UNIVERSITY OF SWAZILAND

Faculty of Health Science

Department of Environmental Health Sciences

Final Examination 2007

TITLE OF PAPER	:	WATER TREATMENT
COURSE CODE	:	EHS 543
DURATION	:	3 HOURS
MARKS	:	100
INSTRUCTIONS	:	READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
	:	ANSWER ANY FIVE QUESTIONS
	:	EACH QUESTION CARRIES 20 MARKS
	:	NO PAPER SHOULD BE BROUGHT INTO NOR OUT OF THE EXAMINATION ROOM
	:	BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER

DO NOT OPEN THE QUESTION PAPER UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR.

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Question 1.

A) Why do we need to treat water before it is distributed to consumers? (10)

B) Water Standards are very important in Water Supply and Sanitation! Support this statement! (10)

Question 2.

Thermal Stratification is a major problem in lakes and reservoirs used for water abstraction for domestic use! Discuss the process of this phenomenon, explaining how it affects the quality of water.
(20)

Question 3.

For the following water quality parameters, state briefly their significance in Public Health and Water Treatment Techniques used to control their concentrations. State also maximum acceptable levels in drinking water.

i) Temperature. (5)

ii) Turbidity. (5)

iii) Nitrates. (5)

iv) Bacteria. (5)

Question 4.

A Water Treatment Plant is to process a flow of 2 3520 m^3 / d. Using the following criteria, Design a system of rectangular horizontal flow sedimentation basin.

i) Surface Loading should not exceed $30m^3/m^2/d$ with all basins in service. (6)
ii) With one basin out of service or cleaning/ repair the surface loading should not exceed $40m^3/m^2/d$. (4)
iii) Detention time be 1-3 hours. (6)
iv) Weir loading should not exceed $250m^3/m^2/d$. (4)

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Question 5.

A) What are the various treatment steps required to treat water high in E. Coli and Turbidity? (6)

B) What are the expected characteristics of the effluent to make it not objectionable to consumers? (4)

C) What are the fundamental differences between slow and rapid filters? (6)

D) Describe the mechanism that take place in both slow and rapid filters. (4)

Question 6.

A) What are the desired characteristics of a good disinfectant? (5)

B) What are the properties of chlorine? (5)

C) Discuss briefly the **slug** method in distribution system of chlorination. (5)

D) Discuss briefly the disinfection kinetics. (5)