



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

(MAIN CAMPUSES)

**UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR**

FOURTH YEAR SECOND SEMESTER EXAMINATIONS

**FOR THE BACHELOR OF SCIENCE
IN
ENVIRONMENTAL HEALTH**

COURSE CODE: HEH 227

COURSE TITLE: COURSE TITLE: LIQUID WASTE MANAGEMENT

DATE: 22/04/2022

TIME: 12.00-2.00 pm

INSTRUCTIONS:

ANSWER ALL QUESTIONS IN SECTION A, AND ANY TWO IN SECTION B

TIME: 2 Hours

MMUST observes ZERO tolerance to examination
cheating

This Paper Consists of 2 Printed Pages. Please Turn Over

SECTION B: ANSWER ALL QUESTIONS IN THIS SECTION (40 marks)

1. Differentiate the following terms as used in liquid waste management (6 marks)
 - a) Sewage disposal and sewage treatment (2 marks)
 - b) Gray water and black water (2 marks)
 - c) Septic system and imhoff treatment system (2 marks)
2. Highlight Three (3) chemicals that are commonly used for the precipitation of metals from wastewater (3 Marks)
3. Classify waste water /sewerage generated in homes or in the community (6 marks)
4. List causes of possible toxicity in activated sludge processes state the means of controlling or reducing the toxicity (2 marks)
5. Outline Six (6) primary risks to human health associated with liquid waste dumping (3 marks)
6. Enumerate Four (4 marks) methods of aeration used in the wastewater treatment facilities (4 marks)
7. Outline Four (4) groups, two of each anaerobic and aerobic bacteria that are involved in the degradation of organic matter in wastewater treatment process (4 marks)
8. Differentiate grab/catch sample from composite/integrated wastewater sampling method (4 marks)
9. Give possible causes of sludge bulking in activated sludge process (2 marks)
10. State by giving examples Three (3) major characteristics of liquid waste (6 marks)

SECTION B: LONG ESSAY QUESTIONS: ANSWER TWO QUESTIONS (QUESTION 1 IS COMPULSORY) (30 marks)

1. Illustrate the sewage treatment process (15 marks)
2. Aseptic tank is a method of excreta disposal that can be recommended in an area where there is water supply with no sewer line (15 marks)
 - a) With an aid of a sketch detail the construction of a septic tank by mentioning five of its key components that are required(10 marks)
 - b) Describe five operation requirements of a septic tank in a rural residential (5marks)
3. You are an employee of Kakamega water and Sewerage Company; you are to lead a team in training workers on sludge treatment. What detailed explanation would you give on the goals of sludge treatment you will also be required to explain three mechanisms that occur as a result of anaerobic digestion during the process (15 marks)