

**INSTRUCTIONS:**

***ANSWER ALL QUESTIONS IN SECTION A AND ANY OTHER TWO QUESTIONS IN SECTION B.***

**SECTION A: (30 marks)**

1. a) i. Explain the relationship between equivalent and valence in soil reactions. (2 marks)

 ii. How man equivalent-ws are needed to neutralize Calcium and Ammonium? (2 marks)

b) i. Explain factors that govern exchange reactions in soils. (2 marks)

 ii. Explain the physical properties imparted to soils by humus. (2 marks)

1. Explain the role of cation exchange capacity (CEC) in plant nutrient availability. (2 marks)
2. i. Describe the characteristics of nitrogen fertilizers. (3 marks)

ii. Explain how the soil pH influences the availability of plant nutrients. (3 marks)

1. Describe sources of plant nutrients in the soil. (4 marks)
2. i. Distinguish between agrochemical and soil conditioner. (2 marks)

ii. Describe the potential effects of agrochemical on underground water. (4 marks)

1. Explain the meaning of:
2. Active acidity. (2 marks)
3. Exchangeable acidity. (2 marks)

**SECTION B: (40 marks)**

**Answer any two questions**

1. i. Discuss the materials that are commonly used to maintain and improve soil fertility. (10 marks)
2. Discuss why the demand for chemical fertilizers has increased over time. (10 marks)
3. i. Discuss the toxicities observed in plants as a result of deficiencies of essential elements. (10 marks)
4. Discuss soil fertility evaluation and its control. (10 marks)
5. Discuss the main processes that produce hydrogen ions (H+) in soil system. (20 marks)