M09/4/ECOSO/SP1/ENG/TZ0/XX+

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ECOSYSTEMS AND SOCIETIES
STANDARD LEVEL
PAPER 1

Wednesday 6 May 2009 (afternoon)

1 hour

Candidate session number

0	0								

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.

0112

1. **Figure 1** gives a list of energy sources used to generate electricity and their cost per kilowatt hour.

Figure 1

Energy source	Unit cost / kw hr^{-1}
Coal	4.8 – 5.5
Natural Gas	3.9 – 4.4
Nuclear	11.0 – 14.5
Wind	4.0 – 6.0
Hydro electric	5.1 – 11.3
Solar	15.0 – 30.0

(a) Identify the **two** energy sources with the average lowest cost in **Figure 1**, and state **one** advantage and **one** disadvantage of each. *[3]*

Energy source	Advantage	Disadvantage
. . . .	. . . .	. . . .
. . . .	. . . .	. . . .

(b) Outline **two** reasons why a country may not use the cheapest energy source to produce electricity. *[2]*

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(Question 1 continued)

(c) Suggest **two** reasons why it is so difficult to persuade people to reduce the amount of energy that they use. *[2]*

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(d) Describe how the second law of thermodynamics applies to environmental systems. *[1]*

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2. **Figure 2(a)** and **Figure 2(b)** show a rocky seashore and the distribution of four species of animal on the seashore. Mean high water mark represents a high tide and mean low water mark a low tide. The abundance of each species is shown by the thickness of the bars.
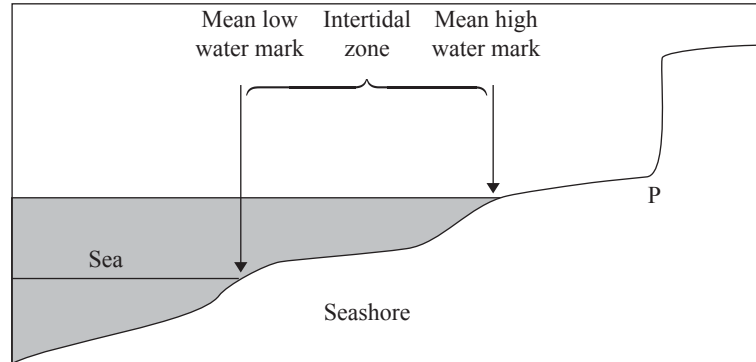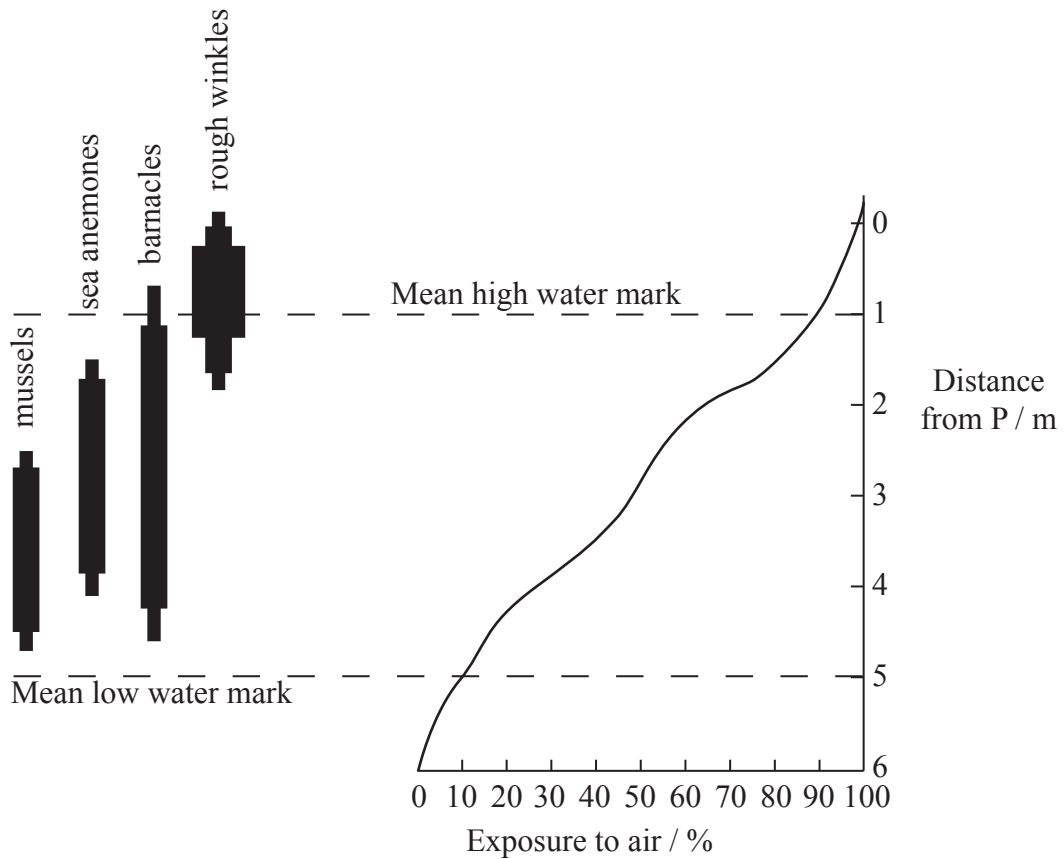
Figure 2(a)

Figure 2(b)

(This question continues on the following page)

(Question 2 continued)

(a)   State the ecological term for the distribution of animals shown in **Figure 2(b)**.   *[1]*

        . . . .

(b)   Identify **one** abiotic (physical) factor which changes from mean low water mark to mean high water mark.   *[1]*

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(c)   Mussels are permanently attached to a rock and feed by filtering small particles of food out of sea water. Suggest **one** reason why they are only found in the intertidal zone.   *[1]*

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(d)   Distinguish between the terms *herbivory* and *predation*.   *[2]*

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(e)   List the following terms in increasing order of size.   *[1]*

biome, ecosystem, biosphere, habitat

Order	Term
Smallest 1	. . . .
2	. . . .
3	. . . .
4	. . . .

0512

Turn over

3.   **Figure 3(a)** shows two wildlife reserve models.   Model A has two isolated reserves whilst Model B has a corridor connecting the reserves.   Species **X**, **Y** and **Z** are found in all three reserves.

Figure 3(a)
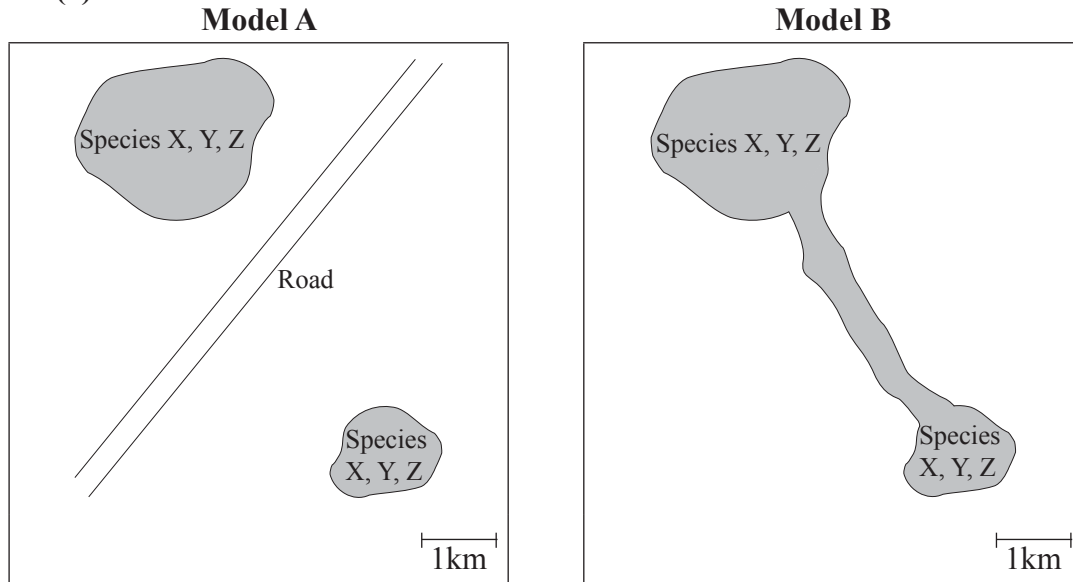
(a)   In **Figure 3(a)**, state, giving a reason, whether Model **A** or Model **B** is better for the conservation of genetic diversity of species **X**.   *[1]*

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Figure 3(b)

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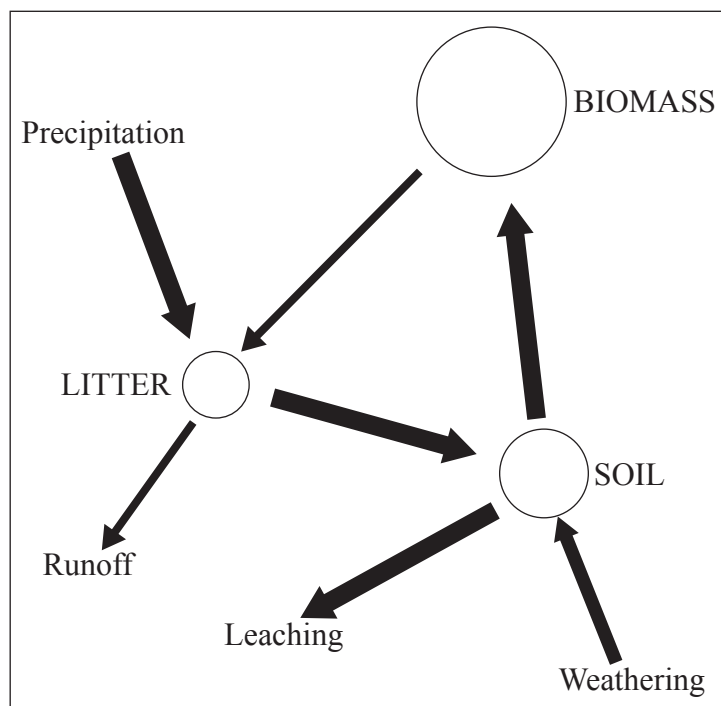
(Question 3 continued)

(b) **Figure 3(b)** is a nutrient model for a rainforest ecosystem. The size of the circles represents the amount of nutrients stored and the width of the arrows represents size of the flow of nutrients.

(i) Explain why the nutrient store for the biomass is so large.   *[1]*

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(ii) Explain why losses due to leaching are so large.   *[1]*

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(iii) State, giving a reason, whether the model in **Figure 3(b)** shows an open or closed system.   *[1]*

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(iv) Evaluate the strengths **and** limitations of the model shown in **Figure 3(b)**.   *[2]*

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(c) Outline **two** reasons why tropical rainforests are vulnerable to habitat destruction.   *[2]*

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4. **Figure 4** shows the effects of two different fishing policies on fish stocks over four years. The numbers represent tonnes of fish.

Figure 4

High intensity fishing policy

Low intensity fishing policy

Key: ▨ Catch ☐ Stock of fish
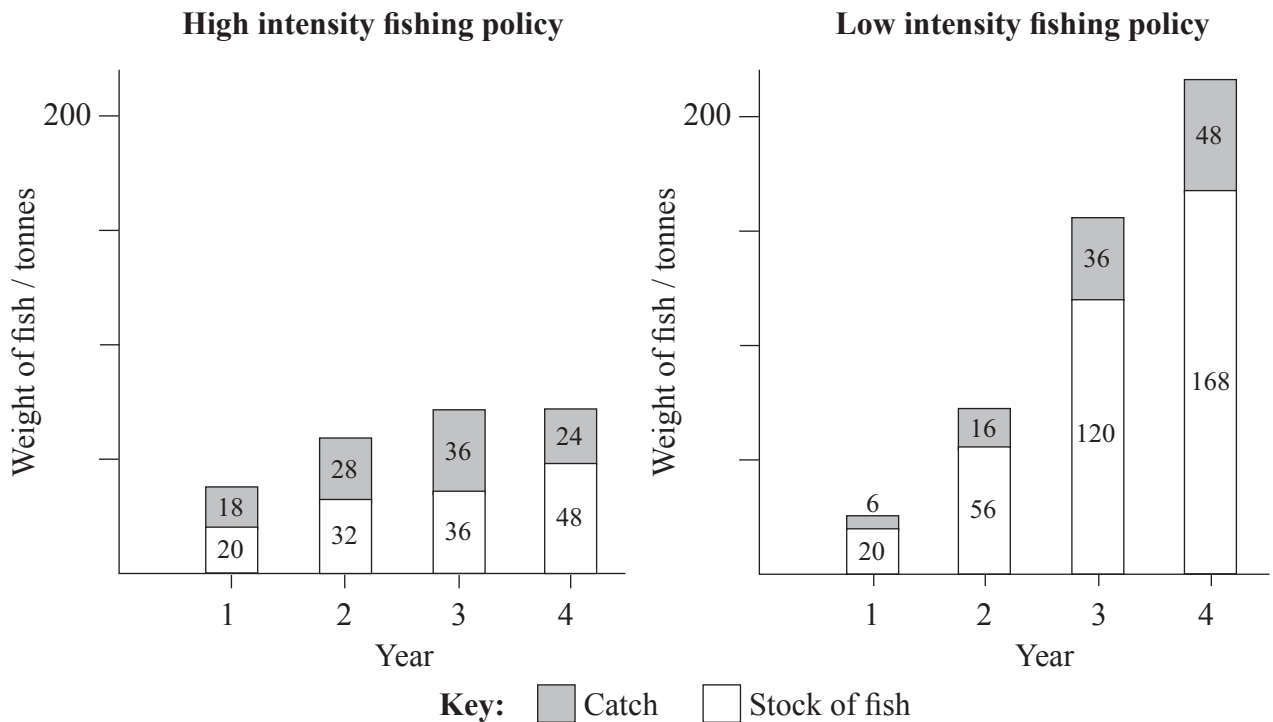
(a) (i) Define the term *sustainable yield*. *[1]*

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. . . .

(ii) Calculate the total catch over four years in each fishing policy in **Figure 4**. *[1]*

High intensity: . . . .

Low intensity: . . . .

(iii) Calculate the percentage difference between the year 4 catch for the high intensity fishing policy and the year 4 catch for the low intensity fishing policy. *[1]*

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(Question 4(a) continued)

    (iv) Predict, giving **two** reasons, which fishing policy would probably give the greater profit over 20 years.   *[2]*

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(b)   Outline **two** reasons why hunting and fishing may not be controlled by legislation.   *[2]*

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(c)   Compare the energy efficiency of terrestrial and aquatic food production systems.   *[2]*

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(d)   Suggest **one** possible solution that a technocentrist might give to the problem of overfishing.   *[1]*

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5. **Figure 5** shows the total population of Europe and the European share of world population at certain dates. By 2010, there will be more 55 to 64 year olds than 15 to 24 year olds in Europe.

Figure 5

Year	Population of Europe / millions	European population as a percentage of world population
1950	547	22
2005	728	11
2050 projection	653	7

(a) Define the term *crude death rate*. *[1]*

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. . . .

(b) Explain why the population of Europe as a percentage of world population is decreasing. *[1]*

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(c) Sketch an age/sex pyramid for the population of Europe in 2050. Label the axes. *[2]*

(This question continues on the following page)

(Question 5 continued)

(d) The total fertility of women in Italy is 1.28 and in Nigeria is 5.45. Define the term *total fertility*. *[1]*

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(e) Predict the effects of an aging population on a country's ecological footprint. *[2]*

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6. (a) Distinguish between the terms *natural income* and *natural capital*. *[2]*

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Figure 6

A view of Yosemite National Park, California, US

(b) Explain why the value of a view may be hard to measure. *[2]*

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(c) Describe **two** ways in which air pollution may decrease the value of this view. *[2]*

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