THE UNIVERSITY *of York*

Degree Examination 2007

ENVIRONMENT DEPARTMENT

BSc in Environmental Science
Part 1b

SCIENCE OF THE AQUATIC ENVIRONMENT

Time allowed: **one and a half hours**

The exam is structured in two parts. **SECTION A** contains short answer questions that are worth 50% of the total mark. You will need to answer **ALL** questions in **SECTION A**.
SECTION B contains long-answer questions that will require some discussion and are worth 50% of the total mark. You will need to answer **ONE** of the two questions in **SECTION B**.

Calculators will be provided

Pay adequate attention to spelling, punctuation and grammar, so that your answers can be readily understood

Section A. Short answer questions

1. What is the difference between a 'contaminant' and a 'pollutant'? (2)

2. Why is ice less dense than water? (3)

3. Explain with a sentence for each component what is meant by a 'PBT contaminant'. Name two groups of chemicals that fall into this category. (4)

4. Explain what is meant by the term 'ion pairing'. What is the implication of ion pairing for solutions of ions and why is this process more important in sea water than in fresh water? (4)

5. What is the most important contributor to the budget for major ions in sea water? Name three other processes that contribute to the budget. (5)

6. Briefly explain what is meant by the trophic diatom index. Why is it a useful indicator of water quality? (4)

7. Describe with a sentence why estuaries are particularly exposed to environmental contaminants (3)

8. Name the main water compartments in the hydrological cycle and put them in ascending order based on water volume. (5)

9. Many rivers will pass through more than one country. Give an example of a challenge that this might raise and give example of how different regions have addressed this problem. (4)

10. What statement is Paracelsus famous for? (2)

11. A substance has a Henry's law constant of 9 Pa m^3/mol. Comment on its volatility in i) a shallow stream, ii) a deep river. (3)

12. List six approaches for removing bacteria during drinking water treatment. (6)

13. Name a class of groundwater pollutant and list four ways in which groundwater can be cleaned up. (5)

Section B

1. Problems associated with contaminants in drinking water are generally much more severe in developing countries than in developed countries. What are the principal reasons for such a striking contrast? Discuss the differences by referring to two important contaminants of drinking water in developing countries and two in developed countries. Your answer might discuss the contaminants in terms of source – behaviour – consequences – control. (50)

2. The Water Framework Directive was published in 2000.

   a) Describe the main objectives of the Directive and discuss how the Directive differs from previous 'water' legislation in the European Union (18).

   b) How is the directive being implemented in the England, Wales and Scotland? Your answer should include a description of the factors used to assess 'good' status (32)