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<b>QUALIFICATION: BACHELOR OF NATURAL RESOURCES MANAGEMENT</b>	
<b>QUALIFICATION CODE: 07BNRS</b>	<b>LEVEL: 7</b>
<b>COURSE: CONSERVATION ECOLOGY 1</b>	<b>COURSE CODE: CSE511S</b>
<b>DATE: JULY 2024</b>	<b>SESSION: 2</b>
<b>DURATION: 3 HOURS</b>	<b>MARKS: 150</b>

<b>SECOND OPPORTUNITY: QUESTION PAPER EXAMINATION</b>	
<b>EXAMINER(S)</b>	Mr Jeremia K.L Amutenya and Prof. Theo Wassenaar
<b>MODERATOR:</b>	Mr Helmuth Tjikurunda

#### **INSTRUCTIONS**

1. Please write neatly and legibly.
2. Do not use the left-side margin of the exam paper.
3. No books, notes or other additional aids are allowed.
4. Mark all answers clearly with their respective question numbers.

#### **PERMISSIBLE MATERIALS**

1. None

#### **ATTACHMENTS**

1. None

**This paper consists of 5 pages including the front page.**

### **QUESTION 1**

**Write short notes to define or explain the following:**

- 1.1. Mutualism (1)
  - 1.2. Nutrient cycling (1)
  - 1.3. Keystone (3)
  - 1.4. Ecological disturbance (2)
  - 1.5. Landscape ecology (3)
- [10]**

### **QUESTION 2**

**Explain the difference between the following pairs of terms.**

- 2.1. Interspecific competition vs. Intraspecific competition. (2)
  - 2.2. Gross Primary Production (GPP) vs. Net Primary Production (NPP). (2)
  - 2.3. Autotrophs and Heterotrophs (2)
  - 2.4. Detritivores vs. Decomposers (2)
  - 2.5. Allogenic environmental engineers vs. Autogenic environmental engineers (2)
- [10]**

### **QUESTION 3**

Multiple choice questions, select only the correct answers.

- 3.1. The lion is a natural predator of the zebra. If the zebra population drops, the lion population will most likely \_\_\_\_\_ (1)
  - a) Decrease
  - b) Increase
  - c) Be unaffected
  - d) None of the Above
  
- 3.2. Competition between individuals of different species (1)
  - a) Counter specific
  - b) Interspecific
  - c) Intraspecific
  - d) A-specific
  
- 3.3. Which of the examples below can best be described as interspecific competition? (1)
  - a) Tilapia in the Zambezi River competing for food.
  - b) Trees in the woodland savanna compete for light.
  - c) Male Elephants in Khaudum National Park compete for mates.
  - d) Lions compete for food in Etosha National Park.
  
- 3.4. Which is a factor in intraspecific competition but is not a factor in interspecific competition. (1)
  - a) Food
  - b) Shelter
  - c) Water
  - d) Mates
  
- 3.5. Lichens are made of fungi and algae and benefit from growing together. Which term below describes this relationship? (1)

- a) Commensalism
  - b) Amensalism
  - c) Mutualism
  - d) Neutralism
- 3.6. An example of a population is \_\_\_\_\_ (1)
- a) All shrubs in Waterberg Park
  - b) All *Vachellia erioloba* trees in the Namib Desert
  - c) All animals in Khaudum National Park
  - d) A mixture of black and white rhinos in Etosha National Park
- 3.7. The carrying capacity of an environment for a species at a particular time is determined by \_\_\_\_\_ (1)
- a) Number of individuals in the species
  - b) Reproductive potential of the species
  - c) Distribution of the population
  - d) Supply of the most limited resources
- 3.8. Logistic growth is representative of a population in an environment with \_\_\_\_\_ resources. (1)
- a) Limited
  - b) Plenty
  - c) Constant
  - d) All the above
- 3.9. The carrying capacity of an environment for a species at a particular time is determined by \_\_\_\_\_ (1)
- a) Number of individuals in the species
  - b) Reproductive potential of the species
  - c) Distribution of the population
  - d) Supply of the most limited resources
- 3.10. Which of the below attributes is **NOT** used to measure Community structure? (1)
- a) Species Diversity
  - b) Multi-dimensional measures
  - c) Physical Diversity
  - d) Community composition list
- 3.11. Almost all levels of the organisation in ecology share a set of properties called. (1)
- a) Structure
  - b) Demographics
  - c) Density
  - d) Species diversity
- 3.12. Which statement below describes composition? (1)
- a) This is the list of species, including their names, that occur in a particular community.
  - b) The proportion (or percentage) of the total number of individuals in the community that belong to a particular species.
  - c) The equitability in the distribution of individuals among the species.
  - d) The set of species present and their relative abundances.

- 3.13. Which element below is used as a measurement of relative abundance? (1)
- Species richness
  - Shannon-Wiener Index
  - Simson's Diversity Index
  - Rank-abundance
- 3.14. Food webs are models that shows .....? (1)
- One sequence of producers and consumers.
  - Stored energy in food chains
  - Complex networks of feeding relationships.
  - Only primary consumers in an ecosystem
- 3.15. The number of different species contained in a community is known as \_\_\_\_\_ (1)
- Evenness
  - Abundance
  - Density
  - Richness

[15]

#### **QUESTION 4**

Indicate whether the below questions are **True or False**.

- 4.1. Almost all atmospheric vapour is contained in the Troposphere. (1)
- 4.2. Temperature differences arise due to radiation from the sun falling unevenly across the hemispheres of the earth because the earth is tilted on its axis relative to its orbital plane. (1)
- 4.3. Pressure differences arise because of temperature differences. (1)
- 4.4. The exponential growth model is a prime example of a population model that is experienced in a Savanna ecosystem. (1)
- 4.5. Competition is a prime example of a density-independent factor. (1)
- 4.6. Greater species richness is reflected by the length of the rank-abundance curve of a community – the shorter it is, the richer it is in species. (1)
- 4.7. Ecologists generally do not study the entire community, the term community is often used in a more restrictive sense. (1)
- 4.8. R.H. Whittaker was the first person to utilize the Rank-abundance plot, hence it is referred to as the Whittaker Plot. (1)
- 4.9. Relative abundance is about one species because it is very informative to know a single species proportional abundance. (1)
- 4.10. Populations of many species do not occur as a single continuously distributed population but in spatially isolated patches with an exchange of individuals among the patches. (1)
- 4.11. An unsuitable matrix can hinder the recolonization of a patch and the population may fail to locate another suitable habitat patch to settle in. (1)
- 4.12. Rank abundance is the only way that abundance can be summarized. (1)
- 4.13. The study of metapopulation dynamics is essentially the study of the conditions under which these two processes are in balance. (1)
- 4.14. Landscape ecology often includes the role of humans in creating and affecting landscape patterns and processes. (1)

- 4.15. Patch size has a crucial influence on community structure, species diversity, and the presence and absence of species. (1)  
[15]

#### QUESTION 5

- 5.1. (a) Is this statement correct: "The earth is a system"? (1) (7)  
(b) If your answer is no, **why** do you think it is not a system? If your answer is yes, **what** does it mean when you say the earth is a system? (Start your answer with a basic general definition of a system) (6)
- 5.2. **Which** four biogeochemical cycles are important for ecology? (4)  
[11]

#### QUESTION 6

- 6.1. Prey species have evolved a wide range of characteristics to avoid being detected, selected, and captured by predators. These are categorized as either chemical or behavioural defences. **List** with examples any **five (5) chemical** predator defence mechanisms that were discussed in class. (10)
- 6.2. One of the possible outcomes of interspecific competition is resource partitioning. **Explain** resource partitioning using relevant examples and ecological terms. (4)  
[14]

#### QUESTION 7

- 7.1. **What** are survivorship curves and **why** are they important? (5)
- 7.2. **Explain why** the logistic growth curve/model is more realistic in describing population growth than the exponential growth curve/model. (2)
- 7.3. Based on studies of survival by a wide variety of organisms, Population Ecologists have proposed that most survivorship curves fall into three major categories. **Draw a graph** illustrating the **three survivorship curves** and **explain** each one of them with a **relevant example** of a species that exhibits that growth. (9)  
[16]

#### QUESTION 8

- 8.1. Almost all levels of organisation in ecology share a set of properties. List the three properties you have been introduced to in class. (3)
- 8.2. Provide a detailed explanation as to why areas around the equator have higher biodiversity, compared to areas north or south of the equator. (4)
- 8.3. Various indices are used to estimate species diversity, to what extent do they differ? (3)
- 8.4. Dispersal limitation is one of the key factors that shape and affect community organisations. **Name five** factors that affect/prevent the movement of a species from the community in which they were born to another community, or population, where they will settle and reproduce. (5)  
[15]

#### QUESTION 9

- 9.1. **List** and **explain** three limiting factors for primary production in a terrestrial (6)

- ecosystem. Focus on bottom-up controls of primary production only.
- 9.2. **Discuss** the process of nutrient cycling within a terrestrial ecosystem. In your explanation, use the essential element nitrogen as an example. (9)
- [15]

**QUESTION 10**

- 10.1. Landscape ecology is the study of the reciprocal effects of patterns on the process, how landscape patterns influence ecological processes, and how those ecological processes, in turn, modify landscape patterns. **Expand** on the processes that shape landscape patterns. (5)
- 10.2. 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 advantages and disadvantages of connectivity between patches? (10)
- 10.3. **How** do metapopulation dynamics differ from normal population dynamics? (4)
- [19]

**QUESTION 11**

- 11.1 **Describe** how the theory of island biogeography may come in handy when making decisions about a protected area or any similar landscape where the protection of biodiversity is a key target. (3)
- 11.2 **Name** seven recent trends in biodiversity. (7)
- [10]

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END OF QUESTION PAPER