



TECHNICAL UNIVERSITY OF MOMBASA  
**Faculty of Engineering &  
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING  
**HIGHER DIPLOMA IN BUILDING & CIVIL ENGINEERING (HDBCE 12J)**

EBC 3308: PUBLIC HEALTH ENGINEERING II

**SPECIAL/SUPPLEMENTARY EXAMINATION**

**SERIES: OCTOBER 2013**

**TIME ALLOWED: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions.

Answer any **THREE** questions

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

### Question One

a) Define the following terms:

(i) Sewage

(ii) Sewerage

(iii) Sewer

(iv) Wet weather flow

(v) Dry weather flow

**(10 marks)**

b) State THREE:

(i) Reasons why storm water should be collected and removed from an area

(ii) Factors that affect the quantity of storm water

**(6 marks)**

c) Explain the importance of the following in sewer design.

(i) minimum velocity

(ii) Maximum velocity

**(4 marks)**

### Question Two

A main sewer is to be designed to serve an area of 12km<sup>2</sup> with a population density of 250 persons/ha. The average rate of sewage flow is 250L per capita. day. The maximum flow is 100% in excess of average (I.e. peak factor is 2) together with a rainfall equivalent of 15mm in 24 hours all of which is assumed to result in runoff. Determine:

(i) The capacity of the sewer (i.e. total flow)

(ii) The size of the circular sewer, taking the maximum velocity of flow to be 3m/s. (Assume pipe is flowing full)

**(20 marks)**

### Question Three

a) (i) Briefly describe the THREE types of sewerage systems.

(ii) State ONE advantage and ONE disadvantage of EACH system in Q3 (a) (i)

**(15 marks)**

b) State:-

(i) Two objectives of providing manholes on sewer lines

(ii) Three factors that affect the location of manholes on sewer lines

**(5 marks)**

### Question Four

a) (i) Make a schematic layout of a conventional treatment plant.

(ii) Briefly describe each of the treatment process in 4(a) (i)

**(16 marks)**

b) Outline the laboratory test for suspended solids.

**(4 marks)**

### Question Five

a) Sketch and label a three chamber septic tank.

**(6 marks)**

b) Differentiate between the following types of waste stabilization ponds.

- (i) Facultative
  - (ii) Maturation
  - (iii) Anaerobic
- c) Outline TWO methods of sludge disposal.

**(9 marks)**  
**(5 marks)**