



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCE SCIENCES

QUALIFICATION: BACHELOR OF NATURAL RESOURCE MANAGEMENT	
QUALIFICATION CODE: 07BNRS	LEVEL: 5
COURSE CODE: CSE511S	COURSE NAME: CONSERVATION ECOLOGY 1
SESSION: JUNE 2022	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 150

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Prof. T.D. Wassenaar, Mr. J. Amutenya and Ms. C Ntesa
MODERATOR:	Mr. H. Tjikurunda

INSTRUCTIONS	
1.	Answer ALL eleven (10) questions.
2.	Read all questions carefully before answering.
3.	Number your answers clearly.
4.	Make sure your student number appears on the answering script.

PERMISSIBLE MATERIALS

1. Calculator

THIS QUESTION PAPER CONSISTS OF 5 PAGES (Excluding this front page)

QUESTION 1

Write short notes to define or explain the following scientific terms:

- 1.1. Ecology (1)
- 1.2. Biogeochemical cycle (1)
- 1.3. Endemic (1)
- 1.4. Ecological niche (1)
- 1.5. Life histories (1)
- 1.6. Carrying capacity (1)
- 1.7. Ecosystem (1)
- 1.8. Species diversity (1)
- 1.9. Trophic cascade (2)

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QUESTION 2

Explain the difference between the following pairs of terms.

- 2.1. Fundamental niche vs. Realised niche. (2)
- 2.2. R-strategist/selection species vs. K-strategists/selection species. (2)
- 2.3. Grazing food chain vs. Detritus food chain. (2)
- 2.4. Structural connectivity vs. Functional connectivity. (2)
- 2.5. Primary succession vs. Secondary succession. (2)

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QUESTION 3

Match definitions or examples with correct words (just write the number and alphabet e.g. 1c).

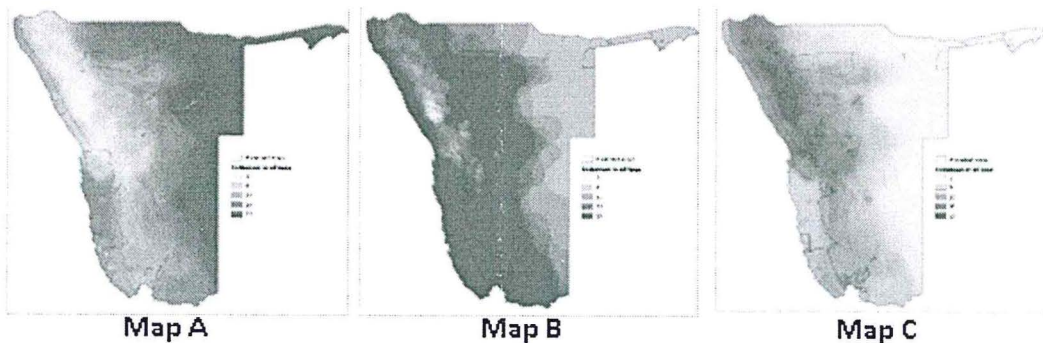
Definitions or examples	Words
1. The change in the genetic composition of a population over successive generations.	a) Predator defences
2. A parasitic plant that derives all of its fixed carbon, nutrients and water from the host plant, in other words, does not carry out photosynthesis.	b) Colonization
3. When an organism maintains steady internal physiological, chemical and physical conditions.	c) Ecosystem engineers
4. A wide range of characteristics that animal species have evolved to avoid being detected, selected, and captured by predators.	d) Holoparasites
5. They are a graphical representation of a life table and summarise the pattern of survival in a population.	e) Natural selection
	f) Competition
	g) Mortality curves
	h) Food web
	i) Hemiparasites
	j) Dispersal
	k) Crassulacean Acid Metabolism (CAM)
	l) Keystone species
	m) Survivorship curves

<p>6. A species with a geographically widespread distribution.</p> <p>7. Species that can physically modify and maintain a community or environment, with their ecological impact being irreplaceable, as they influence resource availability for other species and make the existence of other animals and plants possible.</p> <p>8. The movement of individuals from occupied patches to unoccupied patches to form new local populations.</p> <p>9. One of three main forms of photosynthetic pathways in plants.</p> <p>10. A complex pattern of interconnected food chains in a community/ecosystem.</p>	<p>n) Ubiquitous species</p> <p>o) Evolution</p> <p>p) Type III</p> <p>q) Population density</p> <p>r) Type I</p> <p>s) Endemic species</p> <p>t) Homeostasis</p>
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QUESTION 4

- 4.1. **List** the hierarchy of components or elements in the realm of ecology, in their order of scale from small to large. Use arrows to indicate the progression between the elements. (4)
- 4.2. **Explain** why we refer to the earth as a “system” (2)
- 4.3. **Discuss** the three main factors that affect Namibia’s climate. (6)
- 4.4. Study the three maps below and answer the following questions:
- 4.4.1. **Which** of the three maps below represents the actual distribution of endemism in Namibia (higher endemism is shown by a darker colour)? (1)
- 4.4.2. **List** each factor that could determine the level of endemism and **explain** how it could lead to this pattern. (7)



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QUESTION 5

- 5.1. **Briefly explain** why species interactions are important in any ecosystem. (6)
- 5.2. **Discuss** the three possible outcomes of interspecific competition by using relevant examples. Remember to use relevant ecological terms in your discussion. (9)
- 5.3. Interactions between predator and prey species can result in population cycles of the prey and predator in question. **Explain** this statement. (5)

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QUESTION 6

- 6.1. The population structure of any mammal species is characterized/defined by various factors. **List** and **explain** the five factors that we discussed in class. (10)
- 6.2. **Distinguish** between exponential growth and Logistic growth; and **which** one between the two growth patterns is more common in nature? (5)
- 6.3. In nature, population size and growth are limited by many factors. The environment limits population growth by changing birth and death rates. These environmental limits include density-dependent factors and density-independent factors. **Discuss** any two density-dependent factors in terms of how they influence population growth. (4)
- 6.5. Defining age structure in plant populations is one of the key aspects of population biology. **Clearly, explain** why characterizing an age structure in plants is very difficult, especially in Africa. (3)

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QUESTION 7

- 7.1. You have been appointed as the Warden for Khaudum National Park in MEFT. Which components would you use to measure species diversity in the park? (2)
- 7.2. Khaudum National Park conducted an annual full-moon game count during October 2021 for 72 hours at three different waterpoints. Examine the data presented in the table below and answer the questions that follow.

Species	Waterhole 1	Waterhole 2	Waterhole 3
Blue wildebeest	84	164	486
Eland	20	104	200
Elephant	167	246	789
Gemsbok	73	145	280

- 7.2.1. **What** is the Simpson's Index (D) of the three waterholes (show your calculations) 1 _____ 2 _____ 3 _____ ? (15)
- 7.2.2. **Interpret** the results of the Simpson's Index (D) obtained from your calculations above. (3)
- [20]**

QUESTION 8

- 8.1. Not all organic matter decomposes at the same rate. **Discuss** this statement? (5)
- 8.2. **Place/Rank** the following Namibian ecosystems from the highest to lowest (1 – 3) Primary productivity and **provide** the reasons for your ranking (motivate). In other words, which ecosystem is expected to have the highest, moderate and lowest primary productivity and why? (6)
- Namib Desert
 - Woodland Savanna in the Zambezi Region (north-eastern part of Namibia)
 - Highland Savanna (central Namibia, including Windhoek)
- 8.3. Ecologists are mainly interested in the Net Primary Production (NPP) of an ecosystem. **Explain** the reasons why? (4)

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QUESTION 9

- 9.1. Landscape connectivity is defined as the degree to which a landscape facilitates or impedes the movement of organisms among patches through corridors. **What** are the advantage and disadvantages of connectivity between patches? (10)
- 9.2. **How** do metapopulation dynamics differ from normal population dynamics? (4)

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QUESTION 10

- 10.1. **Define** the theory of island biogeography (2)
- 10.2. As is evident in the decrease in the Living Planet Index (LPI), the majority of species are currently in decline among a range of higher taxa. **Discuss**. Include a definition of what the LPI means. (4)
- 10.3. **Name three** ways in which climate change has already affected biodiversity. (3)

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TOTAL: 150 marks