Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

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

General Certificate of Education
Advanced Subsidiary Examination
June 2010

Environmental Studies ENVS2

Unit 2 The Physical Environment

Wednesday 26 May 2010 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.

ENVS2

There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED

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

1 The table shows some features of the atmosphere.

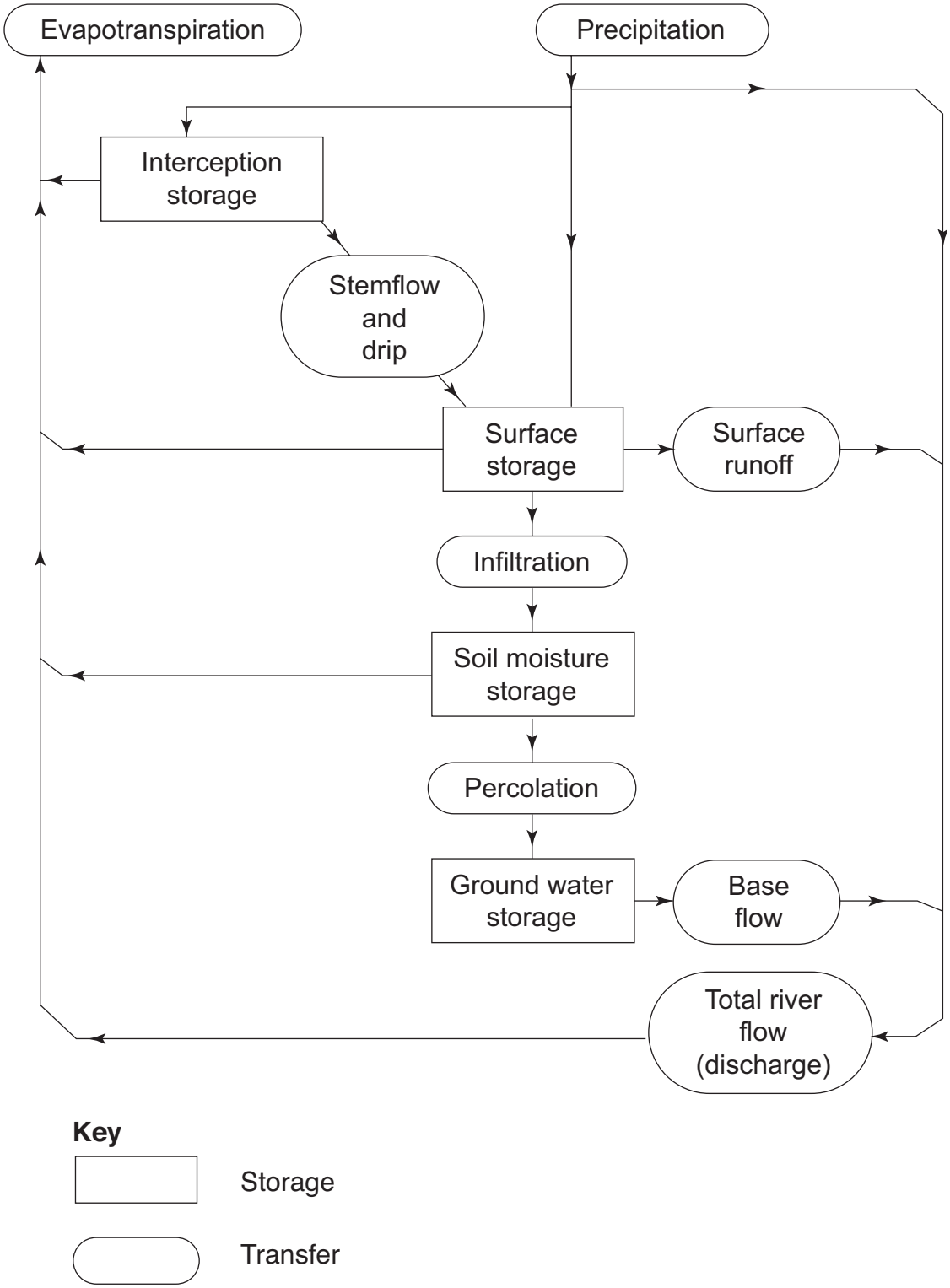
Complete the table.

Gas	Normal % of gas in dry air	One natural process that releases gas	One human activity that causes release of the gas	Was gas present in early atmosphere before life evolved?
Nitrogen	78	Denitrification of nitrates	Use as a low temperature refrigerant	Yes
Oxygen	21	Photosynthesis	Hospital breathing gases	
Carbon dioxide	0.038	Respiration		Yes
Methane	0.00017		Coalmine ventilation	Yes
Oxides of nitrogen	0.00005	Forest fires		No
Chlorofluorocarbons	Trace	Not produced naturally	Old aerosols and disposal of refrigerators	
Ozone	0.000007	Photolytic reactions involving oxygen	Water sterilisation	No

(5 marks)

5

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



2 (a) Suggest **two** ways in which changes in the vegetation cover may alter the movement of water in the hydrological cycle.

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(4 marks)

2 (b) Name the **two** factors that must be known to calculate the residence time of water in any reservoir in the hydrological cycle.

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(2 marks)

2 (c) Suggest how water abstracted from different sources may require different treatment processes before it could be used in public supplies.

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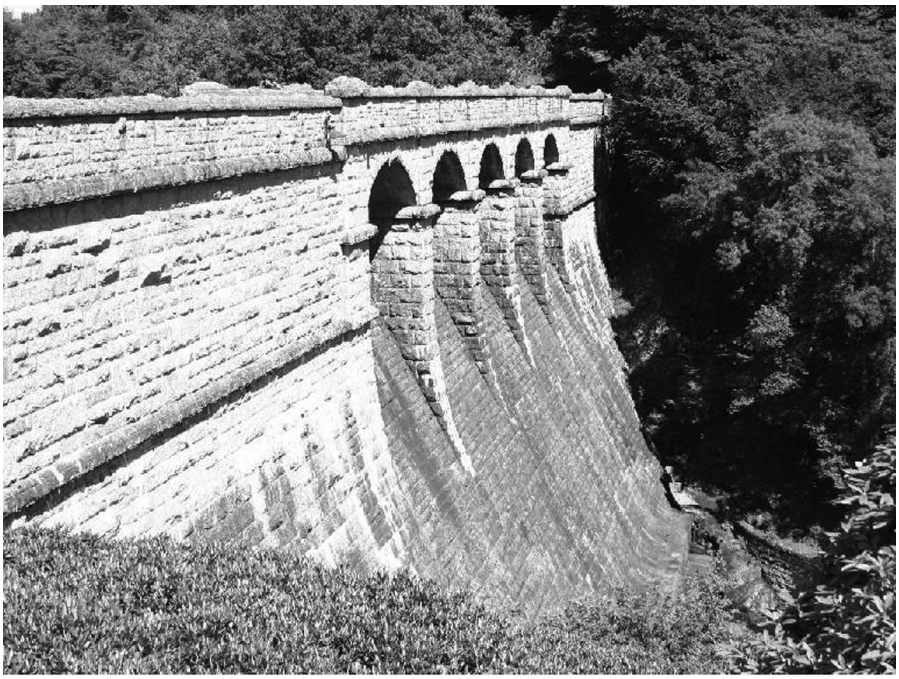
(4 marks)

10

3 The photograph shows the dam of a water abstraction reservoir.



Photograph: Richard Genn

3 (a) Outline how the following factors may affect the suitability of a site for reservoir construction.

3 (a) (i) Topography

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(2 marks)

3 (a) (ii) Geology

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(2 marks)

3 (b) Suggest how a reservoir may be used to prevent floods and low flow in the river downstream of the dam.

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(2 marks)

3 (c) Describe the effect that a reservoir may have on the wildlife that lives in the river.

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(4 marks)

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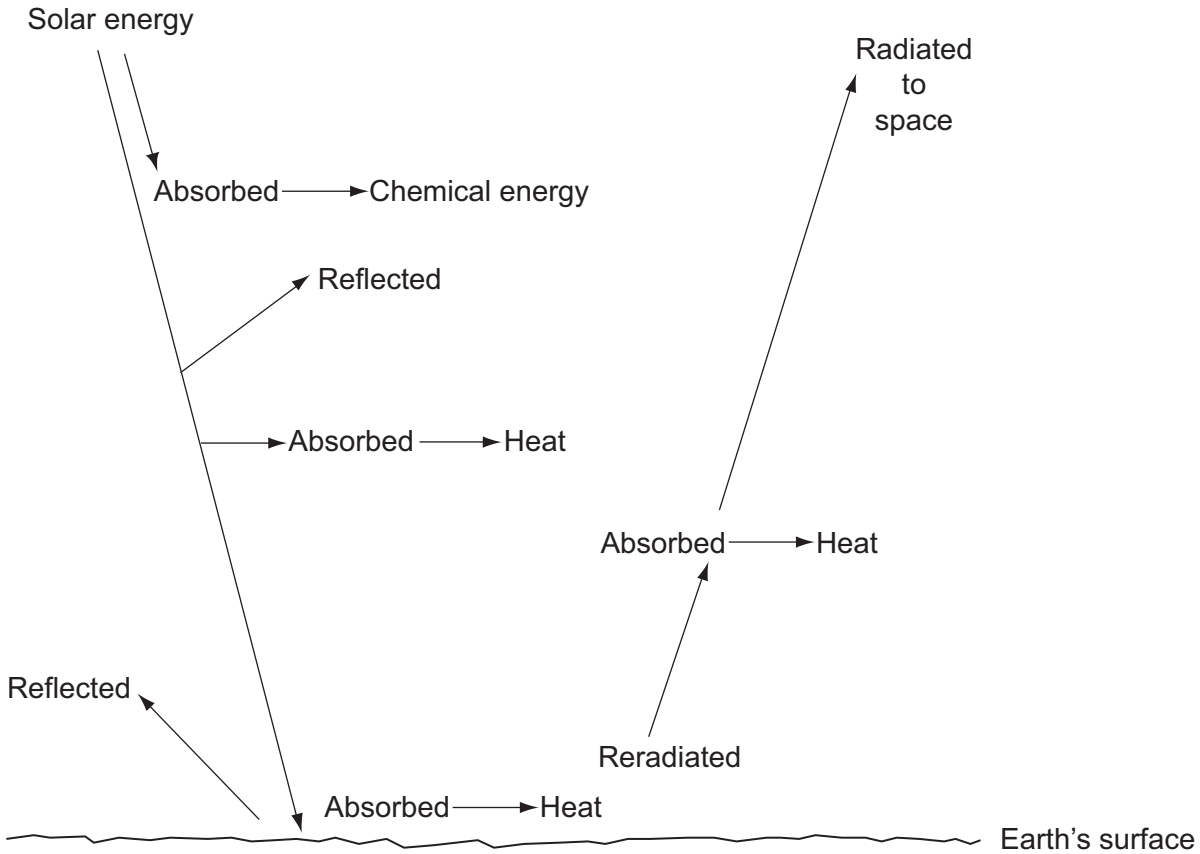
Turn over for the next question

4 The diagram shows how electromagnetic radiation transfers energy in the atmosphere.



4 (a) Explain how a change in the composition of the atmosphere may cause:

4 (a) (i) the troposphere to become warmer

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(2 marks)

4 (a) (ii) more UV light to reach the ground

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(2 marks)

4 (a) (iii) less visible light to reach the ground.

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(2 marks)

4 (b) Use the processes involving energy in the atmosphere to explain the meaning of 'dynamic equilibrium'.

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(2 marks)

4 (c) Explain how a negative feedback mechanism may help to minimise the warming of the atmosphere.

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(2 marks)

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Turn over for the next question

5 The photograph shows a large excavator from an opencast mine which is used to remove the overburden found above the mineral to be extracted.

Photograph: Gordon Genn

5 (a) Outline **two** features of the overburden above the mineral that can affect the viability of the mine.

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(4 marks)

5 (b) Outline **two** methods of reducing environmental problems caused by mine machinery.

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(4 marks)

5 (c) One method used in spoil heap reclamation is the addition of soil followed by tree planting. The soil must have the right texture to reduce the risk of soil erosion.

Outline a method used to estimate the proportions of sand, silt and clay in a soil sample.

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(2 marks)

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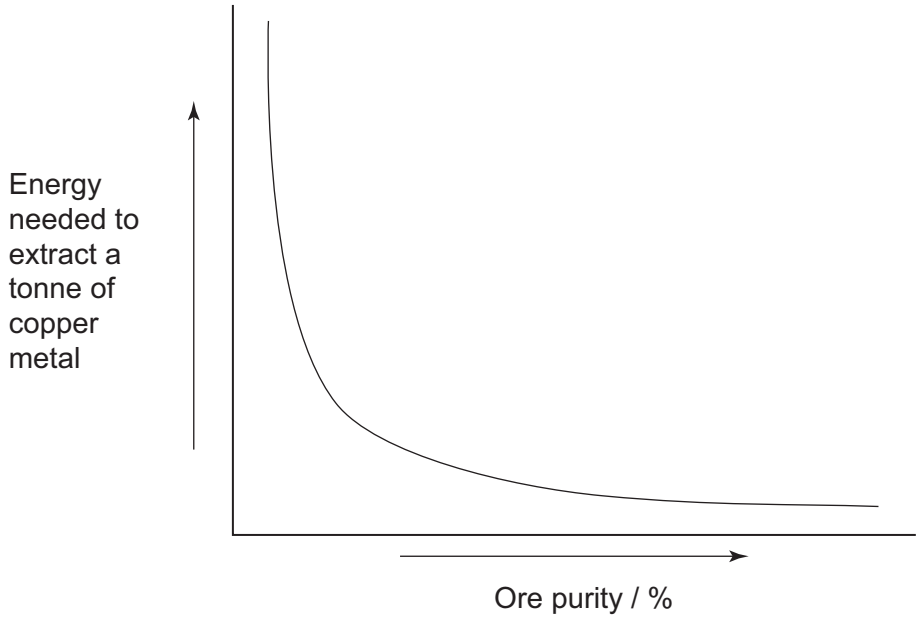
Turn over for the next question

6 The graph shows the amount of energy needed to extract copper from different grades of ore.



6 (a) Suggest **two** ways in which exploiting low grade ores may cause increased environmental damage.

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(4 marks)

6 (b) Use an example to outline how material substitution can be used to conserve finite resources.

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(2 marks)

6 (c) Describe how better exploratory techniques can be used to increase the proven reserves of minerals.

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(4 marks)

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Turn over for the next question

7 The table shows some features of four soils.

Soil feature	Soil			
	A	**B**	**C**	**D**
water in original sample / %	40	55	28	35
sand in dry soil / %	40	25	10	35
clay in dry soil / %	15	15	25	32
organic matter content in dry soil / %	20	15	27	20
main type of peds	platy	platy	platy	crumb
pH	6.8	6.4	4.5	7.1

7 (a) Use information from the table to suggest explanations for the following statements.

7 (a) (i) Soil **A** has the highest permeability.

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(1 mark)

7 (a) (ii) Soil **B** has the highest thermal capacity.

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(1 mark)

7 (a) (iii) Soil **C** contains the fewest earthworms.

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(1 mark)

7 (a) (iv) Root penetration is easiest in Soil **D**.

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(1 mark)

7 (b) A student planned a practical activity to determine the organic matter content of the soil in a field.

7 (b) (i) Describe a sample collection procedure which would ensure that the samples were representative of the whole field.

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(3 marks)

7 (b) (ii) Describe how the organic matter content of a dry soil sample could be measured.

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(3 marks)

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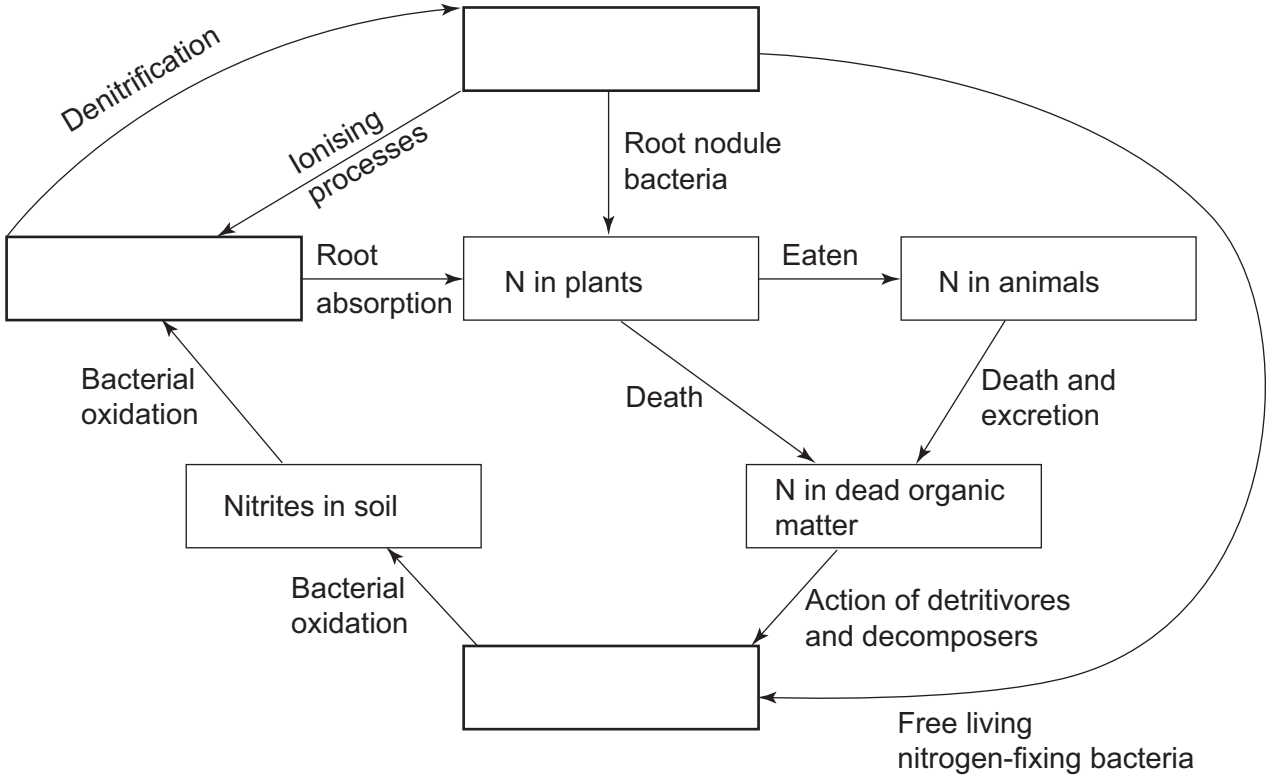
Turn over for the next question

8 The diagram shows some of the processes and reservoirs in the nitrogen cycle.



8 (a) Complete the diagram by adding names of the missing reservoirs. *(3 marks)*

8 (b) Explain how the nitrogen cycle in an area may be changed when a forest is cleared and the land is farmed.

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(4 marks)

8 (c) Soil organisms play important roles in the nitrogen cycle.

Describe a method used to extract detritivores from soil.

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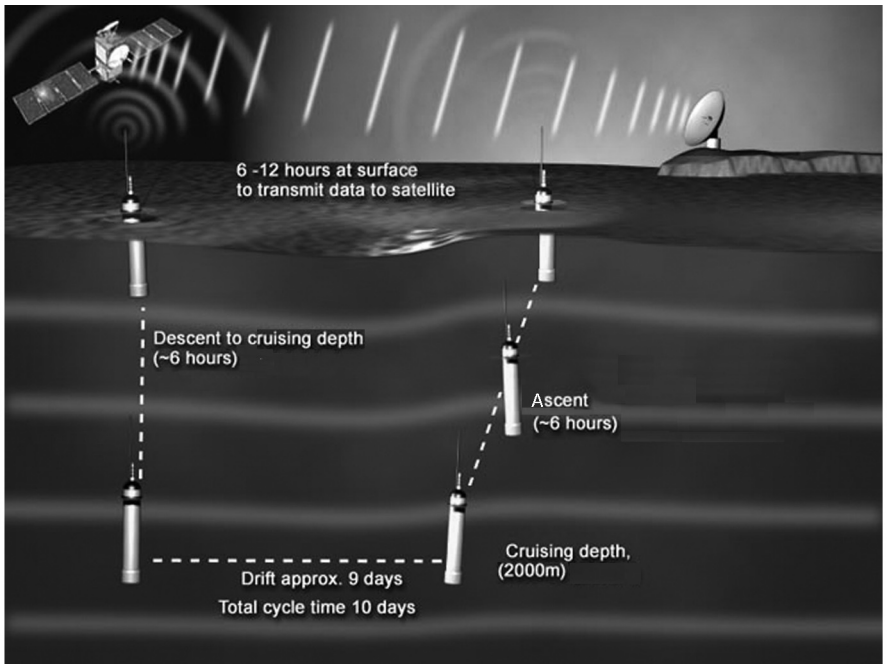
(3 marks)

10

Turn over for the next question

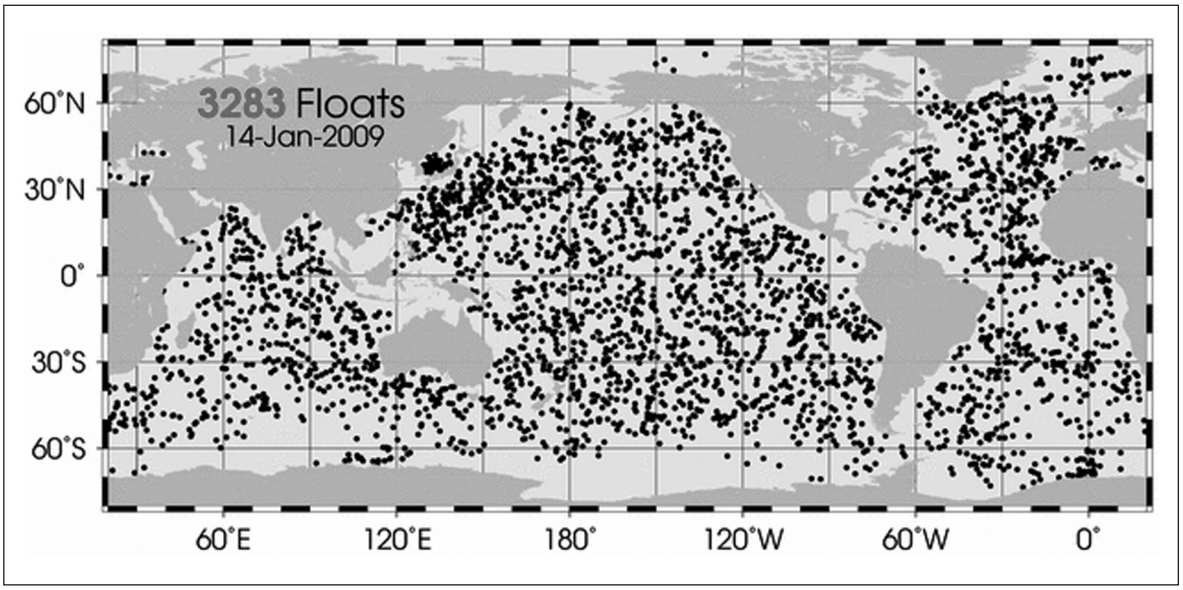
9 The diagram shows the operation of Argo floats that have been used to monitor deep ocean currents since 2000. Each float spends many weeks submerged at a depth of 2000 m, returning to the surface every 10 days to transmit its position and the data collected.



Not to scale

Source: Southampton National Oceanography Centre

The map shows the position of the Argo floats on one day in 2009.



Source: Argo, http://www.argo.net

9 (a) Suggest how the use of Argo floats may help in understanding changes in the characteristics of ocean currents.

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(2 marks)

9 (b) Outline the difficulties in predicting global climate change.

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(3 marks)

9 (c) Describe the likely consequences of global climate change on the survival and distribution of wildlife.

Quality of Written Communication will be assessed in this answer.

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(10 marks)

END OF QUESTIONS

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