

**UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES**

**BACHELOR'S DEGREE IN ENVIRONMENTAL
HEALTH SCIENCES**

**SUPPLEMENTARY EXAMINATION PAPER
JULY 2014**

TITLE OF PAPER : FUNDAMENTALS OF SEWAGE
TREATMENT

COURSE CODE : EHM 213

DURATION : 2 HOURS

MARKS : 100

INSTRUCTIONS : ANSWER ANY FOUR QUESTIONS

: EACH QUESTION CARRIES 25 MARKS

: NO PAPER SHOULD BE BROUGHT INTO NOR
OUT OF THE EXAMINATION ROOM

: BEGIN EACH QUESTION ON A SEPARATE
SHEET OF PAPER

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED
BY THE INVIGILATOR**

QUESTION ONE

- a) Outline the key features of a modern wastewater treatment plant such as the Nhlambeni Waste Water Treatment Plant. [15]
- b) Outline the key features of the traditional method of sewage treatment such as the one in Matsapa. [10]

QUESTION TWO

- a) There are seven conventional elements to consider in designing any waste water management and treatment facility. Discuss each element and their utility. [21]
- b) What is the importance of the following with regards to waste water treatment? [4]
 - 1. Dissolved oxygen
 - 2. Oxygen demand
 - 3. Biochemical oxygen demand
 - 4. Chemical oxygen demand

QUESTION THREE

- a) What are the characteristics of waste water? Give examples for each characteristic as conceptualized by Metcalf and Eddy. [20]
- b) What is the importance of primary and secondary ponds in a traditional waste water treatment facility? [5]

QUESTION FOUR

- a) The selection of a waste water treatment method depends on several factors. Discuss at least eight of these factors. [16]
- b) Describe the process of pretreatment in a waste treatment plant. State the likely by-products during pre treatment [5]

- c) Under what conditions is aerobic and anaerobic decomposition desired in a waste treatment plant? [4]

QUESTION FIVE

- a) What purpose is served by the depth in a primary pond of the traditional waste water treatment plant [5]
- b) Describe the biological processes in a facultative pond [5]
- c) Define the following terms used in sewage treatment: [5]
- i. Sewage
 - ii. Sewerage
 - iii. Sullage
 - iv. Sewer
 - v. Anaerobic lagoons
- d) Distinguish between COD and BOD. [10]
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