



MACHAKOS UNIVERSITY

University Examinations 2017/2018

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGICAL SCIENCES

**THIRD YEAR FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE
IN BIOLOGY**

SBT 310: PLANT PHYSIOLOGY AND BIOCHEMISTRY

DATE: 11/12/2017

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) Differentiate between an amylose and amylopectin (3 marks)
 - b) Explain the meaning of following terms:
 - i. Reductive amination (1.5 marks)
 - ii. Transamination (1.5 marks)
 - c) Describe using an illustration the formation of a triglyceride (3 marks)
 - d) Distinguish between transcription and translation (3 marks)
 - e)
 - i Explain what a co-enzyme is (1 mark)
 - ii Explain the functions of NADH and FADH in metabolic reactions (2 marks)
 - f) Outline the biosynthesis of sucrose (3 marks)
 - g) Briefly explain the term photorespiration (3 marks)
 - h) Explain the differences between non-cyclic and cyclic electron flow Systems (3 marks)
 - i) Outline β -oxidation of fatty acids (3 marks)
 - j) Explain the main purpose of the light reaction phase of photosynthesis (3 marks)
 - k) Describe the photoperiodism phenomenon in plants (3 marks)
 - l) Explain the response of phytochrome system to red and far red light in plants (3 marks)
 - m) Outline the physiological effects of auxins in plants (3 marks)

- n) Differentiate between tropic and nastic movements in plants (3 marks)

SECTION B

2. Discuss C₄ pathway of photosynthesis (20 marks)
3. Describe the biosynthesis and degradation of starch (20 marks)
4. Give a detailed account of nitrogen metabolism (20 marks)
5. Vitamins are accessory food factors which play a vital role in growth, nutrition and certain fundamental metabolic processes. Discuss (20 marks)



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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)

j) Briefly discuss oxidative phosphorylation (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)