



**UNIVERSITY OF SWAZILAND**  
Faculty of Health Sciences

**Department of Environmental Health Science**

Main Examination 2013

BSc. in Environmental Health Science

Title of paper: WATER QUALITY MANAGEMENT 1

Course code: EHM 317

Time allowed: 2 HOURS

Marks allocation: 100 Marks

**Instructions:**

- 1) Answer **ANY FOUR** questions
- 2) Each question is weighted 25 marks
- 3) Write neatly and clearly
- 4) Begin each question in a separate sheet of paper

This paper is not to be opened until the invigilator has granted  
permission

Main Examination : November, 2013.

EHM 317 I

**Question 1.**

It has been suggested that it would be possible to improve the water quality (reducing algal biomass, reducing organic contents, lowering phosphorus and nitrate levels, etc.) of Mntjoli Dam by “ecosystem control” measures such as installing underwater constructions to stimulate growth of communities, harvesting biomass from the dam, etc.

- a) Describe these ecosystem control measures. (15)
- b) Explain the theoretical basis for these approaches (10)

**TOTAL 25 MARKS**

**Question 2.**

- i) With an aid of a sketch, describe the transport process of groundwater contamination, illustrating a typical plume pollutants. (15)
- ii) Explain three (3) reactions that can occur due to contamination of groundwater and give examples. (10)

**TOTAL 25 MARKS**

**Question 3.**

A reservoir has been found to be contaminated with *Escherichia coli* bacteria at very high levels (more than 2500 per 100ml).

- i) What are the likely sources for this kind of contamination? (10)

The reservoir is used for “body contact recreation” such as swimming and as a source of water for purification plant system for the nearby city.

- ii) What problems would be there for these uses because of the contamination? (5)
- iii) How would you attempt to assess the cause and seriousness of the situation? (5)
- iv) What are the mitigation measures to be put in place? (5)

**TOTAL 25 MARKS**

**Question 4.**

- i) With an aid of a diagram, outline the stratification process that occurs in reservoir and explain how it affects water quality. **(15)**
- ii) Discuss the Nutrients (Nitrogen and Phosphorus) as limiting factors for algae growth. **(10)**

**TOTAL 25 MARKS**

**Question 5.**

Discuss the biological water quality monitoring under the following.

- i) Monitoring with macro-invertebrates **(15)**
- ii) Early-warning bio-monitoring **(10)**

**TOTAL 25 MARKS**