



# TECHNICAL UNIVERSITY OF MOMBASA

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FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

**UNIVERSITY EXAMINATION FOR:**

**BSC IN CIVIL ENGINEERING**

**ECE 2504 : PUBLIC HEALTH ENGINEERING III**

**END OF SEMESTER EXAMINATION**

**SERIES: APRIL 2016**

**TIME: 2 HOURS**

**DATE: 10 May 2016**

## **Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, Drawing Instruments, Scientific calculator, examination pass and student ID*

This paper consists of five questions.

Attempt question ONE (Compulsory) and any other TWO questions.

## **Question ONE (Compulsory)**

- a). Make short notes on the following terms as regards water re-use
- i) Scaling
  - ii) Metallic corrosion
  - iii) Biological growth
  - iv). Fouling (8 Marks).
- b). Define onsite waste water treatment system (OWTS) what are the main challenges facing its implementation (12 marks)
- c). Discuss the Solid Waste Management Chain (SWM) (10 Marks).

## **Question TWO**

- a). What are some of the important land fill-siting consideration? (8 marks)
- b). Why is salinity important to plants? (6 Marks).

- c). What do you understand by the term vermicomposting? (6 Marks).

### Question THREE

- a). A new urban residential estate with 1000 homes averaged occupancy of 4.8 person per residence had a single central pack. Can the estate be served by two trucks once a week?

The details for the question are provided as follow:

- Waste generation for parks and recreational areas = 0.02kg/Capita.day
- Waste generation for residential homes = 1.8 kg/Capita
- Park rubbish density = 130 kg/m<sup>3</sup>
- Residential rubbish = 400 kg/m<sup>3</sup>
- Capacity for the truck = 4.5 – 10 m<sup>3</sup> (6 Marks).

- b). Differentiate between Hauled container system (HCS) and the stationary container system (SCS) (4 Marks).

- c). Discuss size reduction and screening methods, citing their objectives (10 Marks).

### Question FOUR

- a). Discuss the operations and maintenance of biogas digester citing its advantages and disadvantages (15 Marks).

- b). Discuss factors that affect generation rates of the solid waste (4 Marks).

### Question FIVE

- a). Describe combustion process and cite any major concern of this process (11 Marks ).

- b). Make short notes under the following terms:

- i). Water demands and Reuse
- ii). Source substitution
- iii). Pollution abatement (9 Marks).