UNIVERISTY OF ESWATINI

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL SCIENCE AND PLANNING

FINAL EXAMINATION, MAY/JUNE 2019

BSc, B. Ed.

TITLE OF PAPER: APPLIED SOIL SCIENCE

COURSE NUMBER: GEP416/433

TIME ALLOWED: THREE (3) HOURS

INSTRUCTIONS:
1. ANSWER THREE QUESTIONS
2. QUESTION 1 IS COMPULSORY
3. ILLUSTRATE YOUR ANSWERS WITH EXAMPLES AND CLEARLY DRAWN DIAGRAMS WHERE APPROPRIATE

ALLOCATION OF MARKS: QUESTION 1 (COMPULSORY) CARRIES 40 MARKS WHILE THE REST CARRY 30 MARKS EACH

THIS PAPER SHOULD NOT BE OPENED UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR

GEP416/433: APPLIED SOIL SCIENCE – MAY/JUNE 2019

SECTION A: COMPULSORY

QUESTION 1

a) Using examples explain the applications of soil science in the following fields:
   i) Environmental engineering (5 marks)
   ii) Civil engineering (5 marks)
   iii) Urban and regional planning (5 marks)
   iv) Agriculture (5 marks)
   v) Forestry (5 marks)

b) 'You have been tasked to advise a farmer, in the Lowveld of Eswatini, who wants to construct a sensitive water pipeline that has to pass through an area with deep vertisols, of the pros and cons of constructing infrastructure on such soils'. Outline your advice based on the soil physical properties as well as the soil's applicability to be used as a medium for construction. (15 marks)

(40 Marks)

SECTION B: ANSWER ANY TWO QUESTIONS

QUESTION 2

a) Discuss methods that can be employed by maize farmers in Eswatini to minimise sheet erosion in their fields. (10 marks)
b) Discuss soil properties in relation to their applicability to farming. (20 marks)

(30 Marks)

QUESTION 3

a) Explain the following parameters used in the characterization of a soil profile:
   i) Soil structure (5 marks)
   ii) Soil texture (5 marks)
b) Discuss the pedogenic factors as outlined by Jenny (1941) and how they interact in the development of different soils in the Highveld and Lowveld regions of Eswatini. (20 marks)

(30 Marks)

QUESTION 4

Discuss five pedogenic processes that act on soils on a macro-scale (global scale), highlighting the locations and conditions under which they are most likely to occur.

(30 Marks)

QUESTION 5

a) Compare and contrast a master soil horizon and a diagnostic horizon. (10 marks)
b) Discuss the World Reference Base and Soil taxonomy soil classification systems and outline the similarities and differences of these. (20 marks)

(30 Marks)