

NATIONAL UNIVERSITY OF LESOTHO
BSc ENVIRONMENTAL HEALTH
END OF SEMESTER A EXAMINATIONS

JANUARY 2024

TIME: 3 HOURS

EHS3209: SOLID AND HAZARDOUS WASTE MANAGEMENT

100 Marks

Instructions to candidates

1. Answer **ALL** questions in the paper.
 2. Each question must be started on a new page.
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QUESTION 1 [30]

- a) Differentiate between the following terms used in Solid and Hazardous Waste Management and give an example of each:
- i. Waste generation and Waste segregation; [6]
 - ii. Waste Reuse and Waste Characterization ; [6]
 - iii. Material Flow analysis and Weight-volume analysis [6]
- b) Explain how the following characteristics of waste are important for selecting the waste management method for a waste stream;
- c) Biodegradability [4]
 - d) Mechanical properties [4]
 - e) Heat value [4]

QUESTION 2 [34]

Suppose you have been hired as a waste management consultant for the newly constructed Queen Elizabeth II Hospital in Maseru. You have been requested to table a proposal presentation to the senior management team of the Ministry of Health to clarify how hazardous Health Care Waste (HCW) will be managed when the hospital reopens. You have opted to use the Integrated Hazardous Waste Management Hierarchy as your model. Explain the following to the team of senior officials:

- a) The Integrated Hazardous Waste Management Hierarchy [12]
- b) Methods that you prescribe to treat the following waste (with justification):

- i. Sharps [4]
- ii. Pathological waste (microorganism cultures) from the laboratory [4]
- iii. Chemical liquid waste containing guanidinium thiocyanate (*GTC*) [4]
- c) Any 5 activities that the hospital will use for 'Cleaner production' of health services [10]

QUESTION 3 [26]

- a) Outline any 3 design features that make a landfill "sanitary". [6]
- b) Discuss any 4 factors (and their significance) that are considered in planning a landfill. [16]
- c) Use a labelled diagramme to illustrate the "cap" of a closed landfill. [4]

QUESTION 4 [10]

Suppose you are an EHP working in the Maseru Urban area and interested in a hydrophilic solid pollutant that has been disposed of into the Maqalika dam over a period of 5 years. The pollutant is soluble in water but also has volatility in high temperatures. You have information that the reservoir was already polluted by petroleum oils disposed nearby mechanical garages.

- a) State the different phases/media available for the pollutant to affiliate with. [4]
- b) Describe the possible fate of the pollutant in the dam, given the different multi-media [6]

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