



88136301

**ENVIRONMENTAL SYSTEMS AND SOCIETIES
STANDARD LEVEL
PAPER 1**

Wednesday 6 November 2013 (morning)

1 hour

Candidate session number

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Examination code

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INSTRUCTIONS TO CANDIDATES

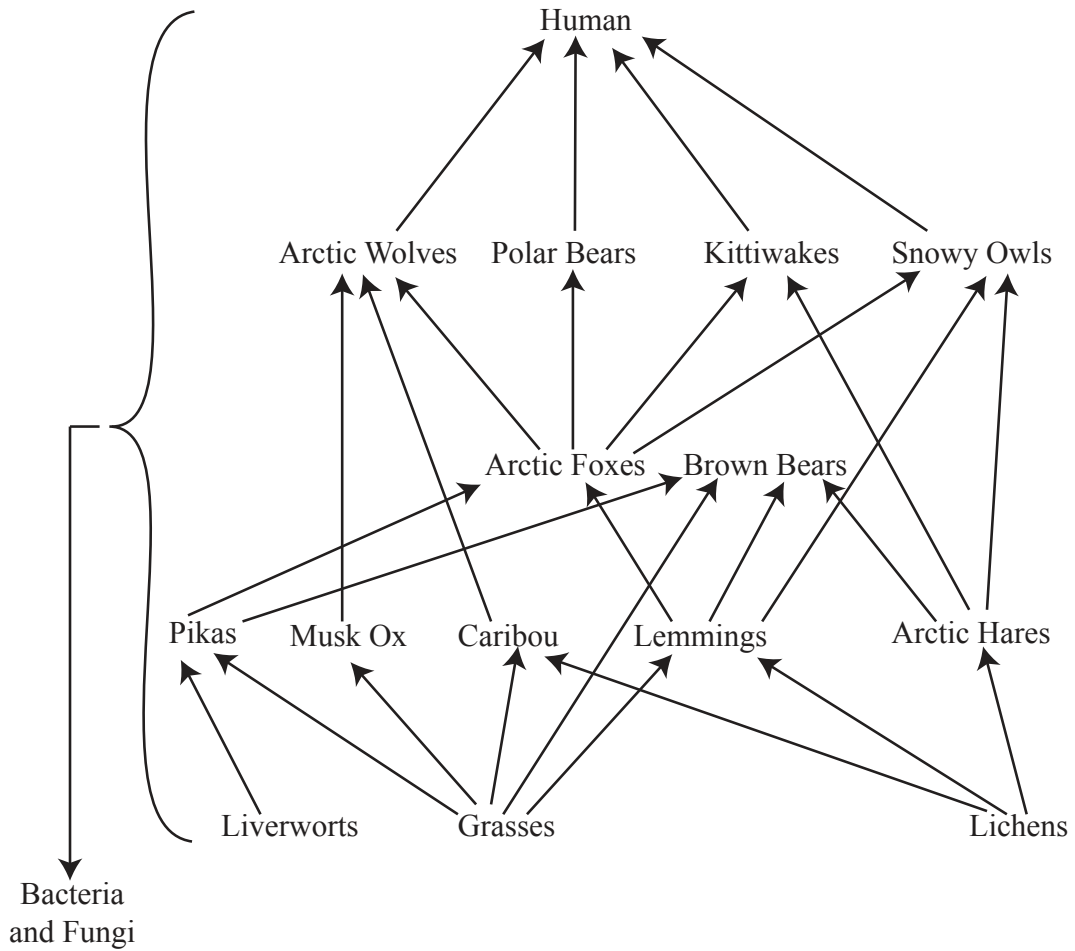
- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all questions.
- Write your answers in the boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is *[45 marks]*.



16EP01

1. Figure 1 below shows a food web for an ecosystem within a Tundra biome.

Figure 1



[Source: http://biomesfirst.wikispaces.com/file/view/Food_Web.JPG]

- (a) Define the term *biome*.

[1]

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16EP02

(Question 1 continued)

(b) Identify **two** abiotic factors that affect the distribution of tundra. [1]

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(c) (i) With reference to Figure 1, state the ecological relationship between two **named** species. [1]

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(ii) State the trophic level of the Arctic foxes in this food web. [1]

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(iii) A food web is a model. Explain one strength and one weakness of this model. [2]

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2. Figure 2 below shows a table of demographic data for four countries around the world.

Figure 2

	Total fertility rate/average number of children per woman in her lifetime	Crude birth rate/thousand population	Crude death rate/thousand population	Natural increase %	Doubling time
Country A	1.4	9	9	0	n/a
Country B	7.0	48	12	X	19
Country C	2.0	13	8	0.5	Y
Country D	2.9	24	5	1.8	39

(a) (i) With reference to Figure 2, determine the values of **X** and **Y**. [2]

X.
Y.

(ii) Suggest **two** reasons for the difference in total fertility rate between Country B and Country C. [2]

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(iii) State the stage of demographic transition for Country D. [1]

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(Question 2 continued)

- (b) (i) Describe how an ecological footprint of a population is calculated. [2]

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- (ii) Outline the relationship between ecological footprint and stage of demographic transition. [1]

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- (iii) Comment on the statement “vegetarians have a smaller ecological footprint”. [2]

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(Question 2 continued)

(c) Suggest how recycling can reduce the ecological footprint of a school.

[3]

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16EP06

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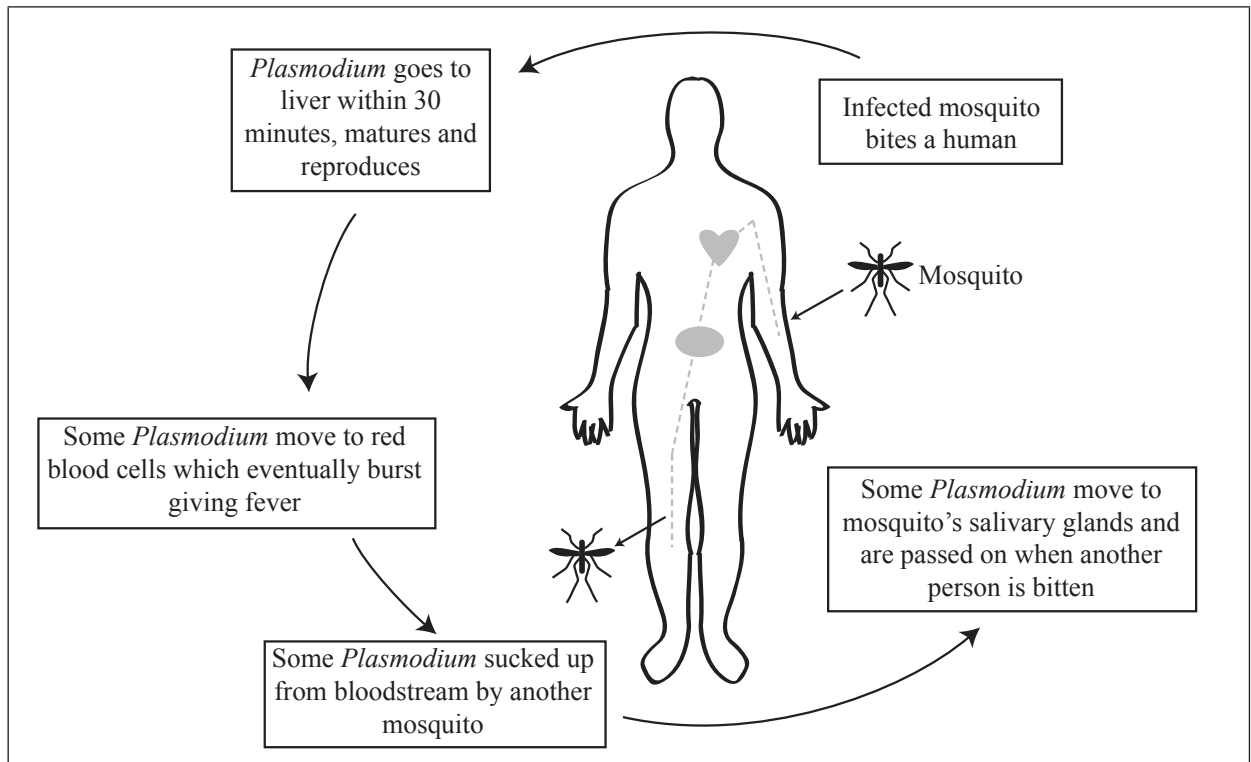


16EP07

Turn over

3. Figure 3 below shows the life cycle of the malaria protozoan *Plasmodium*.

Figure 3



[Source: 'Life cycle of the malaria protozoan *Plasmodium*' from *Geofile Online*, September 2007, issue 553 by Barbara Melbourne. Published by Nelson Thornes 2007.]

(a) (i) With reference to Figure 3, state the type of population interaction between humans and mosquitoes. [1]

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Malarial mosquitoes can be controlled by using pesticides, for example DDT.

(ii) Identify **one** economic benefit of controlling malarial mosquitoes. [1]

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(Question 3 continued)

(iii) State **two** arguments for conserving mosquitoes. [2]

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(iv) Outline how global warming could change the area of distribution of the mosquitoes that carry malaria. [2]

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(b) The publication of *Silent Spring* by Rachel Carson led to a change in the methods used to control mosquitoes and other insect pests, including in agriculture. Describe **one** other major influence **or** event that has changed attitudes to the environment. [2]

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4. (a) Explain how a **named** indicator organism could be used to detect pollution in an area. [3]

Name of indicator organism:

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Explanation:

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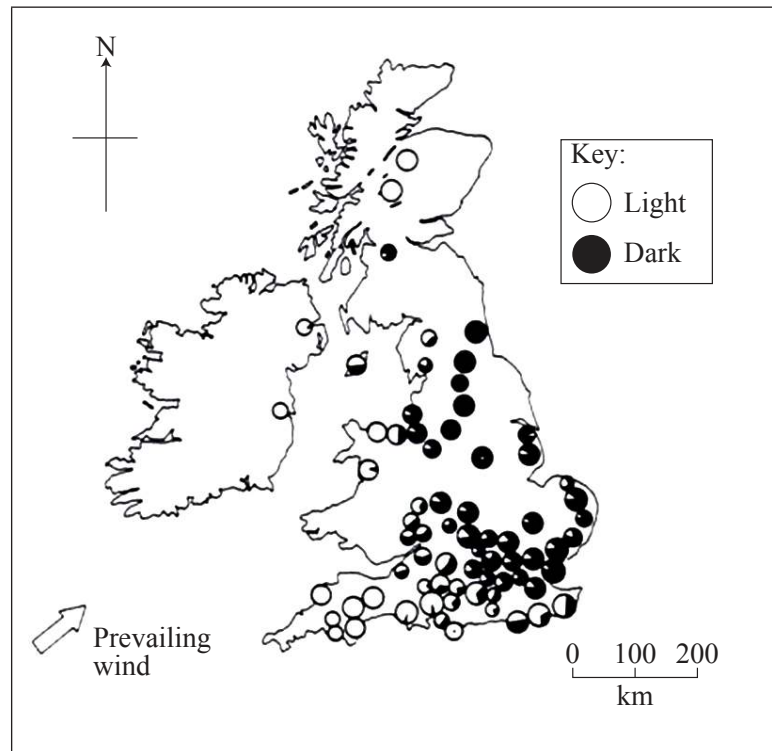
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Figure 4 below shows the distribution of two forms of peppered moths in woodlands of the UK in the 1950s. At the time, surfaces of most trees in Central and South Eastern England were heavily blackened with deposits of carbon from local coal burning. There are two forms of the moth, dark and light, and both may be eaten by woodland birds.

Figure 4



[Source: © International Baccalaureate Organization 2014]

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16EP10

(Question 4 continued)

- (b) (i) Describe the relationship between the distribution of the two forms of moths and habitat pollution. [1]

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- (ii) Suggest **one** reason to explain the relationship you have identified in (b)(i). [1]

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- (iii) Outline **two** ways in which urban air pollution can be reduced. [2]

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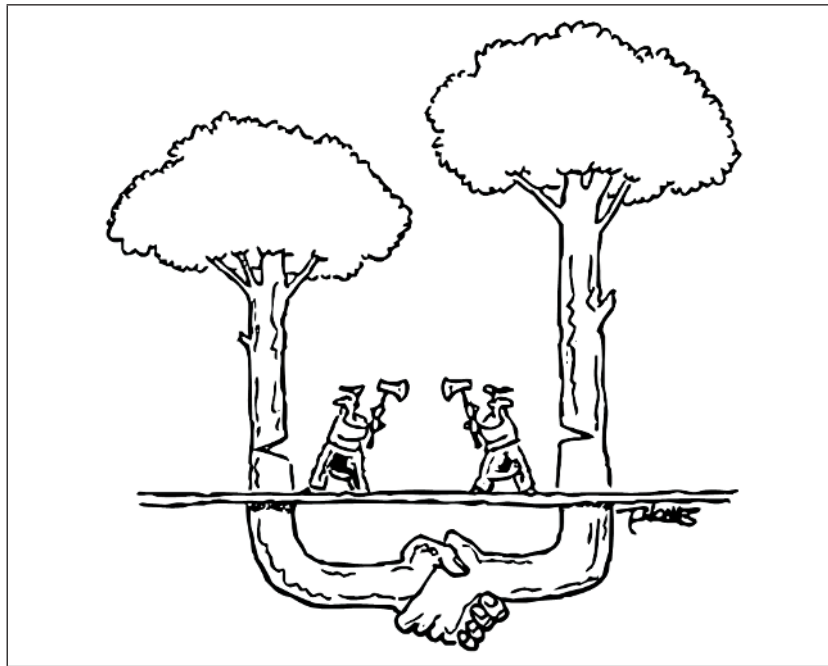
- (c) Explain **one** way in which atmospheric conditions can contribute to air pollution. [2]

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5. Figure 5 below shows an environmental cartoon about rainforests.

Figure 5



[Source: www.CartoonStock.com]

(a) Define the term *climax community*. [1]

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(b) State **two** threats to rainforests other than logging. [2]

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16EP12

(Question 5 continued)

- (c) (i) The cartoonist has drawn the trees “holding hands”. Explain why tropical rainforest ecosystems are more stable when trees remain standing. [3]

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- (ii) Outline the process of succession after deforestation of an area of rainforest. [2]

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- (d) List **two** factors which may have influenced the environmental value system of the cartoonist. [1]

1.

2.



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16EP14

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16EP16