



UNIVERSITY OF SWAZILAND  
Faculty of Health Sciences  
Department of Environmental Health Science

DEGREE IN ENVIRONMENTAL HEALTH SCIENCES

MAIN EXAMINATION PAPER MAY 2018

TITLE OF PAPER : FUNDAMENTALS OF SEWAGE TREATMENT

COURSE CODE : EHS 212

DURATION : 2 HOURS

MARKS : 100

INSTRUCTIONS :

- : READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
- : ANSWER **ANY FOUR** QUESTIONS
- : EACH QUESTION **CARRIES 25** MARKS.
- : WRITE NEATLY & CLEARLY
- : NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
- : BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

**QUESTION ONE**

- a) Give at least five by-products in a Trickling Filters waste water treatment process including where they emanate from. [10]
- b) What are the five key differences between stabilization ponds and trickling filters [10]
- c) Sewage collection and treatment is typically subject to local and state regulations and standards. Specify the regulations [3]
- d) Differentiate between the terms re-purification and recycling in waste water treatment processes [2]

**QUESTION TWO**

- a) Waste water management can be conveniently divided into seven elements. List and discuss each of the seven elements stating their significance. [14]
- b) State four reasons why it is important to treat waste water. [4]
- c) Sketch out and properly label a typical trickling filters process flow chart [7]

**QUESTION THREE**

- a) What are the characteristics of waste water? Give examples for each characteristic as conceptualized by Metcalf and Eddy (2004). [16]
- b) Out of the waste water constituents as conceptualized by Metcalf and Eddy which eight are of serious concern and why? [8]
- c) Define the term eutrophication [1]

**QUESTION FOUR**

- a) With specific examples including fieldwork experience describe how the introduction and application of advanced waste water treatment methods has revolutionized waste water treatment in Swaziland. [15]
- b) Why is it always important to be clear about the relationship between microbes and waste water during waste water treatment process? [5]
- c) The final stage in trickling filters relates to sludge disposal and effluent disposal. Discuss the main aspects of this stage and state the related dangers of not taking care of this stage. [5]

**QUESTION FIVE**

a) State the significance of the following in waste water treatment processes;

- i. BOD test [2]
- ii. COD test [2]
- iii. Nitrification [2]

b) Below is a picture of the stabilization ponds at Matsapa.



- i. Concerning the above state at least five disadvantages related to a pond system of waste water treatment such as the one in Matsapha above. [10]
- c) Give examples of decentralised sewage treatment systems and state role played by such systems [3]
- d) State the functions of the three basic components in an activated sludge treatment process [6]