00600

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
Academic Year	: 2024/2025
Course Code and Title	: ZYU4301 - Ecology
Date	: 21.11.2024
Time	: 1.30 p.m. – 3.30 p.m.
Duration	: 02 hours
Index No.	: .....

General Instructions to Candidates

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Six (06)** questions in **seven (07) pages**.
3. Question paper consists of two parts, part **"A"** and part **"B"**. Part **'A'** is compulsory and answer any three questions from part "B". The answers for Part **'A'** should be written in the space provided.
4. The answer for each question should commence from a new page.
5. Draw fully labelled diagrams where necessary.
6. Do not bring in or have in possession unauthorized materials, including mobile phones and other electronic devices, or violate other examination rules.
7. Use blue or black ink to write your answers.
8. Write the numbers of the questions you answered in the front page of the answer script.
9. Clearly write your index number in the answer script.

Index No: .....

PART 'A'

QUESTION 1

1.1. Mention the two structural components and any two functional units of an ecosystem.

a) Structural components: **(5 Marks)**

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b) Functional units: **(5 Marks)**

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1.2. Define the main difference between macro and micro habitats with one appropriate example.

a) Macrohabitat: **(5 Marks)**

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b) Microhabitat: **(5 Marks)**

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1.3. Fill in the blanks of the text with most appropriate word/s

(anadromous, euryhaline, catadromous, euryphagous, salmon, tuna, shark)

Estuarine fish experience significant salinity fluctuations, making them ....., or capable of tolerating a wide range of salinities. Certain freshwater-associated species migrate to the sea for spawning and are termed .....,, with the eel being a prime example. Conversely, some marine species migrate from seawater to freshwater during their spawning season, known as ....., migration, as seen in .....,. These migratory fish also consume a variety of foods across both freshwater and marine environments, classifying them as .....,. **(10 Marks)**

1.4. Briefly explain the following terms.

a) Bioaccumulation: **(5 Marks)**

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b) Biomagnification: **(5 Marks)**

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1.5. Define the difference between net primary productivity and net community productivity.

a) Net primary productivity: **(5 Marks)**

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b) Net community production: **(5 Marks)**

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1.6. a) What is meant by the consumption efficiency in an ecosystem? **(5 Marks)**

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b) If an ecosystem has 1,000 units of plant biomass available, and herbivores consume 500 units, calculate the consumption efficiency. **(5 Marks)**

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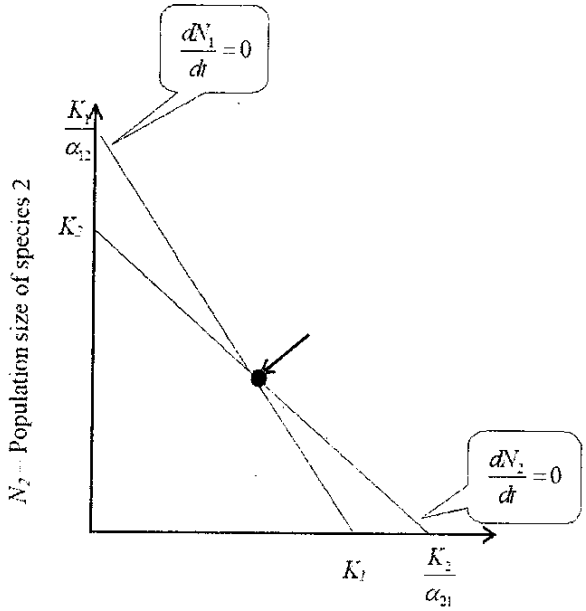
1.7. The figure depicted below is the Lotka–Volterra competition model for the two species, Species 1 and 2. Briefly describe the possible outcome of this competition.

(K=carrying capacity; K_2/α_{21} and K_1/α_{12} are the densities of Sp 1 and Sp 2 exactly needed to exclude the Sp 2 and 1 respectively.)



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(10 Marks)

1.8. A researcher wanted to estimate the population size of a fish species using the single mark multiple recapture method. Suppose **500 fish (M_0)** were marked and released, and five samples were subsequently taken. The data of five sampling attempts are mentioned in the table below. Calculate the population size.

Sample	**Total No. of fish (n_i)**	**No. of marked fish (m_i)**
1	**200**	**50**
2	**100**	**50**
3	**300**	**150**
4	**200**	**150**
5	**200**	**100**

Population Size (N_0): ..... **(10 Marks)**

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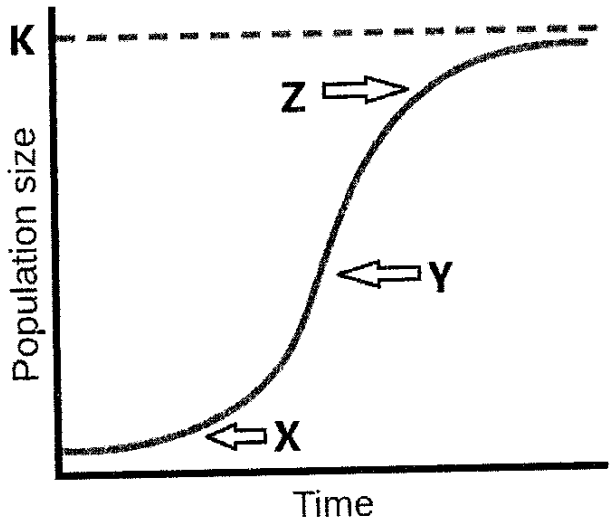
1.9. Answer the questions **a, b** and **c** based on the figure below.



a) Identify the growth model depicted in the Figure. **(3 Marks)**

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b) Name the phases X, Y, Z and K. **(4 Marks)**

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c) Give one reason, why this growth model should exist in the environment. **(3 Marks)**

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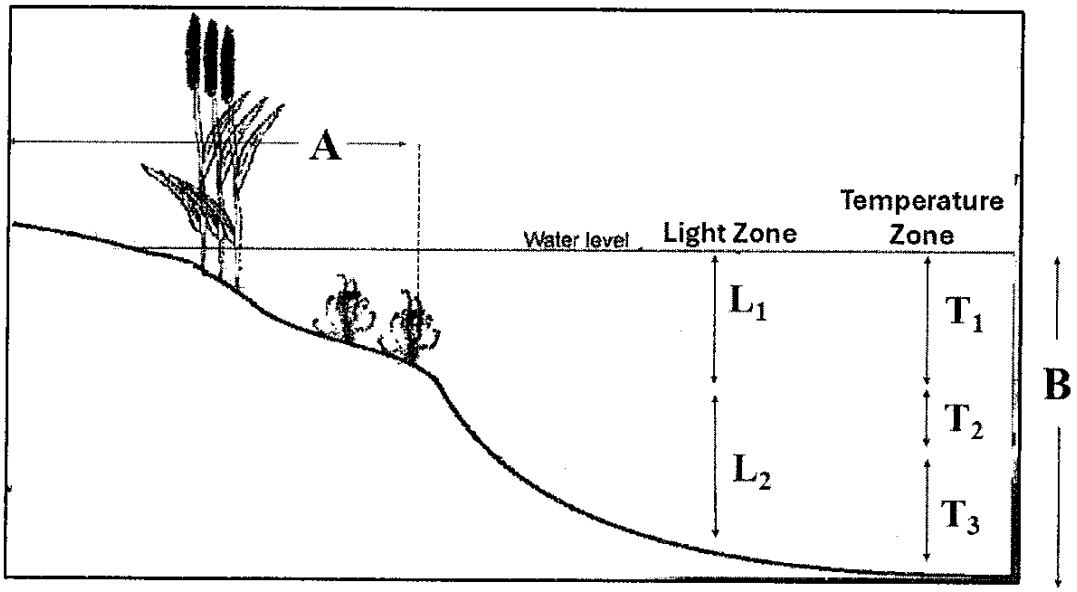
1.10. The figure depicted below shows the zonations of a temperate freshwater lake.



a) Name the zones **A** and **B** with respect to light and temperature. **(6 Marks)**

A: .....

L_1: .....

L_2: .....

T_1: .....

T_2: .....

T_3: .....

b) Mention the importance characteristic feature of the T_2 layer in winter and summer seasons. **(4 Marks)**

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(100 Marks)

PART "B"

ANSWER ANY THREE (03) QUESTIONS

2. (i). Explain the characteristics of the biotic components of the ecosystem with suitable examples. **(80 Marks)**

   (ii). Briefly describe how temperature affects the biology of organisms using four (04) key points. **(20 Marks)**

3. (i). Describe the major properties of a niche. **(60 Marks)**

   (ii). Describe the phosphorus cycle, emphasizing the role of biotic components in the ecosystem. **(40 Marks)**

4. (i). Discuss the patterns and causes for spatial and temporal distribution of animals using appropriate examples. **(50 Marks)**

   (ii). Provide a brief explanation on predation and its different types observed in ecosystems. **(30 marks)**

   (iii). 'Species diversity and richness is higher in tropical countries than countries in temperate region'. Briefly explain this statement using four (04) key factors. **(20 marks)**

5. (i). Explain the edaphic, climatic and community parameters of a climax forest located in the low country wet zone of Sri Lanka. **(40 Marks)**

   (ii). List the three (03) main types of maritime ecosystems in Sri Lanka and briefly describe the adaptations found in the plant communities within each ecosystem. **(60 Marks)**

6. Write short notes on any two (02) of the following.

   a) Density dependent and density independent population regulation. **(50 marks)**

   b) Character displacement and survival of animals. **(50 marks)**

   c) Species- area relationship. **(50 marks)**

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