



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

THIRD YEAR FIRST SEMESTER EXAMINATION FOR
BACHELOR OF SCIENCE (ENVIRONMENTAL SCIENCES)
SBT 310: PLANT PHYSIOLOGY AND BIOCHEMISTRY

DATE:

TIME:

INSTRUCTIONS

Answer Question one (compulsory) from section A and any two questions in Section B.

Use clean well labelled diagrams wherever appropriate.

SECTION A (COMPULSORY)

QUESTION ONE (30 MARKS)

- a) Differentiate between transpiration and Evaporation (3 marks)
- b) Explain the meaning of following terms:
 - i) Oxidative Phosphorylation (1.5 marks)
 - ii) Stomatal Transpiration (1.5 marks)
- c) Illustrate the formation of a triglyceride (3 marks)
- d) Distinguish between transcription and translation (3 marks)
- e) i. Explain the mechanism of water absorption. (1 mark)
- f) ii. Explain the Role of Essential Elements in metabolic reactions. (2 marks)
- g) Outline the biosynthesis of sucrose (3 marks)
- h) Briefly explain the term translocation (3 marks)
- i) Distinguish between non-cyclic and cyclic electron flow Systems (3 marks)
- j) Define The two types of photophosphorylation in plants (3 marks)
- k) Explain the response of phytochrome system to red and far-red light in plants (3 marks)

SECTION B: (ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS)

QUESTION TWO (20 MARKS)

Discuss the glycolysis pathway

QUESTION THREE (20 MARKS)

Discuss growth and development in plants

QUESTION FOUR (20 MARKS)

Give a detailed account of nitrogen metabolism

QUESTION FIVE (20 MARKS)

Vitamins are accessory food factors which play a vital role in growth, nutrition and certain fundamental metabolic processes. Discuss.

**FOURTH YEAR FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE
IN AGRICULTURAL EDUCATION AND EXTENSION**

SBT 403: ECOPHYSIOLOGY

DATE: 20/12/2017

TIME: 8.30-10.30 AM

INSTRUCTIONS

**Answer Question one (compulsory) from section A and any two questions in Section B.
Use clean well labelled diagrams wherever appropriate.**

SECTION A

1. a) Briefly describe the following terms
 - i. Field capacity (1.5 marks)
 - ii. Permanent wilting percentage (1.5 marks)
- b) Differentiate between the following terms:
 - i. matrix potential and solute potential (1 mark)
 - ii. Apoplast and symplast (1 mark)
 - iii. stomata and a hydathodes (1 mark)
- c) Describe the following process in relation to the upward flow of water in plants:-
 - i. Root pressure (1.5 marks)
 - ii. Capillarity (1.5 marks)
- d) Explain the adaptation of plant roots to absorption of water and mineral salts from the soils (3 marks)
- e) Explain the importance of solar radiation to plants (3 marks)
- f) Distinguish between cyclic and non-cyclic electron flow (3 marks)
- g) Outline the main stages of carbon dioxide assimilation in the calvin cycle. (3 marks)
- h) Describe the adaptation of plants to drought stress (3 marks)
- i) Explain the difference between seed vigor and seed viability (3 marks)

SECTION B

2. Describe the C₄ photosynthetic pathways (20 marks)
3. Discuss factors that influence the opening and closing of stomata (20 marks)
4. Discuss seed dormancy (20 marks)
5. Discuss the mechanisms of adaptation of plants to salinity (20 marks)