



MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2017/2018

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

MAIN CAMPUS

NES 203: PROPERTIES AND ECOLOGY OF SOILS

Date: 12th February, 2018

Time: 3.30 - 6.30pm

INSTRUCTIONS:

- Answer Question ONE and any other TWO.



- 1 a) Describe factors considered in soil taxonomy process (4 Marks).
- b) Outline the roles of the following organisms in soil ecology
- i. Plants and roots (2 Marks).
 - ii. Bacteria and fungi (2 Marks).
 - iii. Protozoa and nematodes (2 marks).
 - iv. Bugs or arthropods (2 marks).
 - v. Earth worms (2 Marks).
- c) Explain factors that cause soil salinity (4 Marks).
- d) Discuss factors that control soil porosity (12 marks).
- 2 a) A soil scientist studied soil erosion rate in 2 acre of land and realized that at the end of the first year 120,000 tons of soil was removed from the field. What was the depth of the soil removed (in inches) per annum if the soil density was 1.2g/cc . (10 Marks).
- b) Briefly discuss how the following factors affect soil formation:
- i. Biological factors (6 Marks).
 - ii. Landscape topography (4 Marks).

3 a) Discuss how decreased soil hydraulic conductivity within a watershed results into low aquatic biodiversity (10 Marks).

b) Briefly explain how soil clay and organic particles contributes to nutrients up take by growing plants (10 Marks).

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

b) Explain the on-site and off-site effects of soil erosion caused by both water and wind (10 marks).

5 a) Explain how the following forms of soil degradation usually contribute to accelerated soil erosion.

- i. Soil compaction (2Marks).
- ii. Low organic matter (2Marks).
- iii. Loss of soil structure (2Marks)
- iv. Poor internal drainage (2Marks).
- v. Soil acidity problem (2Marks).

b) Elucidate the roles of the following nutrients in plant growth and development.

- i. Boron (2Marks).
- ii. Calcium (2Marks).
- iii. Potassium (2Marks).
- iv. Phosphorus (2Marks).
- v. Nitrogen (2Marks).