Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	

General Certificate of Education
Advanced Subsidiary Examination
June 2013

Environmental Studies ENVS1

Unit 1 The Living Environment

Tuesday 14 May 2013 9.00 am to 10.00 am

You will need no other materials.
You may use a calculator.

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
  Two of these marks are for the Quality of Written Communication.
- You will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.
- Question 6(b) should be answered in continuous prose.
  Quality of Written Communication will be assessed in this answer.

A

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ANSWER IN THE SPACES PROVIDED

Answer **all** questions in the spaces provided.

1 The table shows the importance of some features of Planet Earth that enable living organisms to exist.

Complete the table.

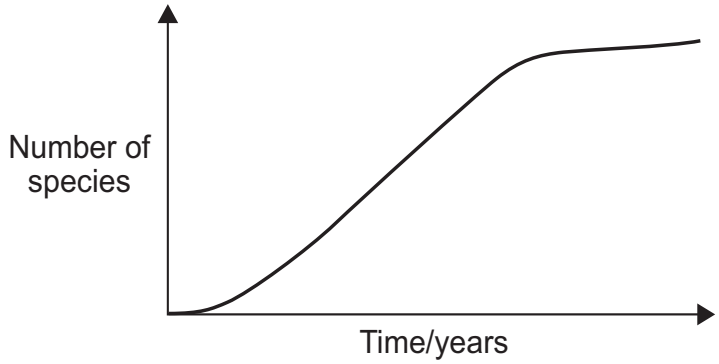
Feature of Planet Earth	Importance of feature
	The energy source for photosynthesis
	The ambient gas made available by the development of photosynthetic organisms
	A gas that absorbs biologically harmful UV radiation
	The main solvent for the chemical reactions in living cells
	A gas that is released by volcanic activity and organisms, which helps to control atmospheric temperature

(5 marks)

5

Turn over for the next question

2 The graph shows the changes in the number of species found on an artificial coral reef.



2 (a) Explain why the number of species changes over time.

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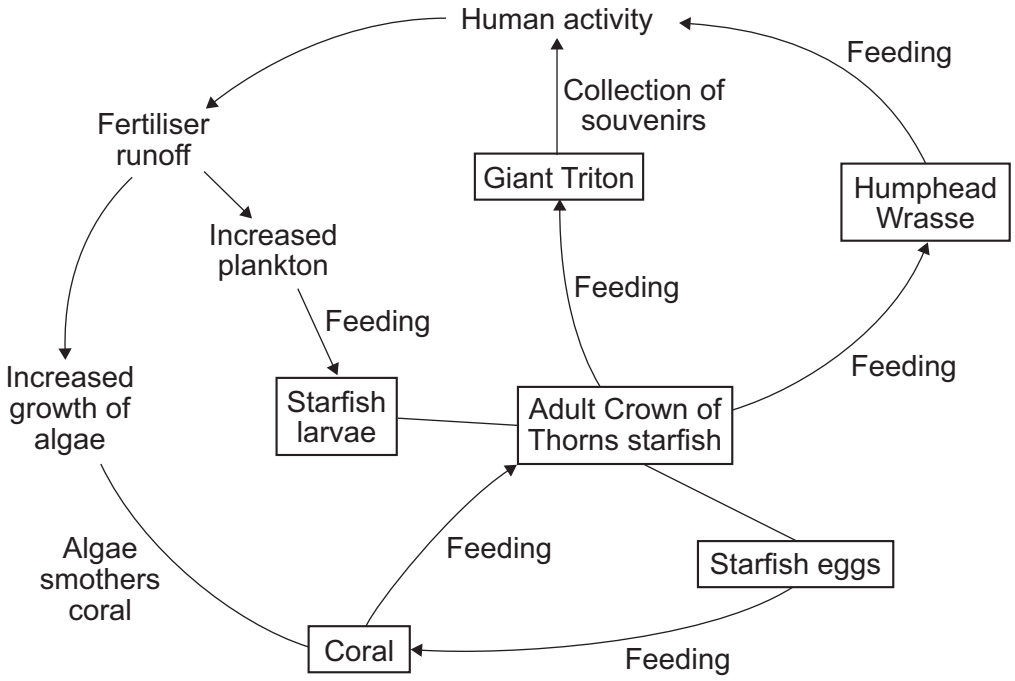
(4 marks)

2 (b) The diagram shows some ecological relationships in a coral reef. The Crown of Thorns starfish is a major predator of coral.



2 (b) (i) Using the information in the diagram, suggest how decreasing the fertiliser runoff may affect the coral population.

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(2 marks)

2 (b) (ii) Use the information in the diagram to explain how coral reefs may be conserved, other than by reducing fertiliser runoff.

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(2 marks)

Turn over ▶

2 (c) Give **two** reasons why coral reefs are important to humans.

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2 .....

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(2 marks)

10

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

3 (a) State:

3 (a) (i) **two** aims of Green Belt designation

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2 .....

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(2 marks)

3 (a) (ii) **two** problems that may be caused by the designation of an area as Green Belt.

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2 .....

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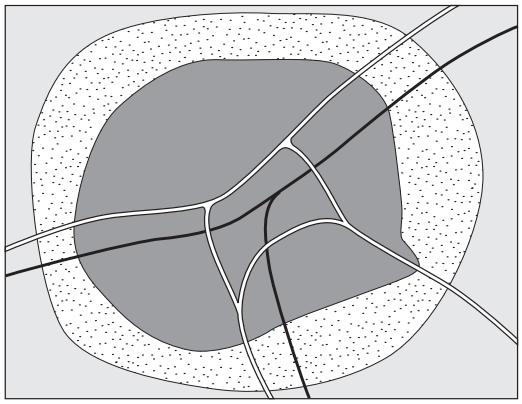
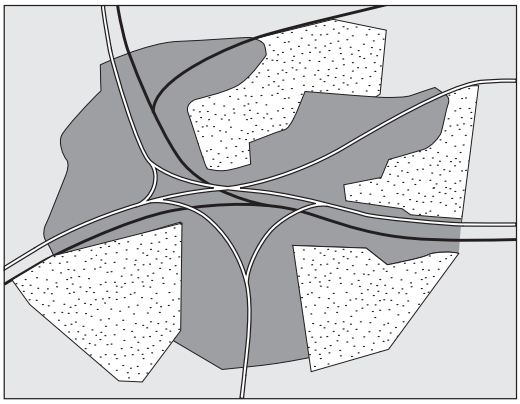
(2 marks)

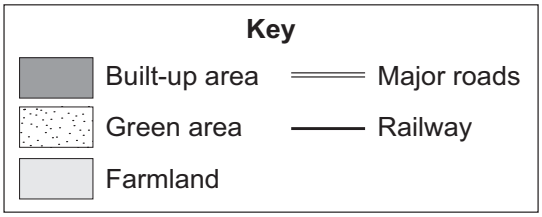
3 (b) The diagrams show a Green Belt and a 'Green Wedge' scheme in a local plan. The 'Green Wedge' scheme has similar purposes to that of the Green Belt designation.

Green Belt Scheme



Green Wedge Scheme





Suggest how the 'Green Wedge' pattern of designated green areas may be of more benefit to wildlife conservation than a typical Green Belt.

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(2 marks)

3 (c) Describe how planning regulations may be used to resolve land use conflicts.

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(4 marks)

10

Turn over for the next question

4 A group of students investigated the following features of a woodland:

A abundance of bluebells
B population of ground beetles
C change in light intensity with increasing distance from the edge of the woodland
D impact of tree cover on light intensity at ground level.

4 (a) (i) For which investigation would a transect be the most appropriate technique?

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(1 mark)

4 (a) (ii) Explain your choice.

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(1 mark)

4 (a) (iii) Some of the investigations involved random sampling.

Explain why it is important to sample randomly.

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(2 marks)

4 (b) Pitfall traps were used to collect the beetles.

4 (b) (i) State **three** limitations of using pitfall traps.

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(3 marks)

4 (b) (ii) Explain how the use of pitfall traps may be standardised.

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(3 marks)

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Turn over for the next question

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5 (a) The table shows the results of an analysis of the diversity of mammal species in an area of the Eastern United States.

Year of estimate	Diversity index
1700	7.3
1900	5.4
1980	2.8
2010	2.7

5 (a) (i) Suggest an explanation for the changes in the diversity index.

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(2 marks)

5 (a) (ii) Explain what may have happened to the ecological stability of the region as the diversity index changed.

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(2 marks)

Question 5 continues on the next page

5 (a) (iii) Suggest why the population of some mammals, such as the White-footed Mouse, *Peromyscus leucopus*, has increased in this area, even though overall mammalian diversity has declined.

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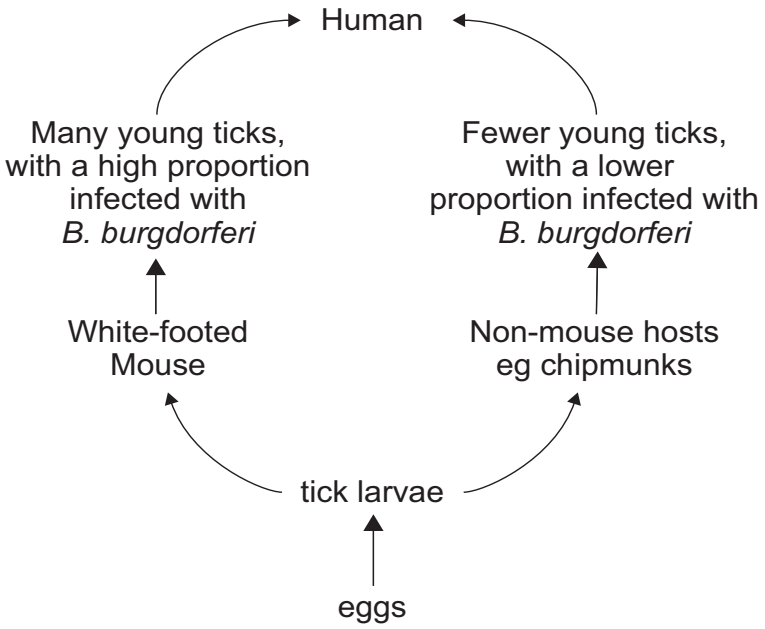
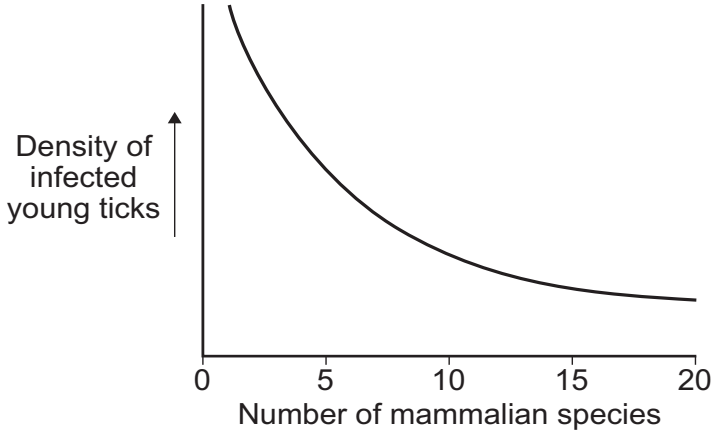
(2 marks)

5 (b) The White-footed Mouse often carries a species of bacterium, *Borrelia burgdorferi*, which may cause Lyme disease in people. Humans may become infected when bitten by ticks that have fed on the mice.

The diagram illustrates how humans may become infected by *B. burgdorferi*.



The graph shows the relationship between the mammalian species and the density of ticks infected with *B. burgdorferi*.



Use the information in the diagram **and** the graph to describe a possible strategy by which wildlife could be used to reduce the incidence of Lyme disease in humans.

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(4 marks)

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Turn over for the next question

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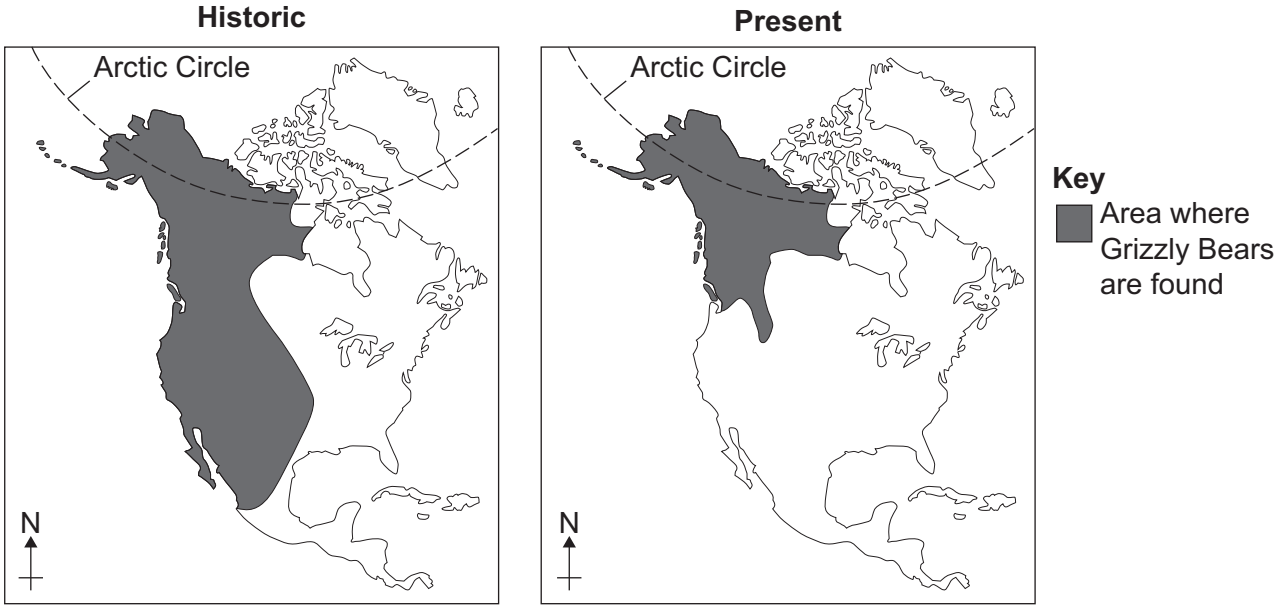
6 The picture shows a Grizzly Bear, *Ursus arctos horribilis.*

Source: Getty Images

The maps show the distribution of the Grizzly Bear.



6 (a) State **two** reasons why it may be important to understand the population dynamics of the Grizzly Bear.

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2 .....

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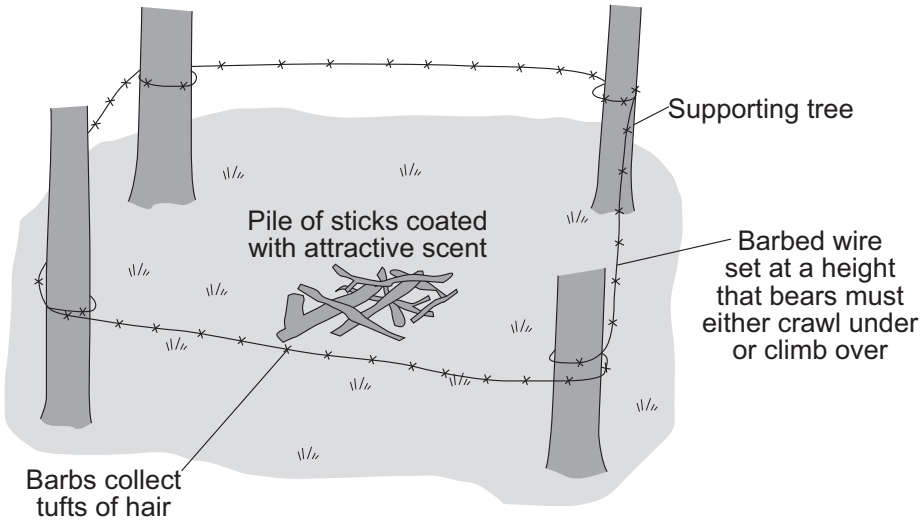
(2 marks)

Turn over ▸

6 (b) The diagram shows a hair trap that may be used to take hair samples from almost every bear in an area. Bear populations may be estimated because the DNA of the bear hair can be used to identify individuals.



Suggest why this method may be used in preference to the mark-release-recapture technique.
You should answer this question in continuous prose.
Quality of Written Communication will be assessed in this answer.

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(7 marks)

6 (c) Grizzly Bears that eat fish from a particular lake accumulate harmless levels of mercury in their tissues from the fish. It is useful for wildlife managers to know how many fish are eaten by the bears. This can be estimated by feeding fish to captive bears and analysing the bears' hair for mercury.

6 (c) (i) Explain why it is useful for wildlife managers to know how much fish an individual bear eats.

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(1 mark)

6 (c) (ii) Suggest how this investigation may be undertaken to produce reliable results.

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(3 marks)

6 (d) In the far north of their range, the percentage of Grizzly Bear cubs surviving to adulthood has increased in recent years.

Suggest why this has happened.

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(2 marks)

15

END OF QUESTIONS

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