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ENVIRONMENTAL SYSTEMS AND SOCIETIES
STANDARD LEVEL
PAPER 1

Tuesday 2 November 2010 (afternoon)

1 hour

Candidate session number

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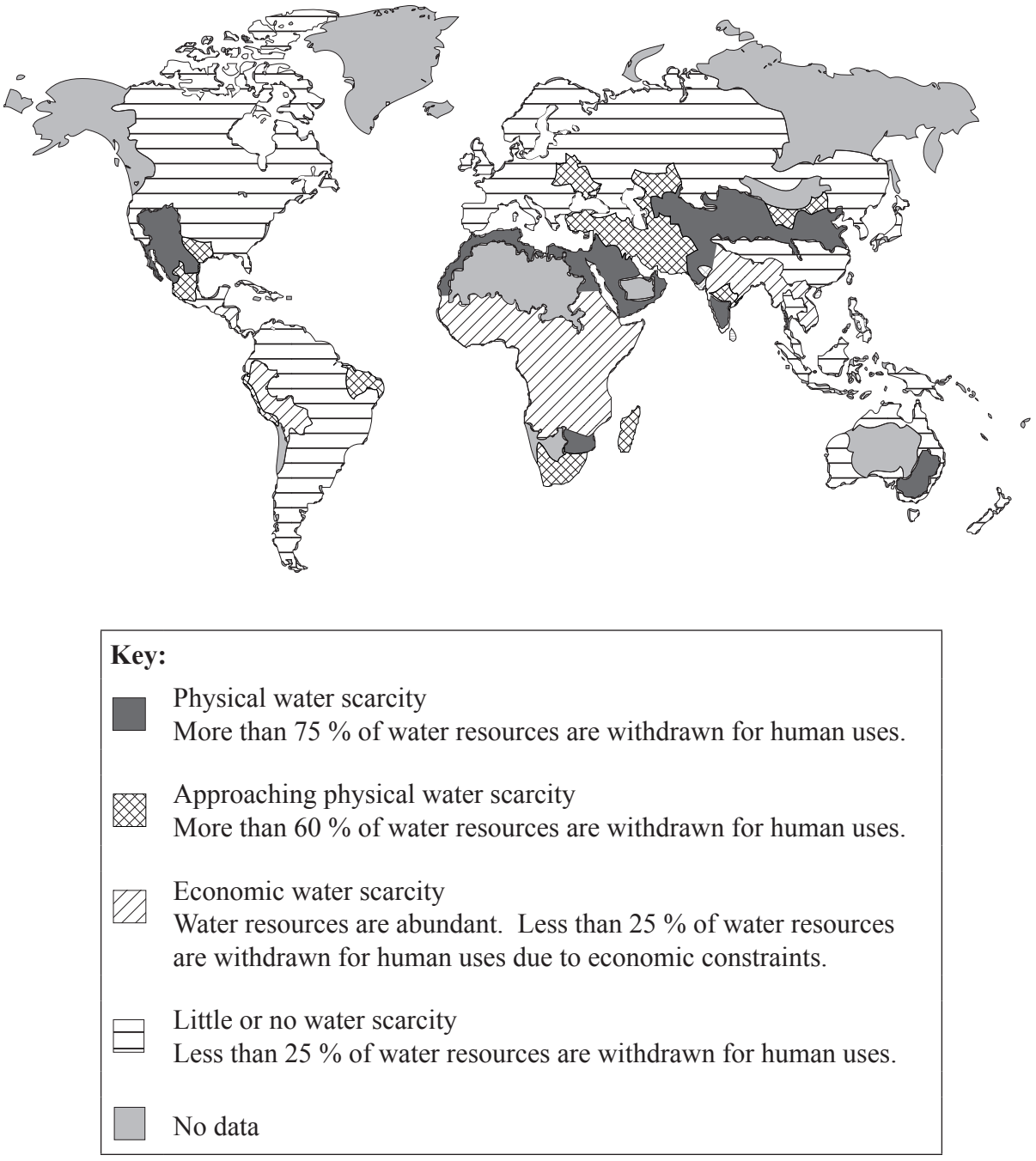
INSTRUCTIONS TO CANDIDATES

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all of the questions in the spaces provided. You may continue your answers on answer sheets. Write your session number on each answer sheet, and attach them to this examination paper and your cover sheet using the tag provided.
- At the end of the examination, indicate the number of answer sheets used in the appropriate box on your cover sheet.

0113

1. Figure 1 below shows the global distribution of physical and economic water scarcity (shortage).

Figure 1



[Comprehensive Assessment of Water Management in Agriculture. 2007. Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture. London: Earthscan, and Colombo: International Water Management Institute.]

(This question continues on the following page)

(Question 1 continued)

(a) With reference to Figure 1,

(i) determine the meaning of water scarcity. *[1]*

. . . . . .

. . . . . .

(ii) describe the pattern of global water scarcity. *[3]*

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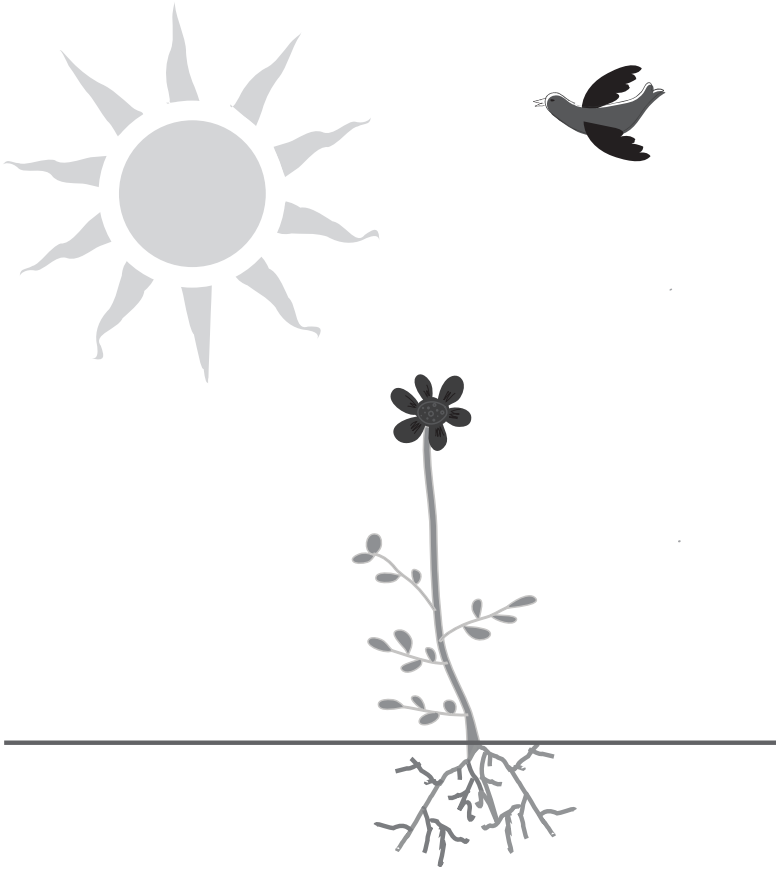
(Question 1 continued)

(b) (i) Construct a diagram to show the water cycle (hydrological cycle). Label stores, flows and processes. *[3]*

(ii) Annotate the diagram in part (b)(i) to show **two** examples of how humans withdraw water from the cycle. *[1]*

2. The diagram below shows two biotic components of the carbon cycle: a plant and a bird.



(a) Annotate the diagram to show the inputs and outputs of carbon through photosynthesis and respiration. *[2]*

(b) Outline **two** examples of a transformation of carbon and **two** examples of a transfer of carbon which occur during the carbon cycle. *[4]*

Transformation of carbon:

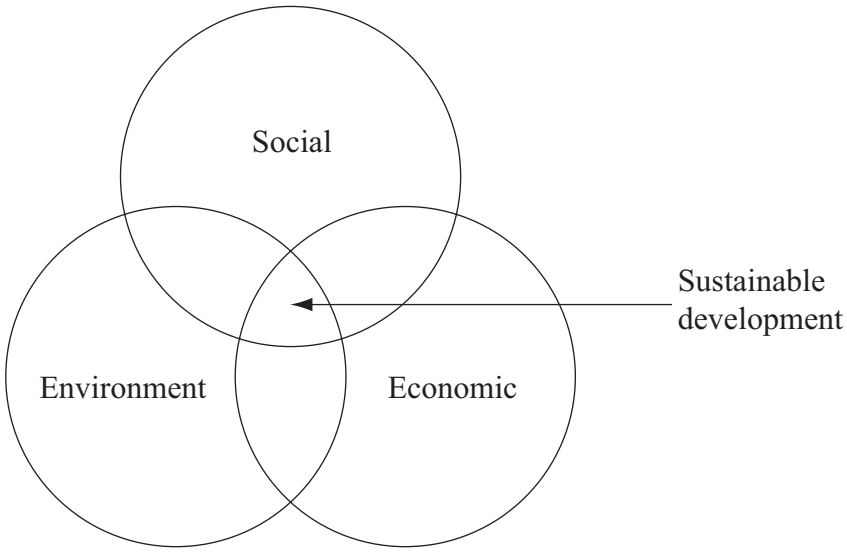
1. . . . . .
. . . . . .
2. . . . . .
. . . . . .

Transfer of carbon:

1. . . . . .
. . . . . .
2. . . . . .
. . . . . .

3. Figure 2 below shows that sustainable development may depend on the interaction between three different priorities.

Figure 2



[Source: adapted from http://commons.wikimedia.org/wiki/file:Sustainable_development.svg
Author: Johann Dréo; date: March 9 2006/translated January 21 2007.]

(a) State what is meant by the term *environmental value system*. *[1]*

. . . . . .

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(Question 3 continued)

(b) With reference to Figure 2 opposite, complete the table below to

(i) identify the priority for each sector of society. *[1]*

(ii) describe an example of how a conservation biologist and a banker may support sustainable development. *[2]*

	Priority	**Example**
Self-reliance soft ecologist	. . . .	Community cooperative set up to sell local produce and share production costs to increase profits.
Conservation biologist	. . . .	. . . .
Banker	. . . .	. . . .

(c) Explain why sustainable energy sources are **not** always adopted by societies. *[2]*

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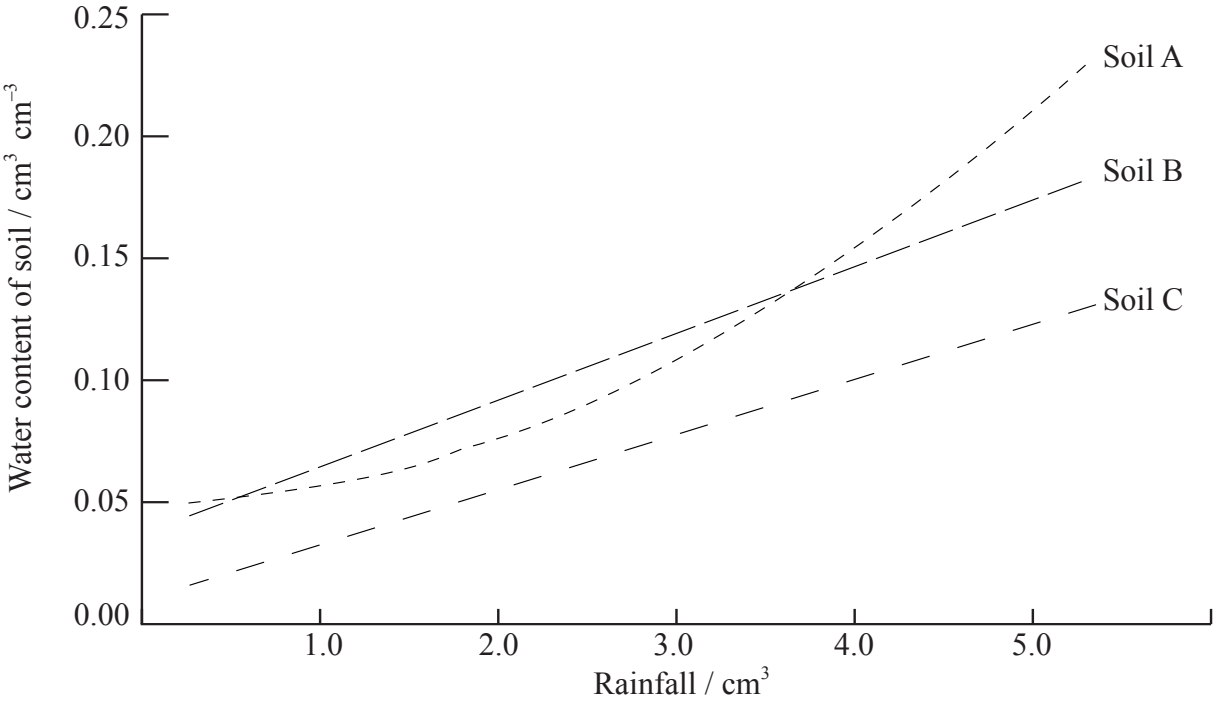
4. Figure 3 below is a graph showing the water content of three different soils (A, B and C) as rainfall increases.

Figure 3



(a) Describe the trend in water content for Soil **A** as rainfall increases. *[1]*

. . . . . .

. . . . . .

(b) Identify which of the three soils A, B **or** C match the soil types listed in the table below. *[1]*

Soil type	Soil A, Soil B or Soil C
Sand soil	
Clay soil	
Loam soil	

(c) Define the term *gross primary productivity*. *[1]*

. . . . . .

. . . . . .

(This question continues on the following page)

(Question 4 continued)

(d) Suggest, giving reasons, which of the soil types in the table opposite will support the highest primary productivity. *[2]*

Soil with highest primary productivity: . . . . . .

Reasons: . . . . . .

. . . . . .

. . . . . .

. . . . . .

5. The map in Figure 4 below shows plate movements and three biodiversity hotspots in Asia and Australasia. Hotspots are regions with especially high biodiversity.

Figure 4

Key:		
I	Himalayas	biodiversity hotspot
II	Philippines	plate boundary
III	South-west Australia	plates moving apart
		plates moving together

[Source: adapted from http://en.wikipedia.org/wiki/File:World_Pacific_centred.svg]

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(Question 5 continued)

(a) Define the term *biodiversity*. *[2]*

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(b) Explain how the plate movements shown in Figure 4 opposite may have contributed to the biodiversity of the hotspot regions. *[4]*

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(Question 5 continued)

(c) Figure 5 below is a photograph of a Clouded leopard (*Neofelis nebulosa*), one of the Himalayan species that is listed as "vulnerable" on the Red List.

Figure 5

[Source: photograph taken by Nancy Vandermey of EFBC's Feline Conservation Center, Rosamond CA. Photograph reproduced with permission.]

(i) Outline **four** factors that are used to determine the conservation status of an organism on the Red List. *[2]*

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. . . . . .

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(ii) With reference to the case history of a **named** critically endangered species **or** endangered species, describe the human factors that have led to its conservation status. *[2]*

Name of species: . . . . . .

Description of human factors:

. . . . . .

. . . . . .

. . . . . .

. . . . . .

6. (a) Describe **one** direct method of monitoring pollution. *[2]*

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. . . . . .
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. . . . . .

(b) State, giving a reason, whether tropospheric ozone is an example of point source pollution **or** non-point source pollution. *[1]*

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. . . . . .
. . . . . .

(c) State the name and identify the source of **one** of the chemicals which causes stratospheric ozone depletion. *[1]*

Name of chemical: . . . . . .

Source of chemical: . . . . . .

(d) Evaluate the success of the Montreal Protocol in reducing ozone-depleting substances. *[3]*

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(e) Explain how depletion of the ozone layer is an example of positive feedback. *[3]*

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