



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2022/2023**

COURSE NAME	:	ECOLOGICAL DYNAMICS
COURSE CODE	:	BWJ 30603
PROGRAMME CODE	:	BWW
EXAMINATION DATE	:	FEBRUARY 2023
DURATION	:	3 HOURS
INSTRUCTION	:	1. ANSWER ALL QUESTIONS 2. THIS FINAL EXAMINATION IS CONDUCTED VIA CLOSED BOOK . 3. STUDENTS ARE PROHIBITED TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

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- Q1** (a) Ecologists collect data to test the hypothesis or describe nature. Explain **THREE (3)** characteristics of valuable data. (6 marks)
- (b) Rocky intertidal is among the driest aquatic ecosystem. Not many organisms can adapt to this ecosystem due to this condition. Explain **ONE (1)** strategy used by plants and **ONE (1)** strategy used by animals in order for them to adapt to these ecosystem conditions. (4 marks)
- (c) Energy flow and trophodynamics occur in a complex ecosystem.
- (i) Define energy. (2 marks)
- (ii) Determine **TWO (2)** laws that describe the behaviour of the energy and contrast both by giving **ONE (1)** point of comparison. (6 marks)
- (iii) Illustrate and explain in detail the process for the first law involved in **Q(c)(ii)**. (7 marks)
- Q2** (a) Ecologists classify animals according to their ability to maintain their body temperature. Classify and differentiate the classification of the animals according to this statement. (8 marks)
- (b) Elaborate why freezing is lethal to plants. (6 marks)
- (c) Plants that live in extreme conditions require an osmoregulation mechanism to balance and maintain electrolytes and water in their bodies.
- (i) Define osmosis. (2 marks)
- (ii) Outline **TWO (2)** strategies of plants in halophyte environments to regulate water intake or loss and osmotic pressure of salt into their body. (4 marks)
- (d) There are two processes in photosynthesis: light reaction and carbon fixation.
- (i) Identify **ONE (1)** by-product from the light reaction process. (1 mark)

- (ii) Distinguish C3 and C4 pathways in the carbon fixation process by giving **TWO (2)** points of comparison. (4 marks)
- Q3** (a) Net Primary Production (NPP) is the amount of energy available to primary consumers.
- (i) State **THREE (3)** factors influence NPP in terrestrial ecosystems. (3 marks)
- (ii) Explain what would happen to NPP if the factors mentioned in **Q3(a)(i)** increase. (2 marks)
- (iii) If the factors mentioned in **Q3(a)(i)(ii)** increase excessively, predict what will happen to the NPP. (2 marks)
- (b) Peat swamp forests have black water due to partial decomposition. Elaborate on the process of decomposition in this ecosystem. (6 marks)
- (c) Speciation occurs when genetically distinct groups separate into species. Compare **FOUR (4)** definitions of the species concept. (12 marks)
- Q4** (a) One way to determine the survival and mortality of individuals in a population is to examine a cohort of individuals from birth to death. This can be done by looking at the life table.
- (i) Name **TWO (2)** types of life tables. (2 marks)
- (ii) Differentiate both types of life tables mentioned in **Q4(a)(i)** by giving **TWO (2)** points of comparison. (8 marks)
- (iii) Based on **Table Q4(a)**, calculate the number of deaths in the age class (10-11) years. (3 marks)

- (iv) Based on **Table Q4(a)**, calculate the survivorship rate in the age class (4-5) years. (3 marks)
- (v) Explain the survivorship rate obtained in **Q4(a)(iv)**. (2 marks)
- (b) Outline your understanding based on **Figure Q4(b)**. (4 marks)
- (c) Illustrate **ONE (1)** difference among **THREE (3)** major landscape elements. (3 marks)

– END OF QUESTIONS –

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Table Q4(a)

Age class	No. alive	No. dying	Proportion surviving	Mortality rate	Average no. alive in age class	Total years alive	Life expectancy
0-1	1000	199	1.000	0.199	900.5	7053	7.0
1-2	801	12	0.801	0.015	795	6152.5	7.7
2-3	789	13	0.789	0.016	776.5	5357.5	6.8
3-4	776	12	0.776	0.015	770	4581	5.9
4-5	764	30	*	0.039	749	3811	5.0
5-6	734	46	0.734	0.063	711	3062	4.2
6-7	688	48	0.688	0.070	664	2351	3.4
7-8	640	69	0.640	0.108	605.5	1687	2.6
8-9	571	132	0.571	0.231	505	1081.5	1.9
9-10	439	187	0.439	0.426	345.5	576.5	1.3
10-11	252	*	0.252	0.619	174	231	0.9
11-12	96	90	0.096	0.937	51	57	0.6

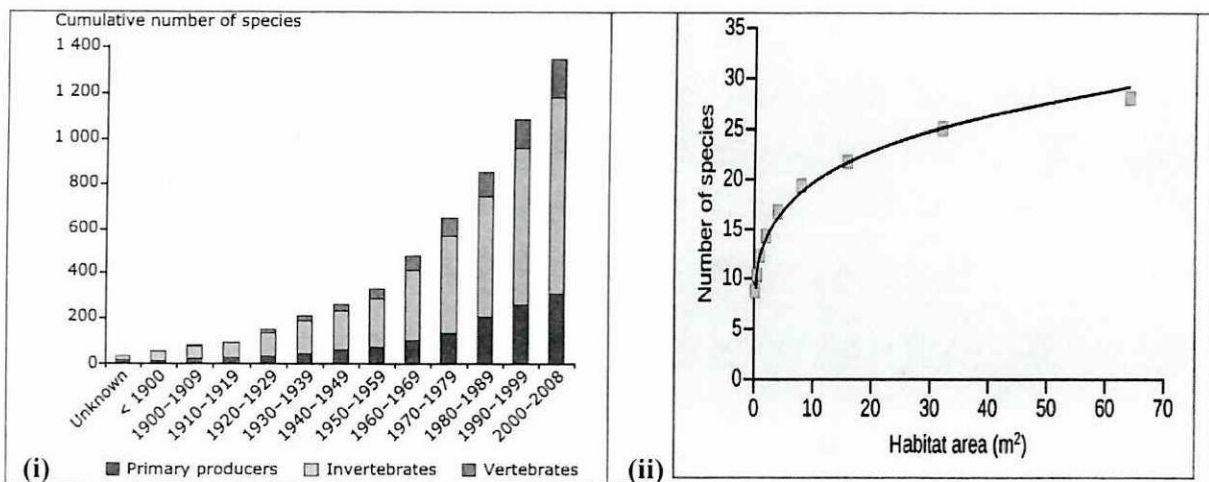


Figure Q4(b)

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