UNAM
UNIVERSITY OF NAMIBIA

FACULTY	**AGRICULTURE, ENGINEERING & NATURAL SCIENCES**		
SCHOOL	**SCIENCE**		
DEPARTMENT	**ENVIRONMENTAL SCIENCE**		
SUBJECT	**ECOPHYSIOLOGY**		
SUBJECT CODE	**EBL 3752**		
DATE	**NOVEMBER 2022**		
DURATION	**3 HOURS**	**MARKS**	**100**

REGULAR EXAMINATION

Examiners: Prof. E.G. Kwembeya & Dr. S. Eiseb (University of Namibia)
Moderator: Dr. L. Hart (University of Namibia)

This examination paper consists of 2 pages (including the front page)

Instructions

- Answer ALL questions from Section A.
- Answer ANY TWO questions from Section B.
- Label all your answers appropriately and neatly.
- The use of scientific calculators in this examination is allowed.

UNIVERSITY OF NAMIBIA EXAMINATIONS

Section A: Answer ALL questions from this section (50 Marks)

Question 1

(a) Explain how absorption and action spectra are used in photobiology. (4)

(b) Distinguish between oxygenic photosynthesis and anoxygenic photosynthesis. (6)

Question 2

(a) Explain the concept of osmotic adjustment during osmotic stress in plants. (6)

(b) Briefly explain why some plants are able to survive if flooded for a long time. (3)

Question 3

Describe the different mechanisms used by plants to tolerate the presence of high concentrations of toxic ions or heavy metals. (6)

Question 4

Why is the permeability of a freshwater animal's integument to water and ions relatively low? (5)

Question 5

Briefly describe "regional endothermy" in marine fish (e.g. tuna). (5)

Question 6

The common leopard frog *Rana pipiens* can hop very fast in comparison to the western toad *Bufo boreas*, which is much slower. These two frog species have different jumping capabilities based in part on different levels of a key enzyme. Provide name of this enzyme and discuss the mechanisms involved. (15)

Section B: Essays Section
Answer ANY TWO questions from this section (50 Marks)

Question 1

Compare and contrast C3, C4 and Crassulacean Acid Metabolism (CAM) modes of photosynthesis to point out key features (anatomical and physiological) of these carbon assimilation pathways and their adaptive advantages in different environments. (25)

Question 2

Discuss the four major theories of stomatal movement namely: (1) Starch–Sugar Inter-conversion Theory (Classical theory) or The Photosynthesis Theory (2) Modified classical theory (3) Active K+ ion transport theory (4) Proton transport theory. (25)

Question 3

Discuss how the Na^+–K^+-ATPase operates in animals. Supplement your answer with drawing of a properly labeled diagram. (25)

**End of Examination **