



88146301

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

Candidate session number

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Thursday 6 November 2014 (morning)

Examination code

1 hour

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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. (a) (i) State **one** type of solid domestic waste management strategy. [1]

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- (ii) Outline **one** advantage and **one** disadvantage of the strategy named in 1(a)(i). [2]

Advantage:
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Disadvantage:
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(This question continues on the following page)



(Question 1 continued)

The table shows solid domestic waste data for the state of Victoria, Australia in 2006–2007.

Waste type	Tonnes ('000s)	Proportion of total mass (%)
Plastic	162	9%
Glass	284	16%
Metal	310	17%
Paper	396	
Food Waste	648	
Total	1800	

[Source: adapted from table 5, page 9, National Waste Overview 2009, EPHC
Reproduced with permission of the Natural Environment Protection Council Secretariat, Canberra, Australia.]

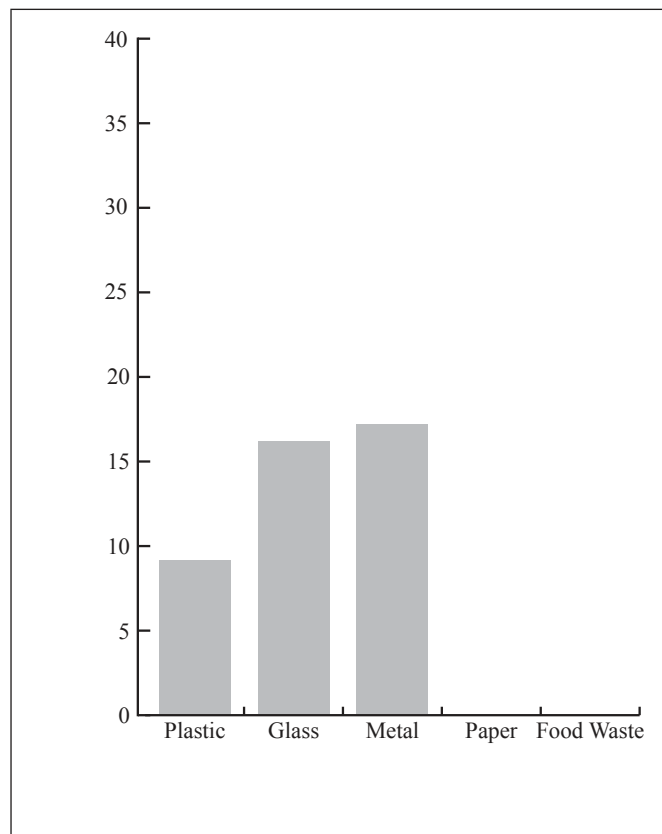
- (b) (i) From the data, calculate the proportion of paper **and** of food waste as a percentage of the total.

Enter these **two** values in the table above.

[1]

- (ii) Complete the following bar chart by using the data calculated in (b)(i). Label the chart correctly.

[2]



(This question continues on the following page)



16EP03

Turn over

(Question 1 continued)

- (c) (i) Define the term *carrying capacity*. [1]

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- (ii) Outline why it is difficult to measure carrying capacity for a human population. [2]

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2. There is a global ban on the trade of ivory obtained from elephant tusks. However, poachers in some African countries kill elephants and trade ivory illegally.

(a) (i) State the type of natural capital of which ivory is an example. [1]

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(ii) Identify **two** factors that have given the African elephant Red List status. [1]

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(b) Elephants eat a variety of vegetation: grasses, shrubs, leaves and small tree seedlings. Describe the impact on a grassland ecosystem of the main large herbivore being removed. [2]

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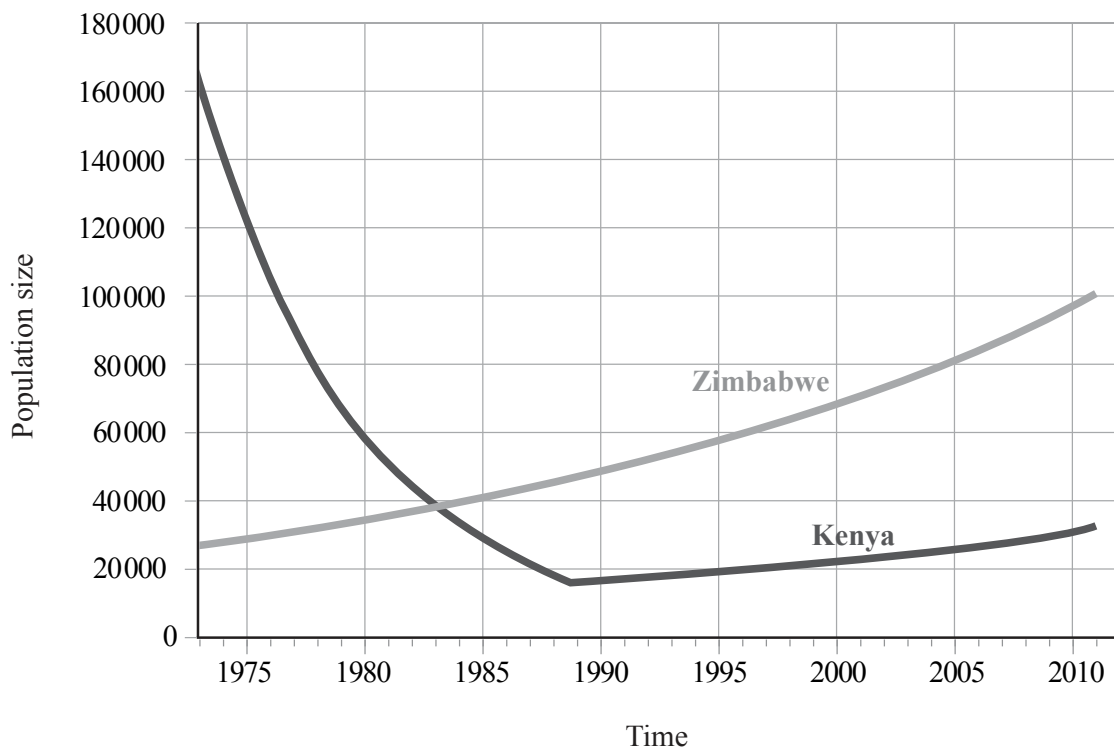
(Question 2 continued)

- (c) Using **Figure 1** below, calculate the annual rate of population increase for elephants in Zimbabwe from 1985 to 2005. [1]

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Figure 1 Elephant Population: Kenya compared to Zimbabwe, 1973 – 2011



[Source: <http://mjerry.blogspot.co.uk/2011/06/how-to-save-elephants-shoot-them.html>.
©Professor Mark J. Perry. Used with permission.]

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16EP06

(Question 2 continued)

- (d) The population of elephants is growing rapidly in countries such as Zimbabwe. This may lead to conservation issues.

Suggest **two** strategies for managing the population of elephants.

[2]

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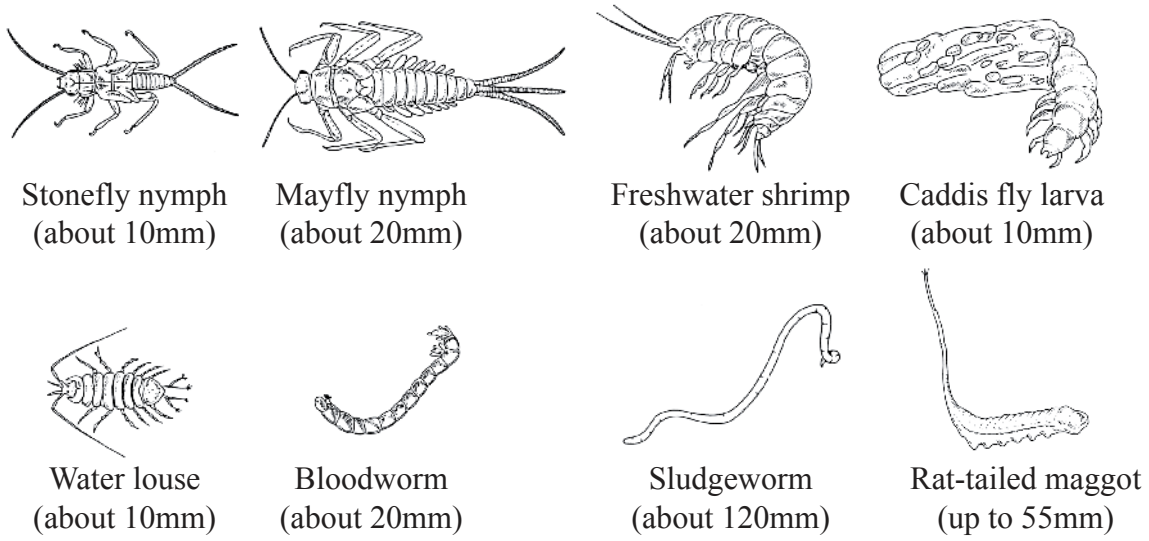


16EP07

Turn over

3. Figure 2 below shows eight freshwater organisms.

Figure 2



[Source: Used with the permission of the Nuffield Foundation and the Society of Biology]

(a) Construct a simple identification key for these eight organisms.

[3]

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16EP08

(Question 3 continued)

- (b) The table shows data from sampling two streams: A and B. Calculate the Simpson's Diversity Index for Stream B.

$$D = \frac{N(N - 1)}{n(n - 1)}$$

You must show your working.

[2]

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Species	Stream A	Stream B
Mayfly nymph	4	0
Caddis fly larva	30	0
Freshwater shrimp	70	1
Water Louse	34	4
Bloodworm	10	45
Sludgeworm	2	100
Simpson's Diversity Index	3.23	

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16EP09

Turn over

(Question 3 continued)

- (c) (i) Define the term *pollution*. [1]

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- (ii) Describe **two** differences between streams A and B. [2]

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- (iii) State, giving a reason, which stream you think is more polluted. [1]

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4. (a) Define the term *biome*. [1]

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- (b) Describe how biomass data from a named biome could be collected. [3]

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- (c) A group of researchers want to investigate succession in an ecosystem.

- (i) State **two** factors that the researchers would need to consider when collecting their data. [2]

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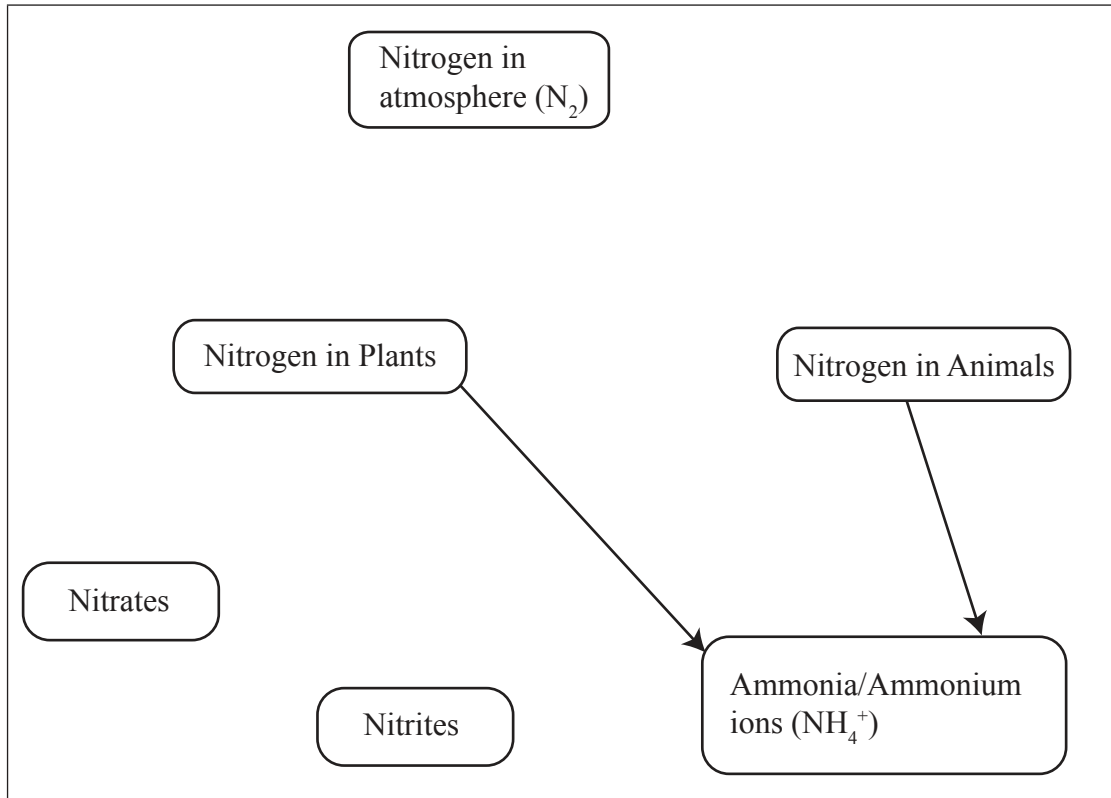
- (ii) Describe how **two** human factors could affect succession. [2]

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5. Figure 3 shows an incomplete model for the nitrogen cycle.

Figure 3



- (a) Label the diagram above to complete the processes and flows in the nitrogen cycle. [3]
- (b) Distinguish between a transfer and a transformation in the nitrogen cycle. [2]

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(Question 5 continued)

(c) Describe **two** ways in which humans may impact the nitrogen cycle.

[2]

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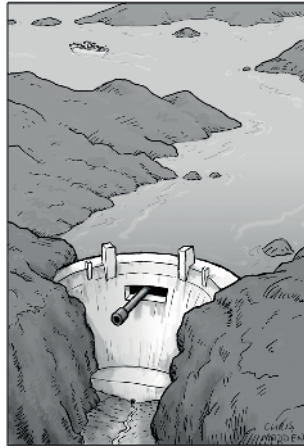


16EP13

Turn over

6. The cartoon below is a comment on the strategic importance of each country securing its own water supply.

Figure 4



IN THE FUTURE,
WARS WILL BE FOUGHT
OVER WATER

[Source: ©Chris Madden. Used with permission of CartoonStock.com.]

- (a) Suggest **one** reason why “in the future, wars will be fought over water”. [2]

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- (b) Suggest **one** way governments can encourage the reduction of domestic water use. [1]

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(Question 6 continued)

- (c) Predict how a technocentric and an ecocentric might differ in their views about dams. [2]

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16EP15

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Answers written on this page
will not be marked.



16EP16