

43



UNIVERSITY OF SWAZILAND
SUPPLEMENTARY EXAMINATION PAPER

1st SEMESTER 2016 -2017

PROGRAMME: BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION

YEAR 2

BACHELOR OF SCIENCE IN HORTICULTURE YEAR 2

BACHELOR OF SCIENCE IN AGRONOMY YEAR 2

COURSE CODE: CPR203

TITLE OF PAPER: CROP PHYSIOLOGY

TIME ALLOWED: TWO (2) HOURS

**INSTRUCTIONS: ANSWER QUESTIONS 1 AND 2 AND ANY OTHER TWO
QUESTIONS.**

**DO NOT OPEN THIS PAPER UNTIL PERMISSION HAS BEEN GRANTED BY
THE CHIEF INVIGILATOR**

QUESTION 1 – (COMPULSORY)

- a) Some of the physiological deficiency symptoms for N are poor growth rate, chlorosis of old leaves and necrosis. Give an explanation for these symptoms (5 marks).
- b) What is the cause of the relatively lower mobility of Ca and S in plants? (5 marks).
- c) Why are Ca and S deficiencies rarely seen in plants in general? (5 marks).
- d) In what plant functions might Na be able to replace K? (5 marks).
- e) In a plant that is actively transpiring water, the water potential of the plant cells is more or less negative than the water potential of the soil solution. Briefly discuss (5 marks).

[25 MARKS]**QUESTION 2 - (COMPULSORY)**

- a) Define what the harvest index is and indicate how it is calculated (5 marks).
- b) Give an explanation as to why the harvest index is low in some crops (5 marks).
- c) How could the harvest index be improved? (15 marks).

[25 Marks]**QUESTION 3**

- a) Explain the following phenomena (found in plants): osmosis, plasmolysis and imbibition (5 marks).
- b) Describe the mass flow mechanism of phloem transport and supplement this description with the requisite details of anatomy and plant water potential (10 marks).
- c) What do you understand by "light" and "dark" reactions in photosynthesis?(10 marks)

[25 Marks]**QUESTION 4**

- a) Write an equation for the energy balance of a leaf including the major means of heat gain and loss. (10 marks).
- b) Describe the major similarities between mitochondrial oxidative phosphorylation and photophosphorylation in the chloroplast? (10 marks).
- c) How would the ATP yield of respiration be affected by inactivating the alternative oxidase? Explain (5 marks).

[25 MARKS]

45

QUESTION 5

- a) Briefly describe the processes that take place during germination (5 marks).
- b) What do you understand by the term, “seed dormancy” (5 marks).
- c) Explain the significance of dormancy in crop plants, citing specific examples (5 marks).
- d) List four external factors that cause seed dormancy (5 marks).
- e) List four internal factors that cause seed dormancy (5 marks).

[25 Marks]