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 2014

Environmental Studies ENVS1

Unit 1 The Living Environment

Wednesday 14 May 2014 1.30 pm to 2.30 pm

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(e) 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 **Table 1** shows some details of some practical techniques.

Complete **Table 1**.

[5 marks]

Table 1

Technique	**Practical Application**
	Sampling night-flying moths
Beating tray	
Pitfall trap	
Mark-release-recapture	
	Laboratory-based method of sampling invertebrates that are able to move through soil

5

Turn over for the next question

2 (a) (i) Give **two** ways in which atmospheric carbon dioxide is important for life on Earth.

[2 marks]

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2 (a) (ii) Describe how sunlight is important for the survival of life on Earth.

[2 marks]

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2 (b) Describe how early photosynthetic organisms changed the composition of the atmosphere.

[2 marks]

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2 (c) State **one** way in which plants increase atmospheric humidity.

[1 mark]

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2 (d) Explain how research into unexploited species may aid future food production.

[3 marks]

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Turn over for the next question

3 **Figure 1** shows a Tasmanian Devil, *Sarcophilus harrisii*. Tasmanian Devils are the largest carnivorous marsupials and are now endangered.

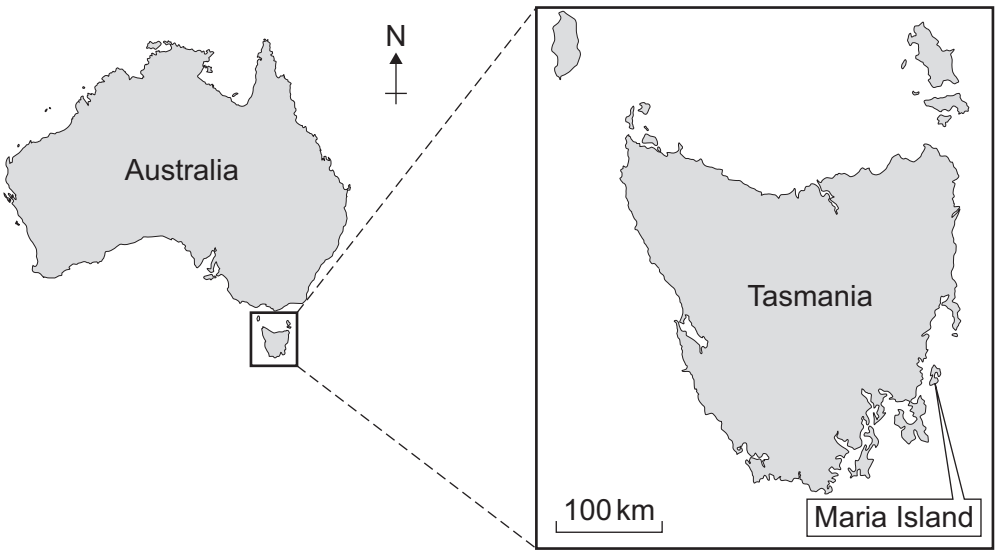
Figure 1

Source: Thinkstock

Tasmanian Devils are indigenous to Tasmania and some were released onto Maria Island in 2012.

Figure 2 shows the location of Tasmania and Maria Island.

Figure 2



3 (a) (i) Between 2001 and 2004, 3392 Tasmanian Devils were reported to have been killed on roads. This was estimated to have been about 5% of the total population in 2001.

Calculate the total population estimate in 2001.

[1 mark]

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3 (a) (ii) The total population of Tasmanian Devils had been estimated using a mark-release-recapture method.

Outline the features of a population which makes mark-release-recapture a suitable method for estimating population size.

[2 marks]

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3 (b) The spread of disease in recent years has reduced the Tasmanian Devil population and they are now endangered.

Explain how having a small population makes a species, such as the Tasmanian Devil, vulnerable to extinction.

[3 marks]

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3 (c) In 2012, 15 Tasmanian Devils were released onto Maria Island, with the aim of establishing a self-sustaining population.

Suggest **two** characteristics that released animals should have if programmes like this are to be successful.

[2 marks]

1 .....

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2 .....

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3 (d) Explain why carnivorous animals need larger protected areas than similar sized herbivorous animals.

[2 marks]

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Turn over for the next question

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4 **Figure 3** shows a river before a management scheme to benefit wildlife was planned.

Figure 3

Source: Thinkstock

4 (a) (i) Suggest how the river could be changed to benefit wildlife.

[4 marks]

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4 (a) (ii) Suggest how such a scheme may increase the amenity value of the river for visitors without damaging its wildlife value.

[3 marks]

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4 (b) Explain how a Leopold Matrix may be used when such schemes are planned.

[3 marks]

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Turn over for the next question

5 (a) Explain what is meant by the term **ecological niche**.

[2 marks]

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5 (b) **Figure 4** shows barnacles on a rock on the seashore. Barnacles are small crustaceans that attach themselves permanently onto hard substrates in the intertidal zone. The **intertidal zone** is between the highest and lowest tides.

Figure 4

Scale
1 cm

Source: Thinkstock

Figure 5 shows how the density of two species of barnacle, *Chthamalus* and *Balanus*, changes in the intertidal zone.

Figure 5

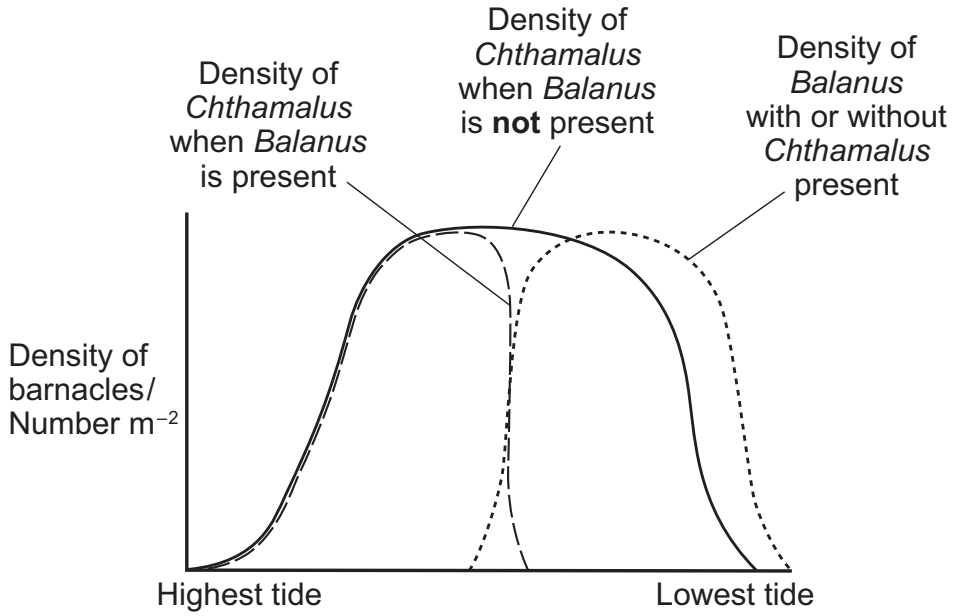
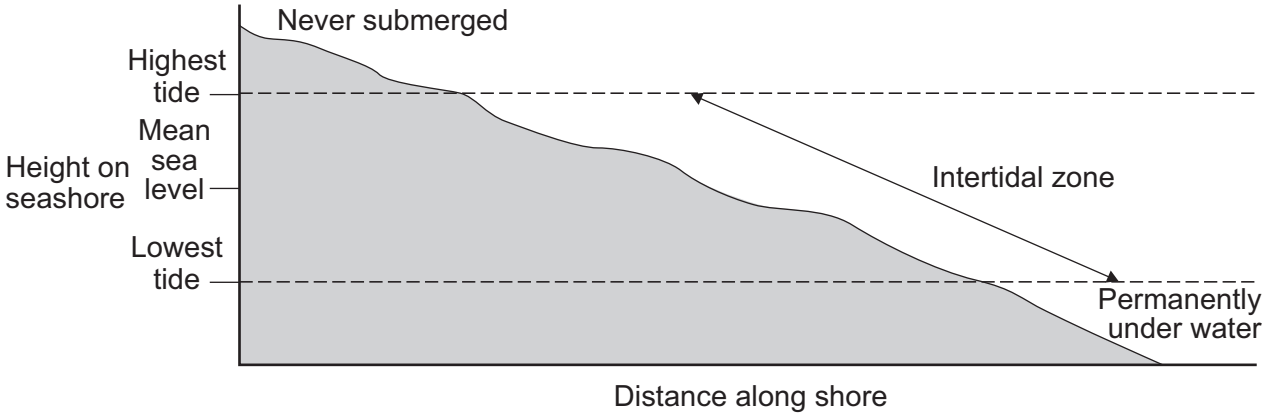


Figure 6 shows a profile of a rocky shore and the intertidal zone.

Figure 6



5 (b) (i) Suggest why the density of *Chthamalus* barnacles changes when *Balanus* barnacles are present.

[2 marks]

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Turn over ▶

5 (b) (ii) Suggest **one** reason why acid rain could affect *Chthamalus* barnacles more than *Balanus* barnacles.

[1 mark]

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5 (c) Describe **one** method that could be used to estimate the density of the population of barnacles in an area.

[3 marks]

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5 (d) During a survey of a rocky shore, a student noticed that there were no barnacles under the opening of a pipe that drained water from an arable field into the sea.

Suggest why there were no barnacles under the pipe.

[2 marks]

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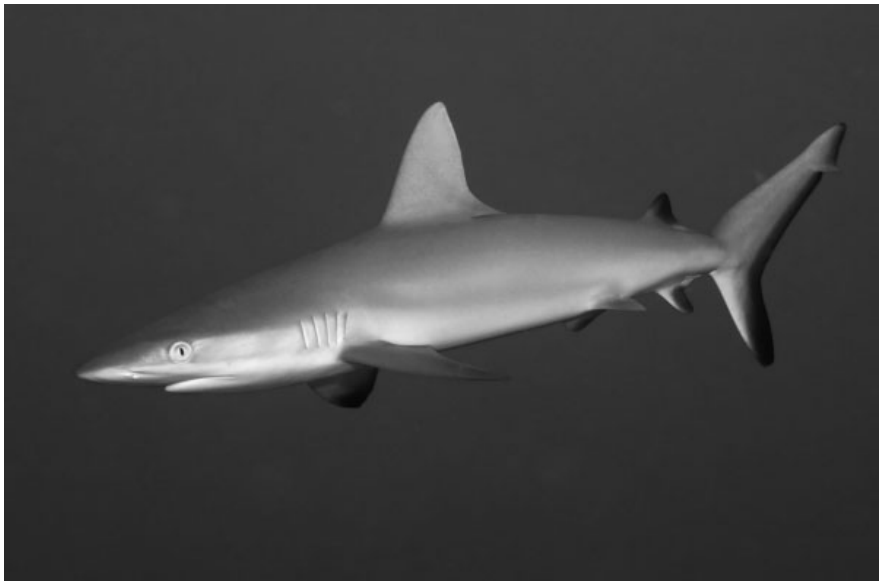
6 **Figure 7** shows a Grey Reef Shark, *Carcharhinus amblyrhynchos*.

Figure 7

Scale

0.5 m



Source: Getty Images

6 (a) Unlike many other fish, female Grey Reef Sharks become sexually mature at the late age of about 9 years and then only give birth to up to six young every 2 years.

Suggest why these facts make Grey Reef Sharks vulnerable to overexploitation.

[2 marks]

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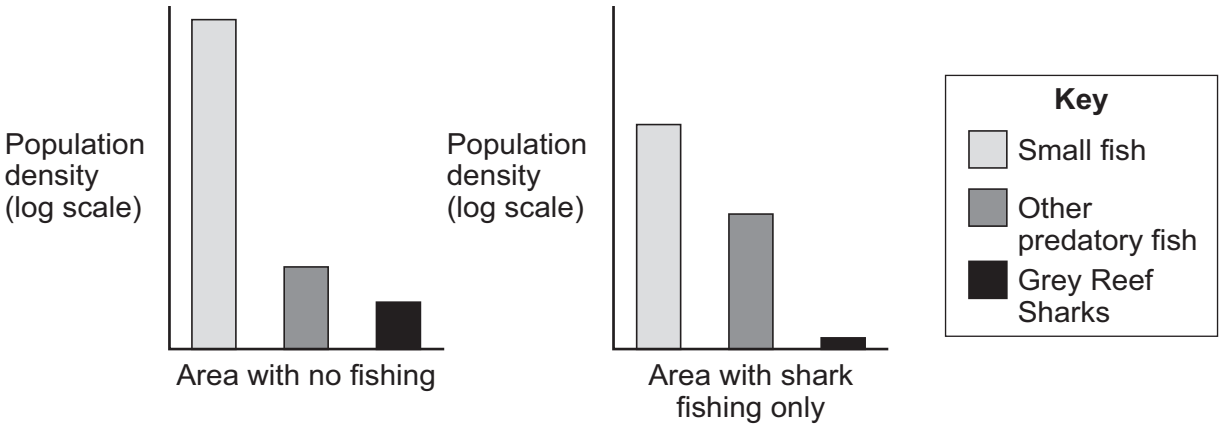
Question 6 continues on the next page

6 (b) **Figure 8** shows the population densities of fish in two areas of a coral reef.

Figure 8



Use **Figure 8** to explain how shark fishing affects the populations of other fish species.

[2 marks]

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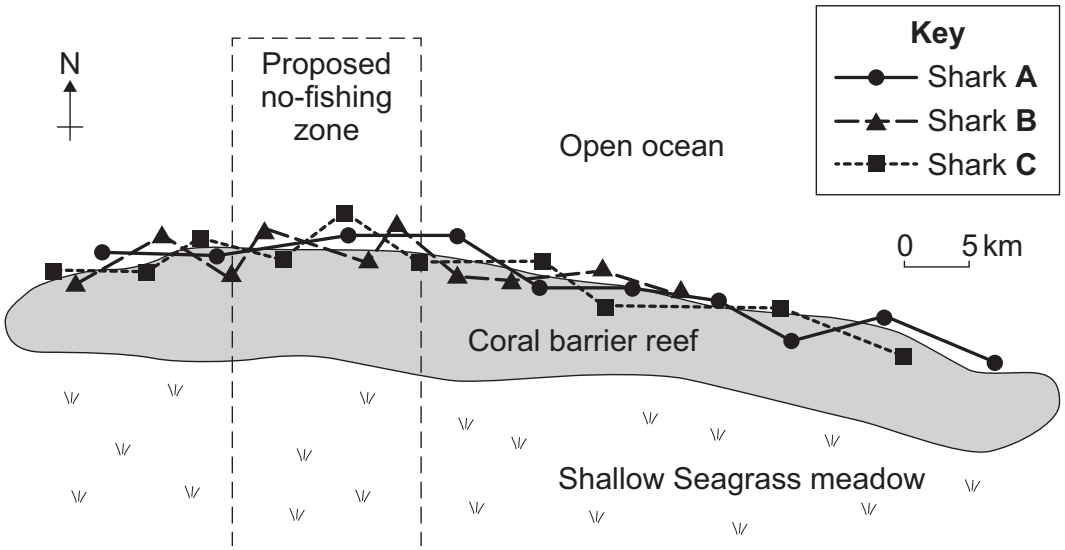
6 (c) **Figure 9** shows data from a satellite tracking survey.

Figure 9



The points indicate the weekly mean positions of individual Grey Reef Sharks as they moved along the reef over 10 weeks.

Give **two** advantages of the **no-fishing zone** for the population of the Grey Reef Sharks on this reef.

[2 marks]

1 .....

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2 .....

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6 (d) Suggest **one** reason, other than the deliberate exploitation by humans, why populations of some marine species, such as Grey Reef Sharks, are declining.

[1 mark]

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6 (e) The populations of reef-building corals are in decline.

Explain the importance of coral reefs to humans.

You should answer this question in continuous prose.
Quality of Written Communication will be assessed in this answer.

[8 marks]

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END OF QUESTIONS

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