UNAM
UNIVERSITY OF NAMIBIA

FACULTY	AGRICULTURE, ENGINEERING AND NATURAL SCIENCES		
SCHOOL	SCIENCE		
DEPARTMENT	ENVIRONMENTAL SCIENCE		
MODULE	PHYSIOLOGY		
MODULE CODE	MBL 3771		
DATE	MAY/JUNE 2024		
DURATION	**3 Hours**	**MARKS**	100

FIRST OPPORTUNITY EXAMINATION

Examiner: Prof. E. G. Kwembeya & Ms. J. Musuuo (University of Namibia)

Moderator: Prof. K. C. Chinsembu (University of Namibia)

This EXAMINATION consists of THREE pages including this front page.

Instructions

1...Carefully read all the instructions.
2...There are two sections in this paper.
3...Remember to include illustrative drawings where possible
4...Answer all questions in Section A and choose any two questions in Section B

UNIVERSITY OF NAMIBIA EXAMINATIONS

Section A

This section is worth 50 marks. Answer all questions

QUESTION 1

(a) Explain the dual role of ATP in metabolism.

(2 marks)

(b) Explain the role of photosystems in the conversion of light energy to chemical energy.

(6 marks)

QUESTION 2

(a) Describe the carboxylation step of the photosynthetic carbon reduction (PCR) cycle.

(3 marks)

(b) Glyceraldehyde-3-phosphate (3PGAL) is a central metabolite in anabolism. Briefly explain the fate of this molecule formed during the PCR cycle.

(3 marks)

QUESTION 3

(a) Describe transpiration as a two-step process.

(2 marks)

(b) Briefly discuss the significance of transpiration to the plant.

(4 marks)

QUESTIONS 4

Use a graph to differentiate between the adequate range, deficient range and toxicity range of a mineral nutrient.

(5 marks)

QUESTION 5

While working on the respiratory fitness of laboratory mice, you discover that their haemoglobin more readily picks up additional oxygen atoms only after picking up the first one. What physiological concept would you use to explain this observation to your friend?

(6 marks)

QUESTION 6

Using specific examples, distinguish among the four forms of energy in living systems.

(8 marks)

QUESTION 7

A broiler chicken farmer, after one year of farming with the chicken, learned that it was best to slaughter his chicken when they reach the 2-3 months mark. Explain why this is significant?

(3 marks)

QUESTION 8

Explain the difference between negative feedback and positive feedback as mechanisms of regulation in the human body. Please provide specific examples in which these mechanisms can be employed.

(8 marks)

Section B: Essays Section

This section is worth 50 marks; Answer any two questions in this section.

1. Discuss the role of the four beneficial elements namely, silicon, sodium, selenium and cobalt in plant inorganic nutrition.

(25 marks)

2. Discuss environmental factors that influence the rate of transpiration.

(25 marks)

3. Describe osmoregulation in freshwater and seawater teleosts.

(25 marks)