Surname		Other Names	
Centre Number			Candidate Number	
Candidate Signature			

For Examiner's Use

General Certificate of Education
June 2008
Advanced Subsidiary Examination

ASSESSMENT and QUALIFICATIONS ALLIANCE

ENVIRONMENTAL SCIENCE **ESC1**
Unit 1 Energy, Atmosphere and Hydrosphere

Tuesday 3 June 2008 1.30 pm to 2.30 pm

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			

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 Complete the table using letters selected from the list below. Two have been completed as examples.

A Mesosphere
B Infra red
C Carbon monoxide
D Troposphere
E Ultraviolet
F Carbon dioxide
G Ozone
H Nitrogen
I Thermosphere
J Stratosphere
K Methane

Description	Letter
Layer of the atmosphere nearest the ground	
Gas released by anaerobic respiration	
Type of electromagnetic radiation absorbed by ozone	**E**
Most abundant greenhouse gas	
Layer of the atmosphere immediately above the tropopause	
Type of electromagnetic radiation emitted by the warm Earth	**B**
Gas that was not present in the early atmosphere on Earth	

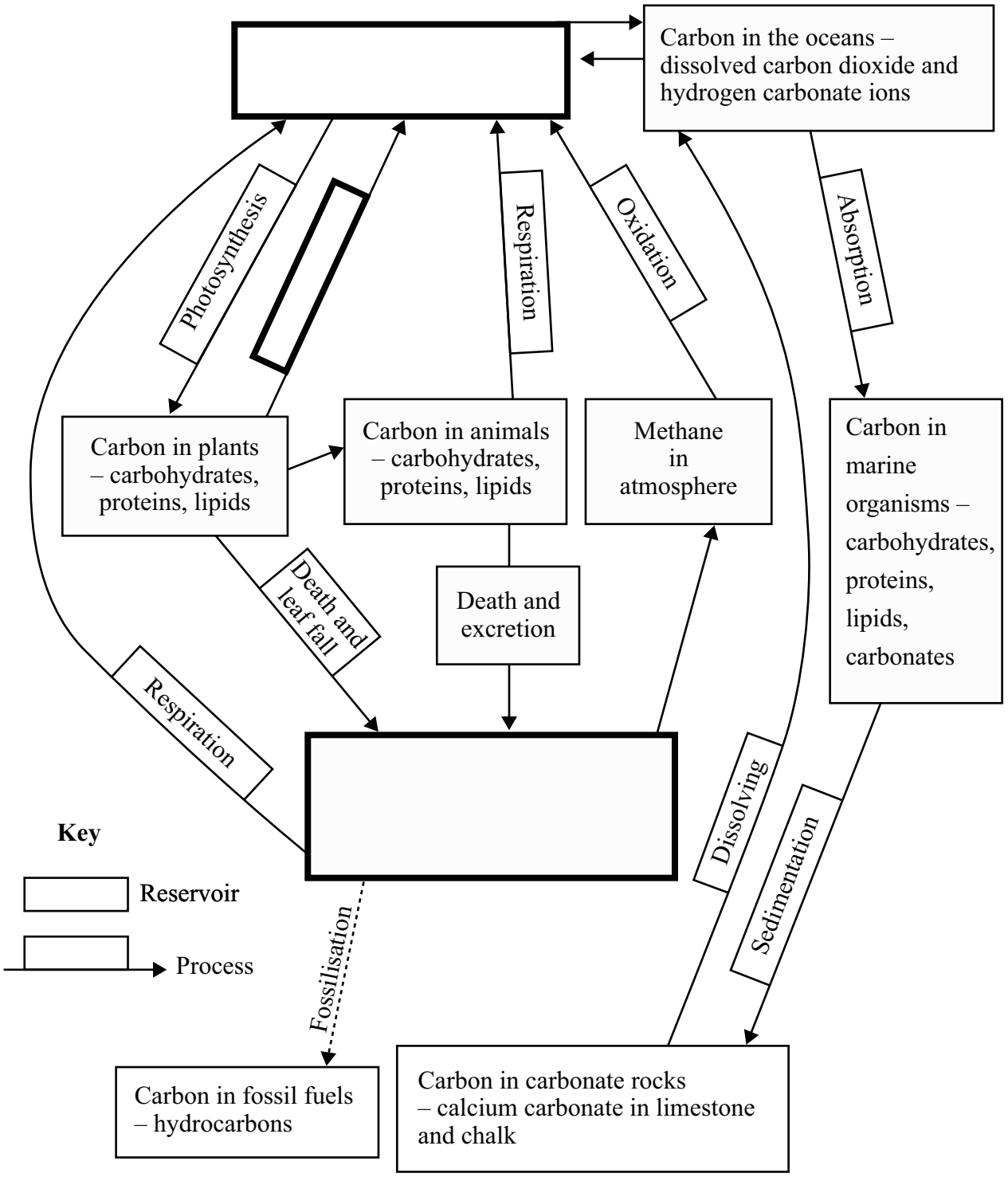
(5 marks)

5

Turn over for the next question

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

2 (a) Complete the diagram by adding the names of the missing processes or carbon reservoirs to the boxes. *(3 marks)*



2 (b) Use the carbon cycle to explain the meaning of dynamic equilibrium.

.....

.....

.....

.....

(2 marks)

2 (c) Explain how human activities may affect the amount of carbon which is found in dead organic matter in the soil.

.....

.....

.....

.....

(2 marks)

2 (d) Explain how the release of carbon dioxide by human activities may cause other changes to the carbon cycle.

.....

.....

.....

.....

.....

.....

(3 marks)

10

Turn over for the next question

3 Aerodynamic car design is increasingly used to reduce fuel consumption.

Photo: Richard Genn

3 (a) Explain how the aerodynamic shape of a car can affect its fuel consumption.

.....

.....

.....

.....

(2 marks)

3 (b) Outline **one** other way in which the design of a car may affect its fuel consumption.

.....

.....

.....

.....

(2 marks)

3 (c) The table shows statistics for bus usage for two years in the USA.

	1960	**2002**
Total number of buses	270 000	760 000
Total distance travelled / millions of km	6 880	10 800
Average distance travelled per bus / km	40 555	23 175
Total fuel consumed / millions of litres	3 320	3 970
Average fuel consumed per bus / litres	12 000	5 200

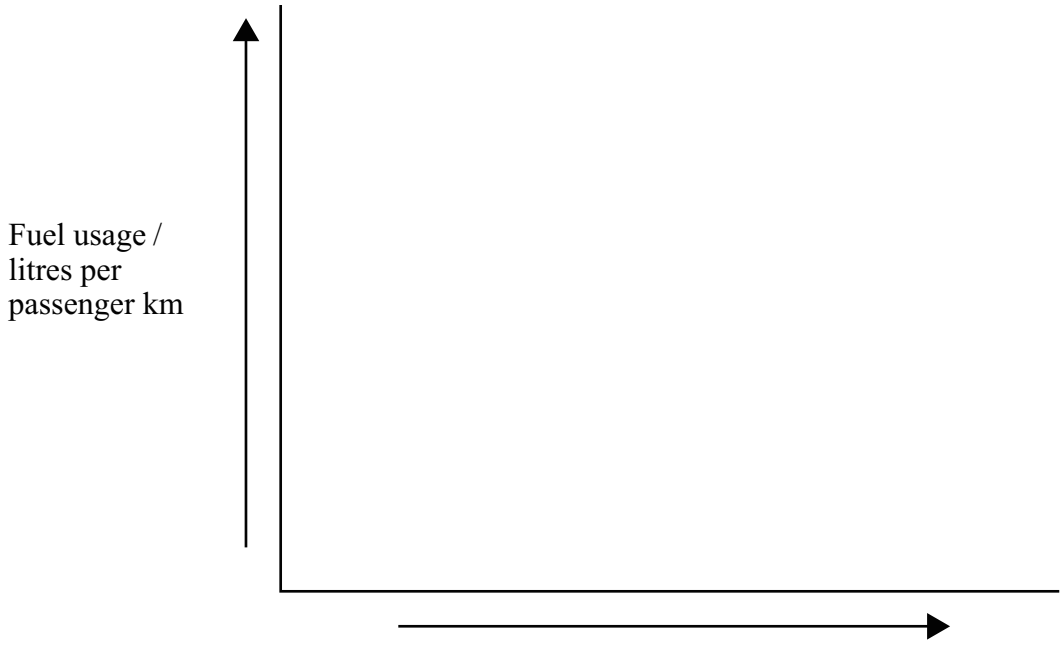
Use the information in the table to show whether the fuel efficiency of bus use has increased or decreased.
Show your working.

(2 marks)

Question 3 continues on the next page

3 (d) Vehicle use efficiency can be measured as fuel used per passenger kilometre and is affected by the number of passengers being carried.

Draw a line on the graph to show this relationship. *(1 mark)*



3 (e) Increasing the thickness of insulation used in a house reduces the rate at which heat energy is lost.

Explain how increasing the thickness of insulation affects the time needed for the money saved to equal the money spent.

.....

.....

.....

.....

.....

.....

(3 marks)

10

4 Comparisons of different energy resources often include inaccurate or misleading statements.

Explain why the following statements are inaccurate or misleading.

4 (a) Using solar power does no environmental damage.

.....

.....

.....

.....

(2 marks)

4 (b) Burning biofuels contributes to global climate change.

.....

.....

.....

.....

(2 marks)

4 (c) Tidal power is unpredictable.

.....

.....

.....

.....

(2 marks)

Question 4 continues on the next page

4 (d) Biofuels could be used to power all our vehicles.

.....

.....

.....

.....

(2 marks)

4 (e) Renewable energy resources cannot be depleted.

.....

.....

.....

.....

(2 marks)

10

5 (a) Name **one** greenhouse gas that does not contain carbon.

.....

(1 mark)

5 (b) Outline how human activities have caused increased atmospheric levels of:

5 (b) (i) methane

.....

.....

.....

.....

(2 marks)

5 (b) (ii) chlorofluorocarbons.

.....

.....

.....

.....

(2 marks)

5 (c) Outline **two** ways that the temperature rise caused by global climate change may result in sea level rise.

1 .....

.....

2 .....

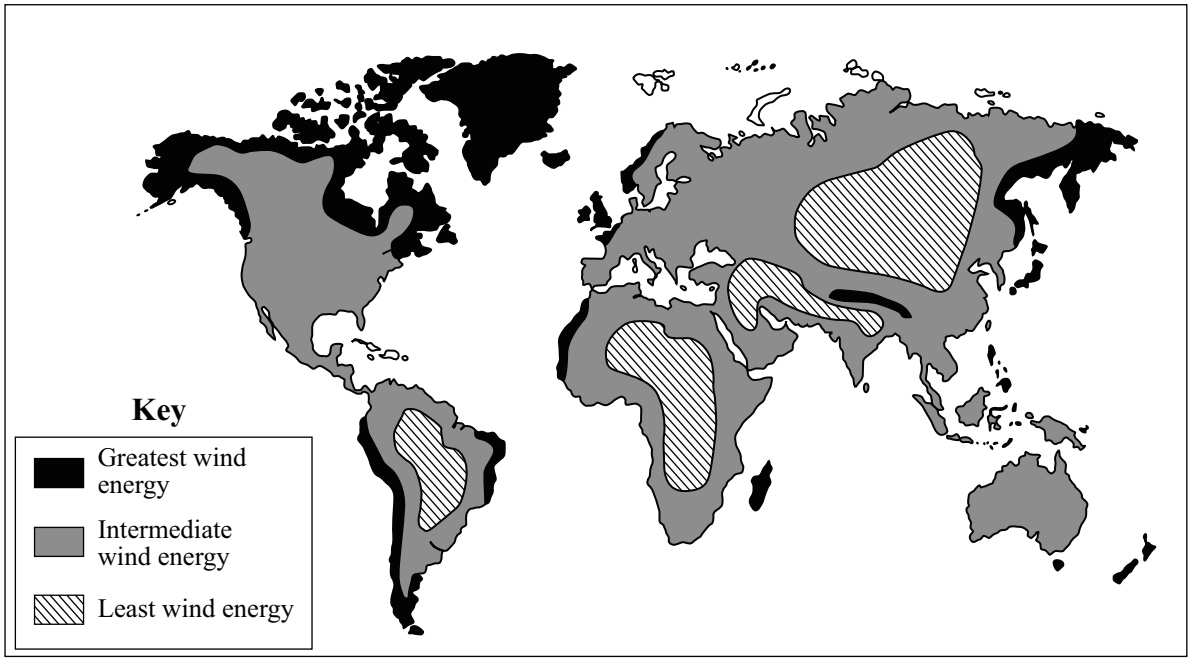
.....

(2 marks)

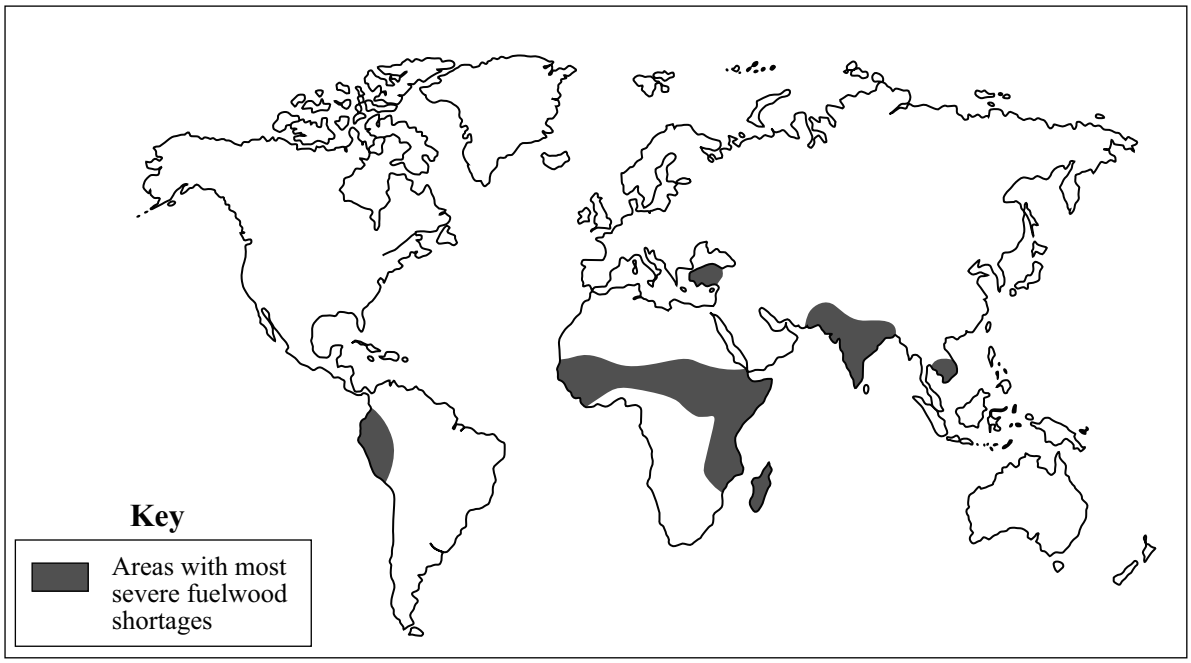
Question 5 continues on the next page

5 (d) The maps show that alternative energy resources may not be available where there are fuelwood shortages.

The worldwide distribution of wind resources



Areas of the world with most severe fuelwood shortages



5 (d) (i) Why may the energy harnessed from wind not be suitable to replace fuelwood?

.....

.....

(1 mark)

5 (d) (ii) Outline how the energy harnessed in areas with the most wind energy could be transported to provide energy for areas with fuelwood shortages.

.....

.....

.....

.....

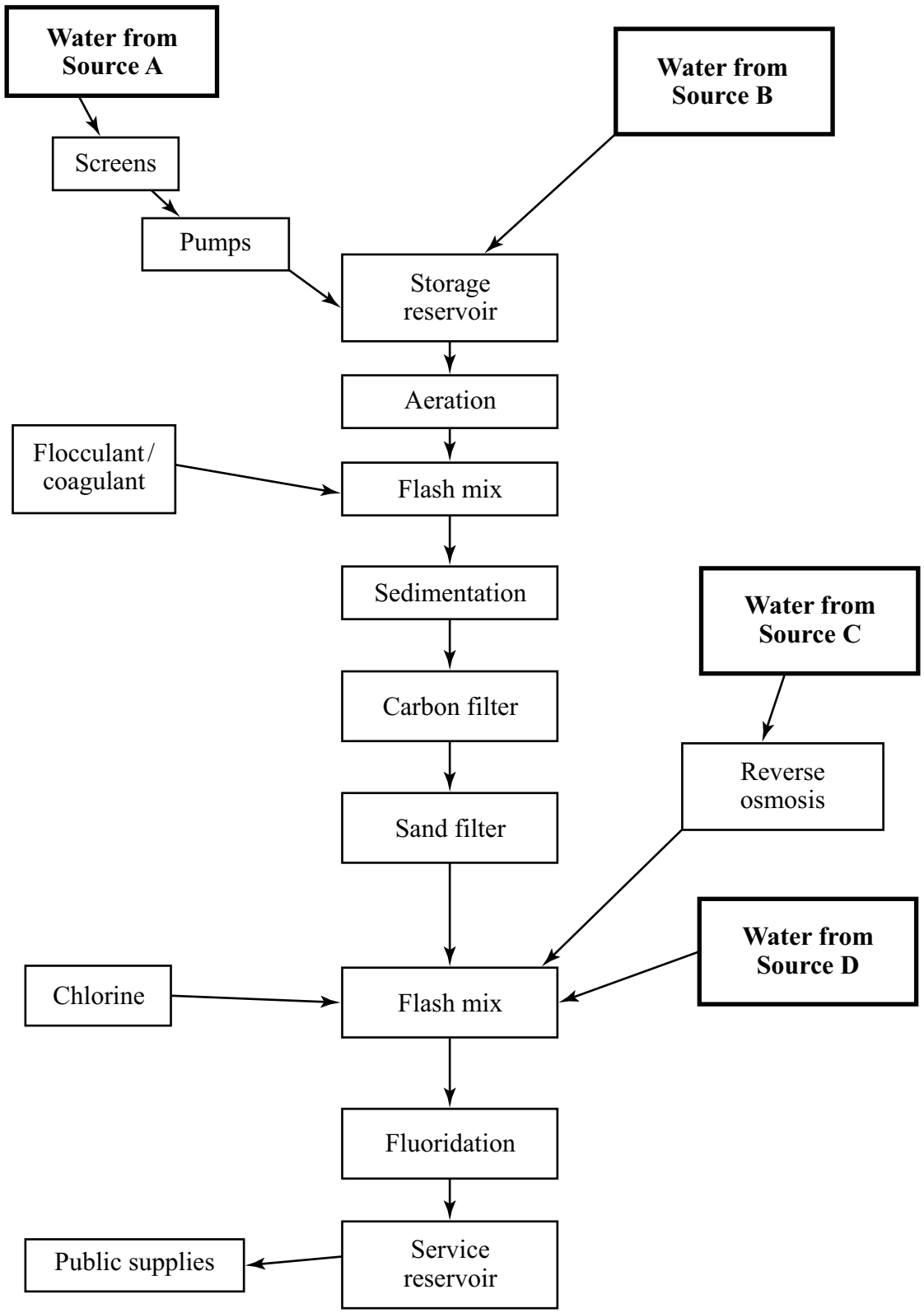
(2 marks)

10

Turn over for the next question

6 Water from different sources may require different treatment processes to purify it for public use.

The diagram shows the processes which may be used to treat water from four different sources.



6 (a) Put a tick in the appropriate box to identify each of the four water sources.

	Source A	**Source B**	**Source C**	**Source D**
Seawater				
Groundwater				
River water				
Upland reservoir water				

(3 marks)

6 (b) Outline the purpose of the addition of:

6 (b) (i) chlorine

.....

.....

(1 mark)

6 (b) (ii) fluoride.

.....

.....

(1 mark)

Question 6 continues on the next page

6 (c) Describe the processes which are used to treat sewage effluent to prevent pollution.

Quality of Written Communication will be assessed in this answer.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(10 marks)

15

END OF QUESTIONS

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

ACKNOWLEDGEMENT OF COPYRIGHT-HOLDERS AND PUBLISHERS
Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright-holders have been unsuccessful and AQA will be happy to rectify any omissions of acknowledgements in future papers if notified.