

MASENO UNIVERSITY UNIVERSITY EXAMINATIONS 2016/2017

SECOND YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF MASTER OF SCIENCE IN PLANT BREEDING

MAIN CAMPUS

AAG 822: CROP PHYSIOLOGY

Date: 12th April, 2017

Time: 9.00 - 12.00pm

INSTRUCTIONS:

· The paper has two sections (A & B)

Attempt ALL questions in section A and any two (2) in section B

MASENO UNIVERSIRTY

UNIVERSITY EXAMINATIONS 2016/2017

FIRST YEAR FIRST SEMESTER EXAMINATIONS FOR THE DEGREE OF MASTER OF SCIENCE IN GENETICS AND PLANT BREEDING

AAG 822: CROP PHYSIOLOGY

Instructions:

The paper has two sections (A & B)

Attempt ALL questions in section A and any two (2) in section B

Section A (30 marks)

Q1.

- a) Photosynthesis is considered fundamental to life process on earth. Highlight the importance of photosynthesis to life on earth.
 - (4 marks)
- b) Highlight the role(s) of 'light scattering' characteristics of leaf tissue to the overall photosynthetic light absorption by leaves.
- c) Understanding of plant physiology is important in facilitating crop improvement. One way in which such physiological knowledge may be used in breeding programmes is to have it inform the choice of the environment for conducting the breeding trials. Explain.

(7 marks)

- Q2. Besides cellular organization, the other defining feature of living organisms is liquid water.
 - a) Explain the importance of cell-water-related turgidity to the cellexpansive growth of plants. (7 marks)
 - b) By outlining the typical leaf water potential of mesophytic crop species (maize), highlight the potential water loss from maize crops under dry subhumid climates with a typical relative humidity of 60%.

(8 marks)

Section B (30 marks)

Q3.

- a) Highlight:
 - (i) Main differences between 'maintenance respiration' and 'growth respiration'. (2 marks)
 - (ii) The basis of the concept of plant growth being the difference between photosynthesis and respiration. (4 marks)
- Aerobic respiration may be defined as the oxidative breakdown of complex carbon compounds to yield energy and simple molecules like carbon dioxide. Discuss this statement basing on the tricarboxylic acid (TCA).
- Q4.

An important physiological trait currently used in breeding of cereals is the erect leaf angle. What is the significance of this trait to the productivity of cereal crops?

(15 marks)

Q5.

Emerson (1950's) supplemented far red light with shorter wavelength red irradiance and reported higher photosynthetic rates for the combination of the two light qualities compared to the sum of the photosynthetic rates of the two light qualities when measured separately. This phenomenon became known as the "Emerson's Enhancement Effect". Discuss the physiological basis of this enhancement effect. (15 marks)