Surname		Other Names	
Centre Number			Candidate Number	
Candidate Signature			

For Examiner's Use

General Certificate of Education
June 2007
Advanced Subsidiary Examination

AQA
ASSESSMENT and QUALIFICATIONS ALLIANCE

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

Thursday 7 June 2007 1.30 pm to 2.30 pm

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

Time allowed: 1 hour

Instructions

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- 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			

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

1 The table shows details of some gases and their possible association with global climate change and ozone depletion.

Complete the table.

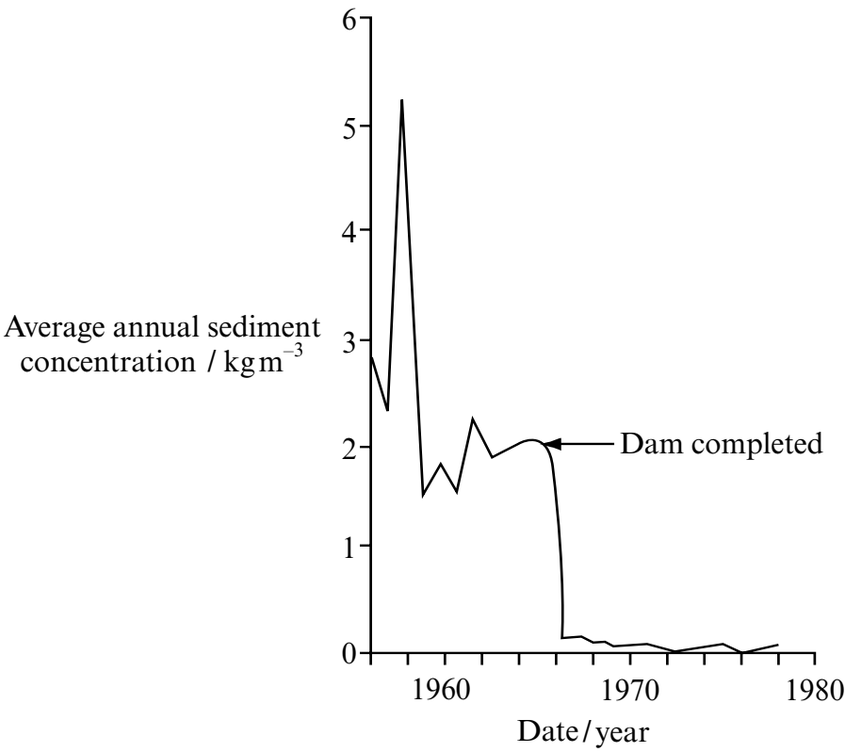
Gas	**Human activity which releases the gas**	**Does gas cause global climate change?**	**Does gas cause ozone depletion?**
Carbon dioxide	Burning fossil fuels		
	Disposal of old fridges	Yes	Yes
Methane	Disposal of organic matter in landfill sites		No
Oxides of nitrogen		Yes	Yes

(5 marks)

5

Turn over for the next question

2 The graph shows the change in suspended sediments in a river downstream of the site of a reservoir.



(a) Explain how the presence of the dam has affected the sediment concentration in the river.

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(2 marks)

(b) Explain how a reservoir may affect the river flow downstream of the dam.

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(2 marks)

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(c) Explain how the presence of the reservoir may alter the climate of the local area.

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(2 marks)

(d) Name a rock type which often forms aquifers.

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(1 mark)

(e) Outline the advantages of using aquifers instead of reservoirs for public water supply.

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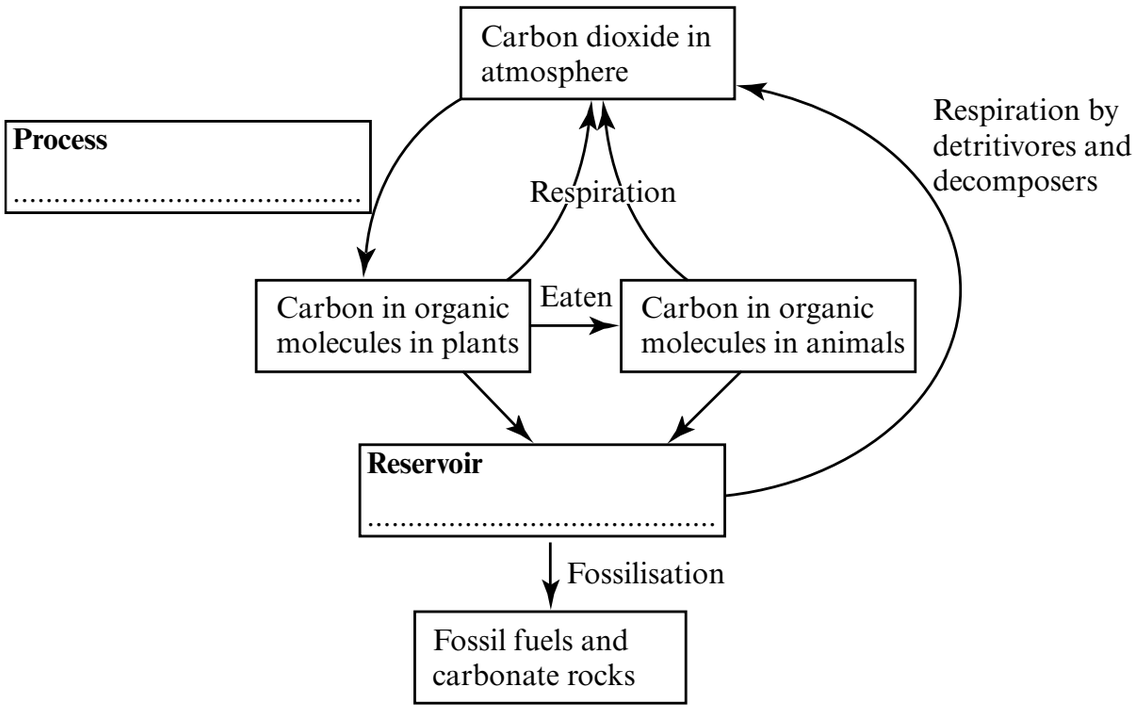
(3 marks)

10

Turn over for the next question

3 The diagram illustrates the carbon cycle.



(a) Complete the diagram. *(2 marks)*

(b) In which reservoir does carbon have the longest residence time?

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(1 mark)

(c) Use the carbon cycle to explain how negative feedback can produce a dynamic equilibrium.

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(3 marks)

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(d) Outline how human activities change the rate of movement of carbon in the carbon cycle.

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(3 marks)

(e) Suggest why it may be difficult to estimate accurately the global amount of carbon present in biomass.

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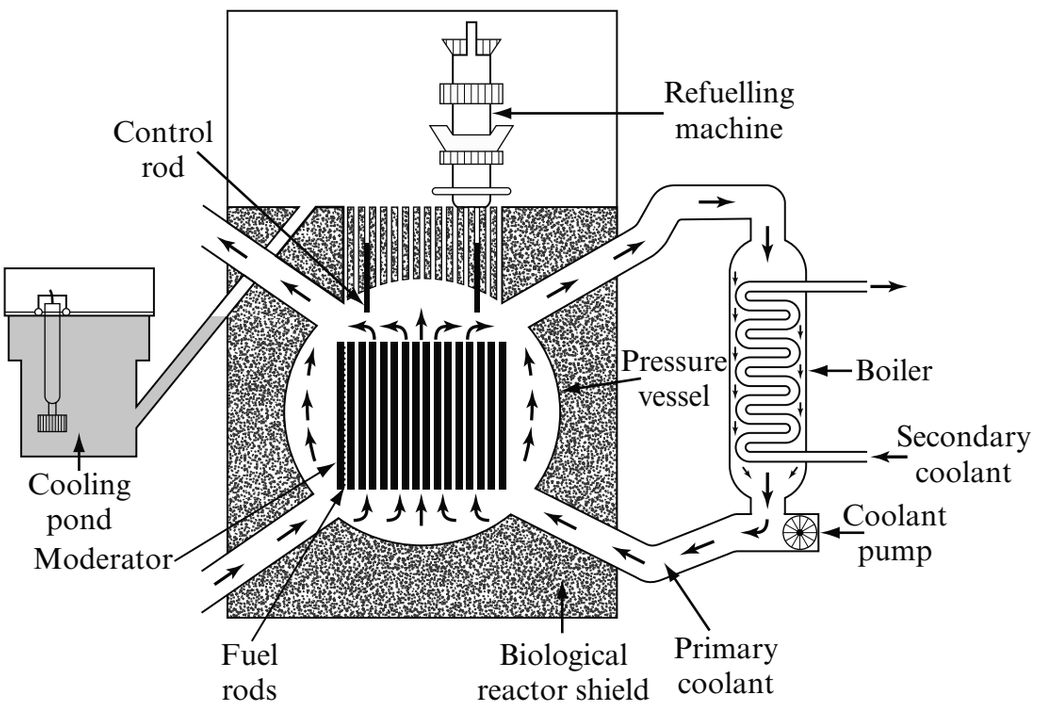
(1 mark)

10

Turn over for the next question

4 (a) The diagram shows the main features of a nuclear reactor.



Complete the table.

Part of power station	Purpose	Principle of operation
Fuel rods	To produce heat	Atoms of uranium undergo fission when bombarded by neutrons
Moderator	To increase the chances of neutrons causing fission	
Control rods	To regulate the power output of the reactor	
Biological reactor shield		Thick layers of concrete absorb radiation

(3 marks)

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(b) Outline **one** advantage and **one** disadvantage of using nuclear power instead of wind power for future energy supplies.

Advantage .....

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(2 marks)

Disadvantage .....

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(2 marks)

(c) Describe **one** difference between the processes of nuclear fusion and nuclear fission.

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(1 mark)

(d) Energy from the sun can be used directly as solar power or indirectly.

Explain why wind power can be described as indirect solar power.

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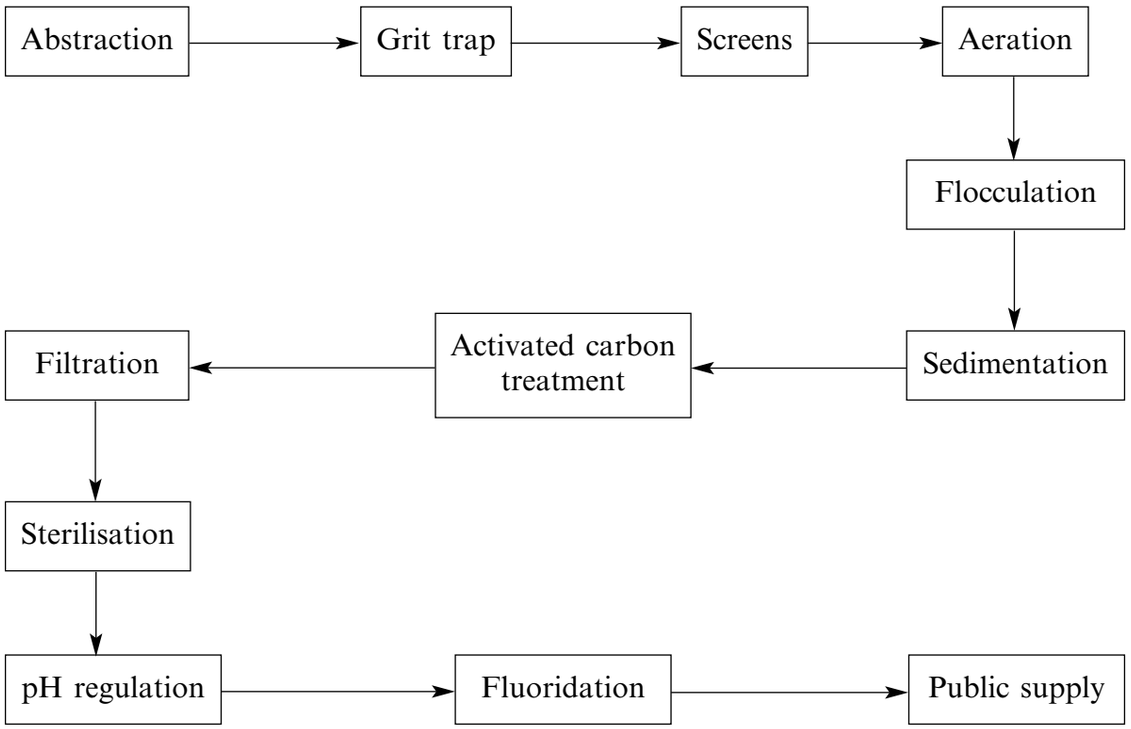
(2 marks)

10

Turn over for the next question

5 The diagram shows some of the main processes in a water treatment works.



(a) State the purposes of the following processes and outline how they work.

(i) Flocculation

Purpose .....

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How process works .....

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(2 marks)

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(ii) Sterilisation

Purpose .....

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How process works .....

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(2 marks)

(b) Name **two** processes which are less likely to be needed when treating water from an aquifer rather than water from a river.

1 .....

2 .....

(2 marks)

(c) Outline how **two** different industrial uses of water have specific water quality requirements.

1 .....

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2 .....

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(4 marks)

10

Turn over for the next question

6 The diagram shows the contributions of different energy resources to total energy supplies.

The diagram is not reproduced here due to third-party copyright constraints.

(a) Estimate:

(i) the amount of energy to be supplied by solar/wind power in 2080

..... EJ

(1 mark)

(ii) the total energy supplied by fossil fuels in 1990.

..... EJ

(1 mark)

(b) Suggest how the following may cause a decline in the use of fossil fuels.

(i) Geological problems

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(1 mark)

(ii) Economic factors

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(1 mark)

(iii) Concerns about environmental damage

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(1 mark)

(c) Outline the methods which may be used to reduce the amount of energy used by industry, transport systems and domestic users.

Quality of Written Communication will be assessed in this answer.

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(10 marks)

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END OF QUESTIONS

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