



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022**

COURSE NAME : PROCESS & SUSTAINABILITY IN BIOTECHNOLOGY

COURSE CODE : BNN 20403

PROGRAMME CODE : BNN

EXAMINATION DATE : JULY 2022

DURATION : 3 HOURS

INSTRUCTION :
1. ANSWER **ALL** QUESTIONS.
2. THIS FINAL EXAMINATION IS A **PHYSICAL** ASSESSMENT AND CONDUCTED VIA **CLOSE BOOK**.
3. STUDENTS ARE PROHIBITED TO CONSULT THEIR OWN MATERIAL OR ANY MATERIAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

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

- Q1**
- (a) State how biotechnology support sustainable future? (2 marks)
 - (b) Give **THREE (3)** examples of marine bioproducts. (3 marks)
 - (c) Define the term “Life Cycle Assessment”. (1 mark)
 - (d) Explain the purpose/importance of Life Cycle Assessment. (3 marks)
 - (e) Propose and explain a Life Cycle Assessment of a frozen food product. (16 marks)
- Q2**
- (a) Define the following terms. (8 marks)
 - (i) chemical stressor
 - (ii) nonchemical stressor
 - (iii) biomarker
 - (iv) biomonitoring
 - (b) Explain the importance of studying industrial ecology (3 marks)
 - (c) Determine the impact of a “drink water box” product to the environment starting from raw materials to the consumers of the product. You can answer the question by using/constructing a diagram. (14 marks)
- Q3**
- (a) Define the terms “industrial park” and “eco industrial park”. (5 marks)
 - (b) State **FOUR (4)** benefits of eco industrial park to the environment and community. (4 marks)
 - (c) Develop an eco industrial park for the following industries/products. Explain your decision in detail. You **MUST** include at least **SIX (6)** industries/products listed below in your proposal.
Industry/Products: Biodiesel, Fruit Juice, Frozen food, ethanol, Chicken farm, Palm oil plantation, wastewater treatment plant, fertilizer, pharmaceuticals, detergent, fruit plantation, power plant, textile. (16 marks)

- Q4** (a) Define the term “biotechnology” and explain the role/importance of “biotechnology” in the concept of green chemistry and sustainability. (5 marks)
- (b) Give **THREE (3)** examples of application of biotechnology in public health and **THREE (3)** examples in agricultural activities which supports the concept of green chemistry and sustainability. Explain your answer. (12 marks)
- (c) Explain the ethical concern of the impact of biotechnology in agricultural activities to the human health and the environment. (8 marks)

- **END OF QUESTION** -

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