

RHODES UNIVERSITY
DEPARTMENT OF ENVIRONMENTAL SCIENCE

EXAMINATION: JUNE 2013
ENVIRONMENTAL SCIENCE 201
PAPER 2

INTERNAL EXAMINERS:	Prof F. Ellery	MARKS: 100
	Ms. M. Talbot	DURATION: 3 HOURS
	Dr G. Thondhlana	
EXTERNAL EXAMINER:	Dr P. O'Farrell	

Instructions:

This paper has three sections (A, B, C).

Answer **EVERY SECTION**, noting the choices within sections.

Answer each section in a **SEPARATE** answer book.

Read the instructions for each section carefully.

NUMBER ALL ANSWERS CORRECTLY.

Wherever possible use examples to back-up your answers.

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: Economic systems**(35 MARKS)**

Answer all questions in this section, taking note of internal choices

QUESTION A1 (10 marks)

Answer any **TWO** of the following three questions:

- a) Explain what is meant by positive and negative externalities of economic activities and why these are conventionally understood to occur in economic theory. (5 marks)
- b) Identify and differentiate between the different kinds of use values that can be estimated and briefly mention the methods that can be used to calculate these values. (5 marks)
- c) Illustrate and describe how Total Economic Value would be derived or calculated. (5 marks)

QUESTION A2 (10 marks)

Answer any **ONE** of the following two questions:

- a) Identify and discuss the different effects that the consumptive and productive activities of the majority of poor and wealthy people separately have on the environment. (10 marks)
- b) Identify and briefly explain the factors that allow or drive economic growth in our market economies. (10 marks).

QUESTION A3 (15 marks)

Answer any **ONE** of the following three questions:

- a) Most people in modern society have been led to believe that economic growth is essential to human wellbeing, despite the history of many other types of economies that have not required continual growth. Critically assess the conventional arguments for the 'need' for growth and evaluate whether this is ethically and morally justifiable from a social and environmental perspective. (15 marks)
- b) Explain how economic growth negatively affects social and environmental systems temporally and spatially and critically discuss whether it is possible to have economic growth that simultaneously increases the wellbeing of all people and reduces pollution and the use of natural resources. (15 marks)
- c) Describe the innovative methods used by Giraud *et al* (2002) to estimate the existence value of the Stellar Sea Lion in Alaska, along with the main findings from their study. (15 marks)

Answer both questions B1 and B2 noting internal choices

QUESTION B1 (10 marks):

Answer **ONE** of the following two questions:

- a) Draw a graph that shows how processes in the Okavango Delta operate at a range of spatial and temporal scales to influence its structure and dynamics. On the horizontal axis you should plot “Spatial scale (ha)” and on the vertical axis you should plot “Temporal scale (y)”. The diagram should show processes operating at the appropriate spatial and temporal scale in the diagram. Provide a brief explanation of the how the processes you have described affect ecosystem structure and function.
- b) Describe how state factors affect ecosystem structure and function, and provide examples of 5 state factors and explain both the role that they play and the scale at which each is likely to operate.

QUESTION B2 (20 marks)

Answer **ONE** of the following two questions:

- a) Explain how the Okavango Delta, which receives almost 500 000 tonnes of dissolved sediment annually (largely as dissolved salts), is able to maintain a freshwater ecosystem when only about 35 000 tonnes of dissolved sediment leaves the ecosystem annually, bearing in mind that salts have been accumulating in the ecosystem for hundreds of thousands of years.
- b) Channel switching in the Okavango Delta leads to the creation of a mosaic of habitats in different stages of wetting and drying, with different nutrient availabilities, and in different successional stages. Explain using this case study example the idea that “the more things change, the more they stay the same”. Include in your answer a brief explanation of the how the adaptive cycle provides a conceptual framework to explain heterogeneity in the Okavango.

SECTION C: Social systems

(35 MARKS)

Answer all questions in this section, taking note of the internal choices in C1 and C2.

QUESTION C1 (5 marks)

Answer ONE of the following questions

- a) Define *values* and explain why values are important in determining environmental behaviour.
- b) Define *sustainable livelihoods* and explain some of the *attributes* of rural livelihoods.

QUESTION C2 (10 marks)

Answer ONE of the following questions:

- a) Discuss Hardin's (1968) '*Tragedy of the commons*'. Clearly outline and explain the main challenges of common property resources and Hardin's view on how these challenges could be overcome.
- b) With reference to natural resources management examples, discuss the importance of acknowledging the contribution of natural resources to people's livelihoods.

QUESTION C3 (20 marks)

Outline and explain Ostrom's (1990) 8 design principles of stable Common Property Resources (CPR) management. Giving examples to support your answer, and discuss the complexities of CPR regimes.

END OF EXAMINATION PAPER