JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF SPATIAL PLANNING

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN WATER RESOURCE AND ENVIRONMENTAL MANAGEMENT

SEMESTER 2016/2017 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: PWE 3324

COURSE TITLE: WATER SUPPLY AND SANITATION II

EXAM VENUE: **STREAM: SPATIAL PLANNING**

DATE: **EXAM SESSION:**

TIME: 2 HOURS

Instructions:

1. **Answer question 1 (compulsory) and ANY other 2 questions.**
2. **Candidates are advised not to write on the question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

Q1 a) Describe the factors that influence composition of wastewater **(6 Marks)**

b) Distinguish between (i) biologic wastewater load and (ii) hydraulic wastewater load **(6 Marks)**

c) Describe any THREE recommended methods for final sludge disposal and /or re-use **(6 Marks)**

d) Explain the concepts of Aerobic and Anaerobic sludge digestion **(6 Marks)**

e) By giving examples, describe the (i) Physiological, (ii) Chemical and (iii) Biological waste characteristics **(6 Marks)**

Q2. With the aid of well labeled a labeled diagram(s), describe in details the Conventional Wastewater Treatment Processes **(20 Marks)**

Q3. Describe the concept of waste stabilization ponds in the following order: (i) Definition, (ii) Functions, (iii) Types, (iv) Advantages and (v) Labelled Layout diagram **(20 Marks)**

Q4 a) Explain any **FIVE** objectives for sludge treatment **(5 Marks)**

b) A reactor with predominantly longitudinal dimensions has a volume of 6,400 m^3. Influent flow is 800m^3/day, substrate concentration = 200g/m^3. Generate the concentration profile along the reactor using an ideal plug flow model under steady state with the following conditions: *Assume biodegradable substance with 1st Order Removal; K=0.66/day; Take C = Co.e^{-kt}*. **(15 Marks)**

Q5. Describe the recommended **Five** methods for final sludge disposal and /or re-use **(20 Marks)**