FOR OFFICIAL USE

Total Marks

X055/201

NATIONAL QUALIFICATIONS 2007

WEDNESDAY, 6 JUNE
1.00 PM – 3.00 PM

MANAGING ENVIRONMENTAL RESOURCES
INTERMEDIATE 2

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth
Day Month Year

Scottish candidate number

Number of seat

1 Attempt **all** questions in Section 1. In Section 2 there is a choice.

2 Read the whole of each question carefully before you answer it.

3 Write in the spaces provided.

4 Additional space for answers will be found at the end of the book. If further space is required, supplementary sheets may be obtained from the invigilator and should be inserted inside the **front** cover of this book.

5 There is a separate Ordnance Survey Map Extract for use with Question 8.

6 Rough work, if any should be necessary, should be written in this book and then scored through when the fair copy has been written.

7 Before leaving the examination room you must give this book to the invigilator. If you do not, you may lose all the marks for this paper.

DO NOT WRITE IN THIS MARGIN

SECTION 1

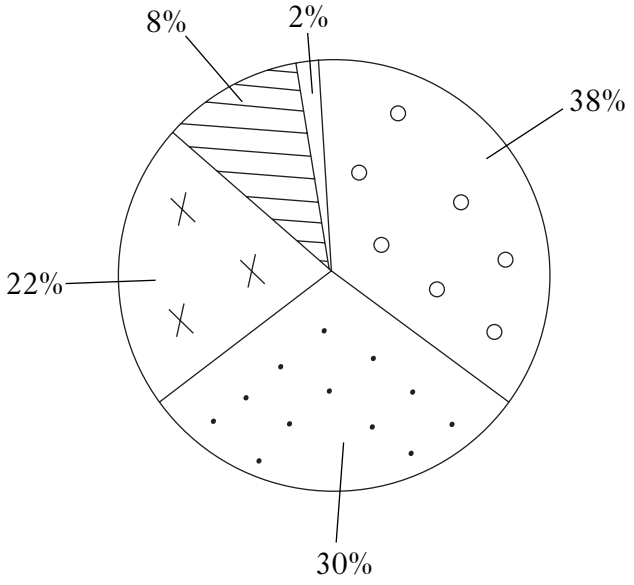
Answer ALL questions in the spaces provided.

Marks

Use the map extract to answer Question 8.

1. (*a*) The pie chart below shows the sources from which electricity was generated in Scotland for the year 2003.

Sources



KEY

	Nuclear
	Coal
	Oil & Natural gas
	Hydro
	Other renewables

(i) Name the major source of electricity generation in Scotland in 2003.

_____ **1**

(ii) What percentage of electricity was generated from fossil fuels in 2003?

Space for calculation

_____ **%** **1**

(iii) Natural gas from the North Sea started to be used for generating electricity in the early 1970s. What was the major source for generating electricity before 1970?

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

1. (continued)

(*b*) The target for electricity generated from renewable sources is 18% by 2010. One proposal being considered in Scotland is to build more wind farms.

(i) Give **two** advantages to the environment of building wind farms.

1 _____ **1**

2 _____ **1**

(ii) Give **two** disadvantages of building wind farms.

1 _____ **1**

2 _____ **1**

(iii) There is an alternative proposal to build another nuclear power station. Give **one** advantage and **one** disadvantage of generating electricity from nuclear fuel.

Advantage _____ **1**

Disadvantage _____ **1**

(iv) Name **one** other renewable resource which can be used to generate electricity.

_____ **1**

(*c*) Name a European country which relies on geothermal sources to generate electricity.

_____ **1**

(*d*) Give **two** differences in energy production between an economically more developed country (EMDC) and an economically less developed country (ELDC).

1 _____

_____ **1**

2 _____

_____ **1**

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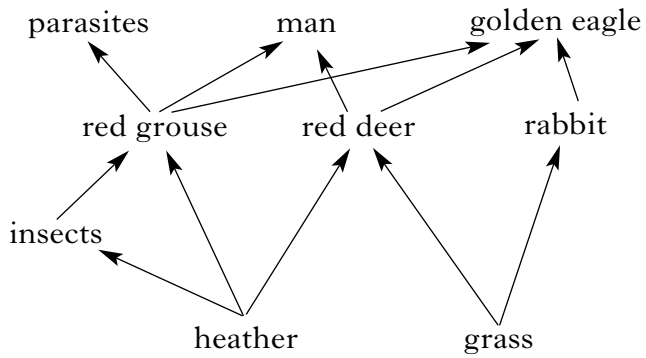
2. The diagram below is part of a moorland foodweb. *Marks*



(*a*) From the food web:

(i) name a producer;

_____ **1**

(ii) name an omnivore;

_____ **1**

(iii) complete the food chain below;

		red grouse	

1

(iv) describe the niche of the red deer;

_____

_____

_____ **2**

DO NOT WRITE IN THIS MARGIN

Marks

2. (*a*) (continued)

(v) name a biotic factor and explain how it can affect the numbers of red grouse.

Biotic factor _____ **1**

Explanation _____

_____ **1**

(*b*) Hen harriers are large birds of prey found on moorland. The number of hen harriers has increased due to legal protection measures.

Predict an effect this would have on the golden eagle population.

Underline one of the options.

Numbers of golden eagle would { increase / stay the same / decrease }.

Give a reason for your answer.

_____

_____ **1**

[Turn over

Marks

2. (continued)

(*c*) The key below is used to identify moorland plants.

Key to moorland plants

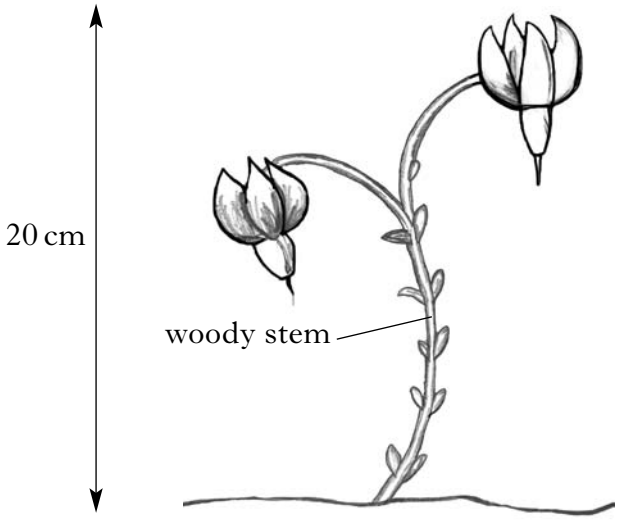
1 Woody plant over 80 cm .....gorse
Woody plant under 80 cm .....go to 2

2 Plant with bell-shaped flowers .....go to 3
Plant with flowers not bell-shaped .....go to 4

3 Flowers dark pink or purple.....bell heather
Flowers pale pink .....cross-leaved heath

4 Flowers single or in pairs on stem .....cranberry
Multiple flowers on stem .....ling

(i) Use the key to identify the plant below.



Name _____ **1**

(ii) Give **one** similarity and **one** difference between bell heather and ling.

Similarity _____ **1**

Difference _____

_____ **1**

Marks

3. (*a*) The table below gives information on sources of emissions causing air pollution in a Scottish city for the year 2005.

	Source of emissions %			
Pollutant	*Road transport*	*Industry*	*Domestic*	*Others*
Oxides of carbon	97	0	0	3
Oxides of nitrogen	78	2	12	8
Sulphur dioxide	88	0	4	8

(i) What is the main source of air pollution?

_____ **1**

(ii) The total emissions of oxides of carbon is 268 tonnes/km.
Calculate the mass of oxides of carbon released by road transport.
Space for calculation

_____ tonnes/km **1**

(iii) Give **one** way of reducing emissions from:

road transport; _____ **1**

industry. _____ **1**

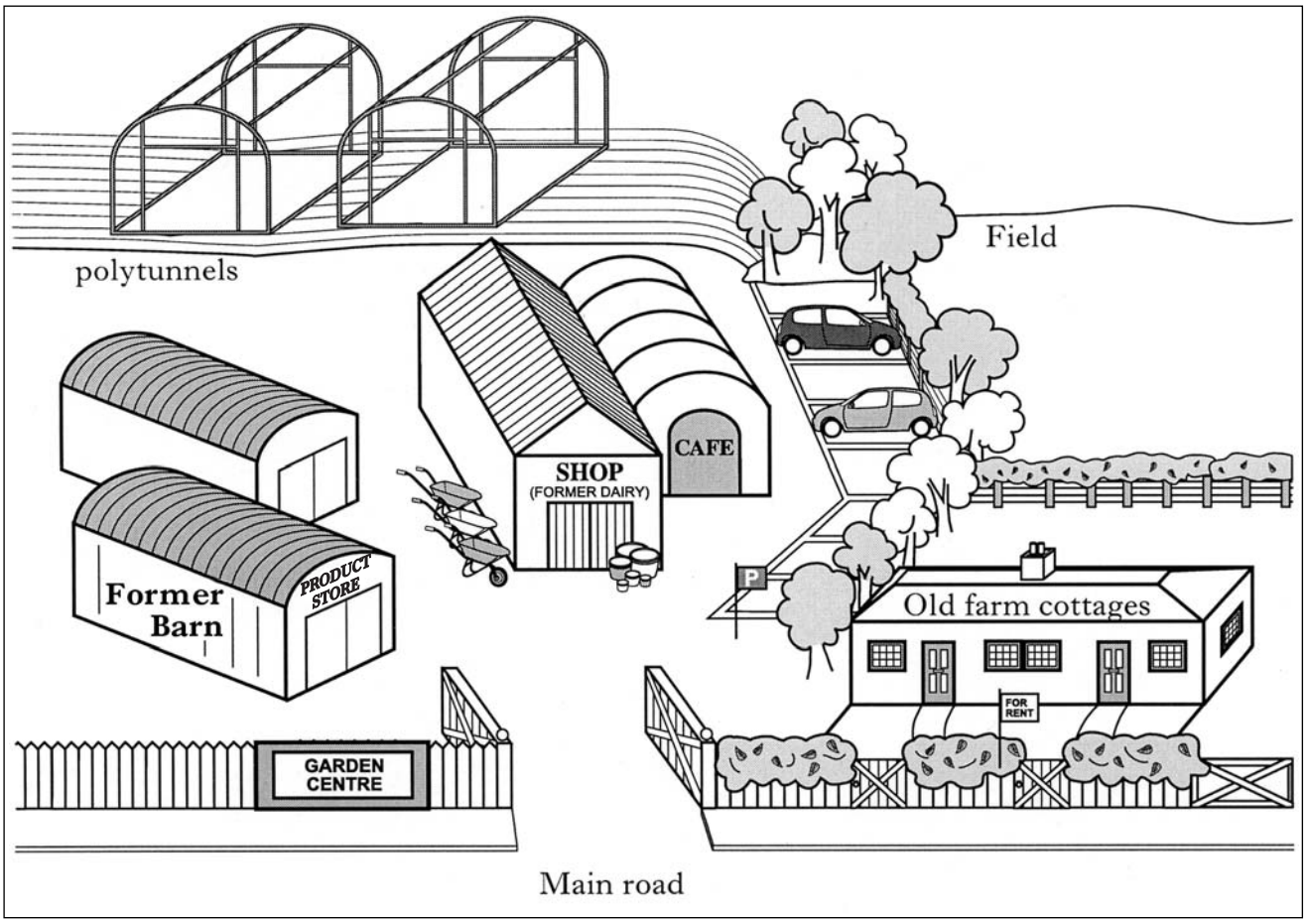
(*b*) Pollutants contribute to the formation of acid rain.
Give **one** effect of acid rain on:

organisms; _____ **1**

habitat. _____ **1**

Marks

4. The diagram below shows a large garden centre sited in the countryside near a town.



(*a*) (i) Give **two** natural resources on which the garden centre depends.

1 _____

2 _____ **1**

(ii) Name **two** man-made resources used at the garden centre.

1 _____

2 _____ **1**

(iii) Suggest **two** types of recyclable waste produced at the garden centre.

1 _____

2 _____ **2**

(iv) Circle the name used to describe the plants sold at the garden centre.

weeds *wild* *cultivated* *domesticated* **1**

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4. (continued)

(*b*) The landowners have diversified from farming.

(i) Suggest a reason for this diversification.

_____ **1**

(ii) Give **two** examples of changes of land use at this site.

1 _____

_____ **1**

2 _____

_____ **1**

[Turn over

Marks

4. (continued)

(*c*) Daily monitoring of temperature occurs at the garden centre.

The daily temperatures recorded for sixteen consecutive days in May 2005 are shown in the table below.

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Ground temperature °C	0	7	0	–3	–1	–1	–4	–3	–1	–2	1	6	3	–4	–4	5
Air temperature (minimum) °C	2	7	3	1	1	2	0	0	1	1	2	7	5	–1	–2	5
Air temperature (maximum) °C	14	14	12	12	12	10	10	13	16	15	17	20	9	11	10	12

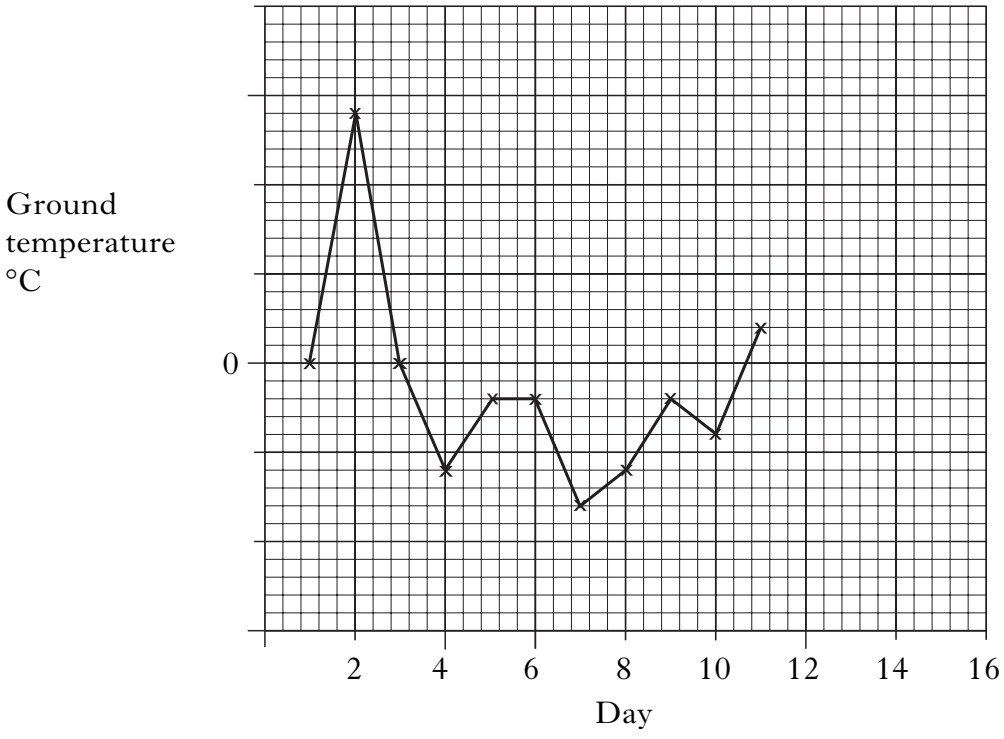
(i) Part of the line graph for **ground** temperature is shown below.

Using information from the table:

A add the appropriate scale to the vertical axis;

B complete the line for **ground** temperature.

(An additional climate graph can be found on page 28.)



2

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4. (*c*) (continued)

(ii) Use the information in the table to complete the sentence.

The range in **air** temperature is from _____ °C to _____ °C. **1**

(iii) From the table, on which **two** days would the plants be at most risk from frost damage?

_____ **1**

(iv) Suggest **one** precaution the garden centre could take to prevent frost damage.

_____

_____ **1**

(*d*) Temperature is an abiotic factor.

Name **one** other abiotic factor which could be monitored at the garden centre.

_____ **1**

[Turn over

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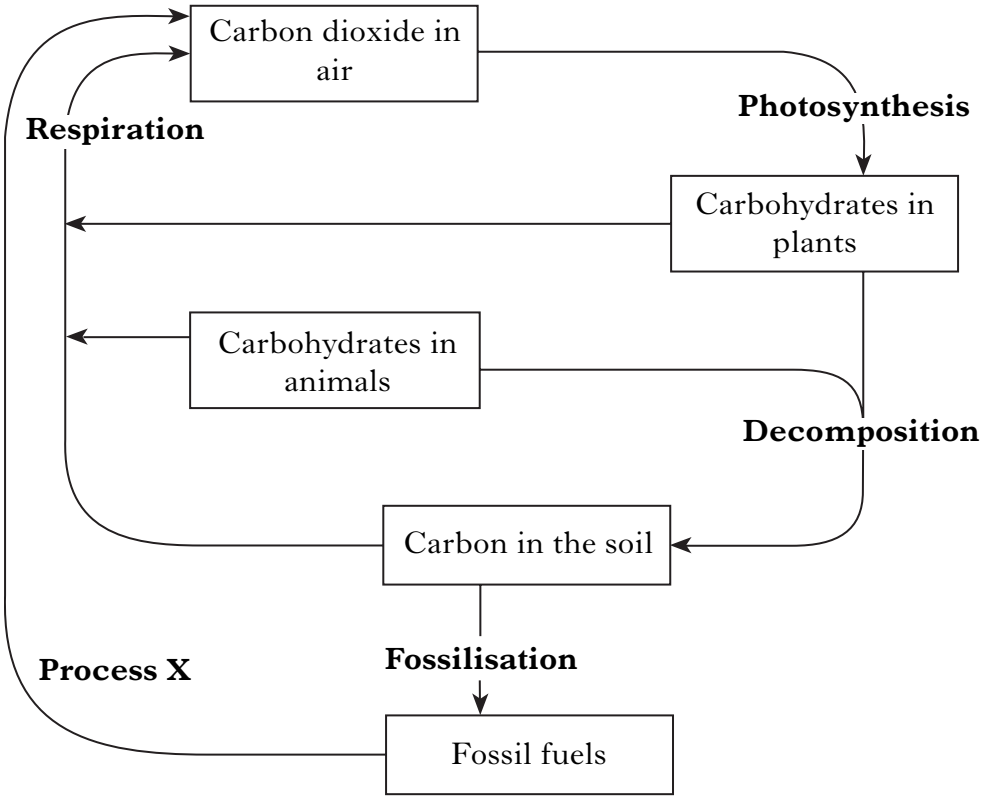
5. The diagram below shows the cycling of carbon.



(*a*) Complete the diagram by:

(i) naming Process X;

_____ **1**

(ii) adding **one** arrow to represent the process of feeding. **1**

(*b*) Name **two** requirements, other than carbon dioxide, for the process of photosynthesis.

_____ and _____ **1**

(*c*) Complete the word equation for the process of respiration.

Carbohydrate + _____ → Energy + carbon dioxide + _____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

5. (continued)

(*d*) Decomposition recycles the nutrient, carbon.

(i) Give **two** examples of decomposers.

_____ and _____ **1**

(ii) Name **one** other nutrient that is recycled during decomposition.

_____ **1**

(iii) Explain why cycling of nutrients is important.

_____

_____ **1**

(*e*) Explain the consequences of increasing levels of carbon dioxide in the air.

_____

_____

_____ **2**

[Turn over

Marks

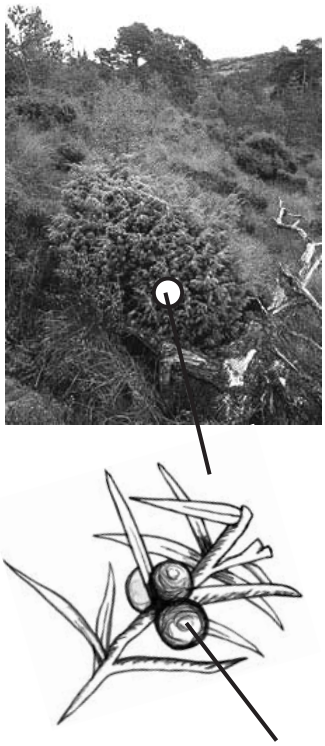
6. Read the passage below and answer the questions which follow.

Local Biodiversity Action Plans

Local biodiversity action plans (LBAPs) are one way in which local authorities are trying to address biodiversity. LBAPs are local partnerships based on national and international initiatives. The Nature Conservation (Scotland) Act (2004) makes conserving biodiversity a statutory duty for all public organisations. A national framework for development is available in the Scottish Biodiversity Strategy. Biodiversity is recognised as being one clear measurement of sustainable development.

A typical local partnership would be headed by a steering group, and, in some cases, have a biodiversity officer, who would co-ordinate the plan. Local priority species and habitats are selected from those highlighted for action in the UK Biodiversity Action Plan.

For example, the Common Juniper (*Juniperus communis*) is a low growing, blue-grey native conifer. It was one of the first trees to colonise Britain after the last glaciation. Recent studies have indicated a 60% decline in this species.



cone

The cones, which resemble berries, were used historically in medicine and for flavouring gin. The wood was burned for its sweet smell and the plant was used traditionally for warding off evil. The juniper is unusual in that it has male and female plants. This becomes a problem where plants have become isolated and so are no longer able to reproduce.

Careful management of identified outcrops of juniper are essential for its survival. A local biodiversity action plan is one way in which this could be achieved.

Everyone has a role to play in conserving local biodiversity. Some measures which could help include:

- plant trees and shrubs to attract butterflies and other insects
- use peat free compost or make your own
- recycle domestic waste.

(*a*) What is meant by sustainable development?

_____

_____ **1**

6. (continued) *Marks* DO NOT WRITE IN THIS MARGIN

(*b*) What is meant by the term "native" in relation to the juniper?

_____

_____ **1**

(*c*) Explain how historical uses have influenced the decline of the juniper.

_____

_____

_____

_____ **2**

(*d*) Suggest **one** way in which a management plan could help prevent the juniper from becoming extinct.

_____

_____ **1**

(*e*) Name **one** animal species in need of conservation.

_____ **1**

(*f*) LBAPs are one way in which a single species can be conserved.

Name **one** other.

_____ **1**

(*g*) Give **two** ways in which you could contribute to improving local biodiversity.

1 _____

2 _____ **1**

[Turn over

7. In 1975, an investigation was carried out into the distribution of lichens in a city. The investigation was repeated in 2005.

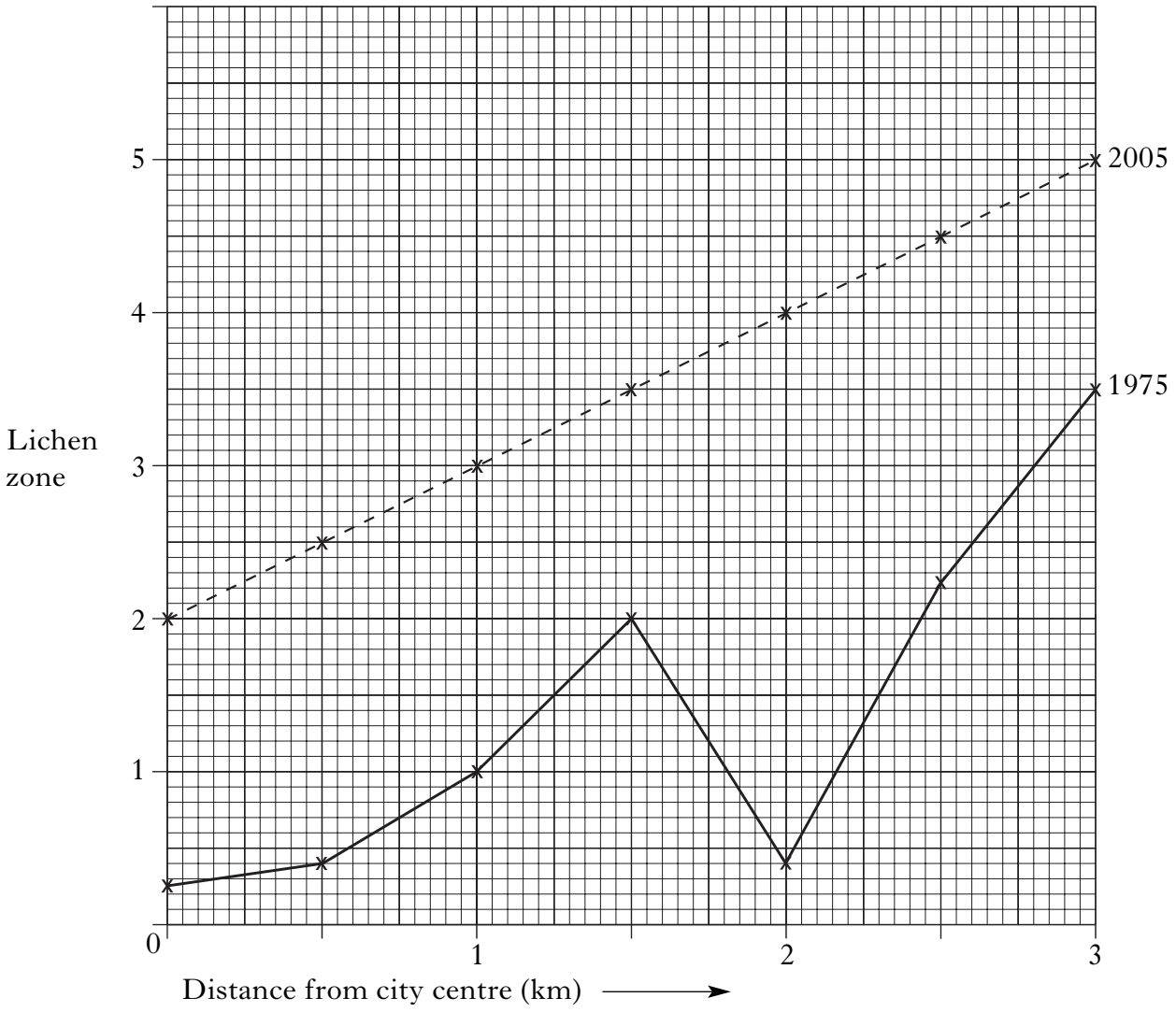
Some lichens are more sensitive to air pollution than others.

Information about the investigation is shown in the table below.

Main type of lichen found	*Lichen zone*	*Level of sensitivity to air pollution*
Crusty	1	Low sensitivity
Scaly	2	↓
Leafy, found on walls	3	↓
Leafy, found on trees	4	↓
Shrubby	5	High sensitivity

Using random sampling, the numbers of lichen species were counted at 0·5 km intervals from the city centre. An average value was calculated at each distance to give the lichen zone.

The graph below shows the lichen zone found at 0·5 km intervals from the city centre for the years 1975 and 2005.



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7. (continued)

(*a*) From the table:

(i) which **type** of lichen is least sensitive to air pollution?

_____ **1**

(ii) which **zone** contains lichens which are most sensitive to air pollution?

_____ **1**

(*b*) (i) Name a piece of equipment which is used to sample plant species.

_____ **1**

(ii) Explain why random sampling is used in this investigation.

_____

_____ **1**

(iii) Explain why an average value was calculated at each distance to give the lichen zone.

_____ **1**

(*c*) Use the graph and the table to answer the following questions.

(i) Suggest a reason for the lichen zone result at 2 km from the city centre in 1975.

_____ **1**

(ii) Give **two** conclusions about air pollution in this city.

1 _____

_____

2 _____

_____ **2**

[Turn over

[Turn over for Question 8 on *Page nineteen*

Marks

8. Use the map extract of the Aberdeen area—Extract No 1562/38 **(separate item)**.

(*a*) The map extract shows different urban environments.

(i) Complete the table using the information below.

9004
9306
port
industry
town park

Land use	*Grid reference*
residential area	
	9502
town centre	
	9505
	9304

3

(ii) Name **two** places, with their grid reference (GR), of tourist interest.

Place _____ GR _____

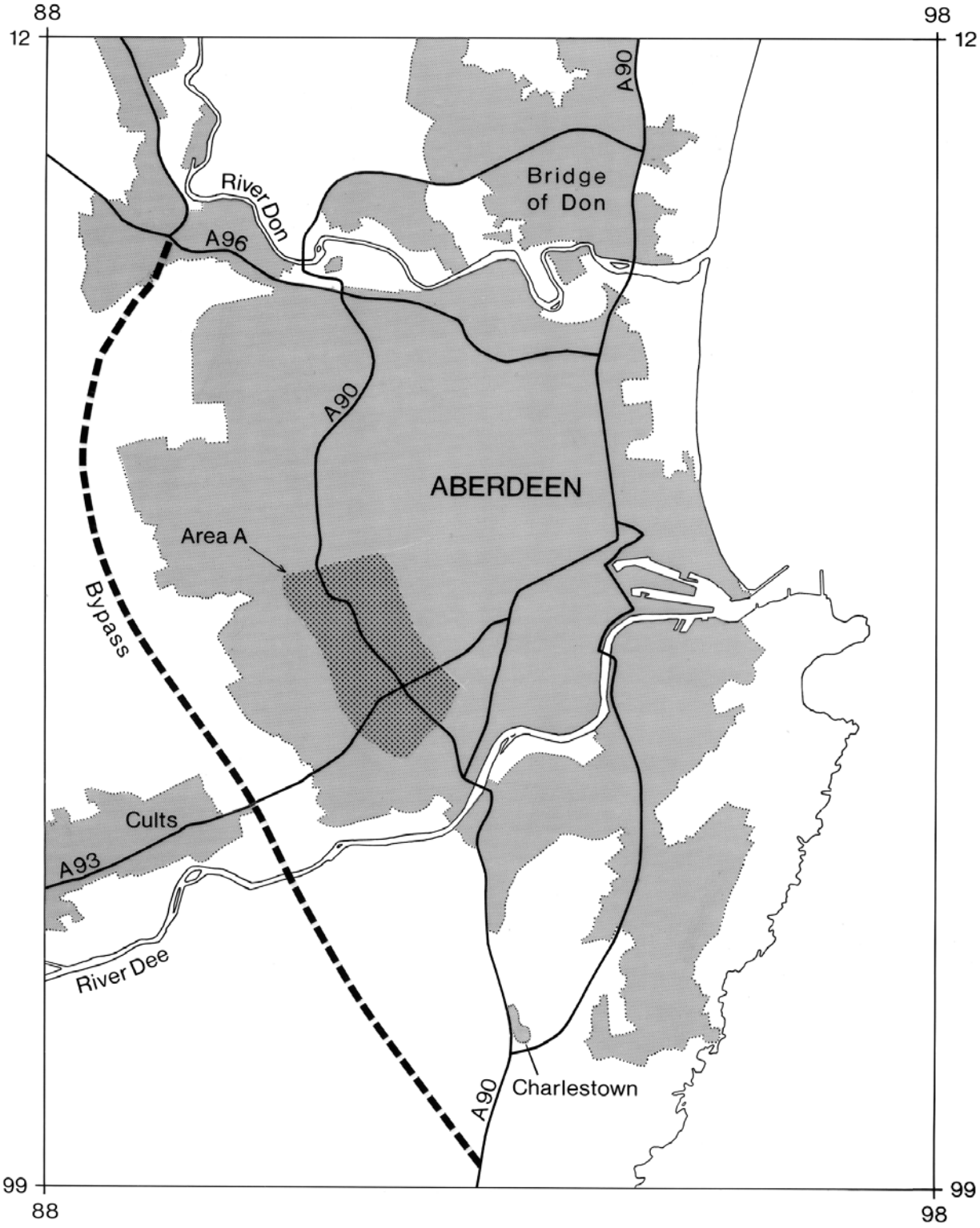
Place _____ GR _____ **1**

[Turn over

8. (continued)

(*b*) Most traffic approaching Aberdeen from the south uses the A90 dual carriageway through the built up area.

The sketch map below shows the route of a proposed bypass.



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8. (*b*) (continued)

(i) Give **one** possible environmental benefit of a bypass to:

residents in Area A;

_____ **1**

the transport industry.

_____ **1**

(ii) Describe **one** negative environmental impact of a bypass.

_____

_____ **1**

(*c*) In the planning process for a bypass, different groups put forward their own interests.

Describe a possible conflict of interest between **two** named groups for the proposed route of the bypass.

Group 1 _____ Group 2 _____

Possible conflict _____

_____ **2**

(*d*) Give **two** examples of energy efficiency schemes for public transport.

1 _____

2 _____ **2**

[Turn over

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Marks

8. (continued)

(*e*) Loirston Country Park and Loch are located at GR 9302 and 9301.

A Country Park is designated as a "park or pleasure ground in the countryside and which, by reason of its position in relation to concentrations of population, affords convenient opportunities to the public for enjoyment of the countryside or open air recreation".

Countryside (Scotland) Act 1967

(i) Name **two** large residential areas close to the Park and the Loch.

1 _____

2 _____ **1**

(ii) Suggest **two** recreational pursuits that would be available in a Country Park.

1 _____

2 _____ **1**

(iii) Loirston Loch is a valuable site for breeding and over-wintering of wild birds. The work of the local Countryside Ranger includes guided walks and talks to schools and local groups.

Explain how this will help protect the wild birds.

_____ **1**

(*f*) Historically, Footdee (GR 9506) was a small fishing village.

(i) Suggest **one** natural feature that gave an advantage to this site.

_____ **1**

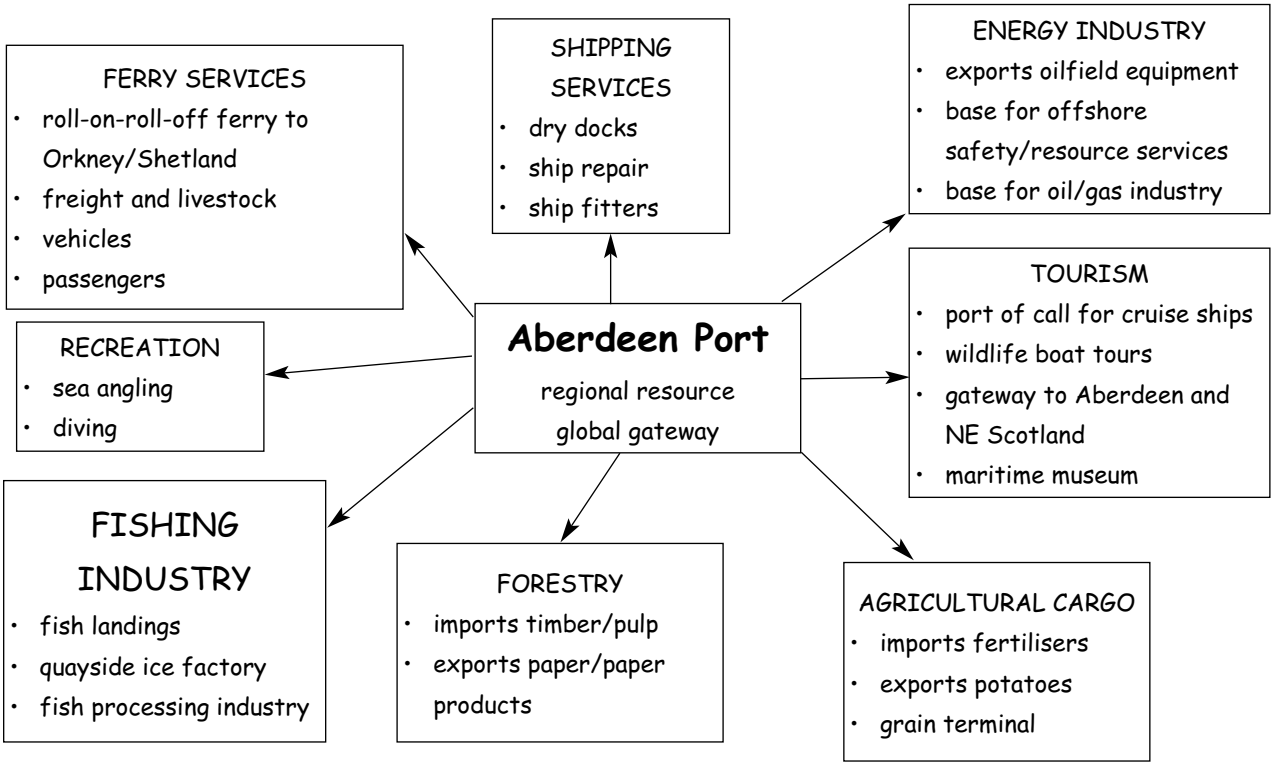
(ii) Suggest **one** geological feature that is dangerous to shipping at this site.

_____ **1**

Marks

8. (continued)

(*g*) The diagram below shows some of the user groups of the Port of Aberdeen.



(i) Name the natural resource on which these user groups in the Port of Aberdeen rely.

_____ **1**

(ii) Explain how the diagram shows multi-use and integration of the user groups.

_____

_____ **1**

(iii) Choose **one** of the user groups and give **two** ways in which this group benefits the local economy.

User group _____

Benefit 1 _____

Benefit 2 _____ **1**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

8. (*g*) (continued)

(iv) Forestry uses sustainable methods.

Give **one** sustainable method which is used in forestry.

_____ **1**

(v) In 2002, 8 cruise ships called at the Port of Aberdeen.
In 2005, 10 cruise ships called at the Port of Aberdeen.

Calculate the percentage increase.

Space for calculation

_____ % **1**

DO NOT WRITE IN THIS MARGIN

Marks

SECTION 2

Answer only ONE question—Option A or B or C.

Write your answers on the pages which follow.

Option A

Discuss the ways in which energy demand can be reduced by initiatives at:

(*a*) a national level; **5**

(*b*) a personal level. **5**

(10)

OR

Option B

Discuss the effects of:

(*a*) oil spillage in a named ecosystem; **5**

(*b*) sewage in a named ecosystem. **5**

(10)

OR

Option C

Describe:

(*a*) the historical influences in the development of your area; **5**

(*b*) how you carried out this investigation. **5**

(10)

[*END OF QUESTION PAPER*]

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Marks

SPACE FOR ANSWERS

DO NOT WRITE IN THIS MARGIN

Marks

SPACE FOR ANSWERS

ADDITIONAL CLIMATE GRAPH FOR QUESTION 4(*c*)(i)