



UNIVERSITY OF EMBU

2016/2017 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

**FIRST YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN AGRICULTURE, BACHELOR OF SCIENCE IN HORTICULTURE
AND BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION**

ACS 104: PLANT/CROP PHYSIOLOGY

DATE: APRIL 10, 2017

TIME: 11:00AM-1:00PM

INSTRUCTIONS:

Answer Question ONE and ANY other TWO Questions

QUESTION ONE

a) Define the following terms as used in plant/crop physiology:

- i. Secondary dormancy [2 Marks]
- ii. Xylem transport [2 Marks]
- iii. Phloem loading [2 Marks]

b) Identify the growth hormone or hormone group (auxin, cytokinin, abscisic acid, ethylene) most likely involved in control of the following growth processes. One answer for each part please.

- i. Cell division, differentiation of the vascular system [1 Mark]
- ii. Vegetative bud dormancy, seed dormancy [1 Mark]
- iii. Stomatal closure, reduction in plant height [1 Mark]
- iv. Inhibition of axillary bud growth, delay of leaf abscission [1 Mark]
- v. Delay of senescence, stimulation of tissue growth in culture [1 Mark]
- vi. Stimulation of leaf abscission, induction of flowering in pineapple [1 Mark]

c) How are the following three terms used in the context of plant physiology:

- i. Symplast [3 Marks]
 - ii. Photophosphorylation [3 Marks]
 - iii. Photosynthetically active radiation (PAR) [3 Marks]
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- d) What are the effects of Boron deficiency in a plant [3 Marks]
- e) Explain the physiological and anatomical aspects of absorption of water and minerals by roots [3 Marks]
- f) Giving specific crop examples, differentiate between epigeal and hypogeal germination [3 Marks]

QUESTION TWO

- i. Temperature is a major factor affecting seed germination. Discuss. [4 Marks]
- ii. Explain four mechanisms of coat-imposed seed dormancy [8 Marks]
- iii. Discuss four main methods of breaking seed dormancy [8 Marks]

QUESTION THREE

- a) Discuss the effects of water deficiency in photosynthetic processes [5 Marks]
- b) Draw the anatomical structure for a typical C₃ plant leaf [5 Marks]
- c) Explain the role of abscisic acid in mediating response to water stress [5 Marks]
- d) Explain the functions of shoot and root apical meristems in plant growth [5 Marks]

QUESTION FOUR

Using appropriate diagrammatic illustrations where necessary, show the movement of water from the soil to the leaves through the plant and the various physical forces that are involved in the movement under the transpiration pull and cohesion theory. [20 Marks]

QUESTION FIVE

Describe the characteristic features in plant leaves adapted to low light intensities as compared to those adapted to high light intensities. Consider leaf morphology and structures, CO₂ fixation photosynthetic electron transport and cell metabolism in your answer.

[20 Marks]

END