Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020

COURSE NAME	:	ECOLOGICAL DYNAMICS
COURSE CODE	:	BWJ 30603
PROGRAMME CODE	:	BWW
EXAMINATION DATE	:	DECEMBER 2019 / JANUARY 2020
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1 (a) Describe briefly **TWO (2)** rules in ecological methodology.

(4 marks)

(b) Collecting data is one the important steps in ecological study. Ecological data can be classified into various types including nominal, ordinal, interval and ratio data. Distinguish **TWO (2)** characteristics among these types of data.

(8 marks)

(c) State **THREE (3)** components of the soil.

(3 marks)

(d) Compare **TWO (2)** characteristics of primary and secondary successions.

(4 marks)

(e) Mechanisms of succession involve 3 processes which are facilitation, inhibition and tolerance. Analyze **TWO (2)** differences among these three mechanisms of succession.

(6 marks)

Q2 (a) (i) "*Animal body size changes in different temperatures*". State the **TWO (2)** theories explaining this statement.

(2 marks)

(ii) Analyze **TWO (2)** differences between the theories stated in **Q2(a)(ii).**

(8 marks)

(b) In photosynthesis, different types of plant will undergo different photosynthetic pathways in carbon fixation process. Give **ONE (1)** example of C3 plant and **ONE (1)** example of C4 plant and examine **FOUR (4)** differences between C3 C4 photosynthetic pathways in carbon fixation process.

(10 marks)

(c) (i) Explain **TWO (2)** reasons why Net Primary Production (NPP) decreases at very high precipitation.

(2 marks)

(ii) List **THREE (3)** factors affecting Net Primary Production (NPP) in terrestrial ecosystem.

(3 marks)

Q3 (a) Define '*food chain*'.

(1 mark)

(b) Explain chemical alteration (mineralization) processes in decomposition.

(2 marks)

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(c) Natural selection can follow one of four different pathways, which are directional selection, stabilizing selection, balancing selection and disruptive selection. Make a comparison among all of these pathways of natural selection.

(8 marks)

(d) Static life table is used by ecologist to gather a data on the age structure of a given population at one point in time. Based on **Table Q3(d)**:

(i) Calculate the number of death in the age class (10-11) years.

(3 marks)

(ii) Calculate the survival rate in the age class (4-5) years.

(3 marks)

(iii) Explain about the survival rate obtained in **Q4 (d)(ii)**.

(2 marks)

(e) Phillip Grime (1977, 1979) proposed a scenario of three strategies of life history instead of the traditional life history strategies, which are, r-selected and K-selected strategies. The strategies are ruderals, competitors and stress tolerators. Compare **ONE (1)** characteristic of these life-history strategies.

(6 marks)

Q4 (a) There are four hypotheses suggested the causes of spatial and temporal patterns of biodiversity, which are Species-Time Hypothesis, Species-Area Hypothesis, Species-Energy Hypothesis and Intermediate Disturbance Hypothesis. Distinguish **ONE (1)** characteristic of these hypotheses.

(4 marks)

(b) Name **ONE (1)** person who introduced the "Equilibrium Theory of Island Biogeography".

(1 mark)

(c) Based on **Figure Q4(c)**, explain your understanding about the extinction rate of species on the island.

(10 marks)

(d) Landscape ecology is the field of study that examines the spatial arrangements of elements in populations and communities. Good landscape ecology considers the factors such as size, number, proximity, connectivity and buffer zones in designing a nature reserve. Imagine you are one of the architects responsible for designing a nature reserve, by using illustration, explain how you can design a good nature reserves by considering all of the factors mentioned.

(10 marks)

– **END OF QUESTIONS** –

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Table Q3(d)

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

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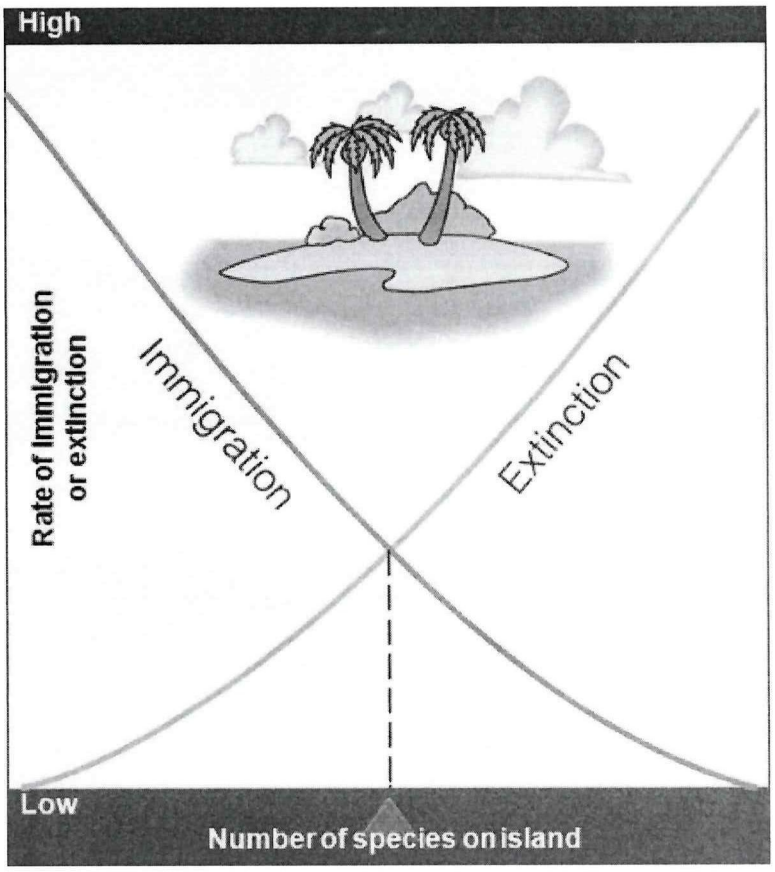

Figure Q4(c)

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