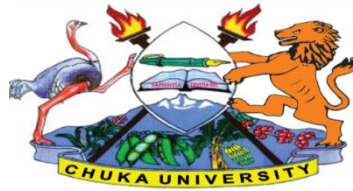


**CHUKA**



**UNIVERSITY**

**SUPPLEMENTARY / SPECIAL EXAMINATIONS**

**THIRD YEAR EXAMINATIONS FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE**

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

**STREAMS: BSc (AGEC, AGED, AGRIC & HORT) Y3S1/S2**

**TIME: 2 HOURS**

**DAY/DATE: TUESDAY 17/11/2020**

**11.30 A.M - 1.30 P.M.**

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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) Explain the organic sources of nitrogen in soils [4 Marks]
- b) Explain base saturation and determine the percentage base saturation of a soil with the following analysis. For a soil with 0.5 meq of K, 2.0 meq Ca, 0.8 meq of Mg and a CEC of 7.0 meq/100g [4marks]

**QUESTION TWO**

- (a) Explain the concept of Microbial Phosphorus in soils [4 Marks]
- (b) How does Soil pH affect P availability? [4 Marks]

**QUESTION THREE**

- (a) Calculate the amounts of N, P and K in a fertilizer bag with an analysis of 17-32-11 [6 marks]
- (b) How does denitrification occur in soils? [3 marks]

**QUESTION FOUR**

(a) Explain rock phosphate as a commercial phosphatic fertilizer source [3 marks]

(b) Derive the equation of how lime neutralizes acidities in soils [2 marks]

**SECTION B**

**QUESTION FIVE**

(a) What are the typical potassium deficient symptoms in plants? [6 marks]

(b) For optimum yields of a new hybrid maize variety, you need to apply 78 kg of phosphorus per hectare. How many kilograms of double super phosphate (DSP: 0:24:0) should you apply to obtain optimum maize yields? [8 marks]

(c) Explain Potassium sulfate (sulfate of potash) as a commercial potassium fertilizer source [6 marks]

**QUESTION SIX**

(a) Explain the factors that influence nitrification processes in soils [6 marks]

(b) Explain the relationships between pH and ion toxicity in soils [6 marks]

(c) Discuss any four (4) factors that determine the availability of magnesium in soils [8 marks]

**QUESTION SEVEN**

(a) Explain the zinc cycling in soils [4 marks]

(b) Contrast foliar versus soil application of nutrients to plants [8 marks]

(c) Explain other factors that may override the fertilizer effects by limiting crop yield potential [8 marks]

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