

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

**FOURTH YEAR EXAMINATION FOR THE AWARD OF
BACHELOR OF EDUCATION SCIENCE AND BACHELOR OF SCIENCE**

BOTA 474: PLANT PHYSIOLOGY

STREAMS: B.ed (SCI), B.sc Y4S1

TIME: 2 HOURS

DAY/DATE: THURSDAY 11/12/2014

2.30 PM – 4.30 PM

INSTRUCTIONS:

Answer ALL Questions in Section A and Two Questions in Section B.

SECTION A (30 MARKS)

Question 1

- (a) Use a labeled diagram to show the electromagnetic spectrum of light indicating energy flow and wavelengths. [4 marks]
- (b) “Light photons do not all possess the same energy”. Using specific examples explain this statement. [2 marks]

Question 2

- (a) Explain the role of chlorophyll in absorption of light photons. [2 marks]
- (b) Using a well labeled diagram illustrate the absorption spectrum of chlorophyll and carotenoids. [4 marks]

Question 3

- (a) Briefly describe the stages of light reaction process of photosynthesis. [4 marks]
- (b) Distinguish between photosystem I and photosystem II with respect to their light absorption peaks. [2 marks]

Question 4

- (a) Name the products of the light stage of photosynthesis which are utilized in building organic molecules. [2 marks]
- (b) Use a chemical equation to illustrate the role of RUBISCO in carbon dioxide fixation. [4 marks]

Question 5

- (a) Explain the advantages of C₄ plants over C₃ plants with respect to photorespiration. [4 marks]
- (b) Give the disadvantage that C₃ plants have which limits their distribution to warm regions of the earth. [2 marks]

SECTION B (40 MARKS)

Question 6

Outline the cyclic and non cyclic electron transport systems and photophosphorylation. [20 marks]

Question 7

Discuss the plant leaf factors that affect the process of photosynthesis. [20 marks]

Question 8

Describe the Calvin-Benson cycle of photosynthesis. [20 marks]
