

**CHUKA**



**UNIVERSITY**

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**UNIVERSITY EXAMINATIONS**

**FIRST YEAR EXAMINATION FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE IN AGRONOMY AND MASTER OF SCIENCE IN SOIL SCIENCE AND MASTER OF SCIENCE IN AGRICULTURAL EDUCATION**

**AGRI 811: CROP PHYSIOLOGY**

**STREAMS: MSC (SB/PART TIME)**

**TIME: 3 HOURS**

**DAY/DATE: TUESDAY 06/08/2019**

**2.30 P.M. – 5.30 P.M.**

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**INSTRUCTIONS:**

- **Answer question ONE and any other TWO questions.**
- **Use of calculators is allowed.**
- **Do not write anything on the question paper.**

**QUESTION 1 (20 MARKS) (COMPULSORY)**

- (a) Using the following information determine the photosynthetic efficiency rate of H511 grown at Embu. The hybrid yields 3850 kg/ha of grain, maize stover (leaves and stems) amount to 4389 kg/ha and root weights were estimated at 2922 kg/ha. Plant nutrients from the soil constitute about 10% of the dry weight/ha. A value of 25% was chosen as amount of respiration losses. The energy required for synthesis of 1 kg of glucose is 15792 KJ. Estimated total solar energy striking a hectare of land during growth period at Embu is 15474 million kJ. (10 marks)
- (b) Describe how a functional balance between carbon assimilation by the shoot and nutrient and water uptake by the root exists. (10 marks)

**QUESTION 2 (20 MARKS)**

- (a) Give the energy balance sheet for the oxidation of glucose via glycolysis. (8 marks)
- (b) Discuss the photosensory systems, detailing their effect on plant growth and development. (12 marks)

**QUESTION 3 (20 MARKS)**

- (a) Discuss the mechanisms of nutrient ion absorption in plants. (16 marks)
- (b) Discuss signal-transduction pathways linking internal and environmental signals to cellular responses. (4 marks)

**QUESTION 4 (20 MARKS)**

- (a) Discuss how the interaction between source and sink affect economic yield of a given crop. (6 marks)
  - (b) Discuss photophosphorylation. (14 marks)
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