00486

The Open University of Sri Lanka
Faculty of Natural Sciences
B.Sc/ B. Ed Degree Programme

Department	: Zoology
Level	: 4
Name of the Examination	: Final Examination
Course Code and Title	: ECOLOGY – ZYU4301
Academic Year	: 2022/2023
Date	: 03.10.2023
Time	: 9:30 pm – 11:30 pm
Duration	: 2 hours
Index number	:

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of 6 questions in 4 pages.
3. Question paper consists of two parts, part "A" and part "B". Answer question 1 from part "A" and any three questions from part "B". Please note that question 1 is compulsory and the answers should be written in the space provided.
4. Answer for each question should commence from a new page.
5. Draw fully labelled diagrams where necessary.
6. Having any unauthorized documents/ mobile phones in your possession is a punishable offense
7. Use blue or black ink to answer the questions.
8. Circle the number of the questions you answered in the front cover of your answer script.
9. Clearly state your index number in your answer script

PART "A"

QUESTION 1

1.1. Define the terms Population, Community and Ecosystems.

a) Population .....

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b) Community .....

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c) Ecosystem .....

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1.2 List the group attributes of a Population.

i ..... ii..... iii.....

iv..... v..... vi .....

vii .....

1.3. Raymond Pearl (1928) recognized three general types of survivorship curves for different populations. Draw these three curves (in one diagram) and briefly explain them with examples.

1.4. A Community shows some attributes that arise as a result of a number of populations assembling together in a particular space. List these community attributes.

i ..... ii.....

iii..... iv.....

v.....

1.5. List the main steps, you need to follow to do a successful ecological survey of soil arthropods in a grassland ecosystem. Explain the steps briefly.

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1.6) Fill the six blank columns given in Table 1 and calculate the diversity for Ecosystem A and B using Shannon Wiener Diversity Index. (Please Note: The Ln values needed for your calculations are given below.). The area of each ecosystem is 05 km^2.

Table 1:

	No of individuals							
Species	Ecosystem A	Ecosystem B	Pi A	Ln pi A	Pi B	Ln pi B		
Species 1	3	10						
Species 2	0	20						
Species 3	1	5						
Species 4	6	10						
Species 5	0	5						
							∑.....	∑.....

Value pi	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Ln pi	-2.3	-1.6	-1.2	-0.9	-0.7	-0.5	-0.4	-0.2	-0.1

i) Fill the title of column 8 (eight) and 9 (nine) in the given space provided.

ii) Diversity of ecosystem A (H_A) = ... Diversity of ecosystem B (H_B) = ...

iii) Calculate the density of arthropods in both ecosystems. A= ..... B= .....

iv) Name the dominant species for each ecosystem (A and B) given in Table 1.

Ecosystem A ..... Ecosystem B .....

PART B

ANSWER ANY THREE (03)) QUESTIONS

2. i) Describe the two main processes of an ecosystem. (15 Marks)

ii) Illustrate a generalized biogeochemical cycle explaining the involvement of the above two processes (2.i) and show how it links with the food chain. (35 Marks)

iii) List the main processes of a gaseous cycle which is responsible for acid rain. (15 Marks)

iv) Briefly explain how the plants and animals obtain this (2. iii) element. (35 Marks)

3) i) Describe the two types of population interactions. (20 Marks)

ii) What are the three main categories of inter specific interactions. Explain in detail. (40 Marks)

iii) Illustrate the Lotka and Volterra proposed model for competition, using graphical representations showing the four possible outcomes of competition. (40 Marks)

4. i) The main niche of an animal is determined by several different (sub) categories of niches. Describe these sub catergories of niches. (20 Marks)

ii) What is "niche breadth". Explain in detail. (45 Marks)

iii) Briefly explain the three critical values of each physico-chemical factor regarding tolerance of an organism. (15 Marks)

iv) Illustrate "broad and narrow peaked tolerance curves" with suitable examples. (20 Marks)

5. i) What are the main differences between autogenic succession and allogenic succession? (20 Marks)

ii) Compare the major characteristic features of plant communities found in the early succession and climax stages. (30 Marks)

iii) What are the major plant communities found in "wet zone-low country (WL)" climatic. zone in Sri Lanka? (10 Marks)

iv) List the physical environmental conditions at salt marshes and briefly explain adaptations in plant communities to overcome those conditions. (40 Marks)

6. Write short notes on **any two** of the following.

a) Logistic growth curve.

b) Trophic levels and ecological pyramids.

c) Density dependent and Density independent population regulation.