Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

For Examiner's Use

General Certificate of Education
January 2009
Advanced Subsidiary Examination

ENVIRONMENTAL SCIENCE **ESC2**
Unit 2 The Lithosphere

Wednesday 14 January 2009 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. Answers written in margins or on blank pages will not be marked.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The maximum mark for this paper is 60.
- The marks for questions are shown in brackets.
- You are reminded of the need for good English, clear presentation and appropriate use of specialist vocabulary. Question 6 should be answered in continuous prose. Quality of Written Communication will be assessed in this answer.

For Examiner's Use			
Question	Mark	Question	Mark
1		5	
2		6	
3			
4			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

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ANSWER IN THE SPACES PROVIDED

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

1 The table describes terms used in connection with land use.

Complete the table by selecting the appropriate letter from the list below.

A Green Belt
B National Park
C Honey Pot Site
D Heritage Coast
E Public Inquiry
F Environmental Impact Assessment
G Area of Outstanding Natural Beauty (AONB)

Description	Letter
Official process used to decide whether a controversial airport terminal should be built	
Designated area intended to reduce urban sprawl	
Site of particular interest or appeal to visitors	
Large area of naturally beautiful countryside where the landscape is conserved and outdoor recreation and education are promoted	
Planning technique used to evaluate the consequences of a development	

(5 marks)

5

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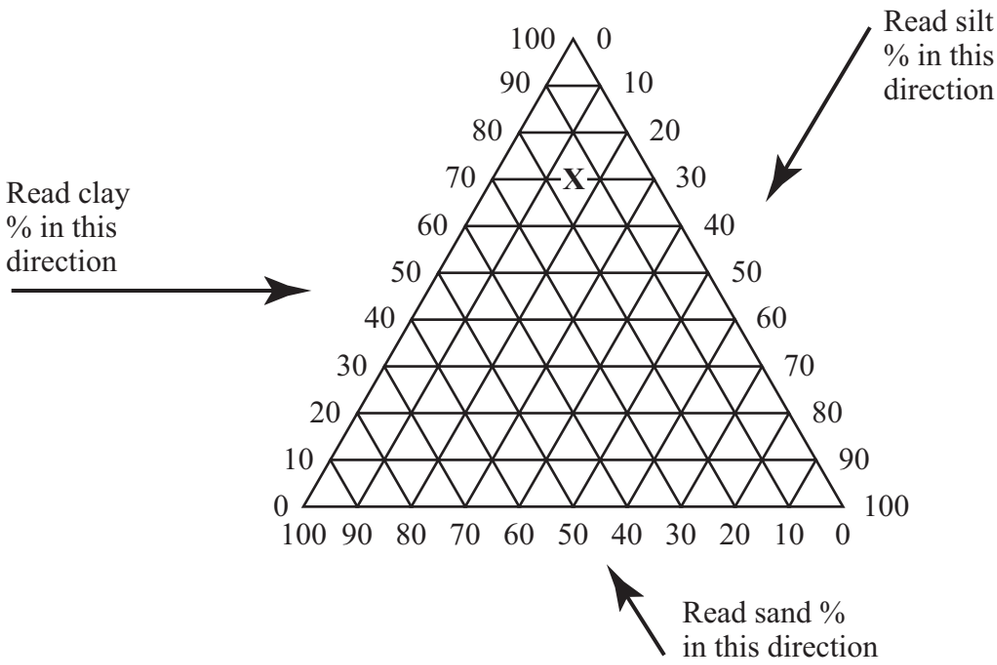
2 The triangular graph is used to represent the texture of a soil.



2 (a) (i) Use the soil triangle to determine the percentages of sand, silt and clay in soil **X**.

sand ..... % silt ..... % clay ..... %

(1 mark)

2 (a) (ii) Describe a technique which could be used to measure the proportions of sand, silt and clay in a soil sample.

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(3 marks)

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2 (b) Explain why clay soils have a low infiltration rate.

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(1 mark)

2 (c) Explain why increasing the pore size may help a soil to warm up more quickly.

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(2 marks)

2 (d) Organic matter in a soil affects its fertility.

Outline a method to determine the organic matter content of a soil.

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(3 marks)

10

Turn over for the next question

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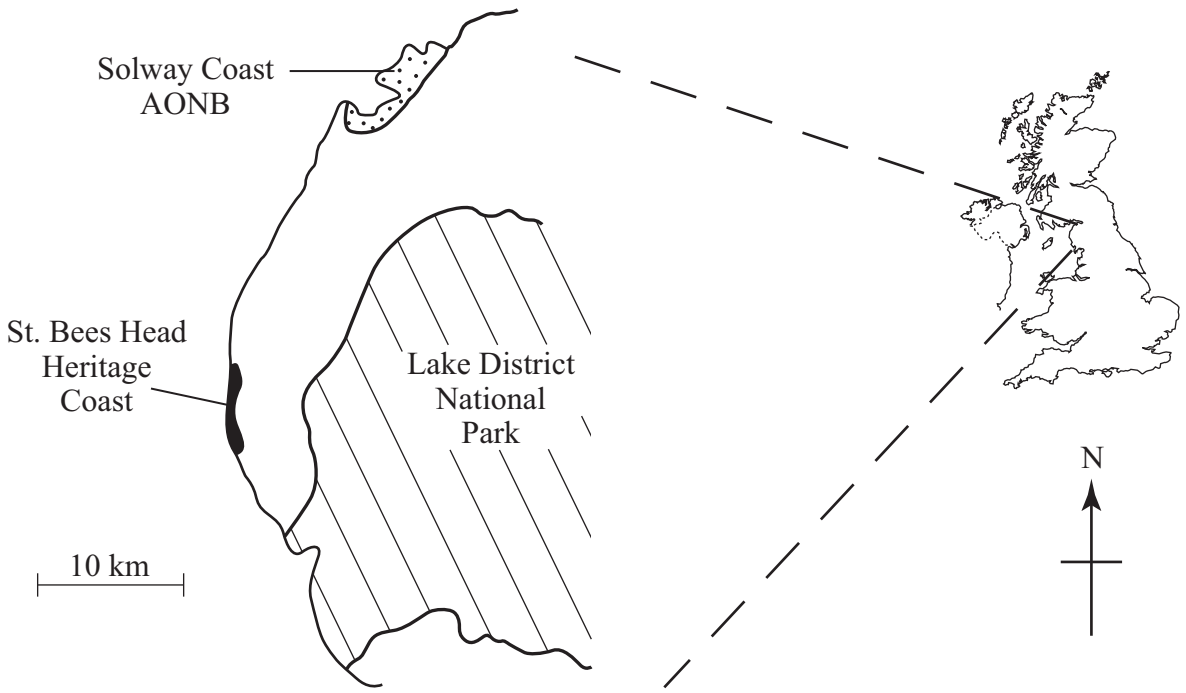
3 The diagram shows the location of St. Bees Head Heritage Coast.



3 (a) Give **two** reasons why some coastal areas are designated as Heritage Coasts.

1 .....

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2 .....

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(2 marks)

3 (b) St. Bees Head Heritage Coast includes a Site of Special Scientific Interest, an RSPB nature reserve, and has dramatic red sandstone cliffs.

3 (b) (i) Suggest **two** environmental problems which may be caused by visitors to St. Bees Head Heritage Coast.

1 .....

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2 .....

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(2 marks)

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3 (b) (ii) Suggest **two** ways by which the area may be enhanced for visitors.

1 .....

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2 .....

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(2 marks)

3 (b) (iii) A survey is to be carried out to investigate the responses of the visitors to the Heritage Coast.

Suggest **two** precautions that should be taken in order to obtain a representative sample of the visitors.

1 .....

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2 .....

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(2 marks)

3 (c) Part of the Solway Coast to the north of St. Bees Head is designated an Area of Outstanding Natural Beauty (AONB).

3 (c) (i) Explain the purpose of an AONB designation.

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(1 mark)

3 (c) (ii) Give **one** difference between the purposes of the AONB and National Park designations.

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(1 mark)

10

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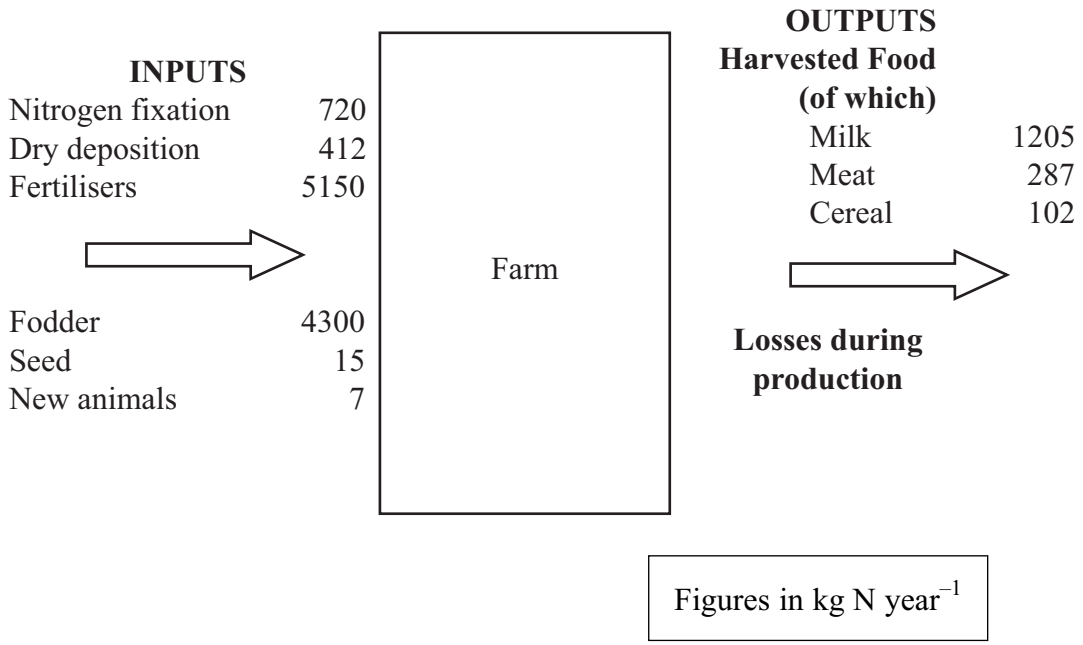
4 The diagram shows the inputs and outputs of nitrogen for a dairy farm.



4 (a) Calculate the nitrogen in the harvested food as a percentage of the total input of nitrogen.

Show your working.

Answer ..... %

(2 marks)

4 (b) Ammonium nitrate (NH_4NO_3) is a commonly used fertiliser.

Explain how the nitrogen that it contains is made available to plants.

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(2 marks)

Areas outside the box will not be scanned for marking

4 (c) Suggest how the farmer could increase the rate of nitrogen fixation in order to reduce the need for fertiliser application.

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(2 marks)

4 (d) (i) Denitrification is an important way in which nitrogen is lost from a soil.

Suggest why losses are greater in waterlogged conditions.

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(2 marks)

4 (d) (ii) Nitrates are lost from the soil by leaching.

Describe the conditions which increase the rate of leaching.

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(2 marks)

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Turn over for the next question

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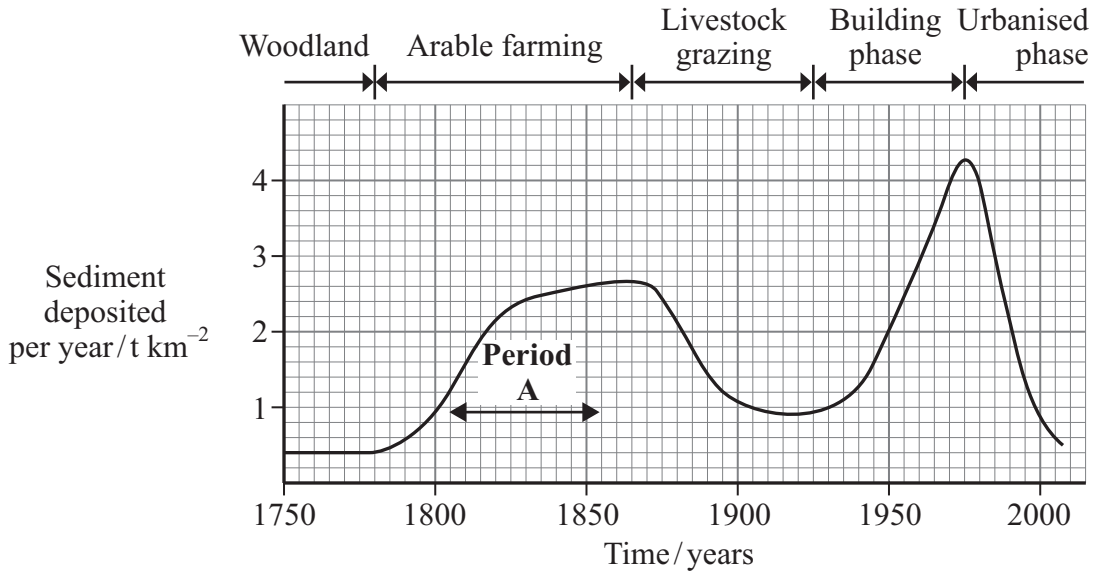
5 The surrounding land use can affect the amount of sediment deposited in a lake.

The graph shows the amount of sediment deposited in a lake as a result of changing land uses.



5 (a) Explain the shape of the graph during **Period A**.

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(2 marks)

5 (b) (i) In which year did sedimentation peak?

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(1 mark)

5 (b) (ii) Suggest an explanation for this peak.

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(1 mark)

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5 (c) Some of the aggregates that were brought into the area, during the building phase, may have changed the pH of the water that runs off the site.

Name an aggregate that might have been used and explain why it affects the pH of the water.

Aggregate .....

Reason for pH change .....

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(2 marks)

5 (d) Suggest methods by which people may encourage the formation of topsoil in their gardens.

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(4 marks)

10

Turn over for the next question

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6 Phosphorus is a vital element for organisms. Most phosphorus is found as the mineral apatite, a type of calcium phosphate. Apatite is most commonly formed from the remains of aquatic organisms.

6 (a) Which of the three major rock types may contain apatite?

.....

(1 mark)

6 (b) There are large inland deposits of apatite.

Describe how phosphate ions might enter the oceans from these deposits.

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(2 marks)

6 (c) Explain why the phosphorous cycle is slow moving.

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(2 marks)

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6 (d) Describe the environmental impacts of mineral extraction.

Quality of Written Communication will be assessed in this answer.

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(10 marks)

15

END OF QUESTIONS

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