

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Education
Advanced Subsidiary Examination
January 2013

Environmental Studies

ENVS2

Unit 2 The Physical Environment

Friday 18 January 2013 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	
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5	
6	
7	
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9	
TOTAL	



J A N 1 3 E N V S 2 0 1

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

- 1** The table shows the names and features of some treatment processes that produce potable water.

Complete the table.

Treatment process	Feature of process
	Removal of organic chemicals as they adsorb onto the particle surfaces
	Removal of suspended solids when water is static
Ozonation	
	Reduction of tooth decay in people who drink the water
Flocculation	Aggregation of clay and fine particles by attraction of static electrical charges
Filtration	Removal of suspended solids as water flows through material with small pore spaces
	Production of potable water by forcing water through a partially permeable membrane under high pressure

(5 marks)

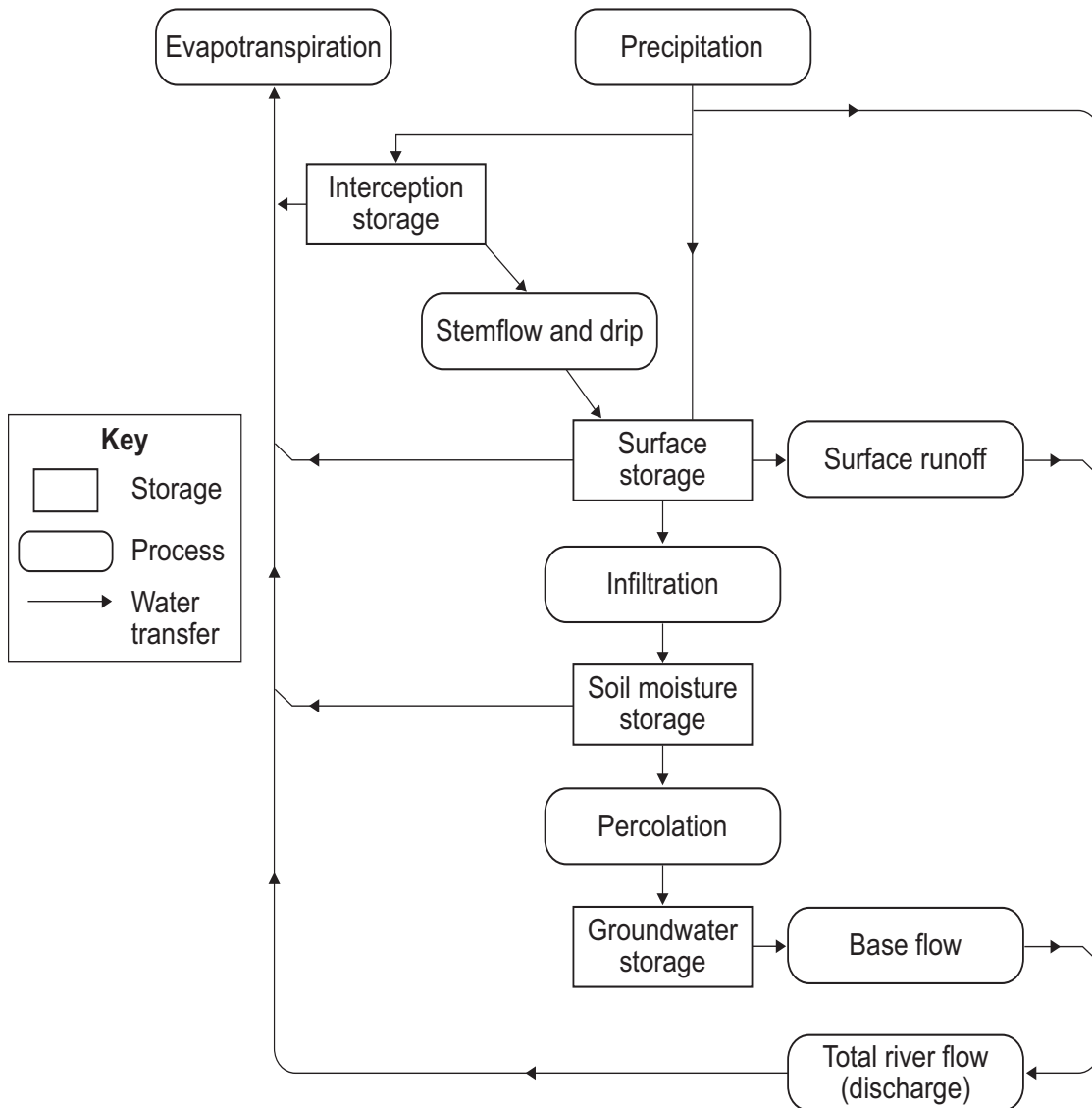
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- 2** The diagram shows some of the reservoirs and processes involved in the hydrological cycle.



- 2 (a)** Explain why a reduction in the vegetation cover may alter the amount of water in:

- 2 (a) (i)** groundwater storage

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(2 marks)



2 (a) (ii) the atmosphere.

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(2 marks)

2 (b) Give examples to explain the difference between the abstractive and non-abstractive uses of water.

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(2 marks)

2 (c) Outline how the quality of water may influence its use.

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(4 marks)

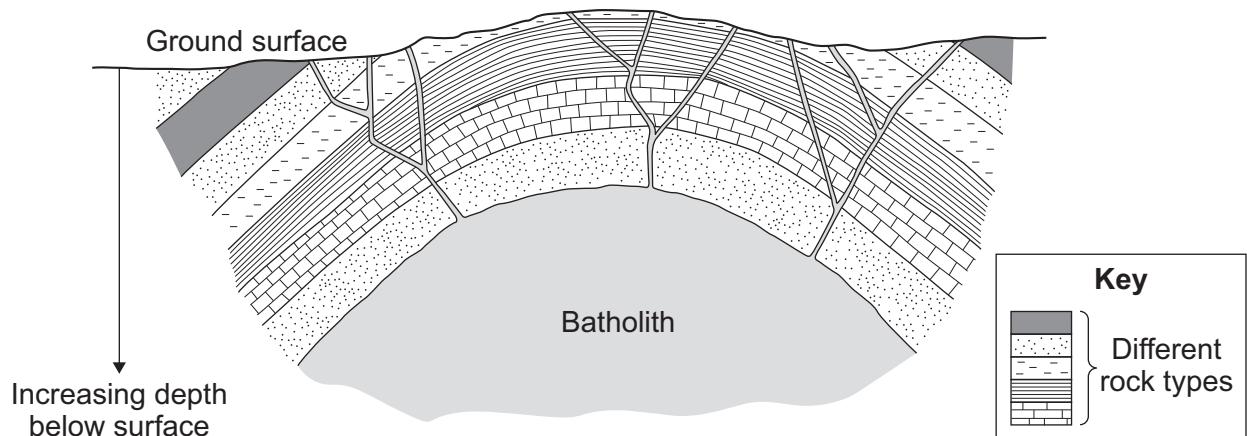
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- 3** The diagram shows a granite batholith and its associated geological structures.



- 3 (a)** Describe the processes that produce hydrothermal metal mineral deposits.

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(4 marks)



- 3 (b)** Before a mine can be developed, thorough surveys of the mineral deposits and associated geological structures must be undertaken.

Outline how an assessment of the viability of a mine requires information about:

- 3 (b) (i)** the mineral deposits

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(3 marks)

- 3 (b) (ii)** the associated geological structures.

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(3 marks)

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- 4** The table shows the market price of copper on selected dates.
(Prices adjusted to April 2007 value).

Date	Market price / US \$ kg⁻¹ (adjusted to April 2007 value)
June 1999	1.32
May 2006	8.27
February 2007	5.29
April 2007	7.71

- 4 (a)** Explain why:

- 4 (a) (i)** the cut-off ore grade was highest in June 1999

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 (1 mark)

- 4 (a) (ii)** the market price in May 2006 caused the estimates of reserves to increase.

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 (1 mark)

- 4 (b)** Outline the advantages and disadvantages of using satellite surveying techniques rather than ground-based surveys.

Advantages.....

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Disadvantages

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(4 marks)



4 (c) Describe **one** method of exploiting minerals from low grade ore deposits.

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(2 marks)

4 (d) Use **one** example to describe how material substitution may be used to conserve the reserves of metal minerals.

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(2 marks)

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5 The table shows some features of four soils.

Soil feature	Soil			
	A	B	C	D
Water content of original sample / % mass	40	50	30	22
Air content of original sample / % volume	5	0	8	12
Organic matter content of dry soil / % mass	35	40	25	20
pH	5.3	4.5	6.0	6.5
Proportion of sand in dry soil / % volume of mineral particles	25	30	30	55
Proportion of clay in dry soil / % volume of mineral particles	55	60	50	30
Main type of ped	Platy	Platy	Platy	Crumb

5 (a) Which soil, **A**, **B**, **C**, or **D**, is most likely to have:

5 (a) (i) the lowest rate of decomposition of dead organic matter

Soil
(1 mark)

5 (a) (ii) the highest thermal capacity?

Soil
(1 mark)



5 (b) The data in the table are mean values of samples from each field.

Suggest how the soil samples should have been collected to ensure that the results were reliable.

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(5 marks)

5 (c) Describe **one** laboratory method that may be used to analyse the texture of a soil sample.

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(3 marks)

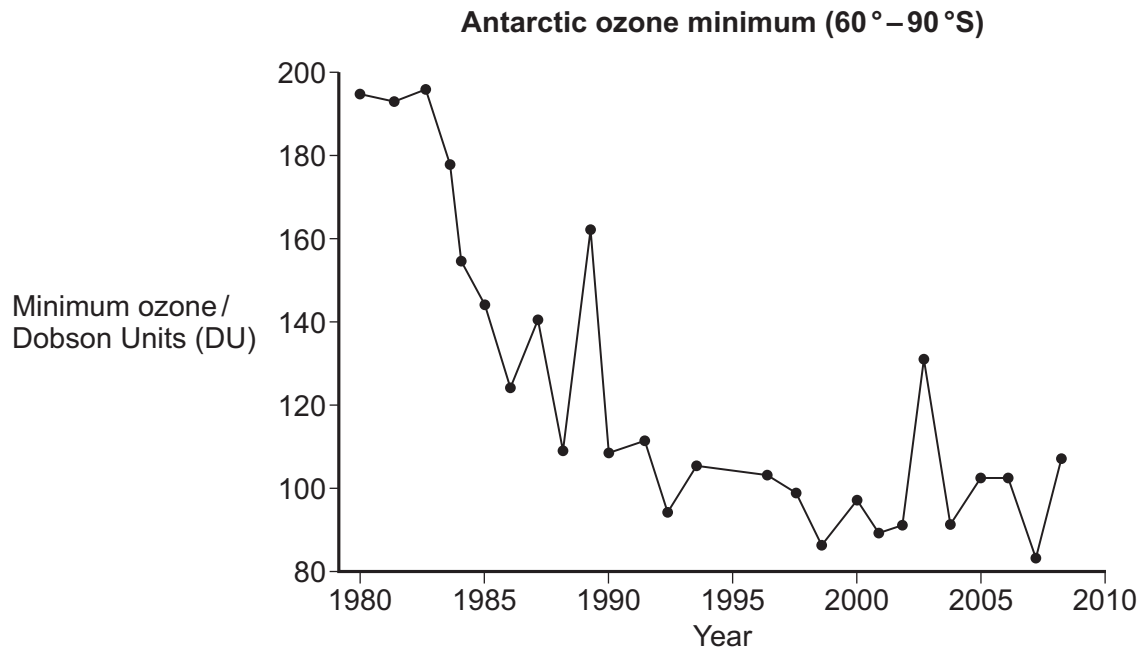
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- 6** The graph shows the lowest ozone concentrations over Antarctica using satellite surveys between 1980 and 2008.



Source: NASA: http://macuv.gsfc.nasa.gov/images/Ozhole_Minimum_grah.JPG

- 6 (a)** Explain why there is concern about ozone depletion.

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(2 marks)

- 6 (b)** Describe how the release of chlorofluorocarbons (CFCs) has caused ozone depletion.

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(3 marks)



- 6 (c)** Explain why, even if the Montreal Protocol agreement is successful, it will be many years before ozone depletion is no longer a problem.

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(1 mark)

- 6 (d)** Describe how CFC emissions have been reduced by:

- 6 (d) (i)** the better disposal of waste CFCs

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(2 marks)

- 6 (d) (ii)** the replacement of CFCs with alternative materials.

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(2 marks)

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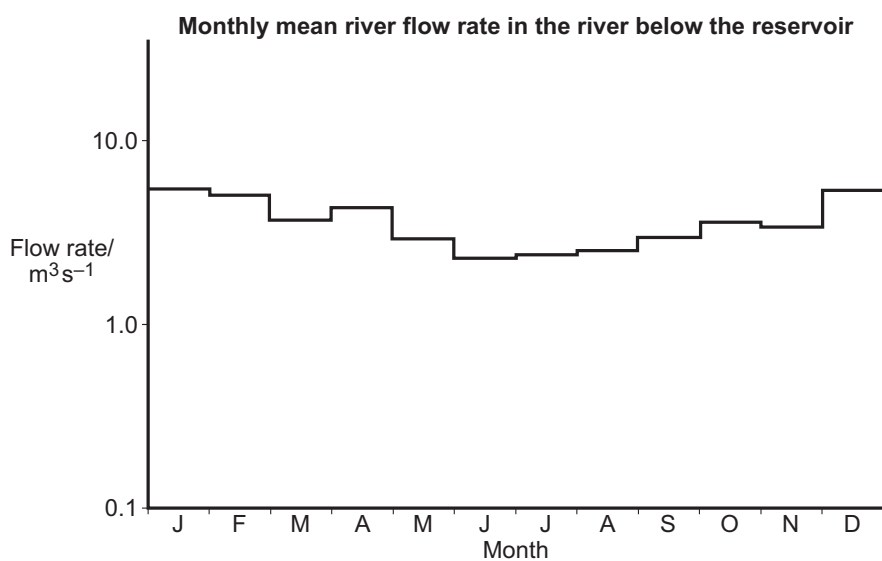
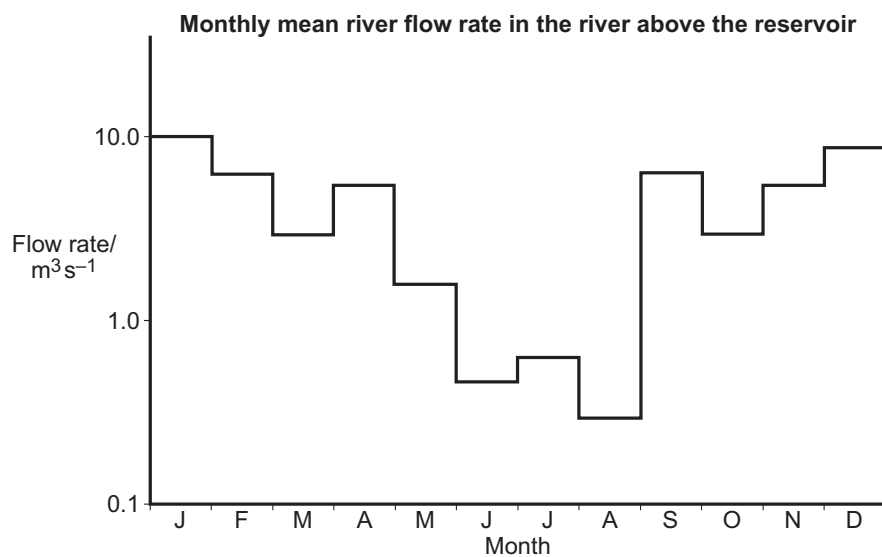


- 7 The photograph shows a reservoir that is used to regulate the water level in the river downstream.



Source: Science Photo Library

The graphs show the mean flow rates in the river above and below the reservoir.



7 (a) With the aid of the graphs, explain how the reservoir is used to:

7 (a) (i) reduce winter flooding downstream of the reservoir

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(2 marks)

7 (a) (ii) raise summer flow downstream of the reservoir during droughts.

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(2 marks)

7 (b) Suggest how the presence of the reservoir may affect the following features of the river downstream.

7 (b) (i) Water temperature

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(2 marks)

7 (b) (ii) Dissolved oxygen level

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(2 marks)

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- 7 (c)** Suggest how land use changes in urban areas may reduce the risk of river flooding after heavy rain.

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(2 marks)

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8 The table shows some features of the atmosphere.

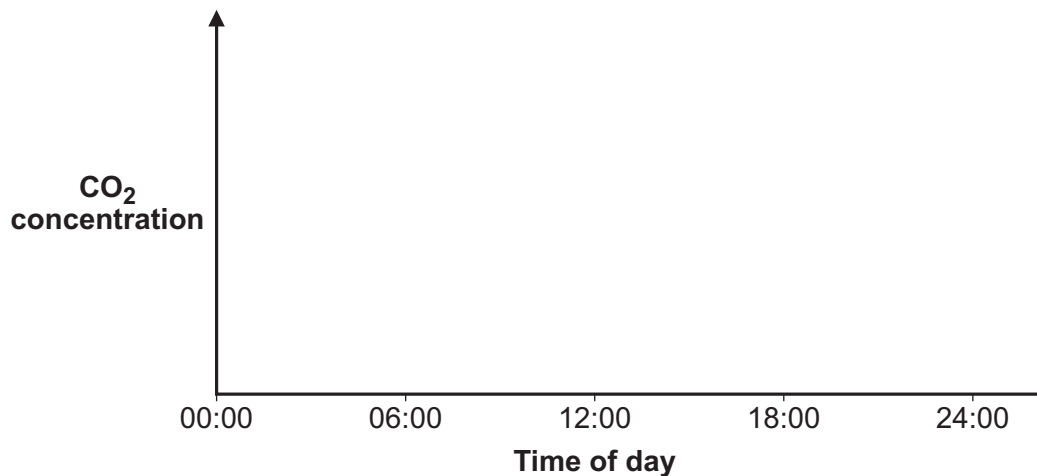
8 (a) Complete the table.

Gas	Mean proportion of gas in dried air/%	One natural process that produces the gas	One human activity that causes release of the gas
	78		Use as a low temperature refrigerant
Oxygen	21	Photosynthesis	Hospital breathing gases
	0.038	Aerobic respiration	Combustion of fossil fuels
Methane	0.00017		Coal mine ventilation
	0 (removed when air is dried)	Evapotranspiration	Power station cooling towers

(5 marks)

8 (b) Sketch graphs to show how the atmospheric concentration of carbon dioxide over a grassland in the UK changes during:

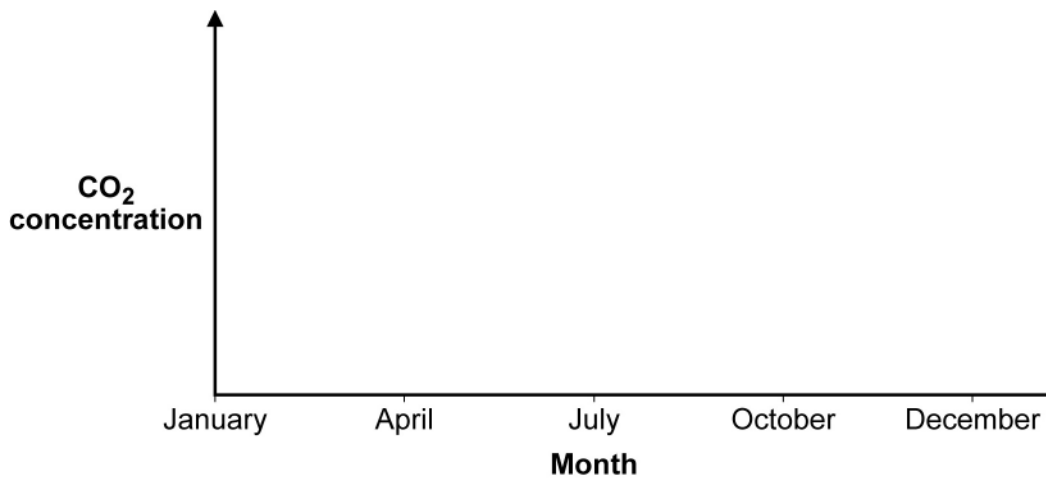
8 (b) (i) a 24 hour period



(2 marks)



8 (b) (ii) a 12 month period.



(2 marks)

8 (c) Explain how the timing of data collection should be planned in any study where readings vary with time.

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(1 mark)

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- 9 (a)** Explain why it is difficult to predict the effect of increasing levels of greenhouse gases on the global climate.

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(3 marks)

- 9 (b)** Name **two** greenhouse gases that do not contain carbon.

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(2 marks)

- 9 (c)** Describe how global climate change is likely to affect the survival of wildlife.

You should answer this question in continuous prose.

Quality of Written Communication will be assessed in this answer.

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