TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE2313 : PUBLIC HEALTH ENGINEERING II

END OF SEMESTER EXAMINATION
SERIES: JULY 2017
TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of five questions.

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

Do not write on the question paper.

QUESTION ONE (COMPULSORY)

a) State FOUR main objectives of waste water treatment

(4marks)

b) Outline the classification of bacteria according to their oxygen need

(3marks)

c) Explain the major difference between the "conservancy" and "water carriage" system of sewage collection giving examples.

(4marks)

d) Explain FOUR uses of the BOD test results

(4marks)

e) The 5 days 20°C BOD of a sewage sample is 150 mg/l. If the deoxygenation constant at 20°C, $k_1 = 0.1$(base 10), determine its 8 days 15°C BOD. Take

$$K_{1_{T^\circ}} = K_{1_{20^\circ}}(1.047)^{T-20^\circ}$$

(6marks)

f) I)Briefly describe the THREE types of sewerage systems
ii) State ONE advantage of each system in f (i)

(9marks)

QUESTION TWO

a) By use of a simple sketch (number of viable micro-organism versus time) illustrate the growth of a pure culture in an ideal medium and explain all the phases in the cycle

(10marks)

b) Define the following terms as used in waste water engineering
   i. Garbage
   ii. Sullage
   iii. Storm water
   iv. infiltration
   v.Dry weather flow

(10marks

QUESTION THREE

a) Briefly describe the following stages of conventional waste water treatment
   i. Preliminary treatment
   ii. Primary treatment
   iii. Secondary treatment
   iv. Tertiary treatment

(12marks)

b) Explain the effects of the following in sewage
   I. PH value
   II. Oil and grease

c) outline the coliform test on waste water

(8marks)

QUESTION FOUR

a) Briefly describe ANY FOUR waterborne diseases with respect to;

(12marks)

b) Explain the following terms;
   i. Total solids in sewage
   ii. Eutrophication in lakes
   iii. Chemical oxygen demand
   iv. Biochemical oxygen demand

(8marks)

QUESTION FIVE

a) State FOUR situations that necessitate the provision of a manhole in a sewerage system

(6marks)

b) With the aid of a sketch explain the working principle of a trickling filter

(8marks)

c) Differentiate between aerobic ponds and anaerobic ponds and facultative ponds.

(6marks)