



EMBU UNIVERSITY COLLEGE

(A Constituent College of the University of Nairobi)

2015/2016 ACADEMIC YEAR

SECOND SEMESTER EXAMINATION

FIRST YEAR EXAMINATION FOR THE DEGREE OF MASTERS OF SCIENCE
(PLANT BREEDING)

ACS 601: ADVANCED PLANT PHYSIOLOGY AND METABOLISM

DATE: APRIL 12, 2016

TIME: 02:00-05:00

INSTRUCTIONS:

Answer ANY FOUR Questions

QUESTION ONE

- a) Outline the structural and functional differences between the following cells.
- i) Collenchyma and sclerenchyma cells. (4 Marks)
 - ii) Sclereids and fibres (4 Marks)
 - iii) Sieve cells and sieve tubes (4 Marks)
- b) Describe the evidence that supports cohesion-tension theory and transpiration pull. (8 Marks)
- c) Outline the protein metabolism in plant cells. (5 Marks)

QUESTION TWO

- a) Describe the carrier concept as a mechanism of active salt absorption and the cytochrome pump hypothesis that explain it. (13 Marks)
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- b) Using examples illustrate how transgenic plants have been used to analyze plant metabolism. (12 Marks)

QUESTION THREE

- a) Explain the three methods of synthesizing ATP. (9 Marks)
- b) Describe the role of photosystems in photosynthesis. (6 Marks)
- c) An experiment was carried out to measure the rate of photosynthesis in plants grown under different intensities of light but at low carbon dioxide concentration. Explain the observations that were obtained from the experiment. (10 Marks)

QUESTION FOUR

- a) Describe the process of gluconeogenesis in plants. (10 Marks)
- b) Explain the significance of gluconeogenesis in plants. (3 Marks)
- c) Describe the nature, structure and functions of any three secondary metabolites in named East African crops. (12Marks)

QUESTION FIVE

- a) Describe how the plants growing in semiarid areas of Kenya adapt to the following physiological stress (15 Marks)
- i) Drought
 - ii) Salinity
 - iii) Acidity
- b) In an experiment a plant cell with a water potential of -840 kPa is immersed in a glucose solution whose water potential is -200 kPa. Explain the observation obtained. (10 Marks)

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