

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

FIRST SEMESTER EXAMINATION

CH461 – ENVIRONMENTAL CHEMISTRY II

THURSDAY 17th JUNE 2021 - 12:50 PM

TIME ALLOWED: 2 HOURS

INFORMATION FOR CANDIDATES:

1. You will have 10 minutes to read the question paper. You **MUST NOT** begin writing in the answer book during this time.
2. **ANSWER ALL QUESTIONS.**
3. All answers **MUST** be written on the answer book provided.
4. Calculators are permitted in the examination room, IF NECESSARY. Lecture notes, notebooks, plain papers, and textbooks are **NOT** allowed.
5. Mobile phones are not allowed. **SWITCH OFF THE MOBILE PHONES.**
6. Show all working and calculations in the answer book.
7. **DRAW any FIGURES** clearly and visibly.
8. **DO NOT** over write
9. Write your name and number clearly on the front page of the answer book. **DO IT NOW.**

MARKING SCHEME: [TOTAL 60 MARKS]

1. (a) Why have mine tailings become such an issue in contemporary environmental discussions? [4 marks]
- (b) In what ways do mining companies dispose their mine tailings? [3 marks]
- (c) Mention TWO cases in Papua New Guinea involving a mine tailing controversy. [4 marks]

(TOTAL: 11 MARKS)

2. (a) What issues must be addressed in the design and maintenance of a sanitary landfill for municipal solid waste? [5 marks]
- (b) Discuss the FIRST and SECOND stages of decomposition (including the products formed) in the life of a sanitary landfill. [6 marks]

(TOTAL: 11 MARKS)

3. (a) Why is the establishment of an environmental monitoring program important? Mention FOUR key points. [4 marks]
- (b) What issue, or issues, brought about the Basel Convention held in 1989? [2 marks]
- (c) What are some of the compliance issues agreed to under the Basel Convention? [6 marks]

(TOTAL: 12 MARKS)

4. (a) Mention THREE issues you will consider, whether, or not, to embark on recycling a used product.

[3 marks]

- (b) Mention the FOUR R's of waste management philosophies applicable to all kinds of wastes.

[2 marks]

- (c) What are the core issues to be considered when embarking on Segregation of wastes?

[4 marks]

(TOTAL: 9 MARKS)

5. (a) Mention FOUR advantages of thermal incineration of municipal garbage over sanitary landfills.

[4 marks]

- (b) Assume the city of Lae has chosen thermal incineration over sanitary landfill as a means to control municipal garbage. What issues will be of concern to you, as a consulting Chemist?

[6 marks]

(TOTAL: 10 MARKS)

6. (a) Arsenic and cyanide are two popular environmental toxicants. Mention ONE source of cyanide, and ONE source of arsenic into the environment.

[2 marks]

- (b) Why should we worry about cyanide in water?

[3 marks]

- (c) What are the toxicological effects of arsenic?

[2 marks]

(TOTAL: 7 MARKS)

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