

CHUKA



UNIVERSITY

**SUPPLEMENTARY/ SPECIAL EXAMINATIONS**

**THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF  
BACHELOR OF SCIENCE IN AGRICULTURE**

**SOIL 320: SOIL FERTILITY AND PLANT NUTRITION**

**STREAMS: BSC (AGRIC) Y3S1**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 02/02/2021**

**8.30 AM – 10.30 AM**

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**INSTRUCTIONS:**

**ANSWER ALL QUESTIONS IN SECTION A (30 MARKS) ANY TWO IN SECTION B (40 MARKS)**

**SECTION A**

**QUESTION ONE**

- (a) Describe diammonium phosphate fertilizer [4 marks]
- b) Explain base saturation and determine the percentage base saturation of a soil the following analysis. For a soil with 0.7 meq of K, 2.8meq Ca, 0.6 meq of Mg and a CEC of 8.0 meq/100g [3marks]

**QUESTION TWO**

- (a) Discuss ANY THREE (3) factors that you would consider when choosing a fertiliser to apply on a given cropped field [3 marks]
- (b) Explain the components of the calcium cycle [3 marks]

**QUESTION THREE**

- a) Calculate the amounts of N, P and K in a fertilizer bag with an analysis of 13-27-12 [6 marks]
- (b) Discuss the methods of movement of nutrients from the soil to plant roots [3 marks]

**QUESTION FOUR**

- (a) Explain the anion exchange process in soils [4 marks]
- (b) Describe Foliar Applications of fertilizers on the farm [4 marks]

**SECTION B****QUESTION FIVE**

- (a) For optimum yields of a new hybrid maize variety, you need to apply 75 kg of phosphorus per hectare. How many kilograms of single super phosphate (SSP: 0:20:0) should you apply to obtain optimum maize yields? [6 marks]

Conversion table

Convert column 1 to 2 , multiply by	Element	Oxide	Convert column 2 to 1 , multiply by
2.29	P	P <sub>2</sub> O <sub>5</sub>	0.437
1.20	K	K <sub>2</sub> O	0.830

- (b) Discuss potassium nitrate as a commercial source of potassium fertilizer [8 marks]
- (c) Describe the Inorganic Sources of Nitrogen [6 marks]

**QUESTION SIX**

- (a) The amount of nutrient that manure provides and its subsequent availability to plants is influenced by a several factors. Discuss [6 marks]
- (b) Explain any THREE (3) factors which contribute to nitrite and nitrate leaching or runoff in soils [6 marks]
- (b) What are physical properties of soil organic matter? [8 marks]

**QUESTION SEVEN**

- (a) How do Liming agents neutralize acidity in soils? [9 marks]
- (b) Describe the manganese cycle [5 marks]
- (c) Explain the functions of nitrogen in plants [6 marks]