MACHAKOS UNIVERSITY

University Examinations for 2024/2025 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

SECOND YEAR FIRST SEMESTER EXAMINATION FOR DEGREE IN BACHELOR OF EDUCATION (SCIENCE)

SBT 201 : PLANT FUNCTION

DATE: 13TH JANUARY, 2025 **TIME: 11.00 AM – 1.00 PM**

INSTRUCTIONS:

- *Answer question **ONE (Compulsory)** and **any other TWO** questions.*
- *Use clean well labelled diagrams wherever appropriate.*

QUESTION ONE (30 MARKS)

a) Distinguish the following terms:
   i. Imbibition and Osmosis. (1 Mark)
   ii. Phospholipids and glycolipids. (1 Mark)
   iii. Suspension and emulsion. (1 Mark)

b) Describe how you can prepare the following solutions in the laboratory
   i. 15% (w/w) solution of sucrose (1½Marks)
   ii. 0.1M NaCl [Na=23, Cl=36.5] (1½Marks)

c) Outline two criteria an element must meet to be considered essential in plants. (2 Marks)

d) Outline two significance of carbohydrates in plants. (2 Marks)

e) Outline three components of water potential. (3 Marks)

f) Describe three factors affecting respiration. (3 Marks)

g) Explain the fate of pyruvic acid in aerobic respiration. (2 Marks)

h) Describe the concept of resonance energy transfer in the chlorophyll. (2 Marks)

i) Describe the term permanent wilting percentage. (2 Marks)

j) Briefly describe the dark reactions of photosynthesis. (3 Marks)

k) Describe three outcomes of the Krebs cycle in cellular respiration. (3 Marks)

l) Illustrate the structure of a primary amino acid. (2 Marks).

QUESTION TWO (20 MARKS)

a) Explain five factors affecting enzyme activities. (10 Marks)

b) Discuss the classification of proteins. (10 Marks)

QUESTION THREE (20 MARKS)

a) Discuss six properties of colloids. (12 Marks)

b) Explain the distribution of intracellular enzymes in a plant cell. (8 Marks)

QUESTION FOUR (20 MARKS)

a) Describe the role of five endogenous plant hormones in regulating plant growth and development. (15 Marks)

b) Explain water flux into the vacuole. (5 Marks)

QUESTION FIVE (20 MARKS)

a) Describe the main steps in the Embden-Meyerhof-Parnas pathway. (10 Marks)

b) Describe three methods used to detect mineral elements in plants. (10 marks)