

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Education
Advanced Subsidiary Examination
January 2011

Environmental Studies

ENVS2

Unit 2 The Physical Environment

Tuesday 18 January 2011 9.00 am to 10.30 am

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

Time allowed

- 1 hour 30 minutes

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 90.
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 9(c) should be answered in continuous prose.
Quality of Written Communication will be assessed in this answer.

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	



J A N 1 1 E N V S 2 0 1

There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



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

1 The diagram shows the hydrological cycle.

Complete the diagram by adding, from the list, the names of the missing reservoir and process, and the percentages of total water.

97%

2%

0.001%

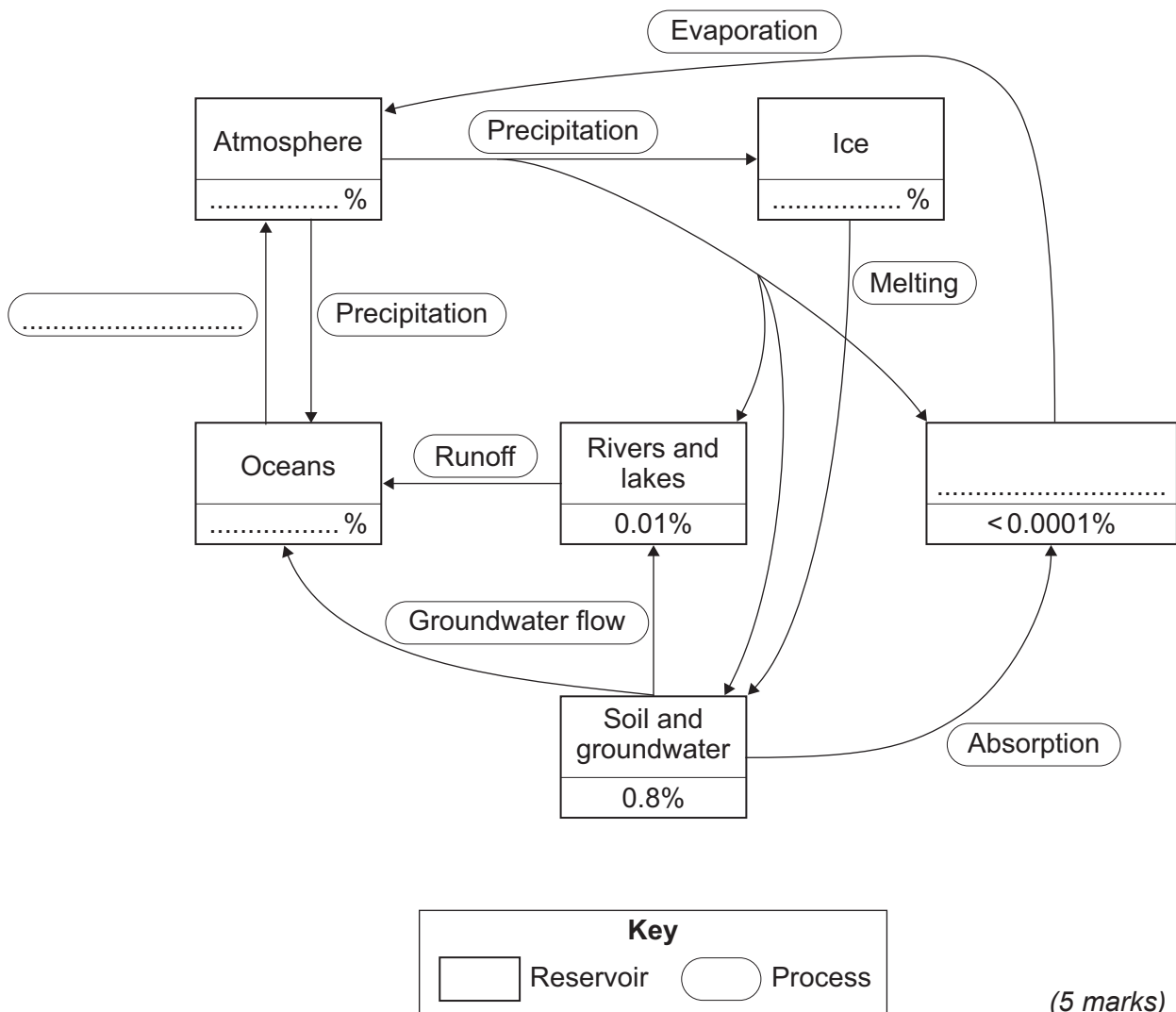
50%

Evaporation

Interception

Lithosphere

Biota



(5 marks)

5

Turn over ►



- 2** A student collected soil samples from a mine spoil heap as part of a study to assess its fertility for a revegetation and stabilisation project.
Some of the results for two samples are shown in the table.

Item	Heating temperature /°C	Period since start of heating at that temperature /hours	Mass /g	
			Sample A	Sample B
Weighing dish	-	-	8.45	8.96
Original sample + weighing dish	-	0	27.35	35.23
Sample + weighing dish	110	12	20.56	29.66
Sample + weighing dish	110	24	18.45	27.29
Sample + weighing dish	110	36	18.45	26.78
Sample + weighing dish	110	48	18.45	26.78
Dried sample + weighing dish	500	0	18.45	26.78
Sample + weighing dish	500	1	16.40	21.99
Sample + weighing dish	500	2	15.43	21.99
Sample + weighing dish	500	3	15.43	21.99

- 2 (a)** Using the information in the table, estimate:

- 2 (a) (i)** the percentage water content of **Sample A**
Show your working.

.....%
(2 marks)

- 2 (a) (ii)** the percentage organic matter content of **Sample B**.
Show your working.

.....%
(2 marks)



2 (b) Suggest how the accuracy of the study may be ensured by the appropriate storage of the samples:

2 (b) (i) between sample collection and first weighing

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(1 mark)

2 (b) (ii) between the end of heating and final weighing.

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(1 mark)

2 (c) Outline methods, other than revegetation, that can be used to stabilise mine spoil heaps.

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(4 marks)

10

Turn over for the next question

Turn over ►



- 3 The picture shows a Tüllgren funnel.



- 3 (a) (i) Describe how a Tüllgren funnel may be used to extract small invertebrates from a soil sample.

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(4 marks)



3 (a) (ii) Explain why some soil invertebrates cannot be extracted using a Tüllgren funnel.

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(2 marks)

3 (b) Habitat biodiversity is affected by soil pH.

Describe how soil pH may be measured.

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(3 marks)

3 (c) Which of the following ranges is suitable for the growth of most plants?

pH 1.0	to	pH 6.0
pH 4.4	to	pH 7.0
pH 7.0	to	pH 10.0
pH 10.0	to	pH 14.0

pH to pH

(1 mark)

10

Turn over for the next question

Turn over ►



- 4 The photograph shows a water steriliser that uses ultraviolet light to kill pathogens in borehole water for private domestic use.



- 4 (a) Name **two** other ways of sterilising water for domestic use.

1

2 (2 marks)

- 4 (b) Describe **two** treatment processes that are more likely to be used for water from rivers than for water from aquifers.

1

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..... (4 marks)



- 4 (c) (i)** Outline how a reservoir may be used to prevent extremes of water flow in the river downstream.

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(1 mark)

- 4 (c) (ii)** Outline **other** ways in which a reservoir is likely to change the river downstream.

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(3 marks)

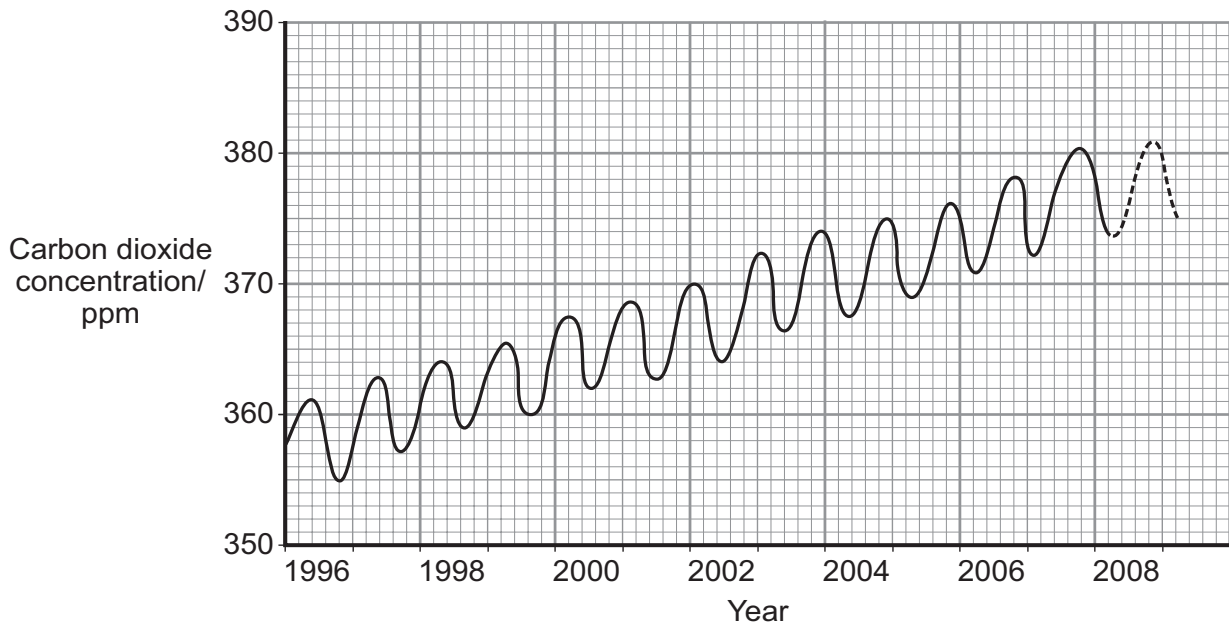
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Turn over for the next question

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- 5** The graph shows trends in atmospheric carbon dioxide concentrations over a 12 year period.



- 5 (a)** Explain why the carbon dioxide concentration fluctuates during each year.

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(2 marks)

- 5 (b) (i)** Explain why the long-term trend shown by the graph is likely to change global atmospheric temperatures.

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(2 marks)



5 (b) (ii) Name **two** other gases that may also change global atmospheric temperatures.

Gas 1

Gas 2

(2 marks)

5 (c) Use the processes that are involved in global atmospheric temperature changes to explain the difference between positive and negative feedback mechanisms.

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(4 marks)

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Turn over for the next question

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- 6** **Graph A** shows the mean ozone concentrations over a research station in Antarctica during a 35 year period. **Graph B** shows the same data with lines added to show the standard deviations of each mean value.

Graphs not reproduced here due to third-party copyright constraints

- 6 (a)** Describe the trends shown by **Graph A**.

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(2 marks)

- 6 (b)** How does the use of the standard deviation lines shown in **Graph B** increase understanding of the mean values used to draw the graphs?

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(1 mark)



- 6 (c)** Name the group of gases released by human activities that caused the ozone depletion shown by the graphs, **and** outline the chemical reactions involved.

Gases

Chemical reactions

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(3 marks)

- 6 (d)** Outline the methods that have been used to control ozone depletion.

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(4 marks)

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Turn over for the next question

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- 7** The photograph shows a building that has suffered structural damage.



- 7 (a)** Suggest how groundwater abstraction may have caused this damage.

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(1 mark)

- 7 (b)** Outline how aquifer water levels may be maintained without reducing abstraction rates.

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(1 mark)



7 (c) Describe **one** method that may be used to produce potable water from seawater.

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(3 marks)

7 (d) Describe the methods that may be used to reduce the amount of water that is treated by water companies to meet public demand.

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(5 marks)

Turn over for the next question

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8 (a) Outline how soil structure affects soil fertility.

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(2 marks)

8 (b) The photographs show two sets of equipment that can be used to analyse soil texture.



Describe **one** method that can be used to analyse the texture of a soil sample.

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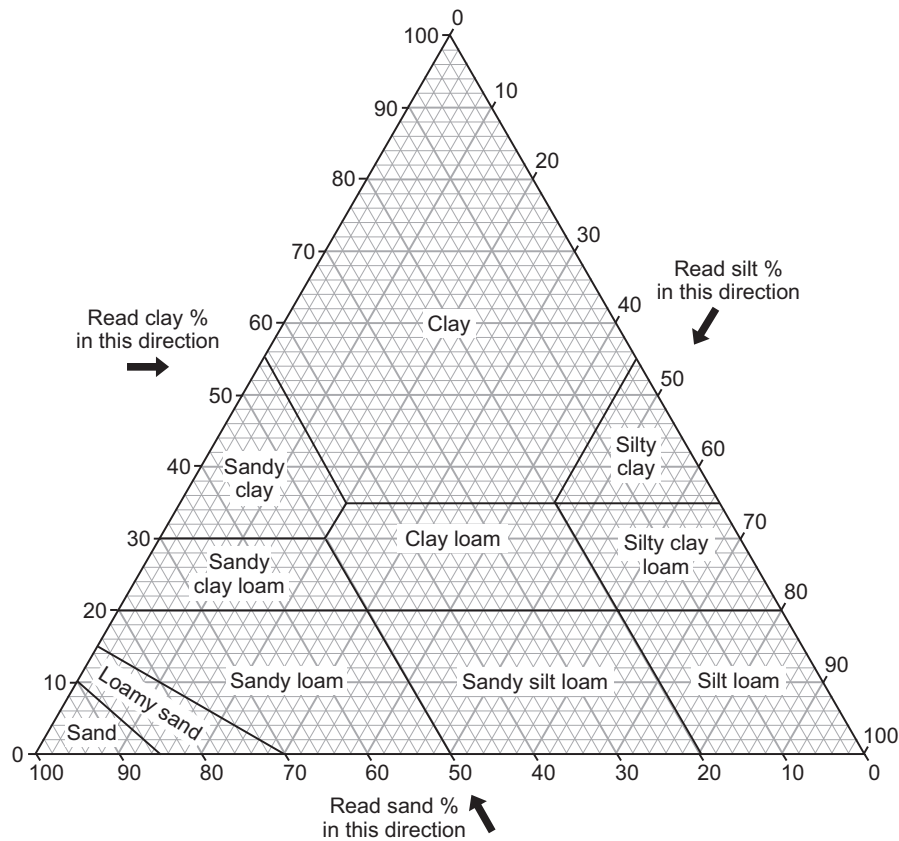
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(3 marks)



8 (c) The diagram shows a soil triangle.



Shade the area of the graph where the soils have more than 30% sand but less than 40% clay. (1 mark)

8 (d) Describe how the texture of a soil affects its properties.

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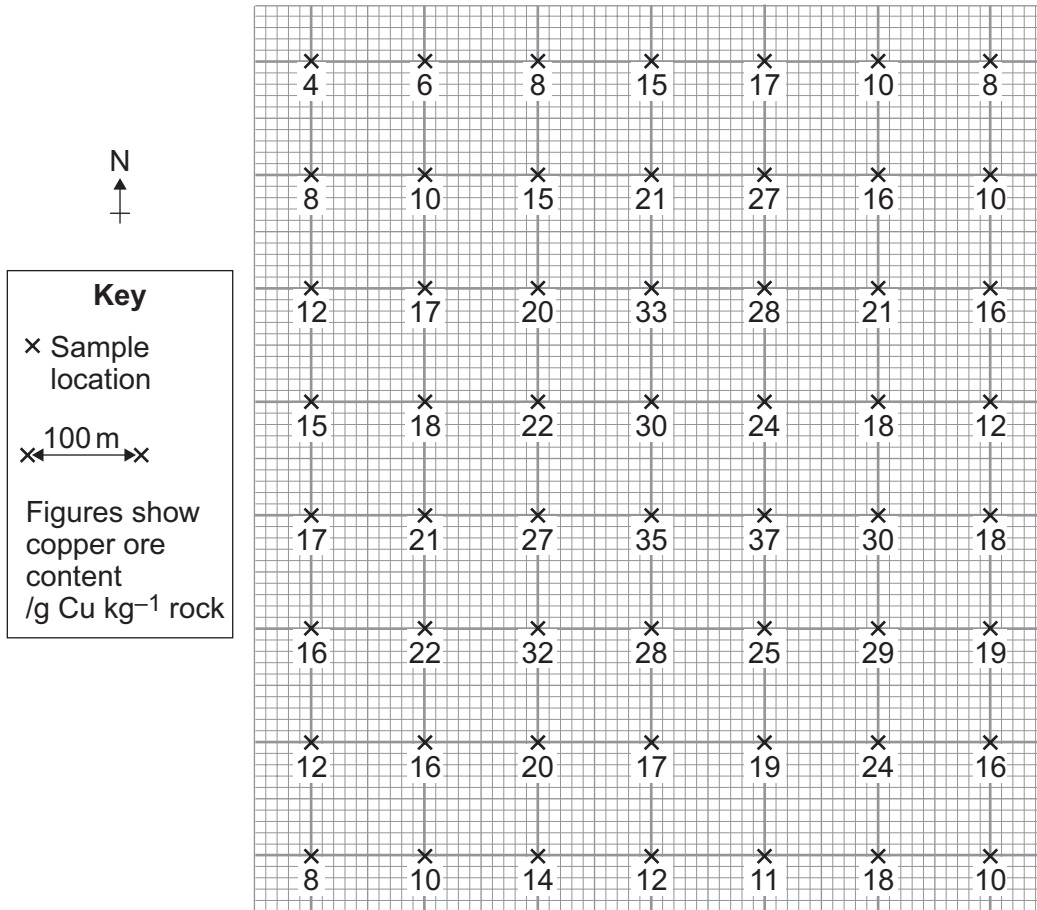
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(4 marks)



- 9 A geologist carried out trial drilling in an area to find out whether the copper ore deposits could be exploited commercially.

The map shows the results of the rock sample analysis.



- 9 (a) Draw a line on the map to surround the area that could be exploited if the cut-off ore grade is 25g of copper per kg of rock. (1 mark)



- 9 (b)** Outline the reasons why a mine may not be developed, even if rich ore deposits have been found.

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(4 marks)

- 9 (c)** Describe the main processes that have produced deposits of minerals and rocks that may be exploited by humans.

Quality of Written Communication will be assessed in this answer.

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Turn over ►



[illegible]

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