

**NATIONAL UNIVERSITY OF LESOTHO
FACULTY OF AGRICULTURE
DEPARTMENT OF SOIL SCIENCE & RESOURCE CONSERVATION**

SSR 320/3 – Soil Fertility and Plant Nutrition

Final Examination

**Programmes: B.Sc. Agriculture – Soil Science, Crop Science and
Agricultural Extension Options**

Year 3

May 2016

Total marks = 100

Time: 3 Hours

INSTRUCTIONS:

Answer ALL Questions

Question 1 (20 marks)

In a tabular format, give all the essential mineral nutrient elements, their elemental symbols, ionic forms in which they are absorbed by plant; grouping them according to their requirements by plants. [20 marks]

Question 2 (30 marks)

In a tabular form,

(a) Give the all the forms in which iron (Fe) and molybdenum (Mo) occur in soil.

[8 marks]

(b) Describe the influence of the following soil factors on their (Fe & Mo) availability:

(i) Clay content [4 marks]

(ii) Clay type [6 marks]

(iii) Humus content [6 marks]

(iv) Soil water content [6 marks]

Question 3 (30 marks)

(a) In a tabular form, discuss the nutrients nitrogen, phosphorus and calcium on the following:

- (i) Occurrence in soil (primary sources, total content and concentrations in soil solution relative to solid forms). [12 marks]
- (ii) Mode of transport to plant root surface [6 marks]

	Occurrence in soil	Mode of transport to plant root surface
Nitrogen		
Phosphorus		
Calcium		

(b) In a tabular format, give the functions and mobility of nitrogen in the plant, and the deficiency symptoms. [12 marks]

Question 4 (20 marks)

- (a) Give the principles of soil fertility management. [5 marks]
- (b) Give any three (3) problems of soil fertility, and **with reference to a specific nutrient**, discuss their impact on soil fertility, particularly on availability of the chosen nutrient. [15 marks]