



88116302

**ENVIRONMENTAL SYSTEMS AND SOCIETIES
STANDARD LEVEL
PAPER 2**

Monday 7 November 2011 (morning)

2 hours

Candidate session number

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Examination code

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INSTRUCTIONS TO CANDIDATES

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all questions. Refer to the resource booklet which accompanies this question paper.
- Section B: answer two questions.
- Write your answers in the boxes provided.



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SECTION A

Answer **all** questions. Write your answers in the boxes provided.

The resource booklet provides information on the impact of shrimp farming on mangrove ecosystems. Use the resource booklet and your own studies to answer the following.

1. (a) (i) Identify **two** abiotic factors to which mangrove trees are adapted. [1]

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- (ii) With reference to Figure 4, state the effect of mangrove tree removal on fish diversity. [1]

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- (iii) With reference to Figure 5, describe the effect of mangrove tree removal on body size of the Blue Striped Grunt. [1]

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- (iv) Suggest why mangrove tree removal has an impact on fish diversity and body size. [2]

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(Question 1 continued)

- (b) (i) Identify **two** inputs and **two** outputs for a semi-intensive shrimp farm. [2]

Inputs:

1.
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2.
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Outputs:

1.
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2.
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- (ii) Compare and contrast the effects that semi-intensive and extensive shrimp farming may have on water quality. [2]

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- (iii) Describe how the pollution produced by the shrimp farm could be considered non-point source pollution. [2]

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(Question 1 continued)

- (iv) Outline **two** reasons, unrelated to shrimp farming, for the loss or destruction of mangrove ecosystems in the Gulf of Fonseca. [2]

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- (c) Compare and contrast the trend for aquaculture and agriculture exports shown in Figure 6 (a) and 6 (b). [3]

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- (d) Some scientists argue that food production systems have reached maximum capacity. Discuss this viewpoint. [3]

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(Question 1 continued)

- (e) (i) Figure 7 lists ecological services provided by the mangrove ecosystem. With reference to the resource booklet, state **two** other sources of natural income that the mangrove ecosystem provides. [2]

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- (ii) Suggest another way of valuing the mangrove ecosystem other than for its economic value. [1]

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- (iii) Explain the relationship between natural income and sustainability. [3]

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SECTION B

Answer **two** questions. Write your answers in the boxes provided.

Each essay is marked out of [20] of which [2] are for clarity of expression, structure and development of ideas:

[0] Quality of expression, structure and development is poor.

[1] Quality of expression, structure and development is limited.

[2] Quality of expression is clear, structure is good and ideas are well developed.

2. (a) Describe how the Gaia concept might be applied to pollution. [4]

(b) Suggest ways to approach the management of a **named** pollutant. Illustrate your answer using the three step pollution management model. [5]

(c) Discuss, with reference to examples, the influence of cultural, political and economic challenges to pollution management. [9]

Expression of ideas [2]

3. (a) Outline the reasons why tropical rainforests should be conserved. [4]

(b) Outline the concept of carrying capacity. Justify your response to the claim that the human population has exceeded the Earth's carrying capacity. [7]

(c) Discuss how development policies and cultural influences can affect human population dynamics and growth. [7]

Expression of ideas [2]



4. (a) Outline the basic components of an ecosystem using the systems approach. [4]
- (b) Explain the flow of energy through food webs. [5]
- (c) Evaluate the advantages and disadvantages of **two** contrasting energy sources and discuss the economic factors that affect the choice of these energy sources by different **named** societies. [9]

Expression of ideas [2]

5. (a) Outline the role of plate activity on speciation. [4]
- (b) Explain the relationship between succession and equilibrium. [6]
- (c) Compare and contrast the role and activities of intergovernmental and non-governmental organizations in preserving ecosystems and biodiversity. [8]

Expression of ideas [2]

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