(*Knowledge for Development*)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS 2021/2022 ACADEMIC YEAR

SECOND YEAR 2ND SEMESTER MAIN EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE AGRICULTURE EDUCATION AND EXTENSION & BACHELOR OF EDUCATION SCIENCE

COURSE CODE: ASS 223
COURSE TITLE: SOIL MORPHOLOGY AND CLASSIFICATION

DATE: 12TH MAY 2022 **TIME: 9 – 11 AM**

INSTRUCTIONS TO CANDIDATES

Answer Question ONE and any other TWO Questions.

TIME: 2 Hours

This paper consists of 3 printed pages. Please Turn Over

1. a) As an invited guest speaker in the United Nations Climate Change Conference, commonly referred to as COP26, held at the SEC Centre in Glasgow, Scotland, United Kingdom, from 31st October to 12th November 2021, describe how you would define Soil to the delegates. (2 Marks)

   b) The Kenya National Highways Authority (KENHA) is planning to build a new highway and discovers that portions of the new highway will cross soils classified as Vertisols. State how these soils will negatively affect the new highway. (2 Marks)

   c) Differentiate between the following terms

      i) Contact and Regional Metamorphism (2 Marks)

      ii) Ab and AB soil horizons (2 Marks)

      iii) Pedon and Epipedon (2 Marks)

   d) As a soil morphology student, describe the classification of igneous rocks based on chemical composition. (6 Marks)

   e) A Soil Science Student sampled a soil by a core ring measuring 7.2 cm in diameter and 4.8 cm deep. The core weighs 320 g. The total core plus wet soil weight is 830 g. On oven drying at 105° C the core plus dry soil weighed 638 g. Calculate the Wet and Dry bulk densities and Gravimetric moisture contents of the soil. (6 Marks)

   f) Describe the MAIN diagnostic features of the soil types that were observed during the Soil Morphology field trip that covered Kibabii - Mumias - Kakamega and Webuye Route using the Revised Legend FAO 1978 Soil Classification System. (8 Marks)

2. a) Using Equations, differentiate between Hydrolysis and Hydration. (4 Marks)

   b) Describe the pedogenetic processes involved in the development of soil horizons. (16 Marks)

3. a) Describe the changes that were introduced in FAO Revised Legend Soil Classification system of 1978. (8 Marks)

   b) Discuss the Reasons for the abolishment of USDA soil taxonomy classification system by Soil Scientists around the world. (8 Marks)

   c) Describe the chronological processes that was involved in the development of World Reference Base (WRB) as a universal soil classification system. (4 Marks)

4. Discuss the MAJOR Resolutions that were made in the International Union of Soil Science (IUSS) Council meeting held in Jeju, South Korea 2014 with regard to Soil Classification. (20 Marks)

5. a) State the Assumptions that are usually made during soil textural analysis in the Soil Laboratory. (6 Marks)

   b) As a Consultant for the Department of Agriculture, Kibabii University. Explain how you will carry out Land Evaluation for their Farm. (14 Marks)