

RHODES UNIVERSITY

DEPARTMENT OF ENVIRONMENTAL SCIENCE

EXAMINATION: JUNE 2014

ENVIRONMENTAL SCIENCE 201

PAPER 2

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MARKS: 100
DURATION: 3 HOURS

External Examiner: Dr P. O'Farrell

Instructions:

1. This paper has four sections (A, B, C and D). Answer **EVERY SECTION**, noting the choices within sections.
2. Answer each section 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 book and Appendices inside the book used to answer **SECTION A**.
7. This paper has **4 PAGES**.

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

SECTION A: Economic systems

(30 marks)

QUESTION A1 (5 MARKS)

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

1. GDP is widely used when measuring economic growth, but some argue that it is inadequate because it misses out on several important aspects of the economy. **Briefly** explain these aspects. (5)
2. List the factors that one needs to consider when defining and measuring employment rates. (5)
3. Define Payment for Ecosystem Services (PES) using the 5 criteria used by Wunder (2005). (5)

QUESTION A2 (10 MARKS)

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

1. With reference to a specific species or site, outline and define each component of the **Total Economic Value** (TEV). (10)
2. What are the main debates and challenges in Payment for Ecosystem Services? (10)

QUESTION A3 (15 MARKS)

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

1. The *Total Economic Value* framework is important when studying the value of ecosystems to human well-being. Discuss this, giving examples to support your answer. (15)
 2. Monetary valuation is the dominant way of expressing the value of natural resources in economic systems. Giving examples, provide arguments for and against monetary valuation. (15)
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SECTION B: Social systems

(30 marks)

QUESTION B1 (15 marks)

(Answer any **THREE** of the following 5 mark questions)

1. Using an illustration of the results from Swartz's value survey indicate which value orientations are most likely to coincide with pro-environmental behaviour and why. (5)
2. Outline the four main social science perspectives regarding human behaviour. (5)
3. Using two examples, one of which relates to natural capital, explain how institutions can shape access to livelihood capital for different people. (5)
4. Using the concepts of subtractability and excludability tabulate examples of the four different types of property regimes and provide an explanation of the table. (5)

QUESTION B2

(15 marks, Compulsory)

The scholarship of Elinor Ostrom, amongst others, has shown that Hardin's (1958) "*Tragedy of the Commons*" is not universal. Common property resources can be sustainably managed and the problems Hardin outlines can be avoided if a particular set of conditions are in place. Discuss what these conditions are and illustrate your answer using the example of a community garden.

SECTION C: Ecological Systems

(30 marks)

QUESTION C1 (10 marks)

(Answer **EITHER** question 1 or 2)

1. Explain the stages of the adaptive cycle using named ecological examples.

OR

2. The environment is viewed as a complex social-ecological system. Explain the ecological complexity of the environment using named examples.

QUESTION C2 (20 marks)

(Answer **EITHER** question 3 or 4)

3. Parr *et al.* (2014) have argued that tropical grassy biomes are misunderstood, neglected and under threat. Discuss this statement focusing primarily on ecological issues.

OR

4. Discuss Bauer and Hoyer's (2014) argument that migratory animals couple biodiversity and ecosystem functioning worldwide.

SECTION D: Practical (10 marks)

You are a consultant that has been approached by a farmer in the Eastern Cape who has struggled with degradation on their land for many years. Increasingly, it is becoming harder to earn enough money through livestock farming, and the farmer is concerned that increasing the number of stock on the land will make matters worse. The farmer asks you to assess the carbon sequestration potential of their land, in order for them to make an informed decision about possibly switching to the carbon farming.

Outline the practical steps you would take **out in the field** (as the hired consultant) in order to assess the above ground carbon stored in herbaceous, litter and woody biomass.

END OF EXAMINATION PAPER