

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

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General Certificate of Education
 June 2006
 Advanced Subsidiary Examination



ENVIRONMENTAL SCIENCE
Unit 1 Energy, Atmosphere and Hydrosphere

ESC1

Thursday 8 June 2006 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 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			
Number	Mark	Number	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 some features of the water cycle.

Complete the table by adding suitable features or descriptions.

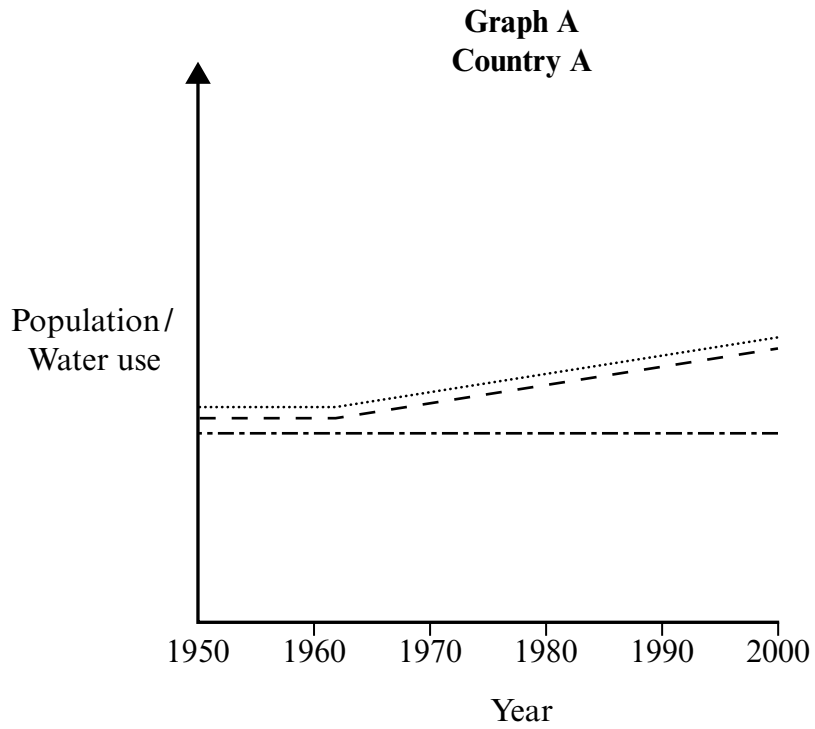
Feature	Description
	Loss of water vapour from the stomata in a plant's leaves
Interception	
	Conversion of liquid water into gaseous water as hydrogen bonds are broken
Infiltration	
	Level in the ground below which the interstitial spaces are filled with water

(5 marks)

5

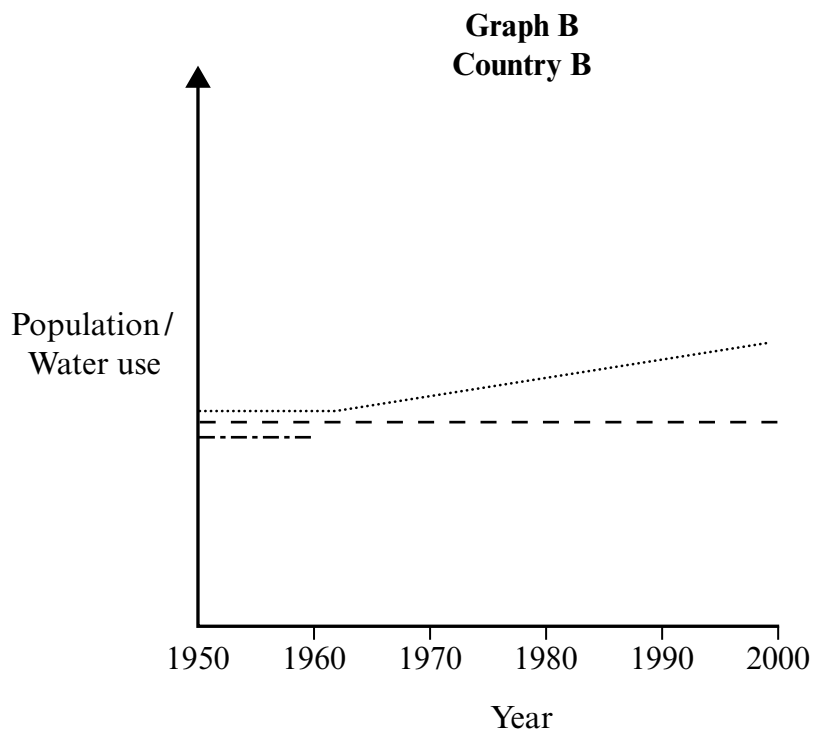
Turn over for the next question

- 2 The graphs show some features of population, total water use and per capita (per person) water use in two countries.



Key

..... Population
 - - - - Total water use
 - · - · - Per capita water use



(a) Continue the line on **Graph B** to show per capita water use between 1960 and 2000. *(1 mark)*

(b) Outline **two** reasons why the per capita water use in a country may increase.

1.
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2.
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.....

(4 marks)

(c) (i) What is an aquifer?

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.....

(1 mark)

(ii) By reference to the amount of water in an aquifer, explain the principles of a dynamic equilibrium.

.....
.....

(1 mark)

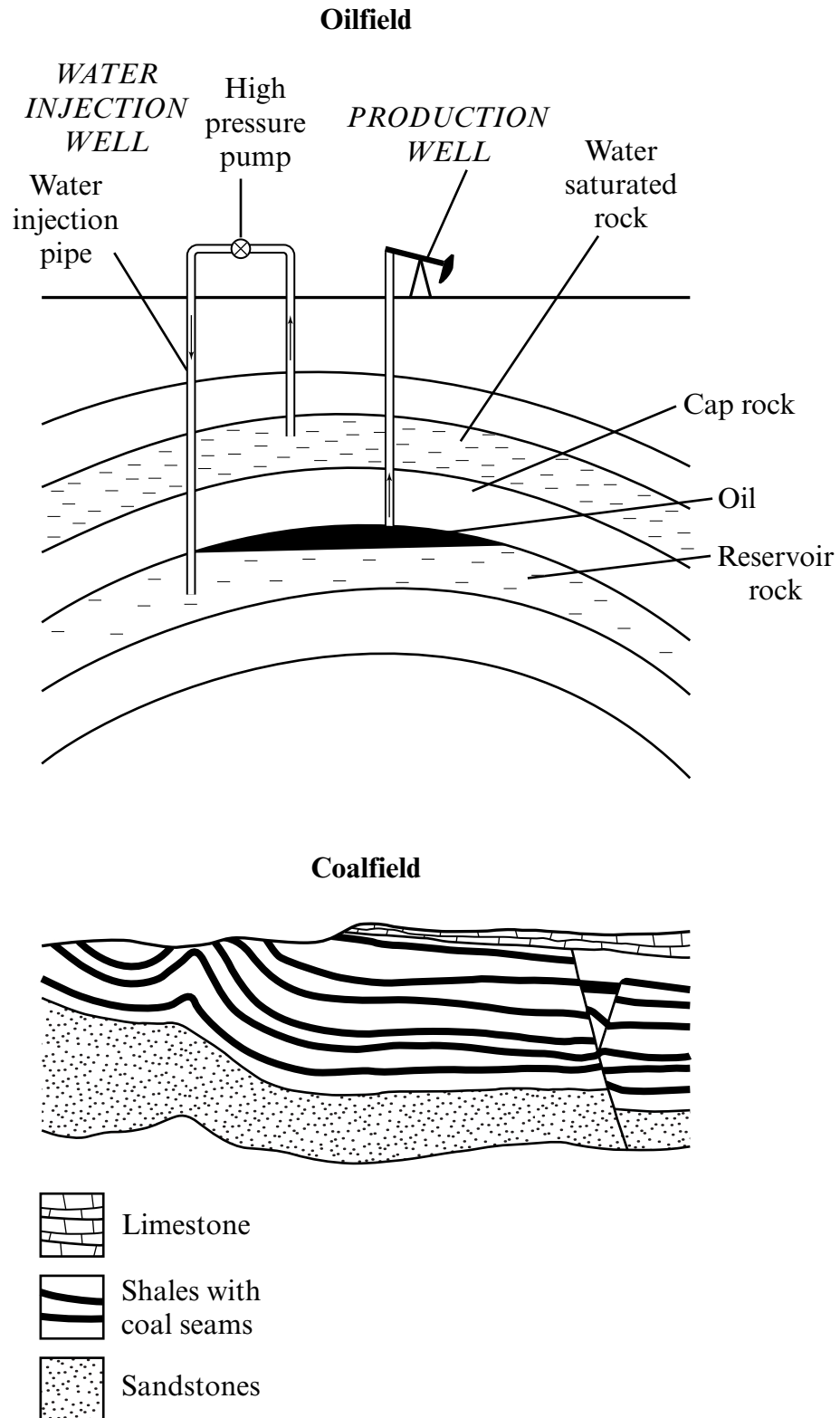
(iii) Describe the likely consequences of the over-exploitation of an aquifer.

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(3 marks)

- 3 Coal and oil can only be exploited economically if the geological conditions of the deposits are suitable.
The diagrams show geological sections through an oilfield and a coalfield.

(not to scale)



(a) Outline **two** geological conditions which affect the economic exploitation of oil or coal.

- 1.
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- 2.
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(4 marks)

(b) Suggest **two** reasons why the use of fossil fuels may stop earlier than is currently estimated.

- 1.
- 2.

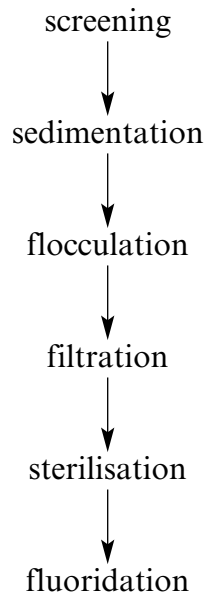
(2 marks)

(c) Describe how the lifespan of fossil fuel reserves could be extended.

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(4 marks)

4 The flow diagram shows some of the processes which are used to produce water for public supplies.



(a) What are the purposes of:

(i) sedimentation;

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(1 mark)

(ii) sterilisation?

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.....
(1 mark)

(b) Describe the process of flocculation.

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(2 marks)

(c) Describe **two** different methods used to reduce the domestic demand for water.

1.

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2.

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(4 marks)

(d) Explain why river water and groundwater are likely to contain different levels of:

(i) dissolved oxygen;

.....

.....

(1 mark)

(ii) turbidity.

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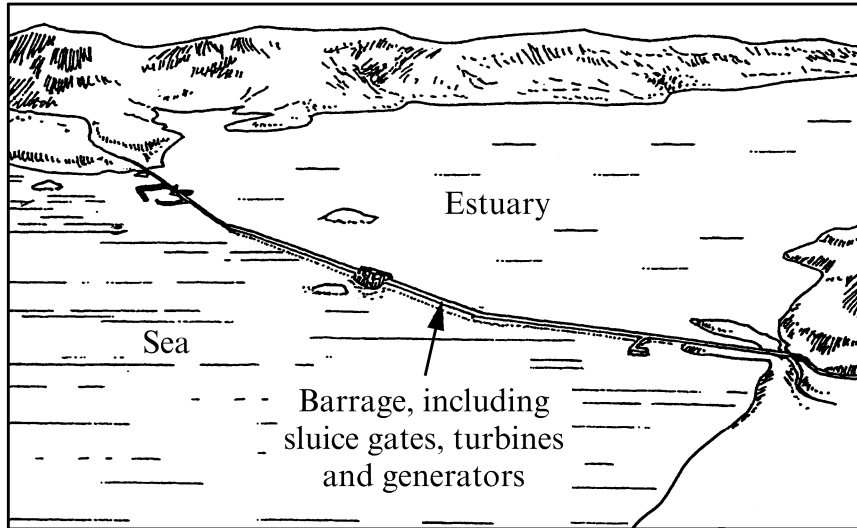
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(1 mark)

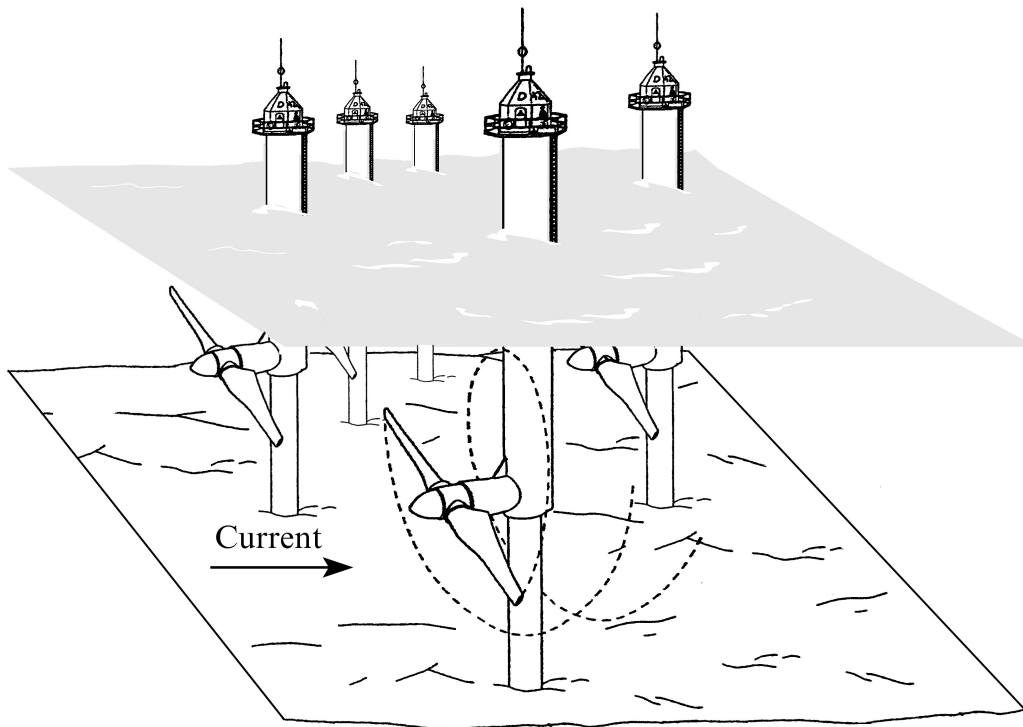
Turn over for the next question

- 5 (a) The diagrams show two different methods of harnessing the energy of flowing water in tidal areas of the sea.

Scheme A
Part of a proposed tidal power scheme



Scheme B
In-stream tide turbine



6 The table shows some human activities which release gases that cause global climate change.

(a) Complete the table.

Gas	Human activities
Carbon dioxide	Combustion of fossil fuels, deforestation
	Livestock and rice production, landfill sites, coal mine ventilation
Oxides of nitrogen	
Chlorofluorocarbons	Aerosol propellants, fire extinguishers, refrigerants
Tropospheric ozone	Chemical reactions involving NO ₂ and unburnt fuel vapours

(2 marks)

(b) Explain how greenhouse gases control the temperature of the atmosphere.

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(2 marks)

(c) Explain how global climate change is likely to affect:

(i) aquifers through sea level rise;

.....

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(1 mark)

(ii) precipitation through altered evaporation rates.

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(1 mark)

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