



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

**THIRD YEAR FIRST SEMESTER UNIVERSITY EXAMINATION FOR THE DEGREE
OF BACHELOR OF SCIENCE IN SOIL SCIENCE AND BACHELOR OF SCIENCE IN
HORTICULTURE**

2017/2018 ACADEMIC YEAR

REGULAR

COURSE CODE: ALS 3316/AHT 3214

**COURSE TITLE: SOIL FERTILITY AND PLANT NUTRITION/ PLANT NUTRITION
AND FERTILIZERS**

EXAM VENUE:LR 2

**STREAMS: BSc. Soil Science , BSc.
Horticulture**

DATE:14/12/17

EXAM SESSION:2.00 – 4.00PM

TIME: 2 HOURS

Instructions:

- 1. Answer ALL questions in section A and ANY other 2 Questions in section B.**
- 2. Candidates are advised not to write on question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

SECTION A [30 MARKS]

Answer ALL questions from this Section.

1. Explain the key functions of agricultural soils. **(3 Marks)**
2. Identify the criteria used for establishing essentiality of an element in plant nutrition and quantify the relative concentrations of essential macro and micro nutrient in plants. **(3 Marks)**
3. Describe the relative importance of root interception, diffusion and mass flow in nutrient transport to plant roots. **(6 Marks)**
4.
 - a. State any THREE advantages of mineral fertilizers. **(3 Marks)**
 - b. A farmer needs to apply 20 Kg/ha of phosphorous and plans to use Single Super Phosphate (20% P₂O₅). Calculate the amount of SSP he would require for his 0.75 ha piece of land. **(3 Marks)**
 - c. If you need to add 80 Kg of Nitrogen and 30 Kg of Phosphorous in one hectare of land, how much Ammonium Nitrate (34% N) and Di-ammonium Phosphate (18:46:0) would you add? **(4 Marks)**
5. Explain the importance of C:N and C:P ratios in plant Nutrition. **(4 Marks)**
6. Describe soil and nutrient management practices that either impair soil productivity and environmental quality. **(4 Marks)**

SECTION B [40 MARKS]

Answer ANY TWO questions from this Section.

7. Discuss THREE roles and TWO deficiency symptoms of each of the following macro-nutrient mineral elements in plants.
 - a. Phosphorous **(5 Marks)**
 - b. Potassium **(5 Marks)**
 - c. Sulphur **(5 Marks)**
 - d. Calcium **(5 Marks)**
8.
 - a) Discuss the factors influencing Phosphorus retention in soils. **(10 Marks)**
 - b) Discuss the factors that affect nutrient availability to plants. **(10 Marks)**
9.
 - a) Define the following term Agronomic Efficiency. **(2 Marks)**
 - b) Highlight any THREE factors that a farmer should consider when determining the rate of fertilizer application for his crops. **(6 Marks)**
 - c) Discuss FOUR ways of improving the fertilizer use efficiency in crops. **(12 Marks)**