

UNIVERSITY OF RUHUNA

Final Examination in BSc Agricultural Resource Management and Technology (Part I)

July - 2016

SS 4104 Techniques in Soil Research

Time allocation: 2 hours

Index number

INSTRUCTIONS

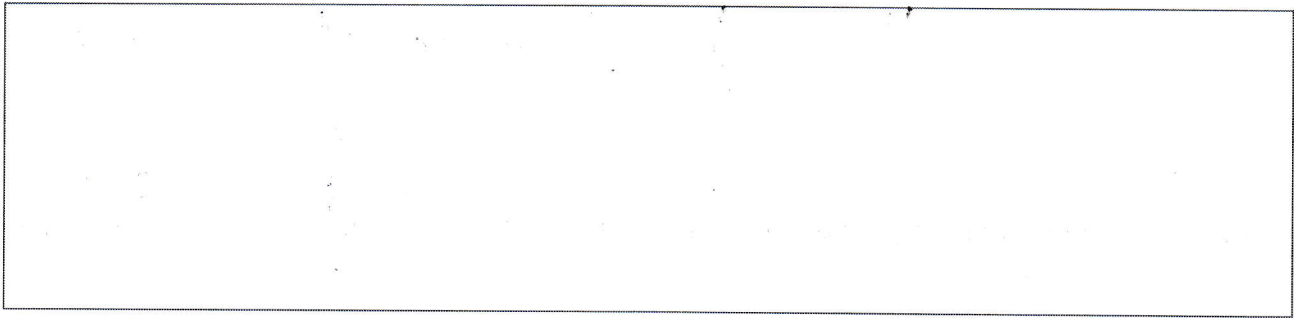
Answer all questions.

Please use the space provided in the question paper

Only non-programmable calculators are permitted.

Mobile phones are NOT permitted.

- 1)
- a. A planter requests you to analyze the soil of his land. What is the first question that you would ask from him? (3 marks)
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 - b. From a planter's perspective, what kind of problems he might be having in his land? (4 marks)
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 - c. Assuming that you have undertaken the job and the planter takes you to his field. What would you do first? (4 marks)
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 - d. What are the challenges you might face when you are given an assignment to analyze the soil of a plantation as in the planter's case? (8 marks)
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 - e. Assume that you have decided to do a quantitative analysis of the soil. What are the basic parameters you would analyze? (6 marks)
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- 2) Assume that you have brought soil samples from the field of the planter to the laboratory for the analysis.
- a. Using a flow diagram indicate the process of sample analysis in the lab (5 marks)



b. What are the factors you consider before, during and after the analysis that lead to a better analysis and results? (6 marks)

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c. During the analysis, what are the avenues that you have to use to detect errors? (4 marks)

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d. What are the measures you can take to reduce the occurrence of errors? (10 marks)

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3)
a. What are the three basic parameters measured during the chemical and physical analysis? (3 marks)

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b. Give an example each for the instances where you have used above three parameters in the laboratory. (4 marks)

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c. Following is a list of sample preparation procedures. Indicate which basic property is intended to be measured afterwards. (6 marks)

Titration –

Precipitation –

Ignition –

Excitation of atoms at high temperature –

d. What are the main activities involved in the assessment of organisms living in the soil? (4 marks)

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e. What are the tricks used to trap motile soil macro and meso fauna? (8 marks)

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4) Instrumentation in soil analysis has developed to a great extent in the recent past

a. Indicate the advantages of using instrumentation for analytical processes. (5 marks)

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b. What are the difficulties the laboratory managers of the developing countries may face in using instrumentation in their laboratories? (8 marks)

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c. Name five (5) analytical instruments you know and indicate the measurement principle used in it. (5 marks)

AAS -
Flame photometer –
pH meter –
EC meter –
ICP -
Spectrophotometer –
Chromatography –

d. Using a labeled diagram and suitable explanations explain the working principle of **one** of the following instruments: Flame photometer, Spectrophotometer, AAS, Gas chromatograph and ICP. (7 marks)

You may use overleaf (page 4) for the answer.