



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE &  
TECHNOLOGY UNIVERSITY EXAMINATIONS 2012/2013**

**2<sup>ND</sup> YEAR 2<sup>ND</sup> SEMESTER EXAMINATION IN DIPLOMA IN  
BUILDING AND CIVIL ENGINEERING**

**(KISUMU L. CENTRE)**

**COURSE CODE: TBC 2227**

**COURSE TITLE: WATER AND WASTEWATER QUALITY ANALYSIS**

**DATE: 15/8/13**

**TIME: 2.00 - 3.30 PM**

**DURATION: 1.30 HOURS**

**INSTRUCTIONS**

- 1. This paper contains five (5) questions.**
- 2. Answer question 1 (compulsory) and ANY other TWO questions.**
- 3. Write all answer in the booklet provided.**

### **QUESTION ONE (30 MARKS)**

- a. Briefly explain the following as applied to water and waste water quality analysis;
- i. Water pollution **(2.5 Marks)**
  - ii. Biological oxygen demand **(2.5 Marks)**
  - iii. Dissolved oxygen **(2.5 Marks)**
  - iv. Effluent discharge requirements **(2.5 Marks)**
- b. It is difficult to find absolutely pure water in nature. Discuss the various possible impurities found in water and their impacts to water quality. **(10 Marks)**
- c. With specific examples, briefly discuss the various requirements for drinking water. **(10 Marks)**

### **QUESTION TWO (15 MARKS)**

- a. Lake Victoria is a main water source for the major town around it. Its water quality is deteriorating at a faster rate and yet there are a number of lead agencies established to maintain/improve its water quality. Briefly explain? **(5 Marks)**
- b. There are various common standard tests applied in examining the water quality in a municipal water supply set up e.g. KIWASCO. Briefly discuss them outlining their importance with respect to;
- i. Physical and chemical examination **(6 Marks)**
  - ii. Biological examination **(4 Marks)**

### **QUESTION THREE (15 MARKS)t**

- NEMA is one of the lead agencies in Kenya charged with the responsibility of maintaining water quality standards. Discuss its mandate with respect to the following;
- i. Protection of water sources **(5 Marks)**
  - ii. Water discharge **(5 Marks)**
  - iii. Water for agricultural use **(5 Marks)**

### **QUESTION FOUR (15 MARKS)**

Outline and briefly discuss, in a logical sequence, the various processes involved in a municipal water treatment plant. **(15 marks)**

### **QUESTION FIVE (15 MARKS)**

- a. Outline an experimental procedure for measuring biological oxygen demand (B.O.D.) **(9 Marks)**
- b. Calculate the 5 day 20°C B.O.D. of sewage which after being incubated for one day at 30°C was found to have a B.O.D. of 120mg/litre. The values of  $K_1$  are 0.1 and 0.16 respectively at 20°C and 30°C. **(6 Marks)**