

Study Programme	: Bachelor of Technology Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	: AGX4356 Soil Science
Academic Year	: 2023/24
Date	: 05/02/2023
Time	: 9.30 to 12.30 hrs
Duration	: 3 hours

## SECTION II

Answer **any four (04)** Questions.

Answer for each question should commence from a new page.

You may spend **two (2) hours**.

1. Define the term “**Rock Weathering**” and explain how water and temperature cause physical weathering of rock.  

*(25 marks)*
2. a) Describe the main processes involved in the nitrogen cycle.  

*(12.5 marks)*

b) Explain how C/N ratio affects the decomposition of organic matter added to the soil.  

*(12.5 marks)*
3. Biological Organisms in soil play a key role in improving soil health for better plant growth. Critically analyse this statement.  

*(25 marks)*
4. a) Why do sandy soils generally have a lower CEC compared to clay or loamy soils?  

*(05 marks)*

b) How can soil pH influence CEC and, in turn, nutrient availability for plants?  

*(10 marks)*

c) What are the consequences of a low CEC on soil nutrient management?  

*(10 marks)*
5. a) Calculate the quantity of Urea, DAP (Diammonium Phosphate), and MOP required for 1 hectare (ha) of a maize field. The recommended dose of N:P:K is 120:80:40 kg/ha, respectively.  
The nutrient contents are as follows:  
Urea: 46% N  
DAP: 18% N and 46% P<sub>2</sub>O<sub>5</sub>  
MOP: 60% K<sub>2</sub>O

**Note:** For DAP, account for both nitrogen (N) and phosphorus (P<sub>2</sub>O<sub>5</sub>) contributions when calculating the required quantities of fertilizers.

*(10 marks)*

b) How can farmers balance the use of organic and inorganic fertilizers to achieve sustainable agriculture? Explain with examples.

*(20 marks)*

6. a) What is acidic soil, and what are causes for acidic formation in soil?

*(5 marks)*

b) Performing soil amendment is a complex and time-intensive process. Explain the steps involved in conducting a proper soil amendment effectively.

*(20 marks)*