CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN BIOLOGY, BACHELOR OF SCIENCE IN CHEMISTRY AND BACHELOR OF EDUCATION SCIENCE

BOTA 474: PLANT PHYSIOLOGY II

STREAMS: BSC (BIO, CHEM), BED SCI **TIME: 2 HOURS**

DAY/DATE: MONDAY 10/12/2018 **8.30 AM – 10.30 AM**

INSTRUCTIONS:

Answer ALL the Questions in Section A and only Two Questions in Section B

SECTION A: 30 MARKS (ANSWER ALL THE QUESTIONS IN THIS SECTION)

QUESTION ONE

(a) Explain the events that occur at night in Crassulacean Acid Metabolism (CAM) plants. [4 marks]

(b) Name three pigment molecules that capture light energy during photosynthesis. [3 marks]

(c) Define photorespiration [1 mark]

(d) Describe two alternative pathways for excited chlorophyll to dispose off its available energy. [2 marks]

QUESTION TWO

(a) Describe the process of chemiosmosis phosphorylation in chloroplast. [2 marks]

(b) Name two major protein complexes involved in photosynthetic electron transport. [2 marks]

(c) Explain the mechanism of photoprotection in repair and regulation of the photosynthetic machinery. [4 marks]
(d) Describe two environmental factors that affect canopy photosynthesis. [2 marks]

QUESTION THREE

(a) Distinguish between dynamic and chronic photoinhibition in an intact leaf. [2 marks]

(b) Explain how light intensity affects the rate of photosynthesis. [2 marks]

(c) Explain the significance of Kranz anatomy in a C_4 plant. [2 marks]

(d) Describe two phases of photosynthesis indicating the outputs in each case. [4 marks]

SECTION B: 40 MARKS (ANSWER ONLY TWO QUESTIONS IN THIS SECTION)

QUESTION FOUR

Illustrate the non-cyclic photophosphorylation, pointing out significant events that lead to generation of ATP and NADPH. [20 marks]

QUESTION FIVE

Describe the Calvin Benson (C_3) cycle [20 marks]

QUESTION SIX

Discuss the reactions that occur in the mesophyll and bundle sheath cells of C_4 plants resulting in CO_2 fixation. [20 marks]
