

**UNIVERSITY OF KABIANGA**

**UNIVERSITY EXAMINATIONS**

**2017/2018 ACADEMIC YEAR**

**SECOND YEAR FIRST SEMESTER EXAMINATION**

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE AND HORTICULTURE**

**COURSE CODE: SSC 211**

**COURSE TITLE: SOIL CHEMISTRY**

**DATE: 1ST FEBRUARY, 2018**

**TIME: 9.00 A.M-12.00 NOON**

**INSTRUCTIONS:**

Answer **ALL** Questions in section A and any other **THREE** Questions in section B.

**SECTION A**

**Question One**

1. State any two mechanisms of ionic exchange in the soil. (2 marks)
2. Differentiate between active and exchangeable acidity. (3 marks)

**Question Two**

With relevant reaction, elaborate why aluminum is considered to be an acid component of the soil. (5 marks)

**Question Three**

Outline the chemical exchanges that would occur in the soil between the lime, soil colloids and soil solution following the application of lime. (5 marks)

**Question Four**

Highlight under what circumstances a soil might be expected to take on a net positive charge. (5 marks)

**Question Five**

Highlight the origins and relative magnitudes of the negative charges of the soil inorganic fraction. (5 marks)

**Question Six**

With relevant examples, explain why certain clay minerals expand in water while others do not. (5 marks)

**Question Seven**

Explain two factors that control the ion selectivity in soil. (5 marks)

**Question Eight**

1. Define soil buffering. (2 marks)
2. List three soil properties and/or constituents determine its buffering capacity. (3 marks)

**SECTION B**

**Question Nine**

Explain three factors that control the ion selectivity in soil. (20 marks)

**Question Ten**

Discuss in detail four functional roles of soil organic matter. (20 marks)

**Question Eleven**

1. Highlight the characteristics of the following salt-affected soils: (6 marks)
2. Saline soils
3. Sodic soils
4. Saline-sodic soils
5. Describe how saline soils and sodic soils are reclaimed so that they can be used again for agricultural crop production. (14 marks)

**Question Twelve**

Explain in detail any five properties of soil colloids. (20 marks)