NATIONAL UNIVERSITY OF LESOTHO

FACULTY OF AGRICULTURE

DEPARTMENT OF SOIL SCIENCE AND RESOURCE CONSERVATION

SSR 4601: SOIL SURVEY AND LAND EVALUATION

Programme: BSc. Agriculture (Soil Science)

JANUARY 2023	**100 MARKS**	**3 HOURS**

INSTRUCTIONS

ANSWER ALL QUESTION

ALL QUESTION CARRY EQUAL MARKS [25 MARKS]

Question 1 [25 marks]

a) Give two definitions of soil survey. **[5 marks]**

b) Mention two (2) types of soil surveys and state any two (2) advantages and two (2) disadvantages of each. **[10 marks]**

c) Five soil survey projects were conducted. The aim for each project is shown in the table below. Indicate the type of soil survey required for each aim. **[10 marks]**

Aims	Type of survey
Project 1: Classify the soils and delineate their location and extent, evaluate their problems and potentials and prepare interpretative maps on soils and land resources	
Project 2: To provide general information on the nature and distribution of the soils in arable and potential arable areas	
Project 3: To assess the suitability of the soils for selected, climatically adapted crops	
Project 4: Identification of contaminated soils and possible remedial strategies.	
Project 5: Mapping soil acidity at NUL farm	

Question 2 [25 marks]

a) One of the principles of soil survey is that *Land resources do not consists of soils alone*. Elaborate this principle. **[6 marks]**

b) Mention any other two principles of soil survey. **[4 marks]**

c) Discuss the following scales as recognized for soil surveys and maps:

i. Reconnaissance surveys **[5 marks]**

ii. Detailed surveys **[5 marks]**

iii. Intensive surveys **[5 marks]**

QUESTION 3 [25 MARKS]

a) What is remote sensing? **[2 marks]**

b) Mention any four (4) importance of aerial photograph in soil survey. **[8 marks]**

c) Describe how tone of an aerial photograph is used to identify land features. **[10 marks]**

d) List five (5) other properties of aerial photographs. **[5 marks]**

QUESTION 4 [25 MARKS]

a) Define the following: **[4 marks]**

Land suitability evaluation

Land capability classification

b) In Land Capability Classification (LCC), what is the criterion for classifying arable and non-arable soils? **[6 marks]**

c) A land suitability evaluation was conducted for watermelon production at a particular place. Results of the evaluation using non-parametric method are shown in Table 1 (next page). As a soil scientist, study the results and provide recommendations to the client interested in producing watermelon in this place. **[15 marks]**

Table 1: Land suitability Evaluation Results for Watermelon

Land Qualities/ Characteristics	Units	Non-parametric method
Climate (c)		
Annual Rainfall	mm	S3
Mean Annual Temp	ºC	S1
Topography (t)		
Slope	%	S1
Wetness (w)		
Drainage		S1
Soil Physical Characters (s)		
Soil Depth	cm	S1
Texture		S1
Fertility Status (f)		
Total. N	%	S2
Available P	Mg/kg	S3
Exchangeable K	cmol/kg	S3
pH		S3
CEC	cmol/kg	S2
Base Saturation	(%)	S1
Aggregate Suitability		
Actual (current)		S3-f, c
Potential		S2-f