



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF EDUCATION SCIENCE

SBT 403: ECOPHYSIOLOGY

DATE: 15/3/2022

TIME: 8:30 – 10:30 AM

Instructions

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

SECTION A

Question 1

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

SECTION B

Questions 2

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

Questions 3

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

Questions 4

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

Questions 5

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)