



NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

SCHOOL OF AGRICULTURE AND NATURAL RESOURCE SCIENCES

DEPARTMENT OF NATURAL RESOURCES SCIENCES

QUALIFICATION: BACHELOR OF NATURAL RESOURCES MANAGEMENT	
QUALIFICATION CODE: 07BNRS	LEVEL: 7
COURSE CODE: CSE621S	COURSE NAME: Conservation Ecology 2
DATE: NOVEMBER 2024	
DURATION: 3 HOURS	MARKS: 150

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Ms. Elise Nghalipo and Mr. Jeremia K.L. Amutenya
MODERATOR:	Mr. Helmuth Tjikurunda

INSTRUCTIONS
1. Answer ALL the questions. 2. Write clearly and neatly. 3. Number the answers clearly.

PERMISSIBLE MATERIALS

1. Examination question paper
2. Answering book
3. Non-Programmable Calculator

THIS QUESTION PAPER CONSISTS OF 3 PAGES (Excluding this front page)

QUESTION 1: Terminology

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

- 1.1 Ecophysiology (2)
- 1.2 Climatic stress (1)
- 1.3 Invasive alien species (2)
- 1.4 Endemism (1)
- 1.5 Habitat Fragmentation (2)
- 1.6 Landscape conservation (1)
- 1.7 Metapopulation (2)
- 1.8 Population density (1)
- 1.9 Ecosystem Health (2)
- 1.10 Land degradation (2)

[14]

QUESTION 2: Terminology

Explain the difference between the following ecological terms.

- 2.1 Habitat resistance vs. habitat resilience (2)
- 2.2 Crown fire vs. Surface fire (2)
- 2.3 Habitat Suitability Modelling vs. Ecological Niche Modelling (2)

[6]

QUESTION 3: Ecosystem Health and Management

- 3.1 Using relevant examples, discuss the seven critical steps involved in ecosystem management. (15)

[15]

QUESTION 4: Dryland Ecology and Habitat Suitability

- 4.1 With reference to your assignment on the topic of limits of adaptability, discuss two examples of species that will be affected by climate change, explaining the main mechanism through which it will be affected, and how it will be affected. (10)
- 4.2 Explain how ecological niches determine species distribution. (5)

[15]

QUESTION 5: Population Ecology and Management

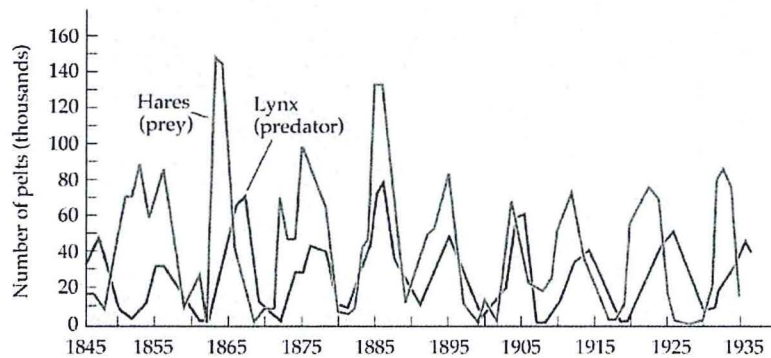
- 5.1 Why is population estimation an important aspect in ecology? (6)
- 5.2 How can you eliminate bias in ecological sampling? (4)

[10]

QUESTION 6: Population Ecology and Management

- 6.1 Explain what the graph below is showing in terms of population regulation. (6)

Further, explain what will happen to the population of each species, if the other is removed from that ecosystem.



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- 6.2 In Etosha National Park (2 270 000 ha) there is an estimated 7 000 blue wildebeest. Calculate the **ecological density** of the blue wildebeest population (in ha/individual and to the nearest 2 decimal places). The wildebeest utilize the whole park where there is some grass. The central Pan consists of 460 000 hectares (there is no grazing on the pan). (2)
- 6.3 In 2024 during a 48-hour waterhole count in Waterberg Plateau Park, NUST students counted a total of 105 giraffes. Data from literature suggests that giraffes drink every 48 hours on average. Calculate the estimated population size of giraffe in the park in the year 2024. (3)
- Show your calculations.
- 6.4 70 roan antelope calves in the Waterberg Plateau Park died out of 155 born in the year 2020; what is the mortality rate of the calves? (2)
- Show your calculations.
- 6.5 In a *E. damarana* population of 10 around NamibRand Nature Reserve, the population grew at a growth rate R_0 of 1.62 from 2019 to 2024 (five years of growth). Assuming the growth to be exponential, calculate population size in 2024. (2)

Show your calculations.

[15]

QUESTION 7: Disturbance Ecology

- 7.1 You are tasked by the Ministry of Environment, Forestry and Tourism to develop a Fire Management Plan (FMP) for Protected Areas (PAs) in the North-East of Namibia. Discuss the main aspects you would address in the FMP to guarantee effective management of (20)

late run-away fires.

- 7.2 Briefly explain the theory of “non-equilibrium Dynamics Ecology” (4)
- 7.3 Name and explain the three (3) types of equilibrium dynamics theories. (6)
- [30]

QUESTION 8: Landscape Ecology

- 8.1 Metapopulation dynamics differs from normal population dynamics in that it is governed by two sets of processes operating at two distinct spatial scales. **Name those processes.** (5)
- 8.2 Do southern African elephants occur as a metapopulation? (5)
- 8.3 Discuss key fundamental ecological concepts that you have been introduced to in your first year, that form the backbone of landscape conservation. (4)
- 8.4 Ecological restoration attempts to assist disturbed areas to recover to a functional state. Discuss why and how a landscape ecology approach can benefit the theory and practice of ecological restoration. (6)

[20]

QUESTION 9: The ecology of a changing world

- 9.1 Explain how the arid climate of Namibia, coupled with mismanagement (e.g. overgrazing) of rangelands can lead to desertification and habitat loss. (10)
- 9.2 Discuss the consequences of habitat loss and fragmentation (10)
- 9.3 Provide a brief plan on how you would control and manage invasive species. (5)

[25]

END OF QUESTION PAPER