



NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY

DEPARTMENT OF CIVIL AND WATER ENGINEERING

SOLIDWASTE MANAGEMENT

TCW 5006

Main Examination Paper

DECEMBER 2015

This examination paper consists of 2 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: NONE

Examiner's Name: ELLEN MANGORE

INSTRUCTIONS

1. Answer any four (4) questions
2. Each question carries 25 marks
3. Use of calculators is permissible

MARK ALLOCATION

QUESTION	MARKS
1.	25
2.	25
3.	25
4.	25
5.	25
TOTAL	100

QUESTION 1

Discuss integrated approach to solid waste management, outlining logical actions, minimization of the production of waste, maximization of recycling and re-use promotion of safe waste collection and disposal. (25 marks)

QUESTION 2

- a. Define the following terms as used in municipal solid waste management.
- i. cell
 - ii. lift
 - iii. leachate
 - iv. breakthrough time
 - v. landfill (10 marks)
- b. Describe, with aid of diagrams how leachate can be controlled in landfills (15 marks)

QUESTION 3

- a. List and describe the factors that must be addressed in developing a design and an operational plan for a landfill (15 marks)
- b. Draw a neat labeled diagram of a modern municipal landfill indicating various components of it . (10 marks)

QUESTION 4

- a. Describe the effects of storage of solid waste at source (10 marks)
- b. In the town of Plumtree, the average family size is 5.6. It has been decided to use a standard container which will be provided by the town. Assuming a waste generation rate of 3.0 kg/capita.day and density 210kg/m^3 , determine the size of the container. (5 marks)
- c. The Ascot apartments consist of 50 units with an average of 1.9 persons/unit. The manager has decided to provide one disposal unit for mixed waste and a single unit for all recycled material. Assuming, 2kgs/capita.day, total waste, % recovered for recycling 12-16% by weight. Determine the size the two containers for weekly pickup. (10 marks)

QUESTION 5

What could constitute the environmental management plan (EMP) for a new landfill project (25 marks)