UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022

COURSE NAME	:	BIODIVERSITY AND ECOSYSTEM INFORMATICS
COURSE CODE	:	CWJ 10303
PROGRAMME CODE	:	CWJ
EXAMINATION DATE	:	JANUARY / FEBRUARY 2022
DURATION	:	3 HOURS 30 MINUTES
INSTRUCTION	:	1. ANSWER **ALL** QUESTIONS. 2. THIS FINAL EXAMINATION IS AN **ONLINE** ASSESSMENT AND CONDUCTED VIA **CLOSED BOOK**.

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

Q1 For focused research in the future, readily available information is required on each and every aspect of biodiversity. Therefore, by utilizing the tools of information technology, experts are trying to digitize the available information on biodiversity into user-friendly databases that can be easily accessed on the internet from anywhere in the world

    (a) Identify the general role of biodiversity networks and databases.

(2 marks)

    (b) Name a global database that plays a lead role in information networks.

(2 marks)

    (c) Compare between Bioinformatics, Biodiversity Informatics, and Ecological Informatics based on their definitions.

(6 marks)

    (d) Assume that a new species of marine-dwelling cephalopod has been recorded in Borneo. Choose **TWO (2)** methods to identify the species. Explain **TWO (2)** aspects for each method.

(10 marks)

Q2 Biological informatics integrates biological, computational, networking, and organizational research, and is concerned with the development, sharing, and analysis of biological datasets, which are usually very large and complex.

    (a) Justify your agreement on how the availability of deoxyribonucleic acid (DNA) sequences along with online software such as the Basic Local Alignment Search Tool (BLAST) provided by the GenBank, National Center for Biotechnology Information (NCBI) has paved the way towards the fast species identification of living organisms by giving **FIVE (5)** viewpoints.

(10 marks)

    (b) Compare between distance-based methods and character-based methods for phylogenetic tree reconstruction by providing **FIVE (5)** differences.

(10 marks)

Q3 The generalization of individuals including specimens of flora and fauna into classes is essential. The assignment of an unknown object to a taxon is called "identification" or "determination".

    (a) Choose the most user-friendly method between single- and free-access keys. Justify your selection by giving **FOUR (4)** viewpoints.

(10 marks)

(b) A Universiti Tun Hussein Onn Malaysia (UTHM) Pagoh campus research team led by Prof. Emeritus Datin Dr. Maryati Binti Mohamed recorded a new species of *Echinopla* ant from Sungai Bantang Recreational Forest near Labis, Johor in May 2017. As a researcher, you aim to plan a DNA sequence analysis or molecular species identification study to identify the species based on its DNA. Determine **FIVE (5)** steps of the study and explain each of them.

(10 marks)

Q4 (a) An algorithm is a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer. Compare between bioclimatic algorithms and genetic algorithms by giving **FIVE (5)** differences.

(10 marks)

(b) Assess **FIVE (5)** differences between pharmacology and chemoinformatics.

(10 marks)

Q5 (a) Suppose there is still a lack of information on the behaviour and habitat characteristics of orangutan in the rainforests of Kalimantan. Choose **ONE (1)** method to collect more data on the habitat and behaviour of the mammal, and briefly explain **FIVE (5)** aspects of the selected method.

(10 marks)

(b) A satellite imagery indicates the presence of natural wildfire near an aborigine settlement in a national park. You would like to conduct a survey and then create a map on the effects of the wildfire to the villagers' economy and to the wildlife. Assess **FIVE (5)** steps that should be considered in planning a survey.

(10 marks)

-END OF QUESTIONS-