



PAMIBIA 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

SECOND OPPORTUNITY/SUPPLEMENTARY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Mr R. Kavari
MODERATOR:	Dr 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 Population (1)
- 1.2 Effective rainfall (1)
- 1.3 Life table (1)
- 1.4 Crude density vs. Ecological density (2)
- 1.5 Emigration (1)
- 1.6 Tolerance limit (2)
- 1.7 Intra-specific vs. Inter-specific competition (2)

B. Give a correct ecological term/word for the following statements:

- 1.8 The study of group of organisms of different species which are associated together as a unit in form of a community. (1)
- 1.9 A composite organism that is formed as a result of symbiotic relationship between fungus and algae. (1)
- 1.10 The reproductive potential of female individuals in a population. (1)
- 1.11 How often an animal needs to drink. (1)
- 1.12 A place where an organism lives. (1)
- 1.13 The average clutch/brood size per female on fecundity table. (1)
- 1.14 Random and drastic changes in environmental factors/parameters. (1)
- 1.15 Different species using the same resource have evolved ways to avoid competition in order to co-exist. (1)
- 1.16 Not how much space an organism occupies, but the range of tolerance of an environmental parameter. E.g. a cheetah can prey on different sized antelopes. (1)
- 1.17 Introduction of a new species into an ecosystem/habitat, resulting into intense competition. (1)

QUESTION 2

[43]

- 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)
 - b) Give four adaptations, with an example of species for each, that help plants cope with browsing pressure. (8)
- 2.2 Which climatic factor would confine a plant species to the southern slopes of the Auas Mountains: macro-, meso- or micro-? (choose one). (1)
- 2.3 Explain why monitoring is important for natural resources management. (2)
- 2.4 In a 48 hour waterhole count in the Waterberg Plateau Park, 750 buffalo were counted. Data from Kruger Park suggests that buffalo drink every 32 hours on average.
 - a) Calculate the estimated population size of buffalo in the park. (3)

- b) If oryx were also counted in this 48 hour waterhole count, how would the accuracy of their population estimate compare with that of the buffalo?? (3)
- 2.5 Explain what baseline survey is and why it is important for monitoring. (7)
- 2.6 What is basal cover and why is it important for us (NRM) to consider or determine? (4)
- 2.7 In a mark recapture experiment, 45 striped field mice were marked and released. A week later 65 were captured. Of these, 4 were recaptures.
- a) What is the population estimate? (Show all calculations) (3)
- b) It was later discovered that the sampler was not very good at cutting off the first toe joint and was, in fact, cutting off toes. 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. (4)

QUESTION 3

[22]

- 3.1 What factors influence the rate of natality and mortality in wildlife populations? (7)
- 3.2 Explain how an alien invasive species, such as *Pennisetum setaceum*, may influence biodiversity negatively. (5)
- 3.3 The following data were obtained from a 48 hour waterhole census. Briefly discuss the age structure of each population, giving possible reasons. (6)

	Juveniles	sub-adults	adults
Kudu	12	14	23
Roan antelope	4	6	17
Wildebeest	5	3	50

- 3.4 What are the management values of understanding age structure and sex ratio of wildlife? (4)

QUESTION 4

[19]

- 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 Discuss the difference between a Cohort and Static Life table in the context of wildlife and human populations. (4)
- 4.3 Survivorship curves are a reflection of the survival rate of a species and tell us much about the life history strategies of species. Draw and clearly label three typical forms of survivorship curves, give an example of a species for each. (6)
- 4.4 Complete the life table below (A- D). Show your answers to nearest three decimal places. (4)

X	N_x	d_x	q_x
0-1	900	A	C
1-2	550	B	D
2-3	250		

QUESTION 5

[27]

- 5.1 A population of 85 sable antelope is introduced to a game farm. Draw the shape of the population growth curve you would expect for this population for 10 years, given that the carrying capacity is estimated to be 450, and assuming that the population grows well. Include the labels for the axes. (5)
- 5.2 After five years, the population 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 about. (9)
- 5.3 A population of 55 roan antelope is introduced to a game farm. Calculate the estimated population size after 13 years, given an estimated growth rate (R_0) (based on research in other areas) of 1.35. (4)
- 5.4 Provide 4 characteristics of r responsive populations. (2)
- 5.5 What factors will cause fluctuations in carrying capacity? (3)
- 5.6 Discuss why carrying capacity is so difficult to measure for humans. (4)

QUESTION 6

[10]

- 6.1 Use appropriate examples to explain what a Keystone species is. (10)

QUESTION 7

[9]

- 7.1 Fill in the missing word/phrase, in your answer book (not on this question paper):
 a) A population of plants growing slower than the rate expected (or declining), because the individuals are spaced so far apart (at a low density), that they mostly cannot be reached by pollinators, is an example of _____ (2)
- 7.2 During the mating season, what kind of distribution would you expect to find for a population of wildebeest on a homogenous grassy plain? Provide reasons. (4)
- 7.3 What is the relevance of spatial distribution to conservation? (3)

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

Total: 150 marks

End