



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

**UNIVERSITY EXAMINATION FOR THE DEGREE IN SCIENCE IN RENEWABLE
ENERGY TECHNOLOGY AND MANAGEMENT**

4TH YEAR 2ND SEMESTER 2023/2024 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TEB 1408

COURSE TITLE: ENERGY AND SOLID WASTE MANAGEMENT

EXAM VENUE: STREAM: BSc. REN ENGY TEC & MGT

DATE: /04/2024 EXAM SESSION:

DURATION: 2 HOURS

Instructions

- 1. Answer question 1 (Compulsory) and ANY other two questions**
- 2. Candidates are advised not to write on question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

QUESTION ONE (30 Marks) (Compulsory)

- (a). Define what you understand by, “solid waste management”, and outline functional elements based on activities associated with it from its source onwards. **(8 Marks)**
- (b). Briefly explain what you understand by Integrated Solid Waste Management (ISWM) hierarchy and its application within waste management system. **(8 Marks)**
- (c). Briefly explain the effects of mismanagement of solid waste to the community, outlining broad categories of solid waste and potential risks. **(4 Marks)**

QUESTION TWO (20 Marks)

- (a). Solid wastes are all wastes arising from human and animal activities and are discarded as useless or unwanted. Briefly describe waste classification based on sources and dominant types of solid waste in each class. **(12 Marks)**
- (b). Differentiate between the following terms as applied in waste management.
- i. Mechanical volume reduction and Thermal volume reduction. **(3 Marks)**
 - ii. Open dumping and sanitary land filling **(3 Marks)**
 - iii. Waste recovery and Waste recycling. **(2 marks)**

QUESTION THREE (20 Marks)

- (a). Differentiate between “Load count analysis” and “Mass-Volume analysis” as used in estimating quantities of solid waste. **(4 Marks)**
- (b). Briefly explain the following processes involved in the analysis of solid waste.
- i. Chemical composition of solid wastes **(8 Marks)**
 - ii. Physical composition of solid wastes **(8 Marks)**

QUESTION FOUR (20 Marks)

- (a). Define composting as applied in solid waste disposal and describe the processes involved. **(12 Marks)**
- (b). Explain the occurrence of Landfill gas, its recovery process and use. **(8 Marks)**

QUESTION FIVE (20 Marks)

- (a). Describe the benefits associated with recovery of energy from wastes. **(4 Marks)**
- (b). Differentiate between Bio-chemical conversion and Thermo-chemical conversion as applied in municipal solid waste management. **(4 Marks)**
- (c). Discuss the main parameters which determine the potential of Recovery of Energy from Municipal Solid Wastes. **(12 Marks)**