



UNIVERSITY OF ESWATINI

MAIN EXAMINATION PAPER

PROGRAMME: BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION, Yr 2
BACHELOR OF SCIENCE IN AGRICULTURAL EXTENSION, Yr 2
BACHELOR OF SCIENCE IN AGRONOMY, Yr 2
BACHELOR OF SCIENCE IN HORTICULTURE, Yr 2

COURSE CODE: CPR203

TITLE OF PAPER: CROP PHYSIOLOGY

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER ALL QUESTIONS

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QUESTION 1

The role of plant growth hormones can be considered either as organisers, primarily defining the basic framework of a plant's axial structure, or, as mediators of environmental signals, which lead to modification of physiology and patterns of development.

- (a) Identify one situation where hormone(s) act as organiser(s) and as mediator(s), respectively.
- (b) Name the hormone(s) responsible.
- (c) Briefly describe the associated mechanism(s) in each case.

[20 marks]

QUESTION 2

- (a) Using a named plant process, clarify the relationship between an absorption spectrum and an action spectrum. Illustrate your answer. [10 marks]
- (b) Change in the dose or concentration of a hormone can elicit or result in different physiological effects. Identify and describe effects of a named hormone at different concentrations. [10 marks]

QUESTION 3

- (a) Describe the path followed by water from the soil, through the plant and into the atmosphere. [10 marks]
- (b) Where in the path are the important resistances to water movement? Why? [10 marks]

QUESTION 4

- (a) The equation for the photosynthetic process written as " $\text{CO}_2 + \text{H}_2\text{O} = \text{CH}_2\text{O} + \text{O}_2$ " starts with carbon dioxide (CO_2). Yet CO_2 joins the second phase of the photosynthetic pathway in what are termed 'dark reactions'. Give reasons for CO_2 entry in dark reactions [10 marks]
- (b) Cell elongation, which is the basis for tissue and organ growth, depends on a number of processes. Briefly describe them. [10 marks]

QUESTION 5

- (a) Describe the reactions of photorespiration. You may illustrate if necessary, but dwell on the overall events. Be sure to mention where each part of the process occurs in the cell.
[9 marks]
- (b) You are given seeds of a plant of unknown origin. Describe how you would determine if it was a short-day plant.
[5 marks]
- (c) Name two ways that a solute can cross a membrane moving up against its concentration gradient. Briefly tell how each works.
[6 marks]