

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

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



General Certificate of Education
Advanced Subsidiary Examination
June 2009

Environmental Studies

ENVS2

Unit 2 The Physical Environment

Tuesday 2 June 2009 1.30 pm to 3.00 pm

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



JUN09ENVS201

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ANSWER IN THE SPACES PROVIDED**



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

- 1** The table shows some of the features of gases that are thought to cause global climate change.

Complete the table.

Gas	Natural process that produces the gas	Human activity that causes release of the gas	Method or regulation to reduce emissions
Carbon dioxide	Decomposition of organic matter		Kyoto Protocol
Methane		Landfill sites	Burning surplus gas
Oxides of nitrogen	Forest fires	Combustion of fossil fuels	
Chlorofluorocarbons	None		

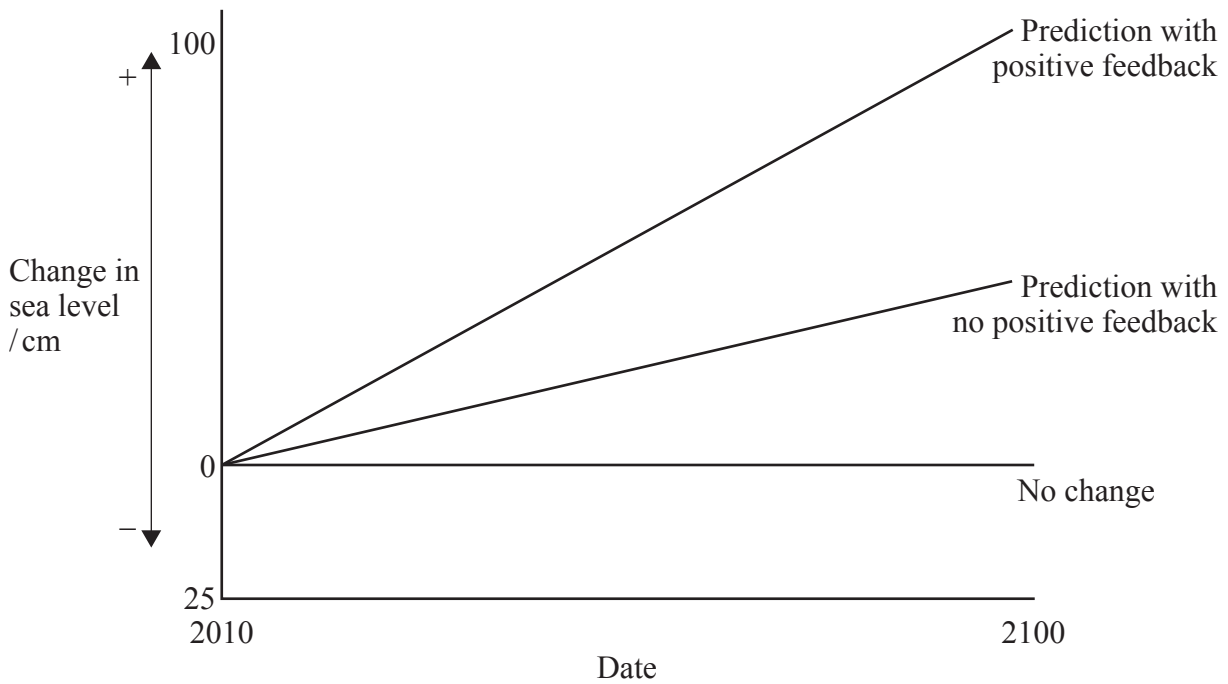
(5 marks)

5

Turn over ►



2 Global climate change may cause major changes to the world's oceans. The graph shows predictions for changes in sea level.



2 (a) Suggest **two** ways in which rising temperatures may cause the sea level to rise.

- 1
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- 2
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(2 marks)



2 (b) Explain how a rise in sea level may affect the distribution of wildlife.

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(4 marks)

2 (c) Suggest how global climate change may affect ocean currents.

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(4 marks)

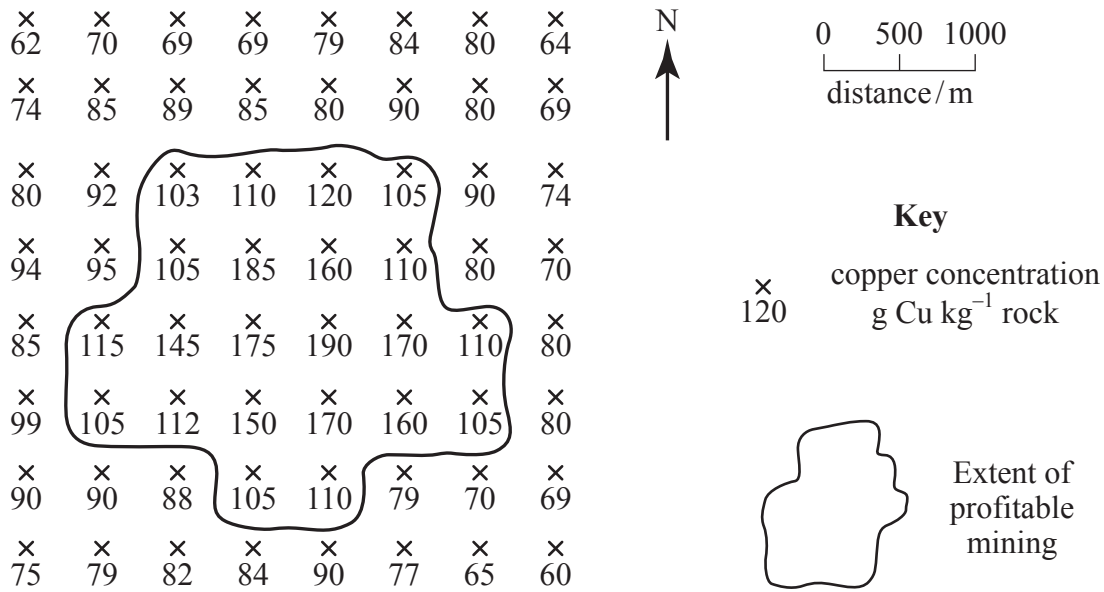
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3 A geologist carried out trial drilling in an area to find out whether there were deposits of copper ore that could be exploited. The map shows the results of the rock sample analysis.



3 (a) Suggest how an increase in copper prices would affect the area that could be mined profitably.

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(1 mark)

3 (b) Outline factors, other than the copper content of the ore and copper prices, that could affect the economic viability of mining these deposits.

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(3 marks)



3 (c) Describe how **two** environmental problems caused by mining can be reduced.

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(4 marks)

3 (d) Describe **one** method that may be used in the future to increase metal supplies.

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(2 marks)

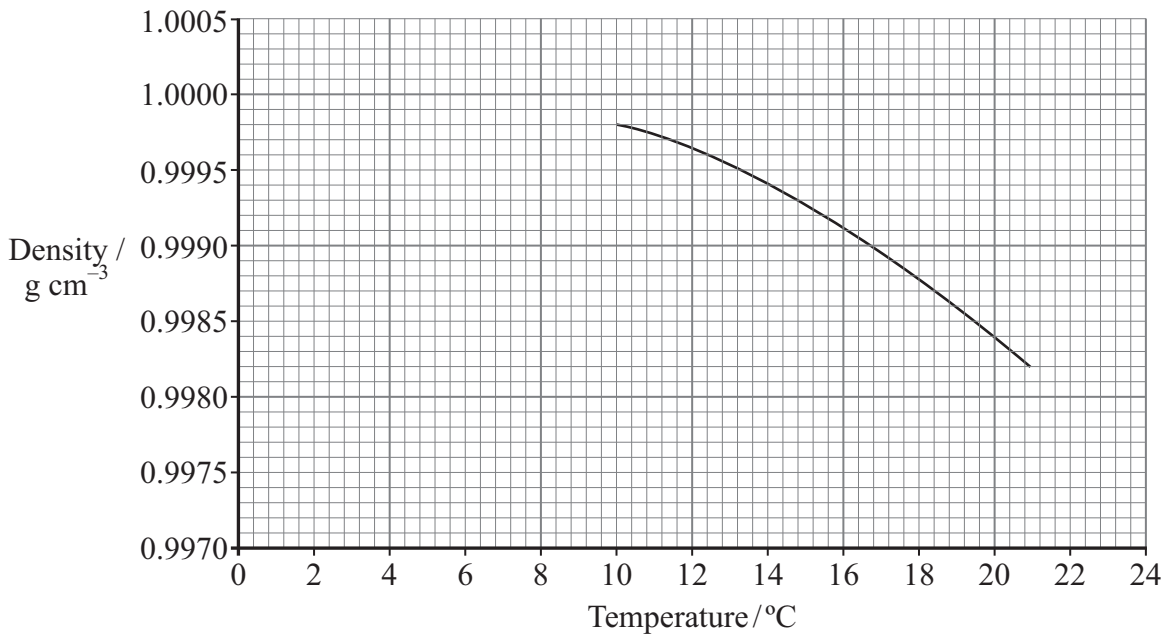
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4 The survival of living organisms relies upon the properties of water. The graph shows how temperature affects the density of water.



4 (a) Complete the graph to show how the density of water changes between 0 °C and 10 °C. (2 marks)

4 (b) Explain the significance of the density of water at 0 °C for aquatic life.

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(2 marks)



4 (c) The table shows the volumes and transfer rates of water in some stores in the hydrological cycle.

Reservoir	Volume / 10 ³ km ³	Transfer rate in or out of the store / 10 ³ km ³ yr ⁻¹
Oceans	140 000	425
Ice	43 500	30
Groundwater	15 300	20
Rivers and lakes	360	20
Atmosphere	15	490

Use the information in the table and the formula below to calculate the residence time of water in ice.

$$\text{Residence time} = \frac{\text{volume of water}}{\text{transfer rate}}$$

Residence time = yrs
(1 mark)

4 (d) Use processes involved in the water cycle to explain what is meant by the term ‘dynamic equilibrium’.

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 (1 mark)

4 (e) Describe a method used to measure the water content of a soil sample.

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 (4 marks)



5 (a) Describe the factors that influence the suitability of a site for construction of a reservoir.

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(4 marks)

5 (b) The table shows the purposes and principles of some of the processes used in the treatment of water for public supply.

Complete the table.

Name of process	Purpose	Principles
	Removal of organic chemicals eg pesticides	Chemicals are adsorbed onto the surface of the filter particles
Screens		Metal meshes filter the water
	Reduce turbidity	Water is allowed to stand still
Flocculation	Removal of fine particles such as clay	

(4 marks)



5 (c) Describe a method used to produce potable water from seawater.

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(2 marks)

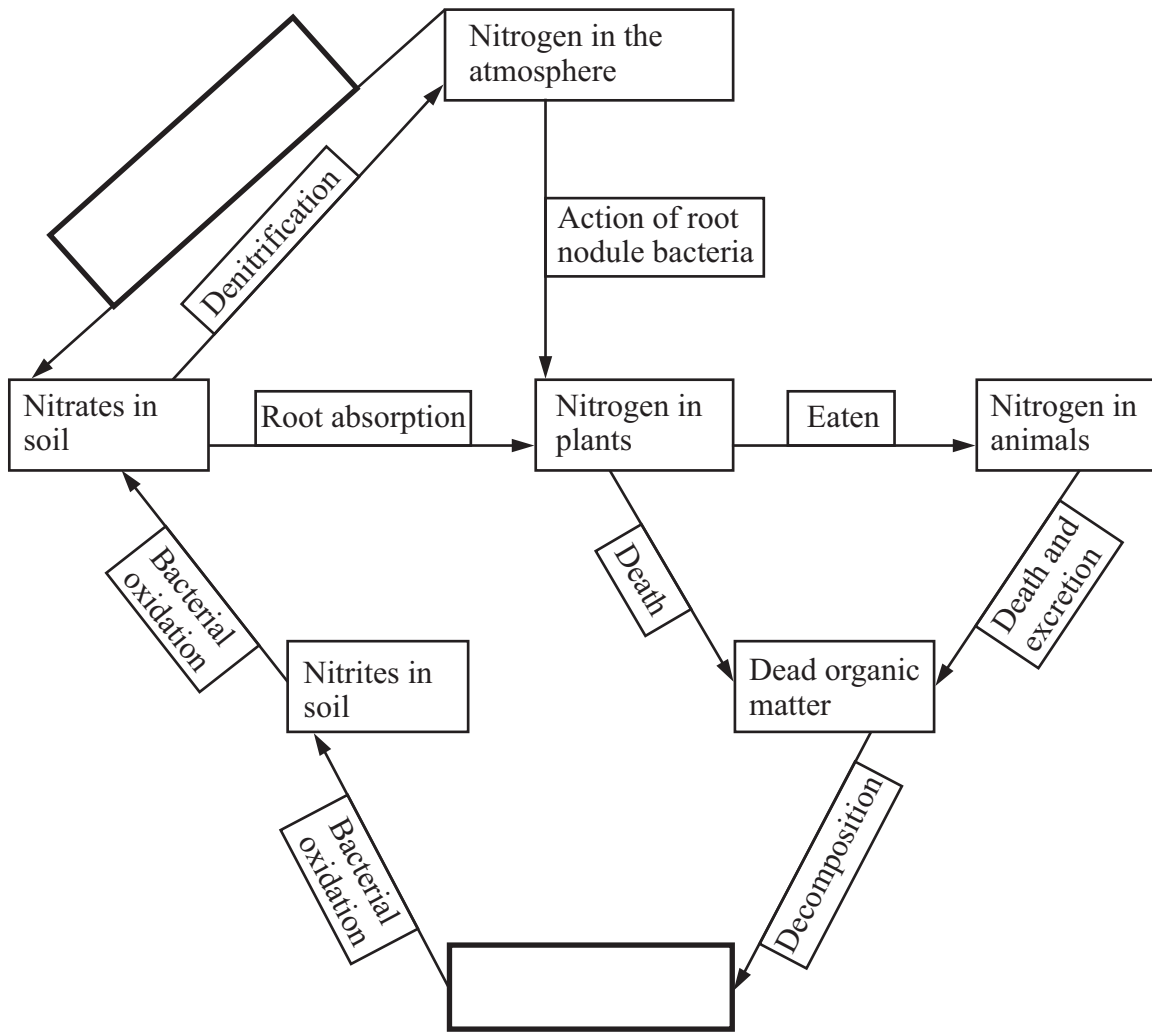
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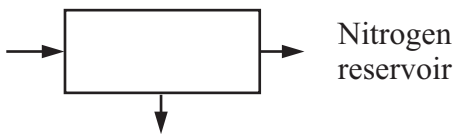
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6 The diagram shows the nitrogen cycle.



Key



6 (a) Complete the diagram by adding the names of the missing reservoir and process. (2 marks)



6 (b) Explain how the following human activities may affect the nitrate levels in soil.

6 (b) (i) Drainage of waterlogged fields

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(2 marks)

6 (b) (ii) Planting legume crops

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(2 marks)

6 (c) Describe how phosphates contribute to the environmental problem of eutrophication.

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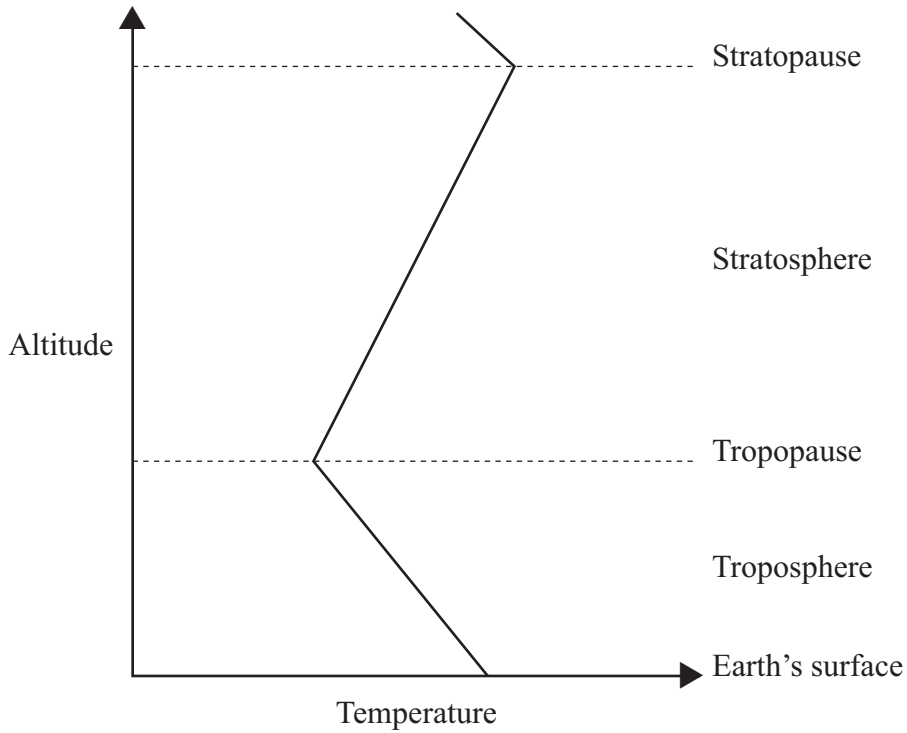
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7 The diagram shows how atmospheric temperature changes with altitude.



7 (a) Explain the temperature changes with increasing altitude in:

7 (a) (i) the troposphere

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(2 marks)

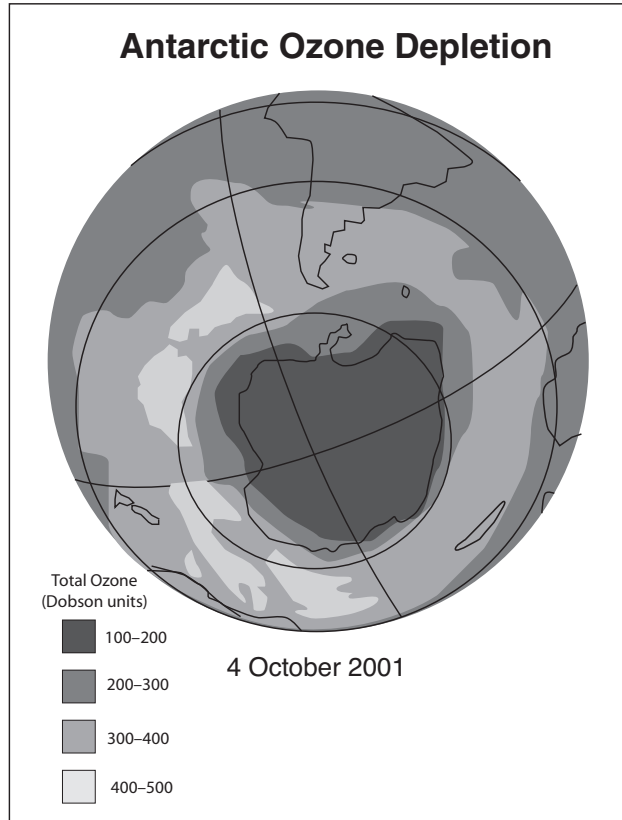
7 (a) (ii) the stratosphere.

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(2 marks)



7 (b) The map shows an area where stratospheric ozone concentrations are lower than normal.



Source: adapted from NOAA (www.noaa.gov)

7 (b) (i) Describe how human activities cause ozone depletion.

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(4 marks)

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7 (b) (ii) Explain why there is concern over ozone depletion.

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(2 marks)

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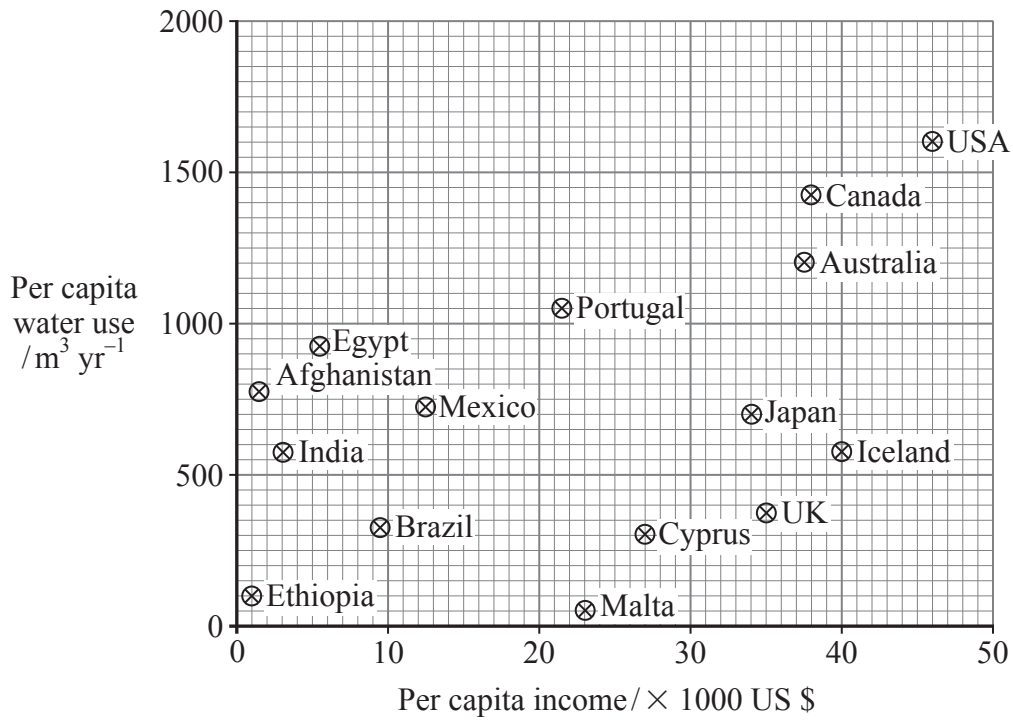
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8 The graph shows the per capita consumption of water in countries with different levels of economic development.



8 (a) Suggest why water consumption in a country may differ from the general trend shown in the graph.

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(2 marks)



8 (b) Suggest ways in which people in richer countries could reduce the amount of water they use without reducing their living standards.

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(4 marks)

8 (c) Explain how water shortages may make economic and social development in poorer countries more difficult.

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(4 marks)

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9 A student carried out a study to see whether the ploughing of a field was the cause of the high turbidity of water entering a reservoir.

9 (a) Describe a method used to measure the proportions of sand, silt and clay in a soil sample from the field.

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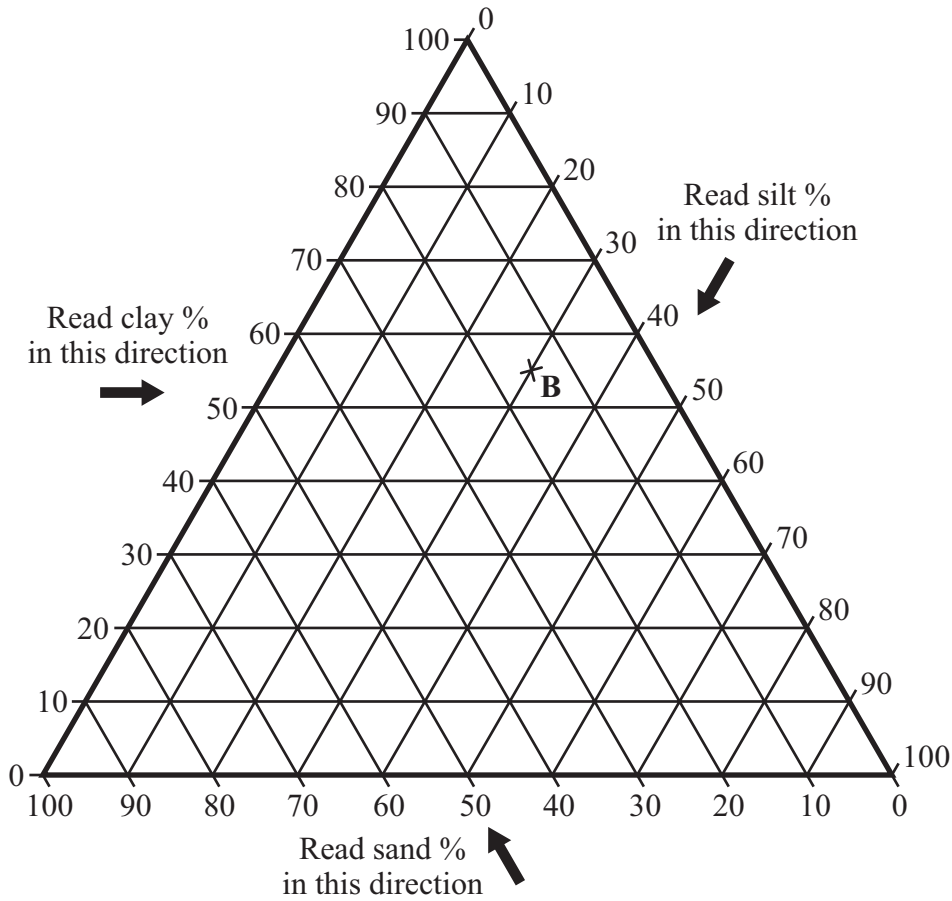
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(3 marks)

9 (b) Some of the results of the study are shown in the table and on the soil triangle.

	Soil sample A	Soil sample B
% Sand	50	
% Silt	30	
% Clay	20	





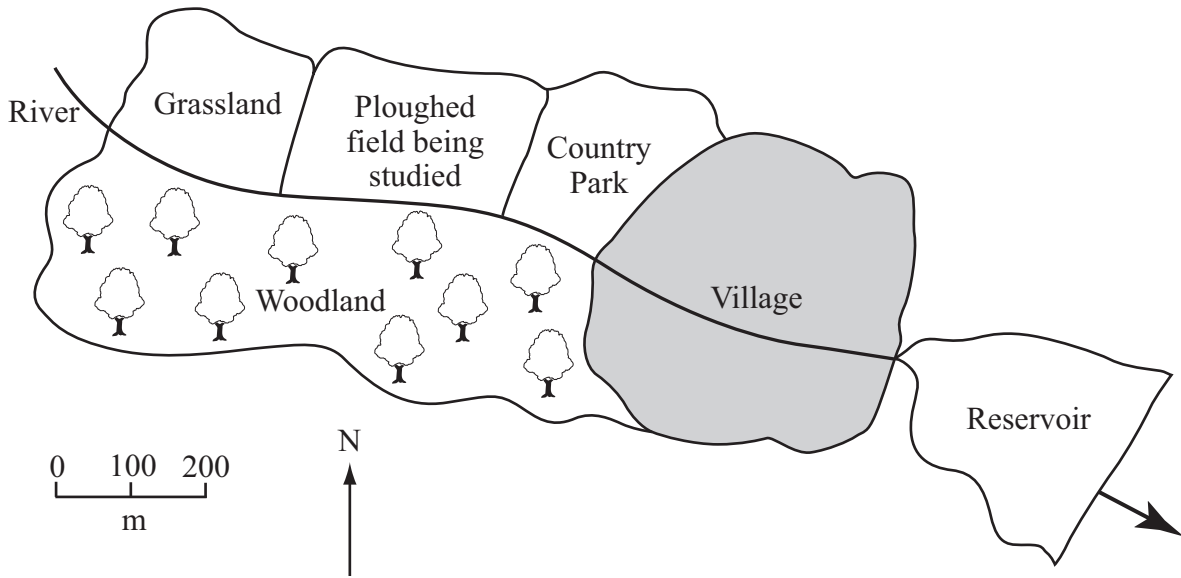
- 9 (b) (i) Complete the table by using the values for soil **B** shown on the soil triangle. (1 mark)
- 9 (b) (ii) Use the data in the table to add an **X** to the soil triangle to show the composition of soil **A**. (1 mark)

Question 9 continues on the next page

Turn over ►



9 (c) The map shows the study area.



The student decided to collect water samples to test the hypothesis that the ploughing of the field was the cause of the high turbidity of the water entering the reservoir. Discuss the factors that the student could consider when planning how to collect the water samples.

Quality of Written Communication will be assessed in this answer.

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(10 marks)

END OF QUESTIONS

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