



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**SCHOOL OF HEALTH SCIENCES**  
**UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN**  
**COMMUNITY HEALTH AND DEVELOPMENT**  
**1<sup>ST</sup> YEAR 2<sup>ND</sup> SEMESTER 2023/2024 ACADEMIC YEAR**  
**KISUMU**

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**COURSE CODE:** HCB 2102  
**COURSE TITLE:** WASTE MANAGEMENT  
**EXAM VENUE:** STREAM: (BSc Comm Hlth & Dev)  
**DATE:** EXAM SESSION:  
**TIME:** 2.00 HOURS

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**Instructions:**

- 1. Answer all the questions in Section A and ANY other 2 questions in Section B.**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**Section A. ANSWER ALL QUESTIONS (30 mrks)**

1. Compare (i) raw sewage and sewage sludge (ii) black and grey waters as sources of waste. (4 mrks)
2. State the difference between thermophilic and mesophilic digestions in wastewater treatment. (2 mrks)
3. Describe 3 on-site disposal methods and 3 categories of transportation of waste. (3 mrks)
4. Name any six possible types of household toxic materials. (3 mrks)
5. Define the term hazardous waste and outline four of major properties/characteristics of hazardous waste. (3 mrks)
6. Outline the prerequisite qualities of a good excreta disposal method. (3 mks)
7. Enumerate three functions of ventilated pipe and three functions of fly screen used in some of the excreta disposal systems. (3 mks)
8. Explain the concepts of “(i) extended producer reliability (ii) polluter pays principle and (iii) recycling method” in waste management. (3 mrks)
9. Explain why composting is a recommended waste disposal method but a significant source of worry in management of wastes. (3 mks)
10. Draw a sketch diagram of a pit latrine, indicating its dimensions and its optimum location with respect to (a) the nearest water source; (b) the nearest house; and (c) the sloping land. (3 mks)

**Section B. ANSWER ANY TWO QUESTIONS (20 mrks each)**

1. Discuss;
  - (a) SIX problems of improper disposal of human wastes. (6 mrks)
  - (b) FOUR major disease-causing micro-organism agents arising from improper disposal of human excreta. In each explain the main routes of transmission, disease associated sign(s) and symptom(s) and appropriate management and control. (6 mrks).
  - (c) Factors that influence the selection and planning for community water supply. (8 mrks)
2. Discuss;
  - (a) advantages and disadvantages of landfills and incineration as methods of waste management. (10 mrks)
  - (b) steps in solid waste management process (5 mrks)
  - (c) five key components of solid waste management. (5 mrks)

3. Excreta disposal methods may be categorized as (i) non-water (dry) conservancy or (ii) water-borne/water carriage conservancy systems.
  - (a) With example for each type of system, **discuss** the structure and application, operation and maintenance costs, area of use and potential problems associated to each. (15 mrks)
  - (b) Discuss the criteria for selecting sewage treatment methods (5 mrks)
  
4. Discuss;
  - (a) the concept of a five basic parts of management hierarchy and strategy in waste management with an aid of illustrating diagram. (10 mrks)
  - (b) five chemical methods applicable to managing hazardous waste. (5 mrks)
  - (c) the principles of integrated water resource management. (5 mks)