



<b>FACULTY</b>	<b>SCIENCE</b>
<b>DEPARTMENT</b>	<b>ENVIRONMENTAL SCIENCE</b>
<b>SUBJECT</b>	<b>ECOSYSTEM ECOLOGY</b>
<b>SUBJECT CODE</b>	<b>EBL3712</b>
<b>DATE</b>	<b>NOVEMBER 2022</b>
<b>DURATION</b>	<b>3 Hours</b>
<b>MARKS</b>	<b>100</b>

### **REGULAR EXAMINATION**

**Examiners: Prof. J.K.E. Mfunne & Ms. C. Deelie (University of Namibia)**

**Moderator: Dr. S. Eiseb (University of Namibia)**

This **Question paper** consists of 4 pages (including this front page)

#### ***Instructions***

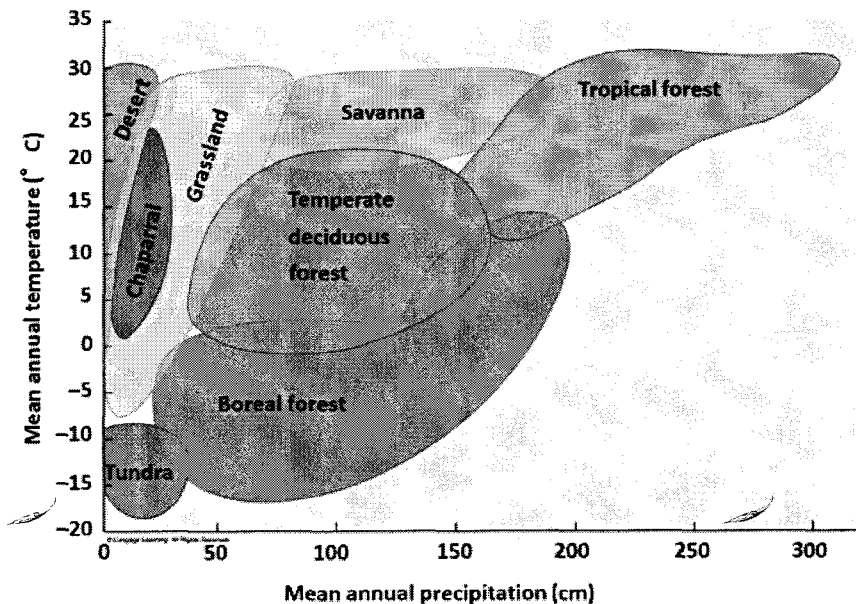
- Section A: Compulsory (60 Marks)
- Section B: Answer 2 questions only (60 Marks)
- Students are allowed to use scientific calculators

## SECTION A: COMPULSORY QUESTIONS

Answer all questions in this section.

### QUESTION 1.

Study Figure 1 below and answer the questions that follow:



**Figure 1. Mean annual temperatures (°C) and Mean annual precipitation (cm) for different biomes**

- 1.1 According to Figure 1, what is the upper mean annual temperature for boreal forests? (1 mark)
- 1.2 Based on Figure 1, which biomes are defined by a mean annual precipitation under 50 cm? (3 marks)
- 1.3. Which biome is defined as having the highest overall mean annual precipitation according to Figure 1? (1 mark)
- 1.4 Describe the location, climate and soils of the Savanna Biome in Namibia. (7 marks)

### QUESTION 2:

- 2.1. Draw a sketch or Figure, to illustrate how the number of species on an island can be affected by its distance from a mainland considering immigration and extinction (8 marks).

### QUESTION 3.

Name compounds A-F given in Table below regarding characteristics of photosynthesis (6 marks).

Description of compound	C <sub>3</sub> plants	C <sub>4</sub> plants	CAM
First organic compound to which CO <sub>2</sub> is first fixed when it enters the leaf	A	B	C
First stable organic compound formed after fixation of CO <sub>2</sub> in the leaf	D	E	F

### QUESTION 4

There are different measures that are used calculate species diversity. Imagine you have calculated the Simpson's index of probability for community N ( $D = 0.92$ ) and Community M ( $D = 0.08$ ). Using Simpson's index of diversity, state which of the two communities is more diverse. Explain your answer (6 marks).

### QUESTION 5

Explain why: -

- Growth efficiency is generally higher in plants than animals (3 marks).
- Growth efficiency is higher in younger than older animals (3marks).
- Aquatic ecosystems have inverted pyramids of biomass (4 marks).

### QUESTION 6

Justify why a decaying (dead) log can be considered to be: -

- An ecological community (4 marks).
- An ecosystem (4 marks).

**SECTION B: Choice questions. Answer only ANY 2 questions of your choice  
(Total 50 marks)**

**QUESTION 7**

Ecological community succession refers to replacement of one community by another in response to changes that are brought about by various factors (25 marks)

- (a) Describe Clements (1916) classical theory of the process of ecological succession (15 marks)
- (b) Differentiate between autogenic and allogenic ecological succession (10 Marks)

**QUESTION 9**

Write an essay on behavioral and morphological adaptations of desert animals (25 marks)

**QUESTION 10**

Summarize 5 hypotheses that have been proposed to explain the latitudinal diversity gradients (25 marks).