



MACHAKOS UNIVERSITY

University Examination for 2021 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

**FOURTH YEAR SPECIAL/SUPPLEMENTARY FOR
BACHELOR OF EDUCATION SCIENCE**

CODE: SBT 403 UNIT NAME: ECOPHYSIOLOGY

DATE: 8/3/2023

TIME: 8.30 – 10.30 AM

INSTRUCTIONS

1. Answer Question 1 (compulsory) and **any two** questions
2. Use clean well labeled diagrams wherever appropriate.

QUESTION ONE (30 MARKS)

- a) Define the following terms: (3 marks)
 - i. Osmotic Potential
 - ii. Pressure Potential
 - iii. Imbibition
- b) Outline any three differences between C3 and C4 plants (3 marks)
- c) Explain any three characteristics of light that influence plants growth and development (3 marks)
- d) Discuss the phosphorylation step of glycolysis process (3 marks)
- e) Describe any three structural factors that affect the rate of transpiration (3 marks)
- f) Highlight any three adaptations to increase water uptake in xerophytes (3 marks)
- g) Outline three directions of translocation in plants (3 marks)
- h) Explain how temperature and Nitrogen affect dry matter production (3 marks)
- i) Outline three adaptations of halophytes to saline environment (3 marks)
- j) Differentiate between physical dormancy and mechanical dormancy in seeds (3 marks)

QUESTION TWO (20 MARKS)

- a) Describe the process of light reaction of photosynthesis (15 Marks)
- b) Discuss any five factors affecting photosynthesis (5 Marks)

QUESTION THREE (20 MARKS)

Discuss any five theories on the mechanisms underlying the translocation of organic solutes through the phloem . (20 marks)

QUESTION FOUR (20 MARKS)

- a) Discuss the glycolytic process (15 Marks)
- b) Explain any five differences between respiration and photosynthesis (5 Marks)

QUESTION FIVE (20 MARKS)

Discuss opening and closing of the stomata based on the following theories

- a) Starch Sugar inter-conversion theory (10 marks)
- b) Active potassium ion pump theory (10 marks)