

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF DEGREE OF MASTERS OF SCIENCE IN AGRONOMY AND MASTERS OF SCIENCE IN HORTICULTURE

AGRI 811: CROP PHYSIOLOGY

STREAMS: MSC (AGRIC, HORT) YISI

TIME: 3 HOURS

DAY/DATE: MONDAY 03/12/2018

8.30 AM – 10.30 AM

INSTRUCTIONS:

- Answer ALL questions in Section 1 and any Two in Section II
- Use of calculators is allowed
- Do not write anything on the question paper

SECTION 1 (20 MARKS): ANSWER ALL QUESTIONS

Question 1 (20 marks)

A plant breeder has developed two maize genotypes, G013 and G087. An experiment was conducted to determine the photosynthetic efficiency of each genotype and the results are presented in table 1.

Table 1:

Genotype	Grain yield (kg/ha)	Stover yield (Kg/ha)	Root yield (Kg/ha)
G013	4960	4389	4032
G087	3850	4389	2922

It is estimated that plant nutrients from the soil constitute about 10% of the dry weight/ha and respiration loss is 25%. The energy required for synthesis of 1 kg of glucose is 15792 KJ and the estimated total solar energy striking a hectare of land during the growth period was 16474 million KJ.

- Determine the photosynthetic efficiency rate for each genotype. [18 marks]
- Advice which would be the best genotype to be adopted in that area. [2 marks]

SECTION II (40 MARKS)

Question 2 [20 marks]

- (a) Describe the functional balance hypothesis with respect to carbon assimilation by the shoot and nutrient and water uptake by the root. [10 marks]
- (b) Discuss the cell wall biogenesis and expansion. [10 marks]

Question 3 (20 marks)

Discuss the photosensory system, detailing their effect on plant growth and development. [20 marks]

Question 4 (20 marks)

Discuss mechanisms of nutrient ion absorption [20 marks]
