RHODES UNIVERSITY

DEPARTMENT OF ENVIROMENTAL SCIENCE

EXAMINATION: JUNE 2012

ENVIRONMENTAL SCIENCE 201

PAPER 2

Internal examiners: Dr Sheona Shackleton

Marks: 100

Prof Charlie Shackleton

Duration: 3 hours

External examiner: Dr Patrick O'Farrell

GENERAL INSTRUCTIONS

1. This paper has three sections (A, B, C). Answer **EVERY SECTION**, noting the choices within sections.

2. Answer each section (A, B, C) in a **SEPARATE** answer book.

3. Read the instructions for each section carefully.

4. **NUMBER ALL ANSWERS CORRECTLY.**

5. Wherever possible use examples to back up your answers.

6. At the end of the examination, place all answer books inside the book used to answer **SECTION A.**

7. This paper has **FIVE** pages.

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

SECTION A: Economic systems
(35 marks)

QUESTION A1 (10 marks)

(Answer any **TWO** of the following three options)

a) Differentiate between the terms '*leakage*' and '*additionality*' with respect to implementing Payments for Ecosystem Services. (**5 marks**)

b) List the factors that one needs to consider when defining and measuring employments rates. (**5 marks**)

c) With respect to economic systems, what is meant by the term '*resilience*' and what attributes of the economic system confer resilience? (**5 marks**)

QUESTION A2 (10 marks)

(Answer any **ONE** of the following)

EITHER

a) Explain what the '*Willingness to Pay*' method of valuation involves and the factors that influence the value the respondents offer. (**10 marks**)

OR

b) What factors may cause the demand curve to shift to the left and how will that effect market equilibrium? (**10 marks**)

QUESTION A3 (15 marks)

(Answer any **ONE** of the following)

EITHER

a) Outline and define each component value of the *Total Economic Value* (TEV) for a species or site. **(15 marks)**

OR

b) Describe the innovative methods used by Ricketts *et al.* (2004) to estimate the ecosystem services *value of pollination services* to coffee plantations in Costa Rica, along with the main findings from their study. **(15 marks)**

SECTION B: Social systems
(35 marks)

QUESTION B1 (5 marks)

(Answer any **ONE** of the following)

EITHER

a) Explain why *values* are important in determining environmental behaviour. **(5 marks)**

OR

b) Explain what is meant by social actors being *"self-interested rational optimisers"* and why this perspective can lend insight into the commons dilemma? **(5 marks)**

QUESTION B2 (10 marks)

(Answer any ONE of the following)

EITHER

a) Why, as environmental scientists, is it necessary to understand the *role and contribution of natural resources to livelihoods*? Provide examples to back up your argument.

OR

b) Why do we need to be thinking about *risk and human vulnerability* as environmental scientists? Define and explain these concepts in your answer.

QUESTION B3 (20 marks)

COMPULSORY

Discuss the key challenges related to the *governance and management of common pool/property resources* and highlight how Hardin's (1958) *"Tragedy of the Commons"* might be avoided. Use examples in explaining your answer.

SECTION C: Integration, case studies and practicals

(30 marks)

(Answer BOTH questions C1 and C2)

QUESTION C1 (15 marks)

Explain how you would measure above-ground biomass and carbon stored in different carbon pools in a forest. How do you avoid cutting down the forest to measure woody biomass?

QUESTION C2 (25 marks)

Choose one of the case studies covered in the last week of the semester and illustrate how this helped you understand the theory dealt with in the course. Do not just describe the case study, but rather use it to point out concepts such as complexity, integration across social, ecological and economic spheres, resilience, thresholds, participation, etc.

END OF THE EXAMINATION PAPER