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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024**

- COURSE NAME : ENVIRONMENTAL CHEMISTRY
- COURSE CODE : DAU 22303
- PROGRAMME CODE : DAU
- EXAMINATION DATE : JULY 2024
- DURATION : 2 HOURS 30 MINUTES
- INSTRUCTIONS :
1. ANSWER ALL QUESTIONS
 2. THIS FINAL EXAMINATION IS CONDUCTED VIA
 - Open book
 - 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 **THREE (3)** PAGES

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- Q1** The environment consists of a few components. Each component plays a unique role in sustaining ecosystems and supporting biodiversity.
- (a) State the environmental components.
(4 marks)
 - (b) Describe any two (2) of the environmental components.
(6 marks)
 - (c) Describe the potential impacts of human activities on the environmental components. Give examples to support your answer.
(5 marks)
 - (d) Explain your understanding of the term 'environmental sustainability'.
(4 marks)
 - (e) The COVID-19 pandemic has had significant impacts on the environment, both positive and negative. Give your opinions on how the lockdown measures during the pandemic affected air and water quality.
(6 marks)
- Q2**
- (a) Water is recycled using a hydrologic cycle. Describe the mechanisms in the hydrologic cycle.
(5 marks)
 - (b) Malaysia's National River Water Monitoring Program has been conducted by the Department of Environment (DOE). Explain the process carried out in the program.
(8 marks)
 - (c) You have been given a task to carry out water quality analysis on water samples collected from a river with a high concentration of organic pollutants. Propose a plan for
 - (i) Water sample collection
 - (ii) Storage of water samples
 - (iii) Preservation of water samples
 - (iv) Water analysis of water samples
(8 marks)
 - (d) Distinguish between biochemical oxygen demand (BOD) and chemical oxygen demand (COD).
(4 marks)

Q3 The atmosphere plays a vital role in supporting life on earth, regulating climate, and shaping weather patterns.

- (a) Describe the different layers of the atmosphere. (6 marks)
- (b) Discuss the two (2) types of air pollutants. Name one (1) pollutant each. (5 marks)
- (c) Describe the air pollutant index (API) and how it is calculated. (5 marks)
- (d) Discuss the greenhouse effect and its role in regulating the earth's climate system. (5 marks)
- (e) Describe four (4) problems associated with global warming. (4 marks)

Q4 A green environment is needed as chemical developments bring new environmental problems and harmful unexpected side effects.

- (a) Differentiate between green chemistry and environmental chemistry. (4 marks)
- (b) Explain three (3) aims of green chemistry. (3 marks)
- (c) Explain any two (2) principles of green chemistry. (6 marks)
- (d) Titanium can be produced following the chemical reaction below.
- $$TiCl_4 + 2 Mg \rightarrow Ti + 2MgCl_2$$
- (i) Calculate the atom economy of the reaction. Given atomic mass in g/mol: Ti = 48, Mg = 24, O = 16, Cl = 35.5. (5 marks)
- (ii) Discuss the answer obtained in Q4(d)(i). (4 marks)
- (iii) Name and define the green chemistry principle in Q4(d). (3 marks)

- END OF QUESTIONS -