

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE  
OF BACHELOR OF EDUCATION SCIENCE AND BACHELOR OF SCIENCE

BOTA 271: PLANT PHYSIOLOGY I

STREAMS: BED (SCI) BSC

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 3/8/2016

2.30 P.M. – 4.30 P.M.

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INSTRUCTIONS:

1. Answer all the questions in section A and two other questions in section B
2. Use illustrations and chemical equations where necessary
3. Candidates are advised not to write on the question paper
4. Adhere to the instructions on the answer booklet

SECTION A (30 MARKS)

1. (a) Explain why cellulose is regarded as a hydrophilic substance. [2 marks]  
(b) Explain how stirring will influence the rate of dissolution of a compound in water. [2 marks]  
(c) State the features of the dispersed phase of a colloidal suspension. [2 marks]
2. (a) State four functions of carbohydrates in the life of a plant. [2 marks]  
(b) Identify the carbohydrate shown by the illustration below and state the bond which joins the two units. [2 marks]

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- (c) Give the chemical equation illustrating the oxidation of an aldose monosaccharide using benedict's solution. [2 marks]
3. (a) Distinguish between saturated and unsaturated fatty acids. [2 marks]
- (b) State the structure and functions of the following plant lipids.
- (i) Glycolipids
  - (ii) Isoprenoids [2 marks]
- (c) Explain how temperature affects the reactivity of plant proteins. [2 marks]
4. (a) Explain the physiology and deficiency symptoms of the following mineral nutrients in plants.
- (i) Nitrates
  - (ii) Sulphates [3 marks]
- (b) Briefly outline the stages of phloem transport of organic food materials in plants. [3 marks]
5. (a) State the functions of the following enzymes in glycolysis
- (i) Hexokinase
  - (ii) Pyruvate kinase
  - (iii) Phosphoglyceratemutase [3 marks]
- (b) Use an illustration to show the  $C_4$  pathway of  $CO_2$  fixation. [3 marks]

### SECTION B (40 MARKS)

6. Discuss the uptake of soil solution in the xylem vessels of plants. [20 marks]
7. Describe the occurrences during the light dependent and light- independent reactions of photosynthesis. [20 marks]
8. Describe the factors which influence enzyme controlled reactions. [20 marks]
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