



<b>FACULTY</b>	<b>AGRICULTURE, ENGINEERING &amp; NATURAL SCIENCES</b>
<b>DEPARTMENT</b>	<b>ENVIRONMENTAL SCIENCE (BIOLOGICAL SCIENCE)</b>
<b>SUBJECT</b>	<b>ECOSYSTEM ECOLOGY</b>
<b>SUBJECT CODE</b>	<b>EBL3712</b>
<b>DATE</b>	<b>OCTOBER / NOVEMBER 2021</b>
<b>DURATION</b>	<b>3 Hours</b>
<b>MARKS</b>	<b>120</b>

**SUPPLEMENTARY / SPECIAL EXAMINATION**

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**Moderator: Dr. W. C. Nesongano (University of Namibia)**

This question paper consists of 4 pages (including this front page)

***Instructions***

- Section A: Compulsory
- Section B: Answer 2 questions only
- Use of scientific calculators is permitted.

## SECTION A: COMPULSORY QUESTIONS

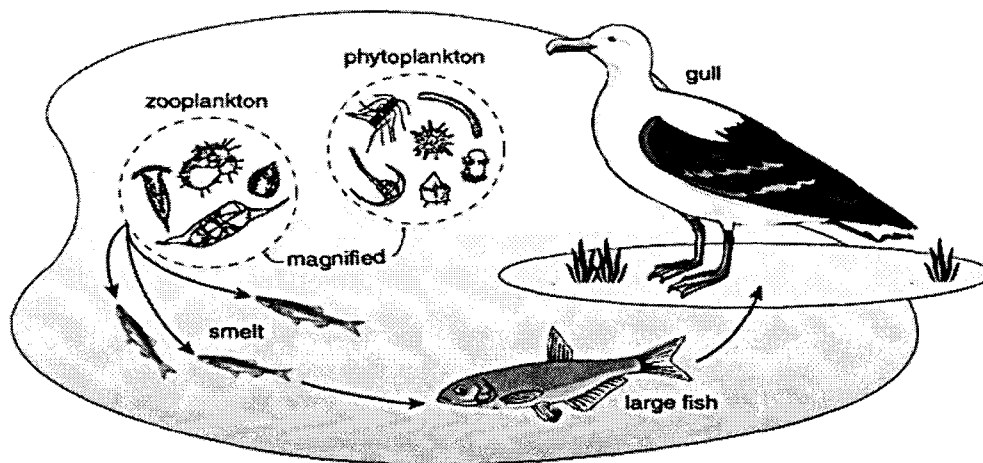
Answer all questions in this section.

### Question 1: [15]

- 1.1 Differentiate between the following concepts: (6)
- (a) local and global stability
  - (b) aestivation and hibernation
  - (c) Fundamental niche and realised niche
- 1.2 Explain why the highest species diversity in a community is maintained at the intermediate level of disturbance. (4)
- 1.3. Discuss the ecosystem services of forests and describe the consequences of deforestation. (5)

### Question 2: [15]

The picture below shows the biomagnification of toxic chemical, mercury, through a simple marine food chain

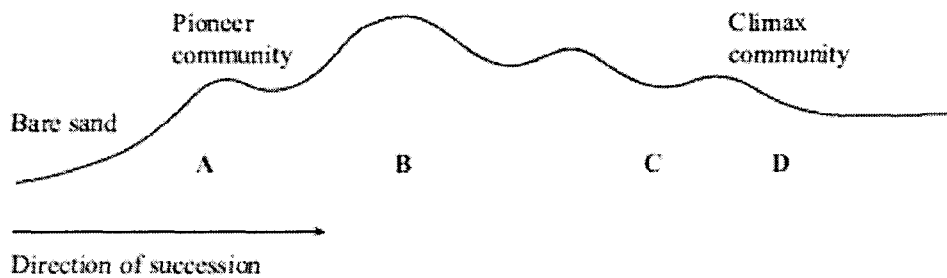


- 2.1. Which of the organism in the picture would most likely be eradicated by bioaccumulation? (1)
- 2.2 Describe the relationship of food webs to biological magnification of toxins by referring to the diagram above. (5)
- 2.2. What is the difference between bio magnification and bioaccumulation? Explain with examples. (4)
- 2.2 Answer the following questions on the Theory of Island Biogeography.
- (a) What factors determine the number of species found on an island? (2)

(b) Why should rates of extinction on islands increase as species richness increases? (3)

**Question 3: [15]**

In a sand dune succession, the pioneer community (A) colonies bare sand. This community is replaced over time by other communities (B and C) until a climax community of woodland D is formed.



- 3.1. The community A and D are composed of different species. Explain how the change in species composition occurs in a succession (5)
- 3.2. Describe a climax community, clearly explaining all attributes associated with a climax community (4)
- 3.3. What is the difference between primary ecological succession and secondary ecological succession? Explain with examples (6)

**Question 4: [15]**

4.1 Indices of diversity can be used as descriptive attributes of communities. The table below contains species abundance data collected from 2 communities.

	Community 1		Community 2	
	Species	Count	Species	Count
1	<i>Albizia foressi</i>	21	<i>Grewia villosa</i>	5
2	<i>Albizia amara</i>	1	<i>Acacia karoo</i>	5
3	<i>Acacia nilotica</i>	1	<i>Albizia foressi</i>	5
4	<i>Grewia tenax</i>	1	<i>Acacia kirki</i>	5
5	<i>Grewia villosa</i>	1	<i>Acacia nilotica</i>	5

- (a) Calculate the species richness and Shannon -Wiener index diversity index for the two communities. Show all calculations. (10)
- (c) Which community is more diverse and why, when you use:
- (i) Species richness (2)
  - (ii) Heterogeneity measures of species diversity? (3)
- [60]

**SECTION B: (60 marks)**

Answer any two questions from this section

**Question 1:**

Discuss how predation and competition may influence the physical and biological structure of ecological communities. (30)

**Question 2:**

Describe the trophic levels in a typical ecosystem. Discuss the flow of energy through the ecosystem, the relationship between the different trophic levels, and the factors that limit the number of trophic levels. (30)

**Question 3:**

A mature forest community is completely destroyed by fire. Describe the stages of succession by which this community could be restored.

**TOTAL: [120]**