Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

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General Certificate of Education
January 2006
Advanced Subsidiary Examination

ASSESSMENT and QUALIFICATIONS ALLIANCE

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

Tuesday 17 January 2006 9.00 am to 10.00 am

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			

There are no questions printed on this page

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

1 The table shows details of some gases found in the atmosphere. Complete the table.

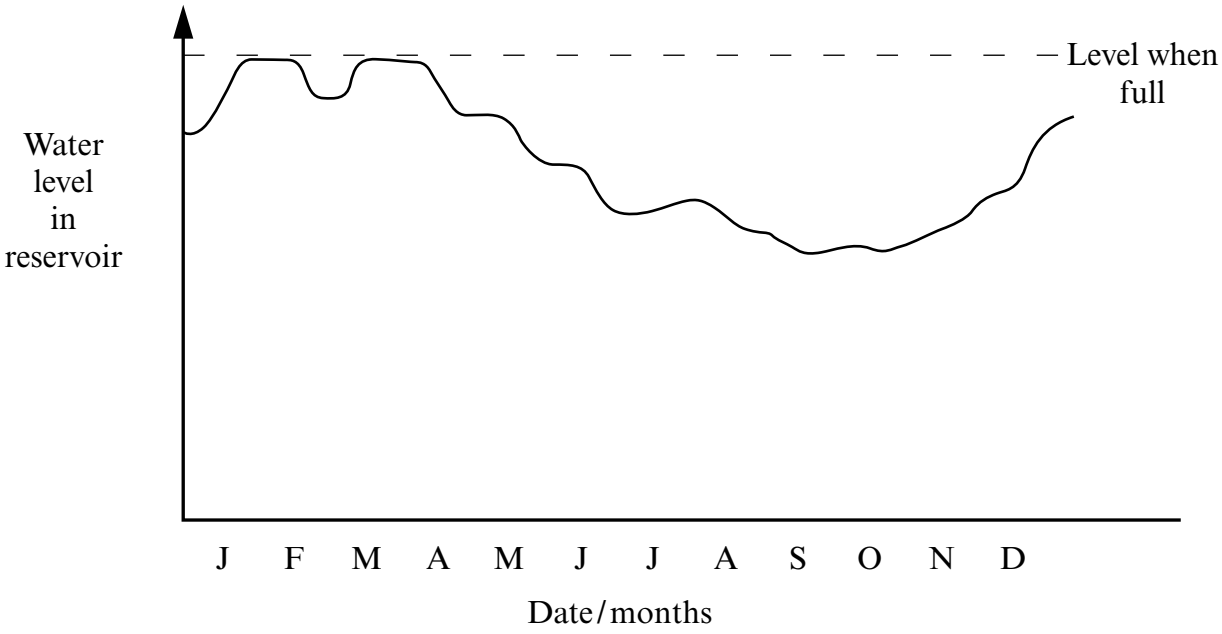
Gas	**Normal % of gas in dry air**	**One source of gas**	**Type of electromagnetic radiation absorbed by the gas**
Nitrogen			N/A
Carbon dioxide	0.035%	Respiration	Infra-red
Ozone	0.000007%	Combination of O_2 and O in the stratosphere	
Methane	trace		

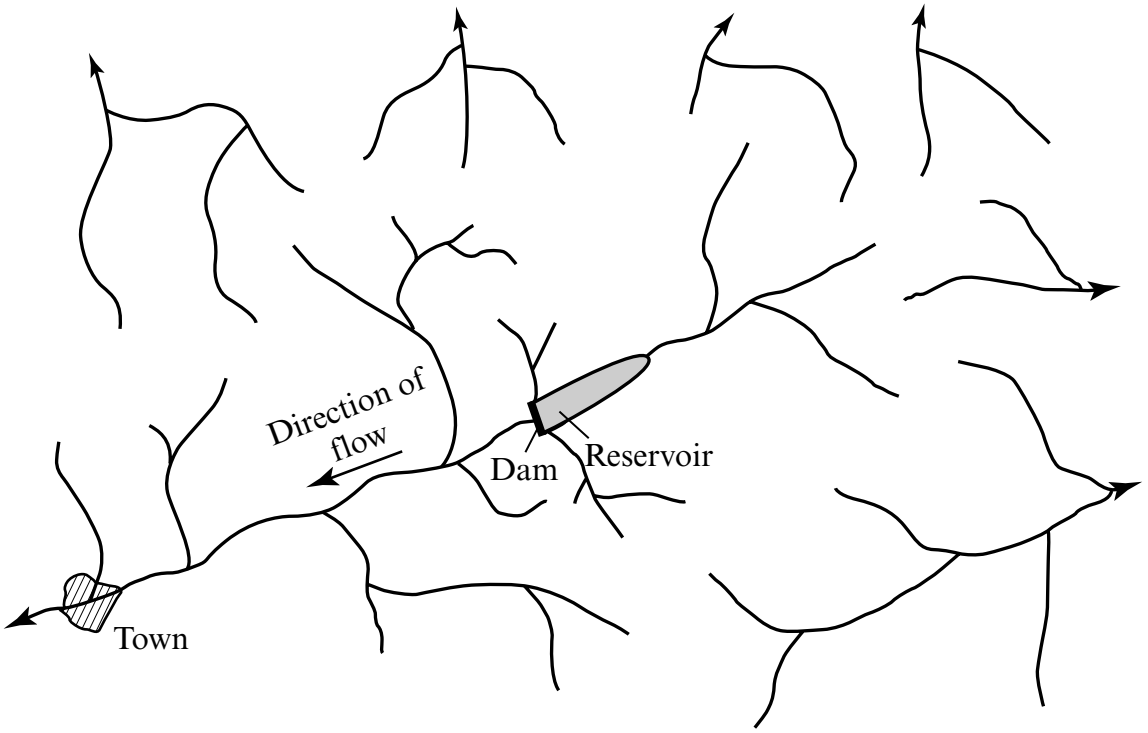
(5 marks)

5

Turn over for the next question

2 The graph and map show features of a reservoir used to control river flow so that the town downstream has reliable water supplies.





(a) What name is given to the area of land which collects the precipitation that eventually flows into a river?

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(1 mark)

(b) Suggest how the reservoir may be used to regulate the level of the river downstream.

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(2 marks)

(c) Outline how **two** land uses in the area may have affected the choice of this site for the reservoir.

1. .....

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2. .....

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(4 marks)

(d) Explain how the presence of the reservoir may affect the turbidity of the river water downstream of the reservoir.

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(1 mark)

(e) Outline how the presence of a large reservoir may alter the climate of the surrounding area.

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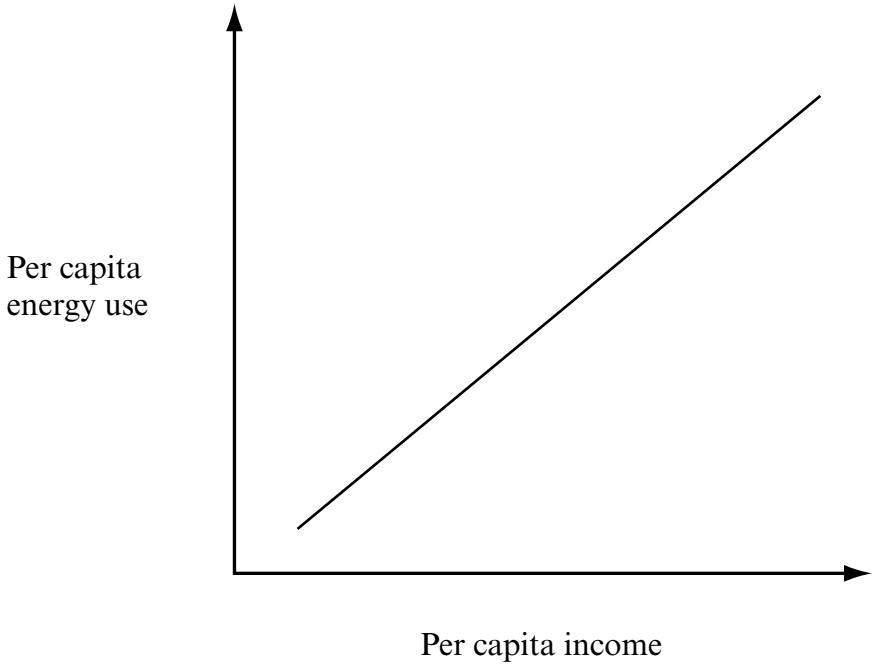
(2 marks)

10

3 The graph shows the relationship between per capita income and per capita energy use. (per capita = per person).



(a) Suggest **one** way in which a high income may result in a high per capita energy consumption.

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(1 mark)

(b) Suggest how the high per capita energy use in richer countries may affect the per capita energy use in poorer countries.

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(2 marks)

(c) Describe **one** method used to increase the amount of oil that can be extracted from an oilfield.

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(2 marks)

(d) Outline the strategies used to increase the availability of energy in a country without increasing its reliance on imported fossil fuels.

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(3 marks)

(e) Outline how **one** environmental impact of transporting energy may be reduced.

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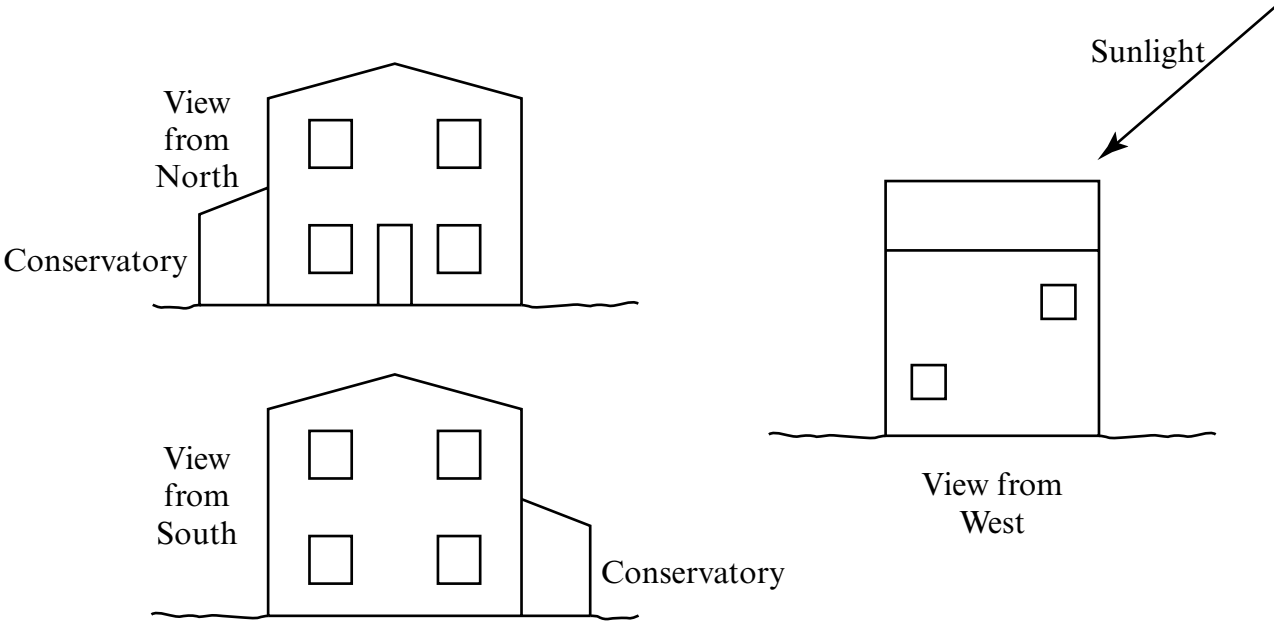
(2 marks)

10

4 (a) The diagrams show a typical house in the UK.



Outline **two** design changes which would have increased the amount of solar energy used to heat the house.

1. .....

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2. .....

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(4 marks)

(b) Explain how cloud cover reduces the amount of solar energy available for use.

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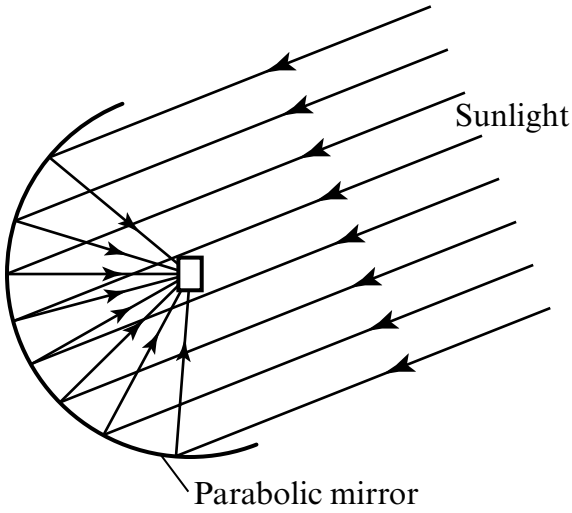
(2 marks)

(c) With reference to the diagram, describe the use of a parabolic reflector.



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(2 marks)

(d) The areas of the world where most solar energy is available are often where the population density is very low.

Suggest why this could be **both** an advantage and a disadvantage.

Advantage .....

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Disadvantage .....

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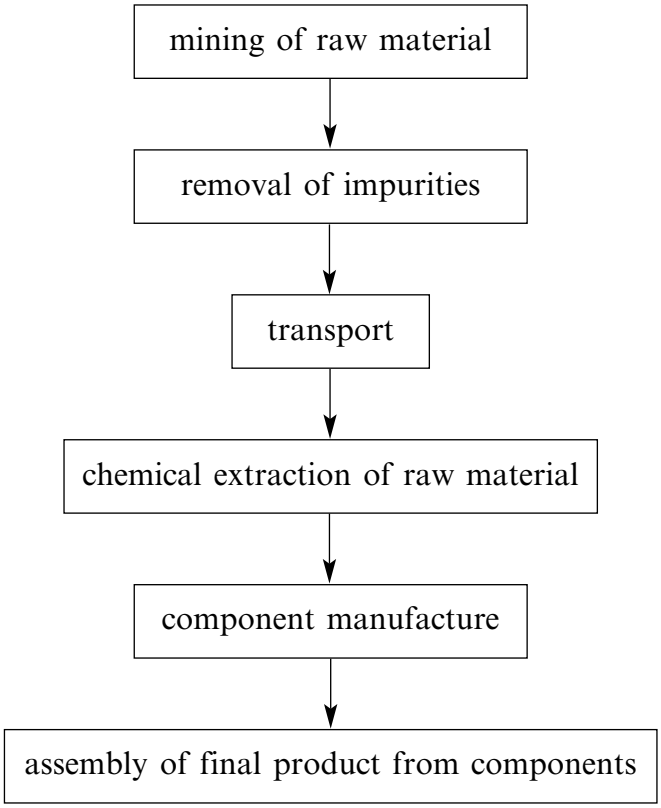
(2 marks)

10

5 The flow diagram shows the main processes of many manufacturing industries.



(a) Describe **one** method used to harness the waste heat from industry so that it can be reused.

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(2 marks)

(b) Why does storing molten metal in one large container result in lower heat losses than storing it in several smaller containers?

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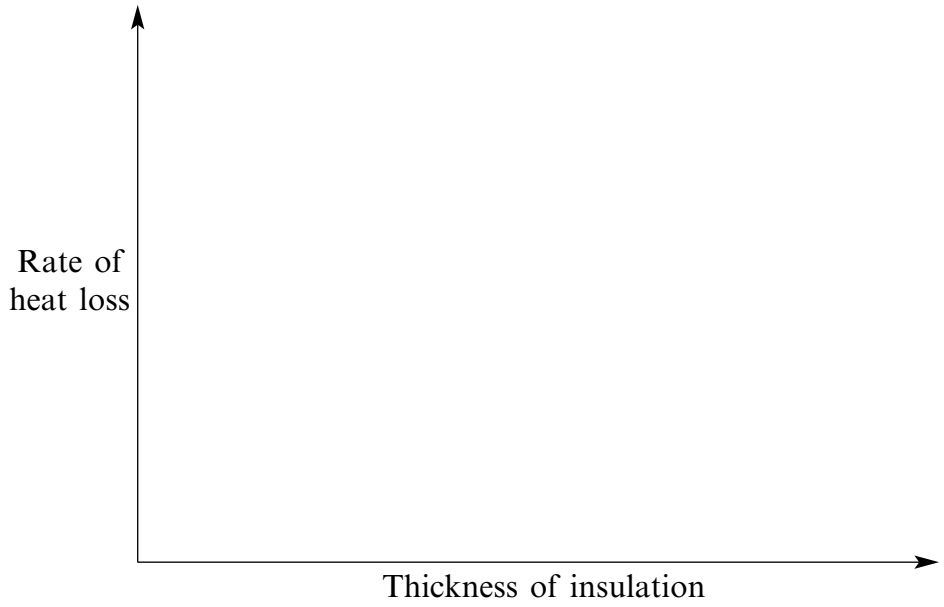
(1 mark)

(c) (i) Draw a line on the graph to show the relationship between the thickness of insulating material and the rate of heat loss from a tank of hot water.



(1 mark)

(ii) Suggest why there is an economic limit to the amount of insulating material which should be used.

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(1 mark)

(d) Describe how double glazing reduces heat loss through windows.

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(3 marks)

(e) Outline **one** example of how car design can reduce energy use.

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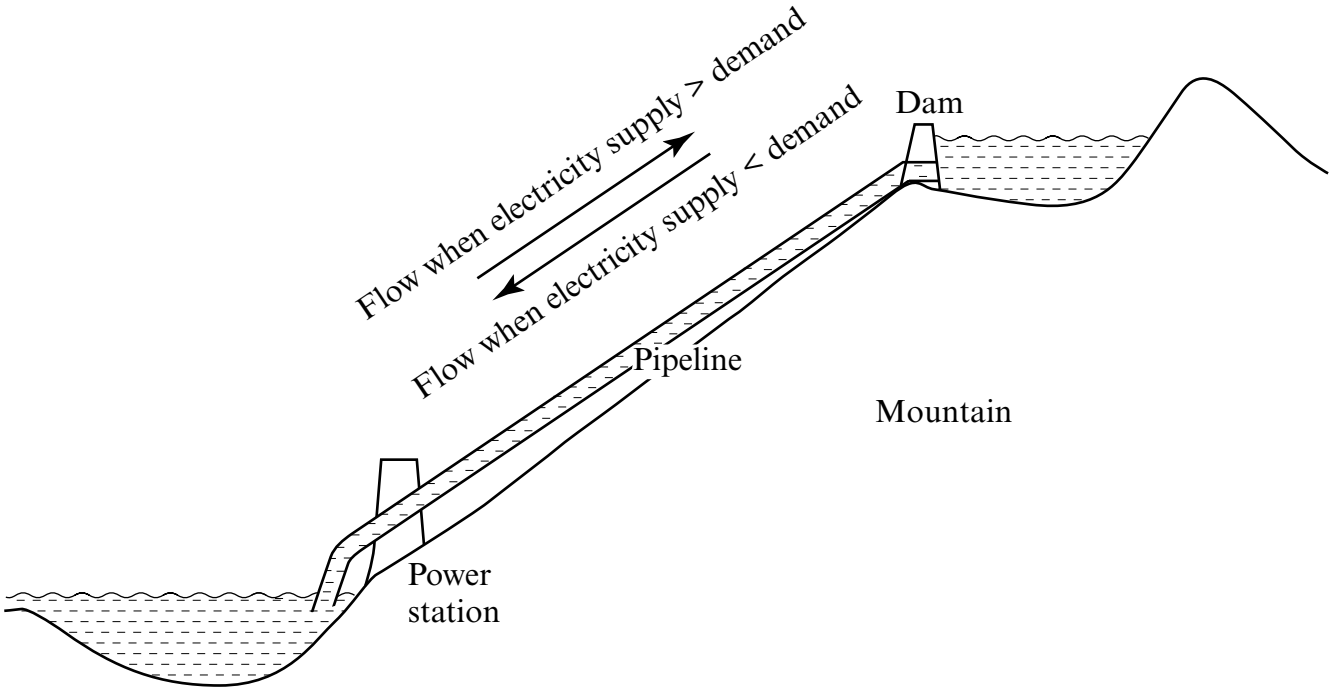
(2 marks)

10

6 The diagram shows a pumped-storage hydroelectric power station.



(a) (i) Identify **two** ways in which the structure of this power station differs from a standard hydroelectric power station.

1. .....

2. .....

(2 marks)

(ii) What is the main purpose of a pumped-storage hydroelectric power station?

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(1 mark)

(b) Outline **two** uses of water in a nuclear power station.

1. .....

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2. .....

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(2 marks)

(c) The degree to which water is treated and purified depends upon its final use.

Describe the processes of water treatment and how the final use of the water affects which processes are used.

Quality of Written Communication will be assessed in this answer.

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Question 6 continues on the next page

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(10 marks)

15

END OF QUESTIONS

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