



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF NATURAL RESOURCES AND SPATIAL SCIENCES

DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES SCIENCES

QUALIFICATION: BACHELOR OF NATURAL RESOURCES MANAGEMENT (NATURE CONSERVATION)	
QUALIFICATION CODE: 07BNTC	LEVEL: 6
COURSE CODE: NCE620S	COURSE NAME: Nature Conservation Ecology 2
DATE: JANUARY 2019	
DURATION: 3 HOURS	MARKS: 150

SUPPLEMENTARY / SECOND OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Mr R. Kavari
MODERATOR:	Prof. B. Strohbach

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 (Including this front page)

QUESTION 1: Ecological Terminologies [20]

A. Define the following ecological concepts:

- 1.1 Line transect vs. Belt transect (2)
- 1.2 Minimum viable population (MVP) (2)
- 1.3 Tolerance limit (2)
- 1.4 Habitat vs. Niche (2)
- 1.5 Niche width vs. niche overlap (2)

B. Give correct ecological terms/words for the following statements:

- 1.6 an approach in ecology that seeks to explain the distribution and abundance of species by studying interactions of individual organisms with their environments. (1)
- 1.7 A composite organism that is formed as a result of symbiotic relationship between fungus and algae. (1)
- 1.8 The number of young born per reproductive female (1)
- 1.9 How often an animal needs to drink. (1)
- 1.10 A place where an organism lives. (1)
- 1.11 R_0 in a fecundity table represents (1)
- 1.12 Random changes in natality and mortality (1)
- 1.13 Different species using the same resource have evolved ways to avoid competition in order to co-exist. (1)
- 1.14 Number of young in a population that survive to reach reproductive maturity. (1)
- 1.15 Introduction of a new species into an ecosystem/habitat, resulting into intense competition. (1)

QUESTION 2 [35]

- 2.1 Namibia is an arid country. Many plant species have evolved adaptations to retain moisture and defences to protect themselves from browsing. Using information from the study guide as well as observation during excursion:
 - a) Give four adaptations, with an example of species for each, that help plants cope with an arid environment. (8)
- 2.2 Explain why monitoring is important for natural resources management. (2)
- 2.3 Explain how you will determine the number of samples to truly represent a population or community? (4)
- 2.4 The theory behind 48 or 72 hour water hole counts is that most of the large mammals will need to drink at least once in this period. Thus, if all water holes are monitored simultaneously, all mammals will be seen.
 - a) Will you see every large mammal in the park? Explain your answer, with examples. (5)

- b) Some animals may drink more than once in this time period. Describe and explain two ways in which the problem of over-counting can be overcome. Discuss the shortcomings of each of these two methods. (4)
- 2.5 In a mark recapture study of lizards, 80 *Meroles cuneirostris* were marked with a paint spot and released. A week later, 90 lizards were captured. 16 of them were marked.
- a) What is the population estimate? (Show all calculations) (5)
- b) It was later discovered that the marked lizards were much more easily visible from above than the unmarked ones. Do you think the estimate is likely to be accurate, an over-estimate or an under-estimate? Explain fully what might have happened and why this may have affected the population estimate. (3)
- 2.6 What is canopy cover and why is it important for us (Natural Resources Managers) to consider or determine? (4)

QUESTION 3 [32]

- 3.1 In Etosha National Park (2 270 000 ha) there is an estimated 10 000 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). (4)
- 3.2 What factors influence the rate of natality and mortality in wildlife populations? (7)
- 3.3 Below are the data for a population of an antelope. (6)

calves < 1 year old		juveniles 1 - 2 years old		subadults 2 - 3 years		reproductive adults 3 - 6 years		post-reproductive 6 years	
M	F	M	F	M	F	M	F	M	F
6	7	15	17	5	7	3	20	1	3

- a) Calculate the overall sex ratio of all the animals in the population. (2)
- b) Why do you think the sex ratio has changed over the years? (2)
- c) What can you conclude about the social structure of this species? Explain your answer. (2)
- d) What can you conclude about the fecundity rate? (1)
- e) Comment on the age structure of the population. What events may have occurred in the life of this population? (4)

3.4 With reference to monogamous and polygamous species explain how sex ratio influences population growth. (4)

QUESTION 4 [11]

4.1 Explain the difference between a life table and a fecundity table. Do not merely give the columns found in each. (5)

4.2 Explain why in some years of good rainfall there might not be any *Acacia mellifera* seeds germinating. (2)

4.3 Discuss the difference between a Cohort and Static Life table in the context of wildlife and human populations. (4)

QUESTION 5 [26]

5.1 Draw likely growth curves for (i) striped mice and (ii) black eagles in the Highland Savanna. Explain the differences in detail. (10)

5.2 A population of 75 sable antelopes is introduced to a game farm. Calculate the estimated population size after 18 years, given an estimated growth rate (R_0) (based on research in other areas) of 1.25. (4)

5.3 Explain how carrying capacity can vary due to i) climatic conditions and ii) management history. (5)

5.4 Explain how density dependent factors affect the growth of a population. (7)

QUESTION 6 [10]

6.1 Clearly distinguish between ecological engineer species and indicator species. Use realistic examples.

QUESTION 7 [16]

7.1 What characteristics would lead to wildlife being randomly distributed in a certain habitat? (5)

7.2 List three factors that could lead to territoriality in some animals. (3)

7.3 Briefly explain the dispersal of organism in the natural environment. (8)

Before handing in your paper ensure that you have answered ALL questions.

Total: 150 marks

End