CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS, BACHELOR OF SCIENCE IN AGRICULTURE EDUCATION, BACHELOR OF AGRIBUSINESS MANAGEMENT

SOIL 320: SOIL FERTILITY AND PLANT NUTRITION

STREAMS: BSC (AGEC), AGED, AGBM) Y3S2 **TIME: 2 HOURS**

DAY/DATE:TUESDAY 14/04/2020 **11.30 AM – 1.30 PM**

INSTRUCTIONS:

Answer ALL Questions in Section A (30 Marks) and any other Two in Section B (40 Marks)

SECTION A (30 MARKS): ANSWER ALL QUESTIONS

QUESTION ONE

(a) Explain the factors which contribute to nitrite and nitrate leaching or runoff in soils. [4 marks]

(b) Define base saturation and determine the percentage base saturation of a soil he following analysis. For a soil with 0.6 meq of K, 2.1meq Ca, 0.7 meq of Mg and a CEC of 4.0 meq/100g [3 marks]

QUESTION TWO

Explain the functions of phosphorous in plants. [6 marks]

QUESTION THREE

(a) Explain how fertigation is carried on the farm. [5 marks]

(b) Explain any three (3) benefits of liming acidic soils. [3 marks]

QUESTION FOUR

(a) Calculate the amounts of N, P and K in a fertilizer bag with an analysis of 18-14-14 [6 marks]

(b) Why was the best management practice concept introduced in agricultural production? [3 marks]

SECTION B

QUESTION FIVE

(a) Describe the mineral soil colloids of a typical soil profile. [8 marks]

(b) Explain the anion exchange process in soils. [4 marks]

(c) Discuss the physical properties of soil organic matter. [8 marks]

QUESTION SIX

(a) What are the benefits of proper potassium K nutrition in agricultural productivity? [5 marks]

(b) Illustrate a typical nitrogen response curve. [9 marks]

(c) Explain the fate of potassium in the soil solution. [6 marks]

QUESTION SIX

(a) For optimum yields of a new hybrid maize variety, you need to apply 72kg of phosphorous per hectare. How many kilograms of double super phosphate (DSP: 0:25:0) should you apply to obtain optimum maize yields? [8 marks]

Conversation table

Convert column 1 to 2, multiply by	Element	Oxide	Convert column 2 to 1, multiply by
2.29	P	P_2O_5	0.437
1.20	K	K_2O	0.830

(b) Explain the factors that determine the availability of magnesium in soils. [6 marks]

(c) Explain the two pathways that account for most of the movement of nutrients in the soil to the roof rhizosphere. [6 marks]
