



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## University Examinations 2012/2013

THIR YEAR, FIRST SEMSTER, EXAMINATIONS FOR DEGREE OF BACHELOR  
OF SCIENCE IN HORTICULTURE

### AHS 2305: PLANT NUTRITION

DATE: AUGUST 2013

TIME: 2 HOURS

INSTRUCTIONS: Answer questions *one* and any other *two* questions

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#### QUESTION ONE – (30 MARKS)

- a) Describe the form in which the following nutrients elements are available to plant.
- i. Carbon
  - ii. Hydrogen
  - iii. Phosphorous
  - iv. Potassium
- ( 5 Marks)
- b) Explain the most recognized functions of nitrogen (N), phosphorus (p) and potassium (K) in plant. (10 Marks)
- c) Explain what is an essential element and highlight four (4) criteria used for essential elements. (6 Marks)
- d) Distinguish between macro-nutrient and micro-nutrients (4 Marks)
- e) Explain the soil factors that influence nutrients uptake. ( 5 Marks)

#### QUESTION TWO (20 MARKS)

- a) Explain how the processes of mass flow, diffusion and root interception affect nutrient uptake. ( 10 Marks)
- b) Explain how nitrogen is lost in the soil. (10 Marks)

#### QUESTION THREE ( 20 MARKS)

Using an illustration, explain how the following terms relate to plant nutrients level in a plant;

- i. Critical value
- ii. Sufficiency range
- iii. Luxury consumption
- iv. Toxicity level
- v. Hidden hunger

**QUESTION FOUR ( 20 MARKS)**

- a) Explain six factors that should be considered when using plant tissue for nutrient analysis. (10 Marks)
- b) Explain how you estimate the total nitrogen present in a particular sample using kjeldahl method. ( 10 Marks)

**QUESTION FIVE ( 20 MARKS)**

- a) Explain the role of the following in supplying nutrients from the soil;
  - i. Soil solution
  - ii. Cation exchange sites
  - iii. Organic matter
  - iv. Soil minerals
  - v. Plant residue(10 Marks)
- b) Explain the following nutrient transformation and interaction;
  - i. Mineralization
  - ii. Immobilization
  - iii. Nutrient uptake antagonism( 10 Marks)