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**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF AGRICULTURAL AND FOOD SCIENCES**

**THIRD YEAR FIRST SEMESTER UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN SOIL SCIENCE**

**2016/2017 ACADEMIC YEAR**

**REGULAR**

**COURSE CODE: ALS 3315**

**COURSE TITLE: Crop Eco-Physiology**

**EXAM VENUE: STREAM: BSc. (Soil Science)**

**DATE: EXAM SESSION:**

**TIME: 2 HOURS**

**Instructions:**

1. **Answer ALL questions in section A and ANY other 2 Questions in section B.**
2. **Candidates are advised not to write on question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**SECTION A [30 MARKS]**

**Answer ALL questions from this Section.**

1. Define the following terms:
   1. Harvest index **(2Marks)**
   2. Water potential **(2 Marks)**
2. a. Differentiate between source and sink and give examples. **(2 Marks)**

b. State the importance of transpiration in plants. **(3 Marks)**

c. Explain the ‘Functional balance hypothesis’. **(4 Marks)**

1. Explain the effects of the following on crop growth:
   1. Chilling temperature **(4 Marks)**
   2. Water stress **(4 Marks)**
2. a. Compare the morphological chacteristics of sun and shaded leaves **(3 Marks)**

b. Outline three mechanisms that have been developed by the plants to acclimatize to

salinity. **(3Marks)**

c. Outline the root characteristics of competitive plants. **(3 Marks)**

**SECTION B [40 MARKS]**

**Answer ANY TWO questions from this Section.**

1. a. Imbalances of abiotic factors in the environment cause primary and secondary effects in

plants. Explain these effects. **(8 Marks)**

b. Discuss the mechanisms of adaptation of plants to water stress. **(12 Marks)**

1. a. Describe how photoinhibition due to high light leads to the production of destructive forms

of oxygen. **(6 Marks)**

b. Outline the phenotypic changes in leaf structure and behavior in response to

environmental stress. **(6 Marks)**

c. Discuss the factors affecting optimum maize population density. **(8 Marks)**

1. a. Define photorespiration and state its importance in C3 plants. **(5 Marks)**
2. Discuss the characteristics of C4 plants that enable them inhabit warm climates.

**(7 Marks)**

1. Describe the symplastic movement of water from the soil to the atmospheres.

**(8 Marks)**