0695

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	: 2025/2026
Course Code and Title	: ZYU4301 - Ecology
Date	: 30.11.2025
Time	: 9.30 a.m. – 11.30 a.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 (i). Define the term '**ecosystem**'.

.....

.....

..... **4 marks**

(ii). Name (03) biotic components of an ecosystem?

.....

.....

..... **6 marks**

1.2 (i). What is an '**Ecotone**'?

.....

..... **4 marks**

(ii). What is meant by the '**edge effect**' in an ecotone?

.....

.....

..... **6 marks**

1.3 (i). Mentioned two types of '**biological weathering**' of rocks.

.....

..... **4 marks**

(ii). Briefly describe the biological importance of the '**stratosphere**'.

.....

.....

..... **6 marks**

Index No: .....

1.4 (i). What is '**celestial orientation**' in animals?

.....

..... **4 marks**

(ii). Briefly describe the following terms with at least one appropriate example.

(a). Hibernation:

.....

.....

..... **3 marks**

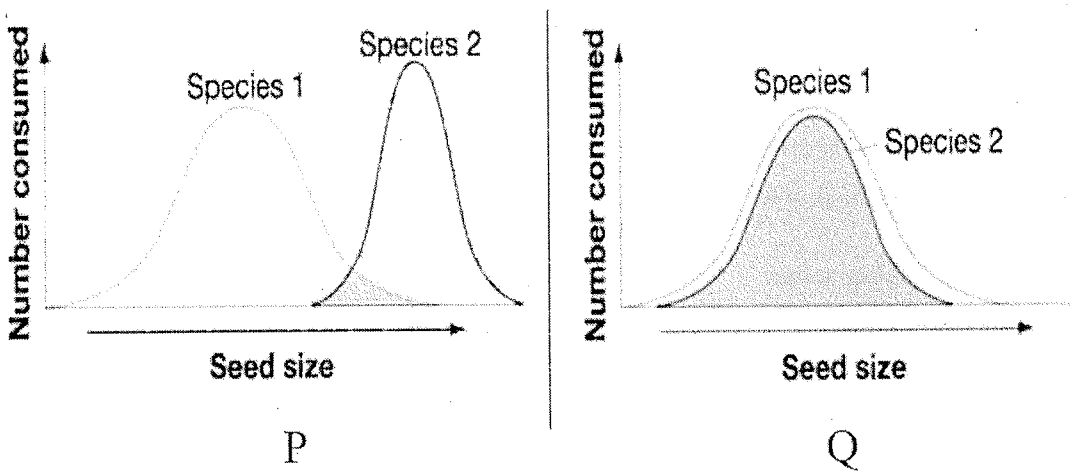
(b). Aestivation:

.....

.....

..... **3 marks**

1.5 (i). The figure (P and Q) depicted two types of niche overlap of two species that lead to competitive outcomes.



(a). Name the type of niche overlaps in the two figures P and Q.

P: .....

Q: ..... **4 marks**

(b). Briefly describe the outcomes of the competition depicted in Figure P and Q.

P: .....

.....

Q: .....

..... **6 marks**

1.6 A discrete population has a **net reproductive rate (R_0)** of **2**, and the **initial population size (N_0)** is **5 individuals**.

(a). State the formula used to calculate the size of a discrete population.

..... **4 marks**

(b). Calculate the population size up to three generations with the initial population being 5.

Generation	Population size
0	5
1	
2	
3	

6 marks

1.7 Define the following terms.

(a). Crude Density

.....

.....

..... **5 marks**

(b). Ecological Density

.....

.....

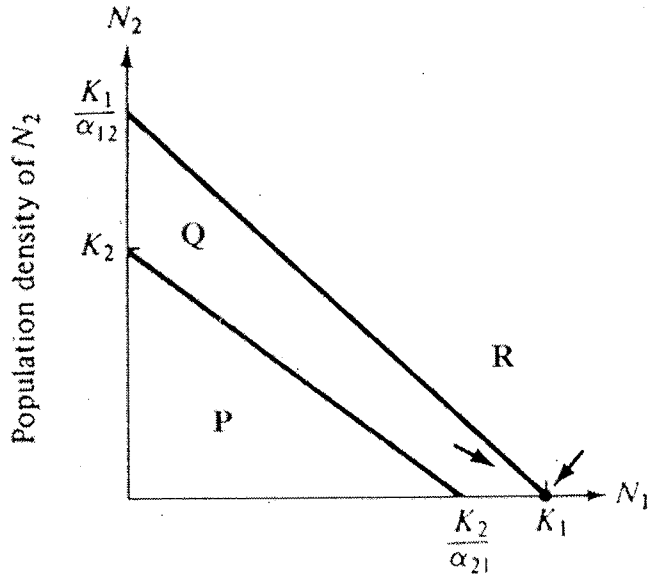
..... **5 marks**

Index No: .....

1.8 The figure below illustrates the Lotka–Volterra competition model for two species, Species 1 and 2.

(a). Briefly describe the possible outcomes of competition when the populations are at points P, Q and R.

(K=carrying capacity; K2/ α21 and K1/ α12 are the densities of Sp 1 and Sp 2 exactly needed to exclude the Sp 2 and Sp1 respectively)



P= .....

.....

..... **3 marks**

Q= .....

.....

..... **3 marks**

R= .....

.....

..... **3 marks**

(b). What is the population growth rate (dN/dt) along the two isoclines of the two populations.

.....

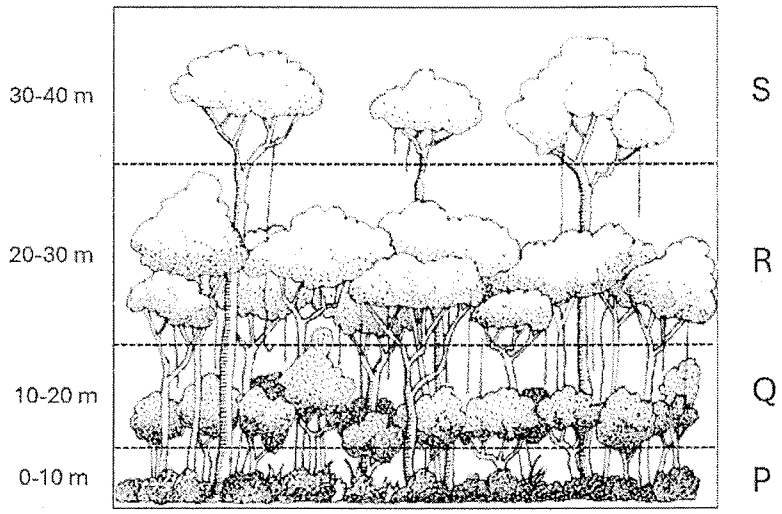
1 mark

1.9 (i). In a sample of a pond community, seven species were counted with the following abundances. Complete the table and calculate the Simpson's Diversity Index (1-D).

Species	Number (n)	n (n-1)
Minervarya agricola	10	
Onychargia atrocyana	3	
Ranatra annulipes	2	
Agabinus glabrellus	2	
Limnoporus dissortis	1	
Arctocorisa carinata	1	
Trithemis festiva	1	
	N =	**Σ** =

Simpson's Diversity Index (1-D)= ..... **10 marks**

1.10 (i). Name the stratification layers labeled P, Q, R, and S in the rainforest shown in the figure below.



P: ..... Q:.....

R:. ..... S: ..... **8 marks**

(ii). State one limiting factor that affects the growth of plants in layer P.

..... **2 marks**

(100 marks)

PART "B"

ANSWER ANY THREE (03) QUESTIONS

2.	(i).	Explain the significance of soil fauna in maintaining the health and functioning of ecosystems.	**(70 marks)**
	(ii).	Briefly explain the steps involved in studying ecological issues using a systematic scientific approach.	**(30 marks)**
3.	(i).	Describe the importance of humidity on the biology of plants and animals.	**(60 marks)**
	(ii).	Briefly describe the process of eutrophication in an inland water body.	**(40 marks)**
4.	(i).	Explain the concept of ecological pyramids, describing their types, structure, and significance.	**(50 marks)**
	(ii).	Discuss types of population interactions between species with appropriate examples.	**(50 marks)**
5.	(i).	Part of a lowland rainforest was completely damaged by wildfire. Explain the **main stages in the natural process** by which the vegetation of the forest land returns to its initial stage.	**(60 Marks)**
	(ii).	Briefly describe how primary productivity and plant biomass change over time in the process you explained above (i).	**(20 Marks)**
	(iii).	What is meant by non-directional or cyclic succession?	**(20 Marks)**
6.		Write short notes on any **two (02)** of the following	
	(i).	Greenhouse effect	**(50 marks)**
	(ii).	Theory of Island Biogeography	**(50 marks)**
	(iii).	Exponential population growth	**(50 marks)**

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