



# **MACHAKOS UNIVERSITY**

University Examinations for 2020/2021

**SCHOOL OF HEALTH SCIENCES**

**DEPARTMENT OF PUBLIC AND COMMUNITY HEALTH**

**THIRD YEAR FIRST SEMESTER EXAMINATION FOR**

**BACHELOR OF SCIENCE (PUBLIC HEALTH)**

**HPH 301: LIQUID WASTE MANAGEMENT II**

**DATE: 16/8/2021**

**TIME: 8:30 – 10:30 AM**

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## **INSTRUCTIONS:**

This paper consists of two sections A and B

### **SECTION A**

#### **Specific Instructions**

- **This section has one question**
- **The question is compulsory**
- **The question is 30 marks**

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

- a) Define the following terms (3 marks)
- Dry Weather Flow
  - Hydraulic loading
  - Sludge
- b) Explain the essential bacteria in a wastewater treatment plant (3 marks)

- c) Public health students visited Nyeri sewerage treatment plant. They observed that the final treated effluent was re-used/recycled. Explain the ways through which this was achieved (3 marks)
- d) Explain the conventional sewage treatment process (3 marks)
- e) Grease in wastewater can cause damage to the treatment works. Explain how grease is removed from wastewater (3 marks)
- f) You are to carry out a laboratory experiment on wastewater. Explain the techniques you will use to collect the sample for analysis (3 marks)
- g) Explain the importance of analyzing waste water in a sewerage treatment plant (3 marks)
- h) Explain why trees should not be planted around sewage treatment works (3 marks)
- i) Explain the different types of waste stabilization ponds (3 marks)
- j) Using examples, differentiate between unit operations and unit processes as applied to waste management (3 marks)

## **SECTION B:**

### **Specific Instructions**

- **This Sections has four (4) questions**
- **Answer any two (2) questions**
- **Each question is 20 marks**

### **QUESTION TWO (20 MARKS)**

- a) Describe the design and functioning of a waste stabilization pond (10 marks)
- b) You have received public complaints about discharge of wastewater into a water source leading to contamination and death of marine life. Discuss the actions you will take to abate the nuisance in your capacity as the area public health officer. (10 marks)

**QUESTION THREE (20 MARKS)**

- a) Killing or inactivating pathogenic organisms in the treated effluent prior to discharge to the receiving stream is important. Explain ways through which this can be achieved (10 marks)
- b) The method of wastewater treatment to be used in a treatment works depends on a number of factors. Explain. (10 marks)

**QUESTION FOUR (20 MARKS)**

- a) Explain the challenges that hinder proper liquid waste management in Kenya. (10 marks)
- b) Describe the activated sludge process in liquid waste management (10 marks)

**QUESTION FIVE (20 MARKS)**

- a) Explain how the solids generated during the physical and biological treatment of waste water are handled. (10 marks)
- b) Explain the impact of waste water discharge to water bodies. (10 marks)