



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

DEGREE IN ENVIRONMENTAL HEALTH SCIENCES

MAIN EXAMINATION PAPER MAY 2017

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 five reasons for improved waste water characterizations. [10]
- (b) Chlorine continues to be used in waste water treatment plants yet there are public health concerns around its use. Give at least five of such concerns. [10]
- (c) For a disinfectant to be considered ideal for disinfecting in a waste water treatment plant it must fulfil at least 12 characteristics. Discuss only five of those characteristics [5]

QUESTION TWO

- a) Methods of waste water treatment processes are generally designed in a way that provides various levels of treatment.
 - i. Name the four levels [4]
 - ii. Describe the primary function of each of the level. [4]
- b) Give five reasons for the treatment of waste water [10]
- c) Define the following terms [5]
 - i. Effluent
 - ii. Sludge
 - iii. Sewage
 - iv. Sewerage
 - v. Sewer
- d) Is it always the case that there is tertiary treatment during waste water treatment process? Explain your answer. [2]

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) 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. [10]
- b) Give 5 (five) pros and 5 (five) cons for using the water carried methods of waste water treatment [10]
- c) Describe and contrast the two principal modes of decomposition in a waste water treatment plant [4]
- d) Define problems caused by non-biodegradable pollutants found in waste water [1]

QUESTION FIVE

- a) Outline the importance of the following in a waste water treatment plant; [6]
- i. BOD
 - ii. Nitrification and Denitrification
 - iii. Total Suspended Solids
- b) Below is a picture of the stabilization ponds at Matsapa.



- i. What are the key features of this treatment method? [10]
- c) Give examples of decentralised sewage treatment systems and state role played by such systems [3]
- d) Define the three basic components tenable in an activated sludge treatment process [6]