



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**SCHOOL OF ENGINEERING AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS FOR THE DIPLOMA IN BUILDING AND CIVIL  
ENGINEERING**

**3<sup>RD</sup> YEAR 2<sup>ND</sup> SEMESTER 2017/2018 ACADEMIC YEAR**

**CENTRE: MAIN CAMPUS**

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**COURSE CODE: TBC 2325**

**COURSE TITLE: WASTE WATER MANAGEMENT**

**EXAM VENUE: LR 15**

**STREAM: DIP IN BLD & CIV ENG**

**DATE: 11/12/2017**

**EXAM SESSION: 2.00 – 3.30PM**

**DURATION: 1 ½ HOURS**

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**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

a) Why is wastewater Engineering also an environmental health concern

(5 Marks)

a) Describe general characteristics of wastewater in reference to the following:

- i. Physical properties
- ii. Chemical properties
- iii. Biological constituents.

(9 Marks)

b) Define the following terms as used in waste water management.

- i. Domestic sewage
- ii. stormwater
- iii. sullage
- iv. sewer

( 8 Marks)

c) State any FOUR objectives of sewerage works is supposed to meet

( 8 Marks)

## QUESTION TWO

Explain design criteria for sewers in reference to the following:

- a) Sewer gradients
- b) Sewer sizes
- c) Manholes
- d) Ventilation of sewers

( 20 Marks)

## QUESTION THREE

JOOUST uses waste stabilization ponds for her wastewater treatment. Illustrate any typical pond arrangements and explain operation mechanism of your chosen arrangement.

(20 Marks)

## QUESTION FOUR

a) Explain any TWO methods of disposing sludge

b) A boarding school with a total population of 1000 has commissioned you to design for them a septic tank. Determine septic tank dimensions on the basis of the following extra information:

- The average water consumption in the school is 50l/p/d.
- Sludge accumulation is 0.03m<sup>3</sup>/p/yr
- Double compartment tank is desirable.

You allowed to make more logical assumption