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**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

**THIRD YEAR 1ST SEMESTER
SPECIAL/SUPPLEMENTARY EXAMINATIONS**

**FOR THE DEGREE OF BACHELOR OF AGRICULTURE AND
BIOTECHNOLOGY**

COURSE CODE: ASS 312
COURSE TITLE: SOIL PHYSICS

DATE: 2ND AUGUST 2023

TIME: 8 – 10 AM

INSTRUCTIONS TO CANDIDATES

Answer Question 1 and any other TWO questions.

TIME: 2 Hours

This paper consists of 3 printed pages. Please Turn Over



QUESTION ONE = 30 MARKS (COMPULSORY)

- a) State the components of Horton's Equation (2 Marks)
- b) A soil has an Apparent Density of 1.62 g/cm^3 and a True Density of 2.75 g/cm^3 . Calculate
- Total Porosity (3 Marks)
 - Void Ratio (3 Marks)
 - Specific Gravity (3 Marks)
 - Dry Specific Volume (3 Marks)
- c) Classify Soil particles based on USDA System (4 Marks)
- d) State the Stoke's Law (2 Marks)
- e) Describe the three Models that explain the distribution of ion in the water layer adjacent to the clay minerals (6 Marks)
- f) State the factors that affect Soil Affinity for water (4 Marks)

QUESTION TWO = 20 MARKS

- a) Describe soil structure based on:
- Edaphological approach (5 Marks)
 - Ecological approach (5 Marks)
- b) Describe the complexity of the soil structure (10 Marks)

QUESTION THREE = 20 MARKS

- a) Describe the methods used in fractionation in soil particle assessment. (6 Marks)
- b) Discuss the soil water regimes (8 Marks)
- c) Describe the conditions for Evaporation process of water from the soil to take place. (6 Marks)

QUESTION FOUR = 20 MARKS

4. a) Describe the crumb formation mechanism according to Calcium linkage theory (6 Marks)
- b) Differentiate between wet and dry sieving as a measure of aggregate stability (4 Marks)
- c) Describe the Atterberg soil constants (10 Marks)

QUESTION FIVE = 20 MARKS

Discuss the equipment's used in measuring soil water contents. (20 Marks)