

UNIVERSITY OF FORT HARE

PAC 326

SUPPLEMENTARY EXAMINATION

JANUARY 2019

Time: 3 HOURS

Subject: Environmental Chemistry 2

Marks: 100

This paper consists of 5 pages including cover page

Internal Examiner

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External Examiner

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Instructions: There are 4 questions in this examination.

Answer ALL

Question 1

- a) Define the following terms commonly encounter in waste management [10]
- i) Ecosystem
 - ii) Ecological equilibrium
 - iii) Toxicity
 - iv) Adsorption
 - v) Contaminant
- b) Briefly describe the term municipal waste and give at least 6 examples. [3]
- c) Why is it advisable to return used battery to the seller and not just dump in the bin? [2]
- d) Give two analytical methods that can be used to asses the following [4]
- i) Wastewater organic pollution
 - ii) Heavy metals in drinking water
- e) Konkobe local municipality is faced with serious financial crises and a huge waste disposal of biodegradable material, as a member of the task force on this project advice your committee members on the way forward to meet two needs. [3]
- f) Give the names and chemical formula of any 4 coagulating/flocculating agents used water treatment. [8]
- [30 Marks]**

Question 2

- a) What is point source and non-point source pollution? [5]
- b) Classify the following as point sources or nonpoint sources pollution. Give your reasons [10]
- i) Sewage from a boat
 - ii) Urban runoff from storm sewers
 - iii) Thermal (hot) water from a power plant
 - iv) Steam from a coal- fired station
 - v) Fertilizer runoff from farmland
- c) Using equation where necessary describe the production of solar energy and biodiesel [10]
- d) Solid wastes can be a huge nuisances thus its disposal must be handled. [2]
- i) Mention two methods that is commonly used to dispose solid waste

- ii) Highlighting their advantages and disadvantages. [8]

[35 Marks]

Question 3

- a) i) What is renewable energy? [2]
ii) List three forms of biomass [3]
iii) Write chemical equation to show how each of the following are produced from biomass, methyl alcohol, ethyl alcohol and methane [4]
- b) What is green chemistry? [3]
i) Highlight the 4 concepts that covers the 12 principles of green chemistry? [2]
ii) What is the relationship between green chemistry and environmental chemistry? [5]
- c) One of green chemistry principles is that it is use fewer chemical process steps in making new product (chemical). How if at all does this principle relates to energy efficiency? [3]
- d) Recycling is a basic application towards the concept of green chemistry.
i) What is recycling? [1]
ii) What are the two components of recycling in modern waste reduction [2]
iii) List 5 recyclable materials [5]
iv) How would you recycle the following material: paper, plastic and tyre [5]

[35 Marks]

Question 4

- a) What is sewage? [3]
- b) Give examples of biological wastewater treatment system. [2]
- c) Outline 5 characteristics of these biological wastewater treatment systems [5]
- d) What are the advantages and disadvantages of these biological waste water treatment systems? [7]
- e) What is activated sludge? [3]
- f) What is syngas in water or sewage treatment processes? [3]
- g) Briefly describe how is syngas produced? [4]
- h) What is ion exchange? [3]
- i) Explain the circumstances leading to the use of ion exchange in water. [5]

[35 Marks]