

**UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES**

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

MAIN EXAMINATION PAPER MAY 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**

EHM 213 Main Exam May 2014 Fundamentals of Sewage Treatment

QUESTION ONE

- a) What is meant by Privy methods and water carried methods of sewage treatment? [10]
- b) Government has allocated 50 million Emalangeni for a Municipal Capital Project to construct a sewage treatment plant. Describe the issues that the Engineers have to consider in order to come up with good advice on the correct type of treatment method [10]
- a) Define the following terms used in sewage treatment: [5]
- i. Sewage
 - ii. Sewerage
 - iii. Sullage
 - iv. Sewer
 - v. Anaerobic lagoons

QUESTION TWO

- a) Waste water treatment is primarily concerned with the removal of a number of contaminants. Metcalf and Eddy discuss eight such contaminants. Which are those?[16]
- b) Beside the famous Wagner and Lainnox criteria there are seven conventional elements to consider in designing any waste water management and treatment facility. Discuss each element and its utility. [7]
- c) Define the term Eutrophication [2]

QUESTION THREE

- a) The waste water engineering field uses at least seven acronyms when referring to stabilization ponds. Which are these acronyms? [7]
- b) Using a properly labeled sketch diagram describe the key process issues during each stage in the traditional or conventional method of sewage treatment as in Matsapa[18]

QUESTION FOUR

Using a properly labeled sketch diagram describe the key design and process issues in a modern waste water treatment plant as at Nhlambeni Waste Water Treatment Plant [25]

QUESTION FIVE

- a) What are the key differences between stabilization ponds and trickling filters? [5]
- b) How does a septic tank operate? [6]
- c) State four sources of waste water [4]
- d) Discuss the importance of the following in waste water treatment; [6]
1. DO
 2. OD
 3. BOD
 4. COD
 5. Nitrification and
 6. Oxidation
- e) Concerning waste water characterization Metcalf and Eddy (1991) distinguish four types of constituents namely physical, chemical, gaseous and biological constituents. For each mention no less than two to demonstrate your understanding of waste water characterization. [4]
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