Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

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General Certificate of Education
June 2006
Advanced Level Examination

ASSESSMENT and QUALIFICATIONS ALLIANCE

ENVIRONMENTAL SCIENCE ESC5
Unit 5 Pollution and Physical Resource Management

Tuesday 27 June 2006 1.30 pm to 3.00 pm

You will need no other materials.
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.
- 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 70.
- 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.
- This unit assesses your understanding of the relationship between the different aspects of Environmental Science.

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.

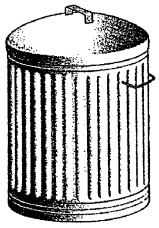
1 Complete the table by adding suitable properties or descriptions of pollutants.

Property	Description
	The effects of two pollutants are greatly increased if they occur together
Persistence	
	The gradual build-up of a substance in a living organism
	The uncontrolled growth of tissue caused by changes to DNA
Teratogenic	Birth abnormalities caused by interference with normal gene function
Biomagnification	

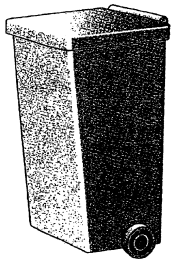
(5 marks)

5

2 The table shows the composition of domestic waste in the UK in 1950 and 2000.



1950	Category of waste	2000
%		%
2	Cloth and clothing	3
74	Dust, ash and cinders	4
3	Food and garden waste	38
6	Glass items	10
4	Metal items	7
8	Paper and cardboard	25
0	Plastic items	5
4	'Unclassified' items	8



(a) Suggest **one** reason for the change in the proportion of:

(i) ash;

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(1 mark)

(ii) food and garden waste.

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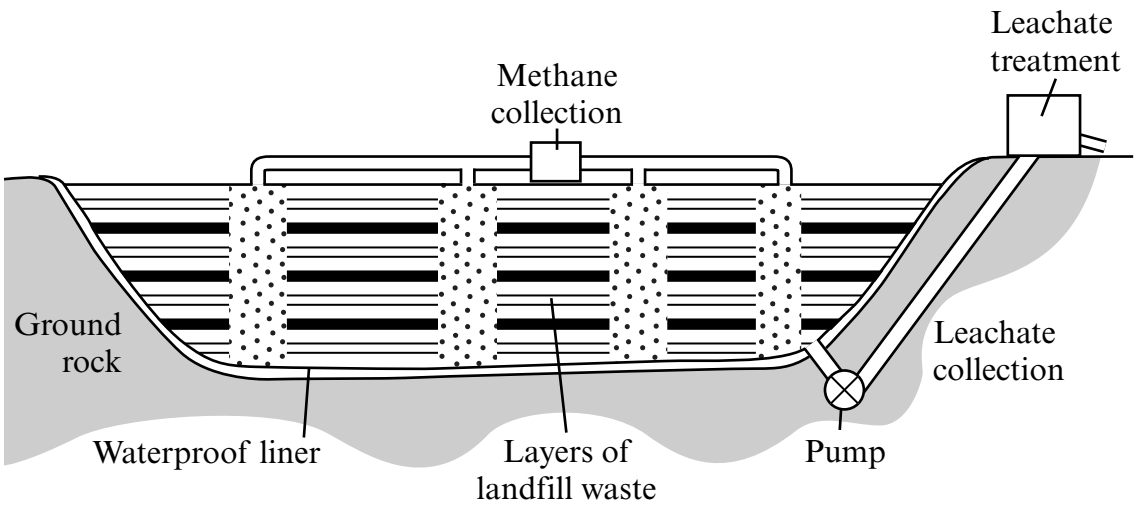
(1 mark)

(b) The diagram shows a landfill site.



(i) Outline the pollution problems caused if liquid leachate containing organic matter drains into a river.

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(2 marks)

(ii) Outline **one** method used to treat landfill leachate.

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(2 marks)

(iii) Outline **one** problem caused by the escape of methane from landfill sites.

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(1 mark)

(c) Although almost all wastes could be recycled, it is often practically difficult to do so.

Outline the reasons why it is difficult to recycle many types of waste.

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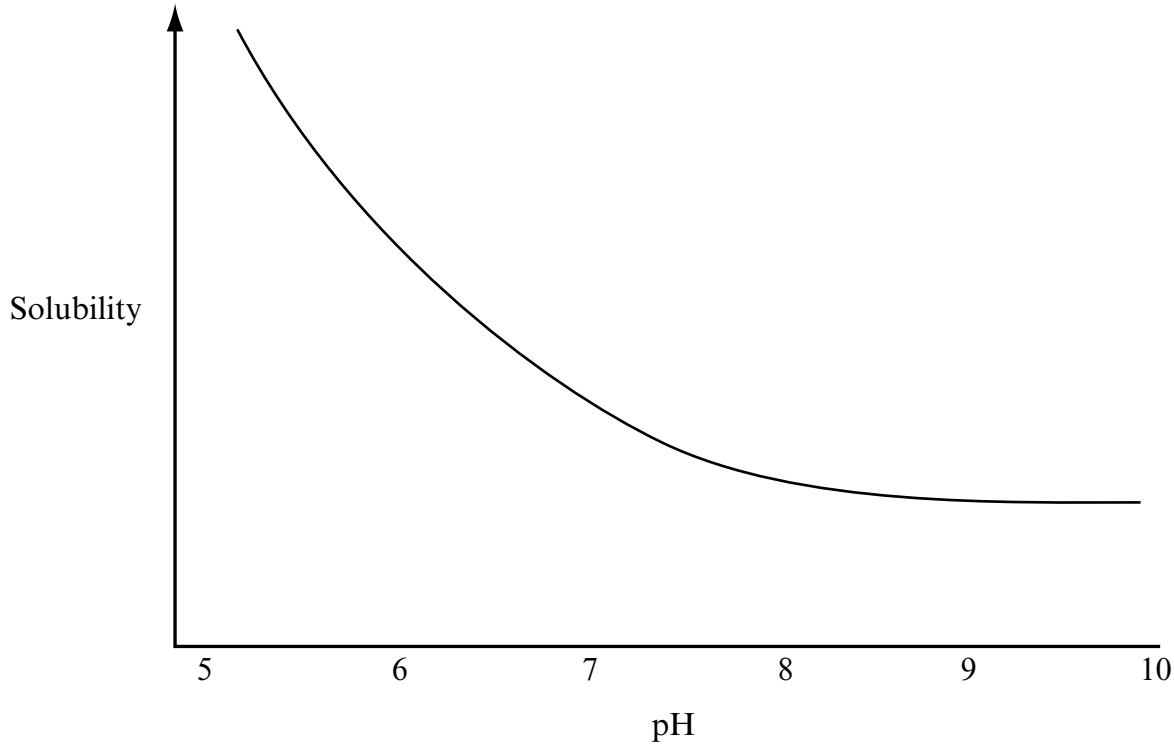
(3 marks)

10

Turn over for the next question

3 The graph shows the relationship between pH and solubility for heavy metals.



(a) Use the information from the graph to suggest a suitable method for treating mine waste containing heavy metals.

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(1 mark)

(b) Explain how lichens may be used as biological indicators of atmospheric acid pollution.

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(2 marks)

(c) Suggest why it may be difficult to prove that exposure to low levels of pollutants actually causes harm.

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(2 marks)

(d) Describe how soil acidification can harm plants.

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(5 marks)

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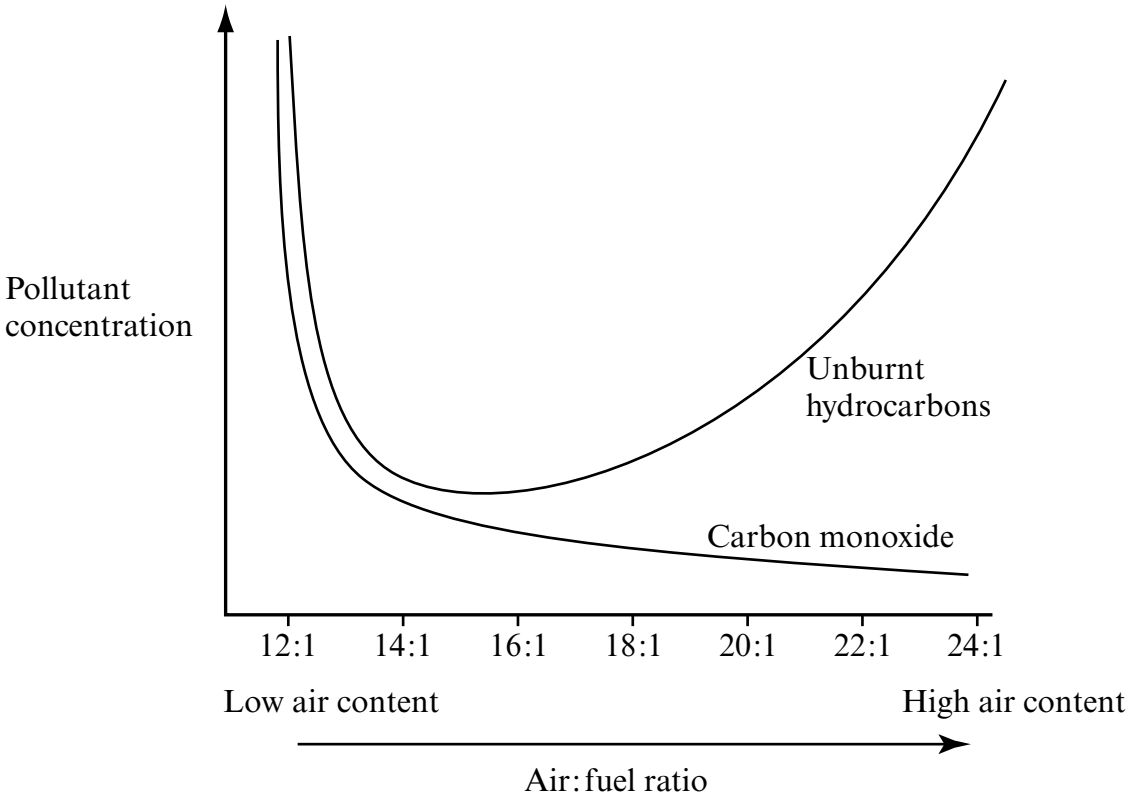
Turn over for the next question

4 The graph shows the relationship between the air : fuel ratio and the production of pollutants by vehicle engines.



(a) Estimate the optimum air : fuel ratio to minimise pollution by carbon monoxide and unburnt hydrocarbons.

Optimum air : fuel ratio = ... :1

(1 mark)

(b) Describe how oxides of nitrogen are involved in the production of photochemical smogs.

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(2 marks)

(c) Describe **one** method used to reduce emissions of oxides of nitrogen from road vehicles.

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(2 marks)

(d) Using named examples of atmospheric pollutants, explain how their properties cause their effects to vary over local, regional or global scales.

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(5 marks)

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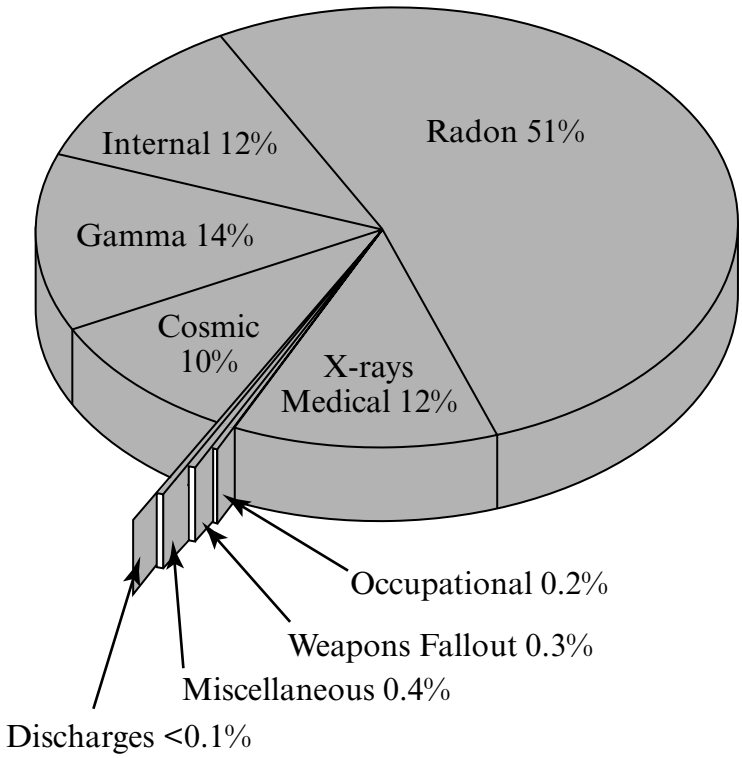
Turn over for the next question

5 The graph shows the sources of exposure to ionising radiation for the average person living in the UK.



(a) Give **two** reasons why some people may receive annual doses that are very different from the average.

1. .....

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2. .....

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(2 marks)

(b) Outline why different types of radiation pose different health risks.

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(2 marks)

(c) Describe **two** methods that are used to reduce the exposure to radiation of workers in the nuclear industry.

1. .....

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2. .....

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(4 marks)

(d) Suggest features of a person's lifestyle that would make them suitable for inclusion in the Critical Group for monitoring pollution from a nuclear power station.

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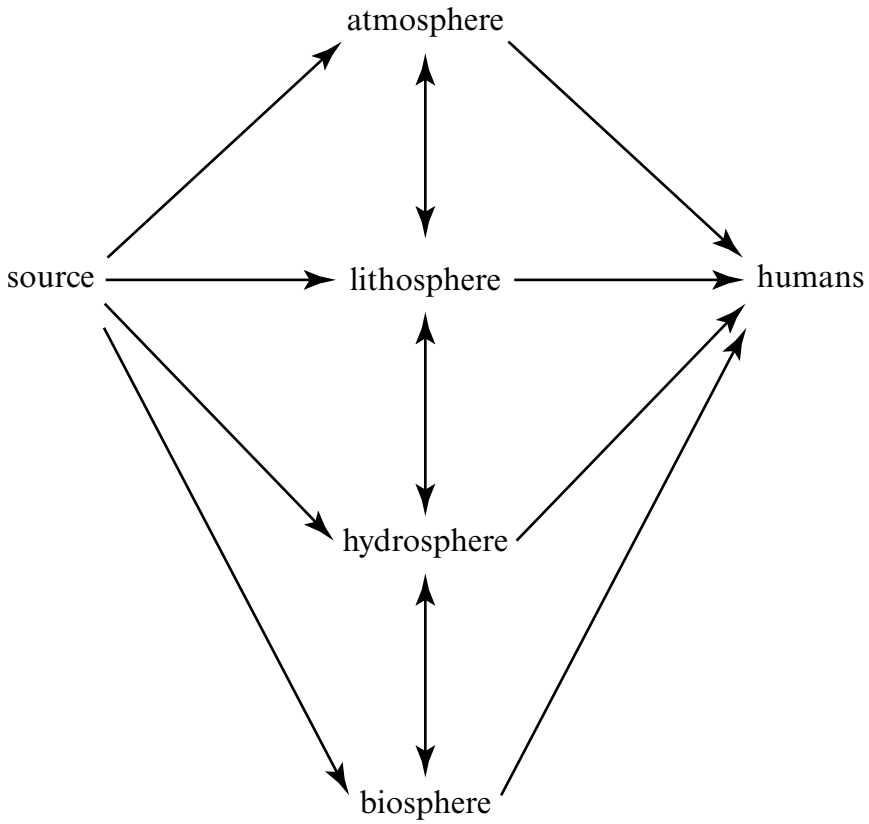
(3 marks)

Question 5 continues on the next page

(e) The diagram shows some of the pathways that a pollutant may take between its source and humans.



Explain how environmental factors may affect pollutant pathways.

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(4 marks)

15

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, also for the organisation and presentation of the essay and use of grammar, punctuation and spelling.

EITHER (a) Discuss the ways in which the extraction, harnessing, processing and use of energy resources may cause pollution. *(20 marks)*

OR (b) Discuss how educational, legal, economic and technological strategies can be used to reduce pollution. *(20 marks)*

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(20 marks)

END OF QUESTIONS

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