NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES SCIENCES

QUALIFICATION: BACHELOR OF NATURAL RESOURCES MANAGEMENT	
QUALIFICATION CODE: 07BNRS	**LEVEL:** 7
COURSE CODE: CSE621S	**COURSE NAME:** Conservation Ecology 2
DATE: November 2022	
DURATION: 3 hours	**MARKS:** 150

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Mr. Richard Kavari, Prof. Theo Wassenaar and Mr. Jeremia K.L. Amutenya
MODERATOR:	Prof. Morgan Hauptfleisch

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. Calculator

THIS QUESTION PAPER CONSISTS OF 4 PAGES (Excluding this front page)

QUESTION 1

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

1.1. Ecological Disturbance (2)

1.2. Savanna (1)

1.3. Succession (1)

1.4. Landscape ecology (2)

1.5. Metapopulation (1)

1.6. Land degradation (1)

1.7. Minimum viable population (MVP) (2)

[10]

QUESTION 2

Differentiate between the following ecological terms:

2.1. Resistance vs. Resilience (2)

2.3. Carrying capacity vs. Stocking rate (2)

[4]

QUESTION 3 Ecosystem Health and Management

3.1. Briefly, explain any 5 of the 12 principles of an ecosystem approach provided by the Convention on Biological Diversity. (5)

3.2. Write an abstract on the topic of 'Ecosystem health towards sustainability", based on the article by Lu et al (2017) titled; Ecosystem health towards sustainability. (6)

[11]

QUESTION 4 Dryland ecology and habitat suitability

4.1. Explain the difference and similarities between the concepts "habitat" and "ecological niche" using an example where applicable. (5)

4.2. With reference to your assignment on the topic of the limits of adaptability, discuss one example of a species that will be affected by climate change, explaining the main mechanism through which it will be affected, and how it will be affected. (5)

4.3. Explain how a habitat suitability model works. (3)

4.4. Explain two main applications of a habitat suitability model, giving one example of each. (4)

4.5. Name four ways in which biodiversity is affected by climate change. (4)

4.6. Explain how the concepts "habitat" and "ecological niche" relate to species distribution. (3)

4.7. True or false: the Kaokoveld Centre of Endemism will most likely experience significant species loss as a result of climate change. (1)

[25]

<u>QUESTION 5</u> Population Ecology and Management

5.1. Explain how you will determine the number of samples to truly represent a population or community? (2)

5.2. Calculate the mean height and percentage difference for the following data set. (4)

Tree number	Height (m)	Mean Height (m)	% difference
1	20		
2	15		
3	12		
4	14		

(Half a mark for each correct answer)

5.3. In a mark recapture survey, 323 barbel (fish) from a small dam were tagged and released. Five days later 360 were caught. Of the 400 caught, 60 were recaptures.

a) Calculate the estimated population size. (2)

b) Between the marking and the recapturing, fish eagled predated upon the fish and due to the shininess of the tag, they tended to catch a high proportion of tagged fish. How would this affect the estimate? Would it tend to be an over or underestimate? Explain why? (3)

c) What other assumptions are made which might easily be violated in the field? (2)

5.4. In 2015 during a 48-hour waterhole count in the Waterberg Plateau Park, NUST students counted a total of 650 buffalos. Data from literature suggests that buffalo drink every 28.8 hours on average. Calculate the estimated population size of buffalo in the park in the year 2015. (3)

5.5. In an estimation of cover, a 50 m tape measure was laid out 8 times. 180 m of the tape measure intercepted the cover of trees. What is the estimated % cover of trees? (2)

5.6. Explain how rainfall may influence natality and mortality of wildlife? (4)

5.7. Draw and fully label a hypothetical graph showing an elephant population growth curve. (3)

5.8. After five years, the population in question 5.7 went extinct. Provide four possible reasons for this, referring to habitat conditions and predation, and the Allee Effect and demographic and environmental stochasticity, as well as other concepts you have learnt. (6)

5.9. A population of 450 elands was introduced into a game park. In the first year, 200 were born and 80 died. Calculate the size of the population after 25 years, assuming a constant growth rate based on the natalities and mortalities of the first year. Show all calculations. (5)

[36]

<u>QUESTION 6</u> Disturbance and Response

6.1. African savannas are complex systems, however, they are prone to disturbances. **Name five (5)** different disturbances that can affect a savannah ecosystem. (5)

6.2. Briefly discuss how you will use the intermediate disturbance hypothesis to successfully manage a fire and provide high nutrient quality forage to wild animals in Waterberg Plateau Park. (8)

6.3. Compare the impacts of natural and anthropogenic disturbances on a savannah ecosystem, using a table. (10)

6.4. Why did the equilibrium dynamic theory experience criticism from ecologists? (3)

[26]

QUESTION 7 From ecology to management at landscape level

7.1. Discuss at least two ways in which landscape ecology is used in biological conservation and management and give an example. (5)

7.2. Ecological impact assessments (that part of Environmental Impact Assessments that focus on impacts to biodiversity) are often not well done or often ignored completely. Discuss why and how a landscape ecology approach can benefit the assessment of impacts to biodiversity and give an example of a landscape ecology concept that can be included in an assessment. (5)

7.3. Discuss the arguments for and against the southern African elephant population as a metapopulation? (5)

7.4. Define island biogeography and give one example where it has a practical application in Natural Resource Management. (3)

7.5. Define the Unified Neutral Theory of Biodiversity. (2)

[20]

QUESTION 8 The ecology of a changing world

8.1. Mention the main causes of land degradation. Clearly explain the measures you will put in place to curtail the devastating consequences of land degradation. (8)

8.2. Explain how habitat fragmentation is a threat to biodiversity. (5)

8.3. Explain how an alien invasive species, such as *Pennisetum setaceum*, may influence biodiversity negatively. (5)

[18]

Total: 150
End!