

**MAASAI MARA UNIVERSITY**

**REGULAR UNIVERSITY EXAMINATIONS 2016/2017 ACADEMIC YEAR**

**THIRD YEAR FIRST SEMESTER**

**SCHOOL OF TOURISM AND NATURAL RESOURCE MANAGEMENT**

**BACHELOR OF SCIENCE IN FORESTRY**

**COURSE CODE: FOR 313**

**COURSE TITLE: SOIL CHEMISTRY AND**

**FERTILITY**

**DATE: 31st JANUARY, 2017 TIME: 8:30-10:30AM**

**INSTRUCTIONS TO CANDIDATES**

Answer **ALL** questions in Section A, and Any three in section B.

***This paper consists of 2 printed pages. Please turn over***

**SECTION A**

1. List and briefly describe the FOUR different types of soil colloids **(2 Marks)**
2. Explain how the *Tetrahedrons* and *octahedrons* arrange to form sheets, and how the sheets arrange to form 1:1 and 2:1 clay minerals **(4 Marks)**
3. Identify 5 factors that affect the rate of organic matter decomposition and explain why they are important **(5 Marks)**
4. The following data was obtained after leaching a soil sample with ammonium acetate and KCL **(3 Marks)**

**Exchangeable Cations** **Me/100g Soil (Cmol/Kg soil)**

Ca 1.5

K 1.25

Mg 2.00

Na 1.5

H 0.25

Al 1.5

**Calculate**:

1. CEC
2. % BS
3. % exchangeable acidity
4. Explain how the availability of plant nutrients affected by soil pH **(3 marks)**
5. Describe the main functions of N, P, K, and S in plants, and the main form(s) in which each can be taken up by plants **(4 marks)**
6. Explain the care that should be taken in removing soil samples from a field before testing the soil fertility levels **(2 marks)**
7. Identify four factors that determine the method of fertilizer application **(2 marks)**

**SECTION B**

1. In a 20g soil the following values were obtained: 0.5 m.e of Ca, 0.25 me of Na, 0.1 m.e of K and 0.2 m.e. of Mg. Suppose the C.E.C was 10 m.e/100g soil. Calculate the % saturation of each cation and the total %base saturation    **(15 marks)**
2. Discuss FIVE methods for reclaiming Sodic & Saline-Sodic Soils **(15 marks)**
3. Describe the methods used in the determination of nutrient status of plants in a site **(15 marks)**
4. Compare and contrast the properties, advantages, and disadvantages of organic verses inorganic fertilizer sources **(15 Marks)**
5. Based on your knowledge of organic matter, explain how each of the following agricultural practices tend to affect soil organic matter content     **(15 marks)**
6. Manure additions
7. Tile drainage
8. Tillage
9. Cropping sequence
10. Fertilizer additions

**//END**