(*Knowledge for Development*)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS 2020/2021 ACADEMIC YEAR

SECOND YEAR 2ND SEMESTER SPECIAL/SUPPLEMENTARY EXAMINATION

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

COURSE CODE: SAB 210
COURSE TITLE: SOIL PHYSICS

DATE: 13TH JANUARY 2022 **TIME:** 11 – 1 PM

INSTRUCTIONS TO CANDIDATES

Answer Question ONE and any other TWO Questions.

TIME: 2 Hours

This paper consists of 2 printed pages. Please Turn Over

QUESTION ONE = 30 MARKS (COMPULSORY)

a) Differentiate between Soil Buffering and Filtering capacities (4 Marks)

b) A cylindrical soil core had a height of 5 cm and a diameter of 10 cm. The wet mass of the soil was 500 g. After oven drying the soil mass was 450 g. Calculate the following:

(i) Bulk density (4 Marks)

(ii) Mass wetness (3 Marks)

(iii) Volume wetness (3 Marks)

(iv) Porosity of the soil (2 Marks)

c) Classify Soil particles based on USDA System (7 Marks)

e) Describe the Stokes law assumptions (7 Marks)

QUESTION TWO = 20 MARKS

a) Describe soil structure based on:

- Engineering approach (5 Marks)
- Pedological approach (5 Marks)

b) Describe the Russell's theory of crumb formation (10 Marks)

QUESTION THREE = 20 MARKS

a) Describe how clay content affects the Atterberg's limits. (6 Marks)

b) The cross – sectional length of the soil 15 cm and the outflow is 25 cm/sec. What is the saturated hydraulic conductivity (*Ks*) if the hydraulic gradient is 0.46 (3 Marks)

c) Differentiate between primary and secondary soil separates. (5 Marks)

d) Describe the Swelling process in the soil. (6 Marks)

QUESTION FOUR = 20 MARKS

a) Describe the soil water regimes (10 Marks)

b) Describe the importance of Soil Solids. (10 Marks)

QUESTION FIVE = 20 MARKS

Outline the procedure for Particle Size analysis using the Hydrometer method. (20 Marks)