



**MASENO UNIVERSITY**  
**UNIVERSITY EXAMINATIONS 2015/2016**

**SECOND YEAR FIRST SEMESTER EXAMINATIONS FOR THE  
DEGREE OF BACHELOR OF SCIENCE IN ENVIRONMENTAL  
SCIENCE WITH INFORMATION TECHNOLOGY**

**MAIN CAMPUS**

**NES 203: PROPERTIES AND ECOLOGY OF SOILS**

Date: 11<sup>th</sup> January, 2016

Time: 8.30 - 10.30 am

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INSTRUCTIONS:

- Answer Question ONE (COMPULSORY) and any other TWO Questions.



**NES 203: Properties and ecology of soils**

Time 2 hrs

**INSTRUCTIONS**

**Answer questions ONE and ANY other TWO questions**

- 1a) Outline the roles of the following organisms in soil ecology
- i) Plants and roots
  - ii) Bacteria and fungi
  - iii) Protozoa and nematodes
  - iv) Bugs or arthropods
  - v) Earth worms
- (2 marks each)
- b) Explain how soil pH affects the availability of the following nutrients to plants up take
- i) Iron
  - ii) Copper
  - iii) Potassium
  - iv) Molybdenum
  - v) Magnesium
- (2 mark each)
- c) Elucidate the main functions of soil in an ecosystem. (10 marks).
- d) Discuss the effects of decreased soil hydraulic conductivity within a watershed on an aquatic ecosystems. (10 marks)
- 2 a) A soil scientist studied soil erosion rate in a field and realized that at the end of one year 60,000 tons of soil is removed from an acre of land. What was the bulk density (in g/cc) of the soil removed per annum if the depth of the soil removed was 15 inches (15Marks).
- b) Enumerate products formed during the conversion of organic forms of the elements to their inorganic forms in soil. (5 Marks)

3. Discuss the roles of the following nutrients in plant growth and development.

(4 Marks each)

- a) Boron
- b) Calcium
- c) Potassium
- d) Phosphorus
- e) Nitrogen

4 a) Describe the factors that control the rate and magnitude of soil erosion caused by wind. (10 Marks)

b) Describe the role of micro-organisms in soil fertility (10 Marks)

5.a) Briefly explain the role of soil clay and organic particles on the nutrients uptake by growing plants. (10 Marks)

b) Explain factors that determine soil carbon to soil nitrogen ratio on a landscape. (10 marks)

6. In detail discuss soil forming factors. (20 marks)