MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2013/2014

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: 28ᵗʰ November, 2013,   Time: 8.30 - 10.30 a.m.

INSTRUCTIONS:

- Answer Question ONE and ANY other TWO questions.

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Answer question ONE and ANY other TWO questions from this paper

1 a) Describe how soil permeability and water holding capacity determine soil functions. (4 Marks)

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   (1 mark each)

c) Outline factors that cause soil salinity. (4 Marks)

d) Enumerate products formed during the conversion of organic forms of the elements to their inorganic forms in soil. (5 Marks)

e) Elucidate factors that control soil porosity. (12 Marks)

2 a) A soil scientist studied soil erosion rate in a field and realized that at the end of one year 120,000 tons of soil is removed from an acre of land. What was the depth (in inches) of the soil removed per annum if the soil density was 1.2g/cc. (10 Marks)

b) Explain how irrigation farming can affect soil's properties, ecology and its' influence on global climate change phenomenon. (10 Marks).

3 a) Discuss the factors that control the rate and magnitude of soil erosion caused by water. (10 Marks)

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

4 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

5 a) Discuss the soil forming factors. (15 Marks)

b) Describe the role of micro-organisms in soil fertility. (5 Marks)

6 a) Discuss how soil hydraulic conductivity within the watershed can influence water quality of an aquatic ecosystem. (20 Marks)