NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOLOGY

FACULTY OF APPLIED SCIENCES

DEPARTMENT OF ENVIRONMENTAL SCIENCE AND HEALTH

FINAL EXAMINATIONS

INTRODUCTION TO THE FRESH WATER ENVIRONMENT: ESH 2101

January 2013 **Time Allowed: 3 Hours** **Total Marks 100**

INSTRUCTIONS TO CANDIDATES:

Answer any FOUR questions. Each question carries 25 marks

Question 1

a) Define the term limnology. **(3 marks)**

b) Describe giving examples for each, the origin and morphology of any 5 lake types and explain how these factors influence their trophic status. **(22 marks)**

Question 2

a) During the summer the epilimnia of many lakes, like Lake Michigan, have a decrease in transparency simultaneously with formation of mineral particles in the water column. These calcium carbonate compounds occur in part for physical reasons and in part for biological ones. Describe the processes and explain fully how the phenomenon occurs.
(10marks)

b) Discuss the significance of thermal stratification in Lake ecosystems. **(15 marks)**

Question 3

The table below contains dissolved oxygen data of a freshwater pond which was sampled from early morning till evening.

Table 1: Diurnal oxygen variation in a shallow freshwater pond on a sunny day.

Time of day	**Dissolved oxygen concentration (mgl^{-1})**
4 AM	6.0
6 AM	7.3
8 AM	8.5
10 AM	9.7
12 NOON	9.7

2 PM	7.3
4 PM	7.7
6PM	7.3

a). Plot this data on a graph paper (8 marks)

b). Describe and explain fully the possible causes of the observed trend of dissolved oxygen concentration in the pond through the day. (17marks)

Question 4

Describe the changes in the physical nature of a lotic system between its headwaters and its mouth, and explain how these changes affect water chemistry, phytoplankton, benthic invertebrates, and fish communities?

Question 5

Discuss the potential effects of climate change on the productivity of freshwater ecosystems.

Question 6

Give a critique of Zimbabwe's governance systems for freshwater water resources.

End of question paper

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BACHELOR OF ENVIRONMENTAL SCIENCE HONOURS DEGREE

SUPPLEMENTARY EXAMINATIONS

INTRODUCTION TO FRESHWATER ENVIRONMENT : ESH 2101

Year 2013 **Time allowed: 3 Hours** **Total Marks:100**

INSTRUCTIONS:

Answer any FOUR questions. Each question carries 25 marks.

Question 1

Describe the various chemical and physical properties of water.

Question 2

(a) Name and explain the salts in freshwater that are essential for aquatic life **(15 marks)**
(b) Describe the process of osmoregulation in freshwater fish and factors that influence it. **(10 marks)**

Question 3

Describe the inputs, outputs and nutrient based classification of Lake ecosystems.

Question 4

Using diagrams where applicable, describe the types of equipment used for sampling freshwater bodies. Indicate advantages and limitations of each.

Question 5

Write an essay on the economic value of freshwater resources.

Question 6

A car battery manufacturing plant is to be located near a river and dam. Describe the effects of the plant's effluent if it was to be discharged into the river or dam.

End of Question Paper