

**UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES**

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

MAIN EXAMINATION PAPER MAY 2015

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

: BEGIN EACH QUESTION ON A SEPARATE
SHEET OF PAPER

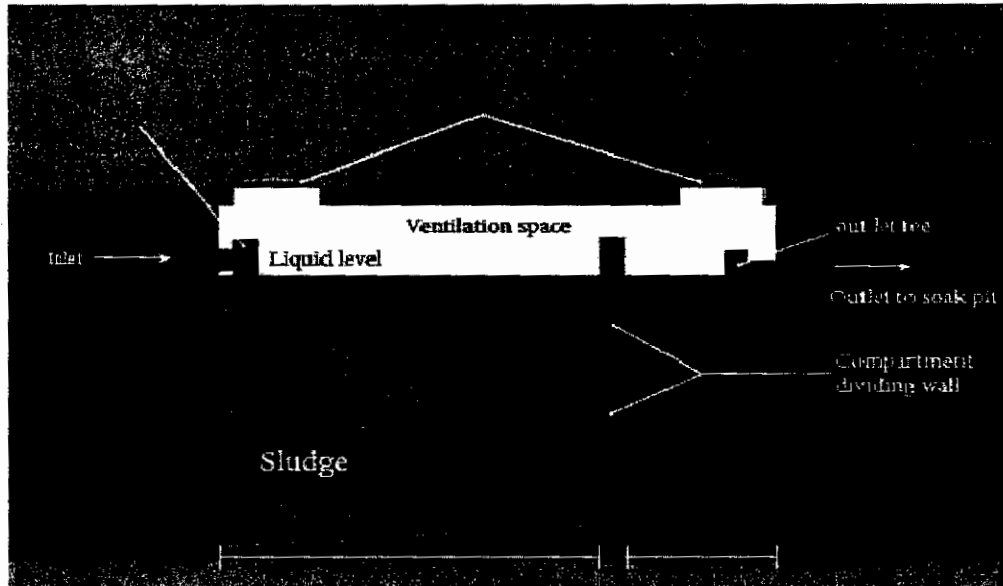
DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE
INVIGILATOR

QUESTION ONE

- a) What would you consider to be the main shortcomings of stabilization ponds. Give four [8]
- b) The Activated sludge is a superior treatment system than the stabilization ponds.
- Give at least three reasons for that [3]
 - Name the three important component parts of an activated sludge process [6]
- c) One of the most important roles of an EHO is to advise on the maintenance of septic tanks. Discuss the various pieces of advise you would give in order for people to continue enjoying a proper functioning septic tank system. [5]
- d) Screening involves the uses of various screens during primary treatment. Give the three normal screen names and their corresponding sizes [3]

QUESTION TWO

- a) The following graphic represents a septic tank. A septic has at least seven components that are very important to the way septic tanks treat waste water. Describe functions of seven components of a septic tank [14]



- b) According to Metcalf & Eddy (1991), Waste water may be characterized according to Physical, chemical, gaseous and biological constituents. List at least two under each

constituent to demonstrate your understanding of these important characteristics of waste water. [8]

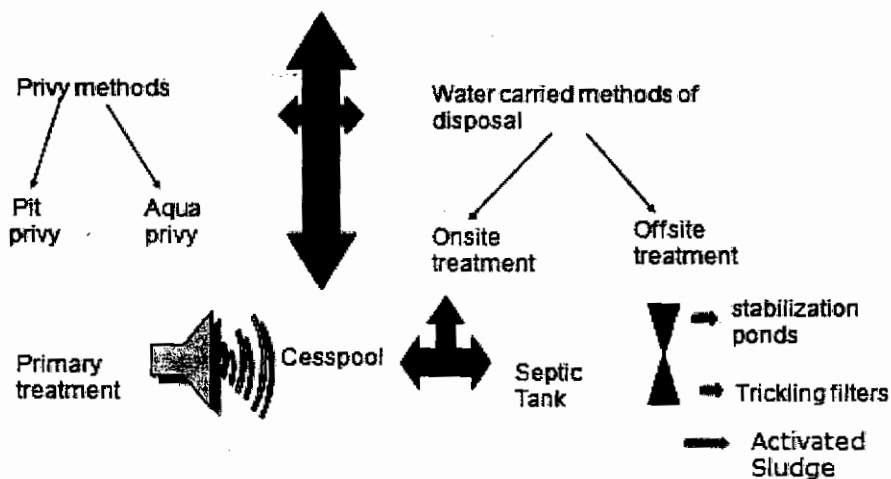
- c) Draw a graphic sketch outline indicating the component parts of a stabilization pond [3]

QUESTION THREE

- a) You have been appointed as resident engineer for the design of a new waste water treatment plant at Ebuhleni. Discuss the steps you would take in order to come up with a reasonable design for the plant. [10]
- b) A certain treatment plant operator has been dismissed from his job for the poor performance of the facility during week three in March 2015. Suggest at least ten possible reasons for his expulsion. [10]
- c) Explain the relationship between microbes, waste water and waste water treatment [5]

QUESTION FOUR

- a) Refer to the graphic below and answer the following questions.



- i. There is pre treatment involved for all offsite wastewater treatment facilities. Describe the process of pretreatment in a waste treatment plant. State the likely by-products during pre treatment in all the three systems [12]

- ii. State the by products of secondary and tertiary treatment in trickling filters [8]
- iii. Explain the need for offsite treatment systems against on site methods of treatment [2]
- iv. What are the three problems associated with the lower layers in a facultative pond? [3]

QUESTION FIVE

- a) Discuss the importance of the following in waste water treatment; [6]
 - 1. DO
 - 2. OD
 - 3. BOD
 - 4. COD
 - 5. Nitrification and
 - 6. eutrophication
 - b) What are the five key differences between stabilization ponds and trickling filters?[5]
 - c) Give five names of pieces of legislation related to waste water treatment in Swaziland. For each piece of standard and regulatory requirement state the responsible agencies[10]
 - d) Why is a treatment facility regarded as a microbiology farm [2]
 - e) Complete the following sentence. " The main focus of waste water treatment is the reduction of (a)..... and (b).....in the effluent" [2]
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