RHODES UNIVERSITY
DEPARTMENT OF ENVIRONMENTAL SCIENCE

EXAMINATION: JUNE 2014

ENVIRONMENTAL SCIENCE 301

PAPER 2

Internal examiners: Prof J Gambiza — MARKS: 100

Dr G Cundill — DURATION: 3 HOURS

External examiner: Dr P. O'Farrell

GENERAL INSTRUCTIONS TO CANDIDATES

1. Answer **EVERY** section, noting the choice within sections.
2. Answer each section in a **SEPARATE** answer book.
3. Time management is very important. The value of the mark for each question should be used as a rough guide to the amount of time allocated to answer the question.
4. It is in the candidate's interest to write legibly.
5. At the end of the examination, place all answer books inside the book used to answer **SECTION A**.

PLEASE DO NOT TURN OVER THIS PAGE UNTIL TOLD TO DO SO.

SECTION A: (40 marks)

Please answer any FOUR questions

Question A1: **10 marks**

Using an annotated diagram label and explain the usefulness of the different elements of a box and whisker plot in data analysis.

Question A2: **10 marks**

What are the principles of experimental design?

Question A3: **10 marks**

Explain the advantages and disadvantages of commonly used measures of central tendency.

Question A4: **10 marks**

Outline the steps in null hypothesis significance testing.

Question A5: **10 marks**

Explain the assumptions of a two-sample t-test. Which functions would you use in the R programme to test if the assumptions hold?

SECTION B: Collecting Monitoring Data (30 marks)

Please answer ONE question

EITHER

Question B1: **30 marks**

Drawing on your year-long research project, discuss the key challenges in designing questionnaires and in conducting interviews.

OR

Question B2: **30 marks**

With reference to examples, discuss the opportunities and trade-offs associated with adopting a citizen science approach to environmental monitoring.

SECTION C: Interpreting Monitoring Data (30 marks)

Compulsory Question

Question C1: **30 marks**

Discuss the challenges of null hypothesis significance testing.

END OF EXAMINATION PAPER