



UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

**PROGRAMMES: BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION,
BACHELOR OF SCIENCE IN AGRONOMY AND BACHELOR
OF SCIENCE IN HORTICULTURE YEAR III**

COURSE CODE: CP 305

TITLE OF PAPER: CROP PHYSIOLOGY

TIME ALLOWED: TWO (2) HOURS

**INSTRUCTIONS: ANSWER QUESTION ONE (1) WHICH IS A COMPULSORY
QUESTION AND ANY OTHER THREE (3) QUESTIONS.**

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THE CHIEF INVIGILATOR**

QUESTION 1 (COMPULSORY QUESTION)

Compare and contrast the fundamental differences between the use of light in a developmental signal versus use of light in photosynthesis in plants. [25 marks]

QUESTION 2

- (a) Explain how water moves across a largely hydrophobic plasma membrane? [6 marks]
- (b) Describe the 'cohesion-adhesion theory' in relation to water movement in plants. [13 marks]
- (c) If the air surrounding a transpiring leaf gets warmer, how will such a change affect the transpiration rate of the leaf? [6 marks]

[25 marks]

QUESTION 3

- (a) In the review of 'plant structure and function' it was observed that plants must be able to continually obtain nutrients that are 'finite' and 'dilute'. Describe how plants are designed for collecting finite and dilute nutrients in the environment. [15 marks]
- (b) Is it correct that the main function of aerobic respiration is the production of ATP? Explain your answer. [10 marks]

[25 marks]

QUESTION 4

- (a) Explain the concepts of source and sink in phloem transport [10 marks]
- (b) Describe specific situations and mention the hormones involved, for each of (i), (ii) and (iii) below where:
- i. Any two hormones cooperate to promote a response
 - ii. One hormone decreases sensitivity of cells (antagonistic) to another hormone
 - iii. Two hormones act independently but show contrasting effects

[15 marks]

[25 marks]

QUESTION 5

State a phrase or term (s) that correctly describes the statement that follows

- a) _____ Ratio between the total leaf area (or photosynthesizing tissue) to the total respiring plant tissues (or total plant biomass)
- b) _____ Accumulates in the cytoplasm and organelles to balance the osmotic pressure of ions in the vacuole under both water and salt stress
- c) _____ Hormone action is sometimes mediated by this substance
- d) _____ When leaf water potentials drop due to water deficits, turgor is insufficient to drive this process
- e) _____ Stimulates production of pectinases and cellulase which helps create many intercellular spaces characteristic of hydrophytes
- f) _____ Catalyze movement of one type of ion or molecule against its concentration gradient coupled with the movement of a different ion or molecule in the opposite direction
- g) _____ Major way in which ATP is generated from bond energy under anaerobic conditions
- h) _____ Light response that lead to lateral growth giving shoots and roots of plants recognizable architecture
- i) _____ Application of water soluble solid fertilizer or liquid fertilizer through an irrigation system
- j) _____ Plants that rely on high ion uptake to maintain cell turgor when soil water potential is low

[25 marks]