Surname		Other Names	
Centre Number			Candidate Number								
Candidate Signature											

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General Certificate of Education
June 2005
Advanced Level Examination

AQA
ASSESSMENT and QUALIFICATIONS ALLIANCE

ENVIRONMENTAL SCIENCE ESC5
Unit 5 Pollution and Physical Resource Management

Monday 27 June 2005 Morning Session

No additional materials are required.
You may use a calculator.

Time allowed: 1 hour 30 minutes

Instructions

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided. All working must be shown.
- Do all rough work in this book. Cross through any work you do not want marked.

Information

- The maximum mark for this paper is 70.
- Mark allocations are shown in brackets.
- You are expected to use a calculator where appropriate.
- This unit assesses your understanding of the relationship between the different aspects of Environmental Science.
- You will be assessed on your ability to use an appropriate form and style of writing, to organise relevant information clearly and coherently, and to use specialist vocabulary, where appropriate.
- The degree of legibility of your handwriting and the level of accuracy of your spelling, punctuation and grammar will also be taken into account.

For Examiner's Use			
Number	Mark	Number	Mark
1			
2			
3			
4			
5			
6			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

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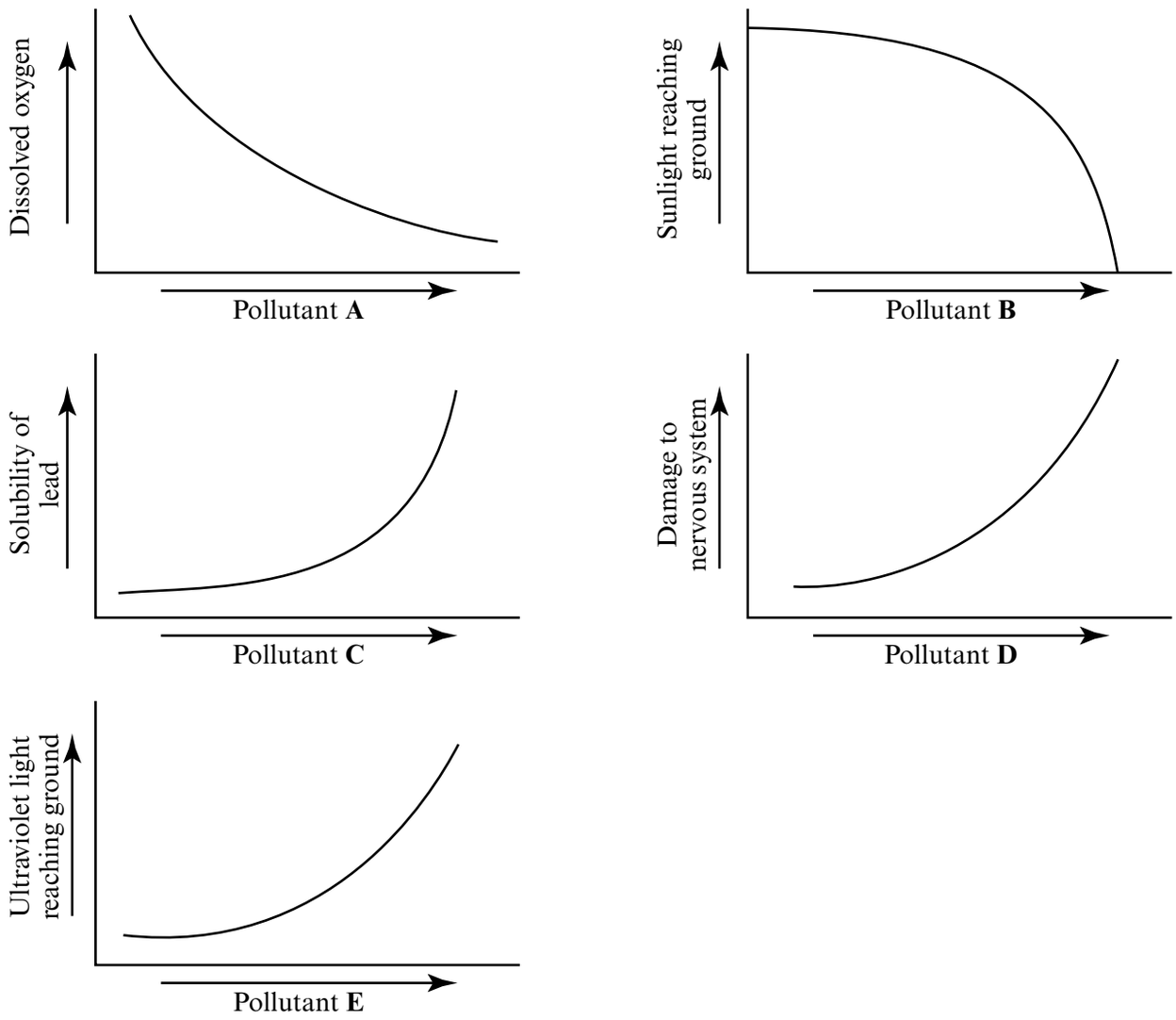
Answer **all** questions in the spaces provided.

1 The graphs illustrate the properties of selected pollutants.



Suggest pollutants which show the properties illustrated by each graph.

Pollutant **A** .....

Pollutant **B** .....

Pollutant **C** .....

Pollutant **D** .....

Pollutant **E** .....

(5 marks)

5

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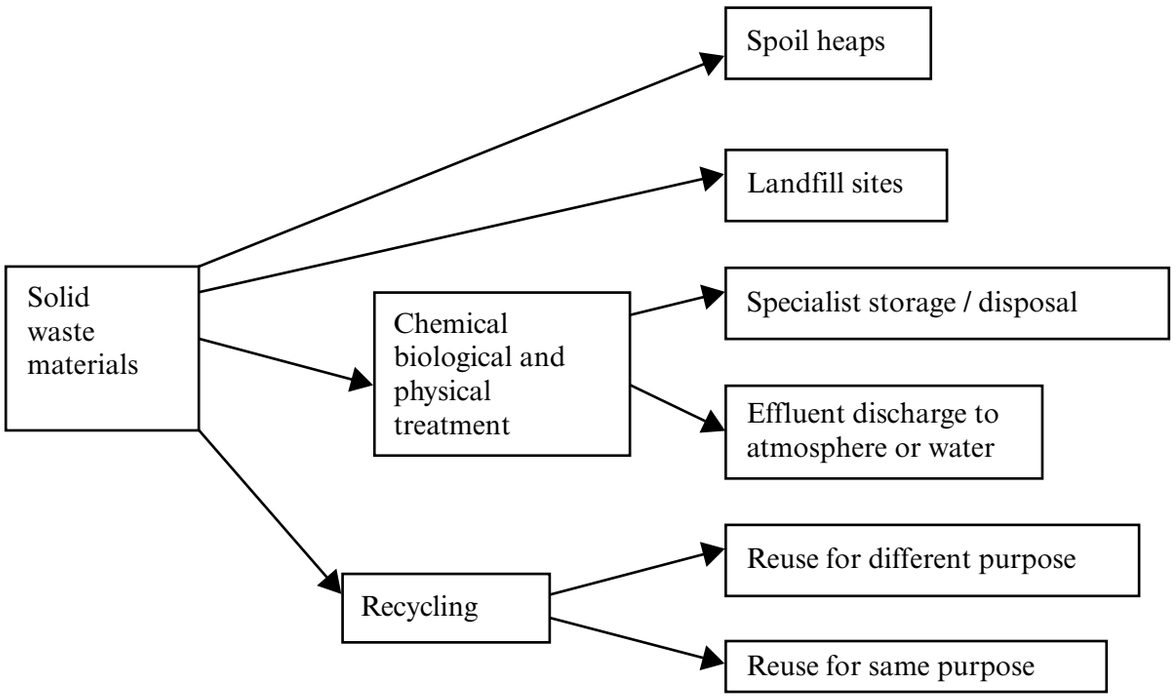
2 The diagram shows some of the methods used to deal with solid wastes.



(a) Give **one** strategy used by the UK Government to reduce the amount of waste disposed of in landfill sites.

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(1 mark)

(b) Outline **two** ways in which solid wastes may be used as energy resources.

1. .....

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2. .....

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(4 marks)

QUESTION 2 CONTINUES ON THE NEXT PAGE

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(c) Outline **one** way in which recycling used materials may increase pollution problems.

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(2 marks)

(d) Describe **one** method for the long-term disposal of highly radioactive waste.

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(3 marks)

10

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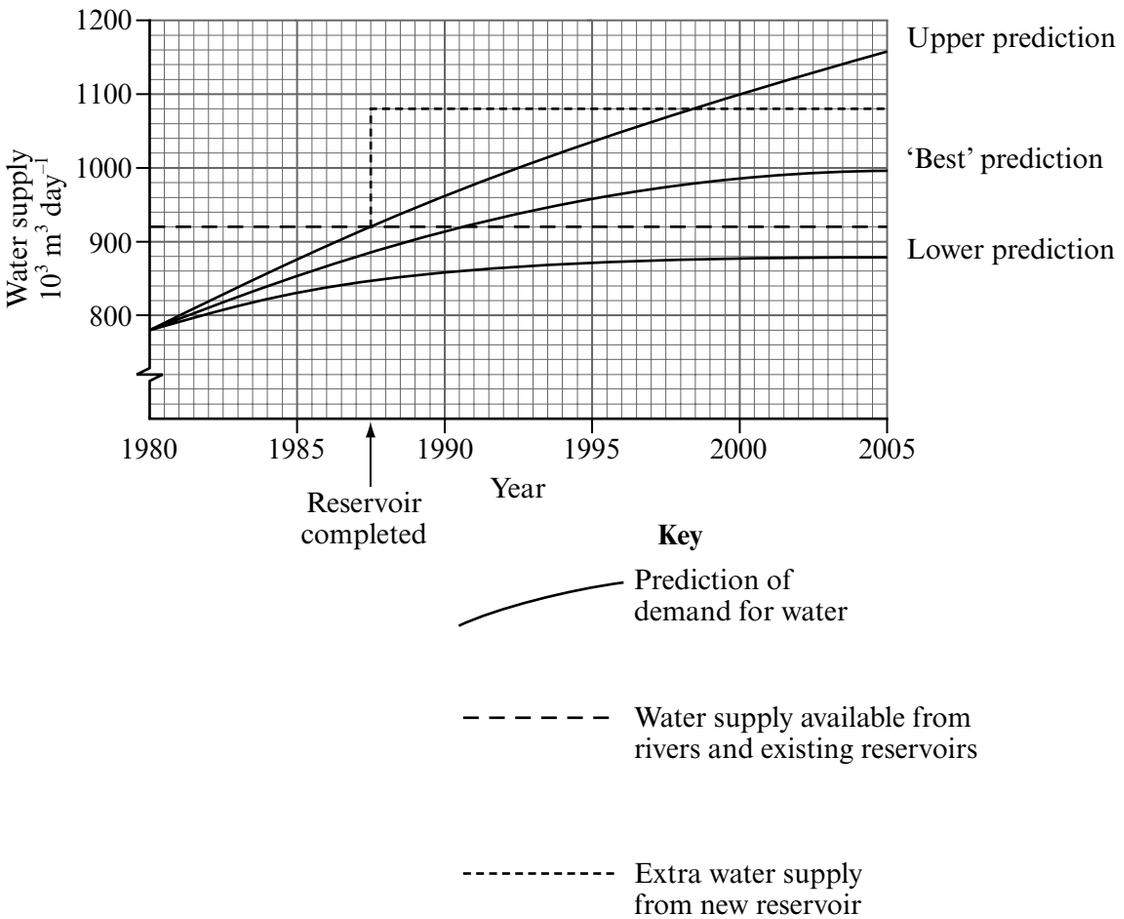
3 To meet future demand for water it is necessary to predict how demand may change in the future.

(a) The graph shows some of the predictions made in 1980 when the decision was taken to build a large reservoir in the UK.



(i) From which year would there have been water shortages if the reservoir had not been built and the 'best' prediction had been accurate?

.....

(1 mark)

(ii) Estimate the shortage of water supply in the year 2005 if the upper prediction had been accurate and the reservoir was completed.

..... 10^3 m^3 day^{-1}

(1 mark)

QUESTION 3 CONTINUES ON THE NEXT PAGE

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(b) Outline a factor which may increase agricultural use of water.

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(2 marks)

(c) Outline a factor which may reduce industrial use of water.

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(2 marks)

(d) Describe **one** method which may be used to reduce the domestic demand for water.

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(2 marks)

(e) A variety of possible sources may be used to increase water supplies.

Suggest reasons why desalinated seawater is rarely used if other water sources are available.

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(2 marks)

10

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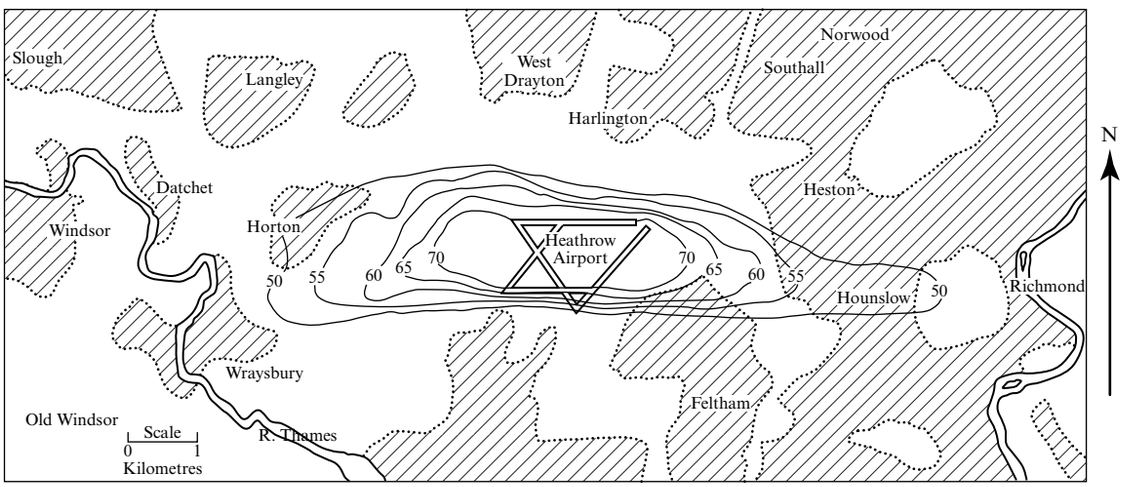
4 The Noise and Number Index (NNI) is used to measure aircraft noise pollution. Calculation of the NNI includes the number of aircraft in a particular time period and the noise each one produces.

(a) The map shows isolines of NNI around Heathrow Airport for a typical day.



NNI (for the period 0600-1800 h GMT)	Average reaction
0	not noticeable
20	noticeable
35	intrusive
45	annoying
60	very annoying
70	unbearable

Suggest how such maps may be used in land use planning.

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(1 mark)

(b) Suggest a reason why sounds below 80 deciBels (dB) are not included when the NNI is calculated.

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(1 mark)

(c) What value on the deciBel scale is the threshold of human hearing?

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(1 mark)

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(d) Outline **two** ways in which excessive exposure to loud noises may cause human health problems.

1. .....

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2. .....

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(2 marks)

(e) Describe how aircraft operations can be managed to reduce noise nuisance.

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(3 marks)

(f) Outline **one** other method to reduce noise nuisance caused by an airport.

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(2 marks)

10

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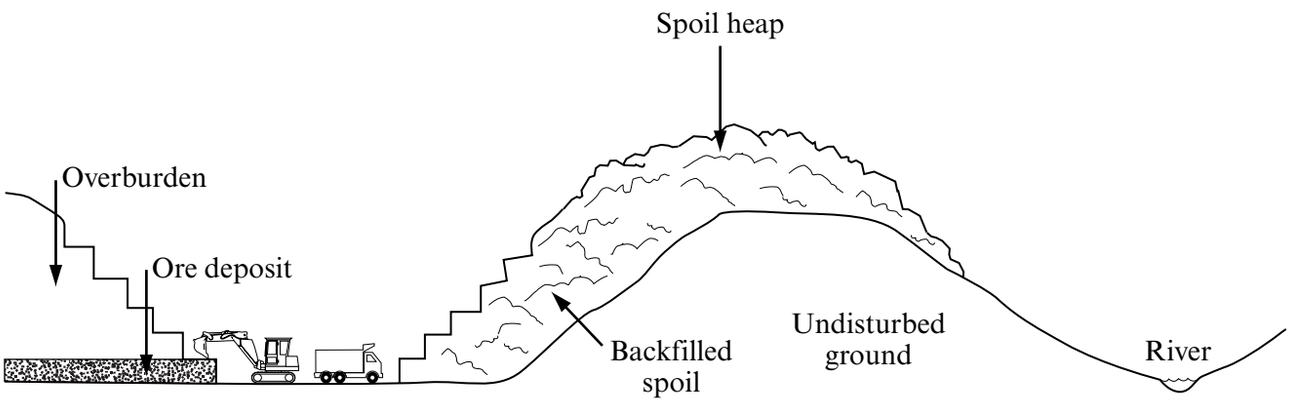
5 Mining of metal ores has many environmental impacts.

The diagram shows a mine from which metal ore is extracted.



(a) Explain why the drainage water from metal mine spoil heaps is often acidic.

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(2 marks)

(b) Describe the effect that acidic drainage water may have on the wildlife in a river.

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(2 marks)

(c) Explain how the geology of an area affects the severity of acid pollution problems.

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(2 marks)

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(d) Outline **one** advantage and **one** disadvantage to a company of spending money on pollution-control equipment.

Advantage .....

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Disadvantage .....

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(4 marks)

(e) Name the Government agency which is responsible for monitoring and controlling water and air pollution.

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(1 mark)

(f) Describe the techniques used to reduce the problems caused by waste water from mines.

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(4 marks)

15

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6 Write an essay on **one** of the following topics. Credit will be given for your understanding of the relationship between different areas of the subject and also for the organisation and presentation of the essay and use of grammar, punctuation and spelling.

EITHER (a) Describe how effluents containing organic and inorganic nutrients cause water pollution and outline the methods used to control these problems. *(20 marks)*

OR (b) Describe how the properties of pollutants may cause them to have effects at local, regional and global scales. *(20 marks)*

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(20 marks)

END OF QUESTIONS

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