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

BSc. IN ENVIRONMENTAL MANAGEMENT AND WATER RESOURCES

SUPPLEMENTARY EXAMINATION PAPER 2017

TITLE OF PAPER        :       WATER QUALITY MANAGEMENT II

COURSE CODE           :       EHM 421

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 OR
                              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 1**

In Water Quality Management define the following terminologies:

    i)   Water Quality Standards                                      **(5)**

    ii)  Water Quality Criteria                                        **(5)**

    iii) Water Quality Guidelines                                **(5)**

    iv) Water Quality Objectives                                **(5)**

    v)  Water Quality Requirements                            **(5)**

**Question 2**

What are the responsibilities of a Surface Water Pollution Control organization? **(25)**

**Question 3**

Discuss the Environmental impacts of the following pollutants in water.

    i)   Re-use of sewage for agricultural purpose.              **(10)**

    ii) Disinfection by-products                           **(15)**

## Question 4

Explain how Water Quality Management is applied under the following International Practice:

| | |
|---|---|
| i)   Drinking Water Standards and Criteria | **(5)** |
| ii)  World Health Organization (WHO) | **(5)** |
| iii) European Union (EU) | **(5)** |
| iv) South Africa | **(5)** |
| v)  Surface Water Quality for Portable Abstraction | **(5)** |

## Question 5

A) The use of wastewater for agriculture is a very old practice and land disposal was the first wastewater treatment system:

   i)      What was the limiting factors for the rate of application for the
           wastewater                                                                **(6)**

   ii)     Give and explain two (2) categories of risks associated with re-use of
           wastewater for agriculture.                                               **(4)**

B) With regard to the mathematical approach adopted, water quality models can be classified as Empirical or Statistical, Stochastic and Deterministic.

   Describe how each of these models can be used in predction and simulation of
   water Quality.                                                                    **(15)**