

FOR OFFICIAL USE

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Total for
Sections A and B

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X055/301

NATIONAL
QUALIFICATIONS
2011

WEDNESDAY, 8 JUNE
1.00 PM – 3.30 PM

MANAGING
ENVIRONMENTAL
RESOURCES
HIGHER

Fill in these boxes and read what is printed below.

Full name of centre

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Town

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Forename(s)

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Surname

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Date of birth

Day Month Year

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Scottish candidate number

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Number of seat

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- All questions should be attempted.
 - It should be noted that in **Section B** questions 8 and 9 each contain a choice.
- The questions may be answered in any order but all answers are to be written in the spaces provided in this answer book, and must be written clearly and legibly in ink.
- 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.
- The numbers of questions must be clearly inserted with any answers written in the additional space.
- Rough work, if any should be necessary, should be written in this book and then scored through when the fair copy has been written.
- 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.

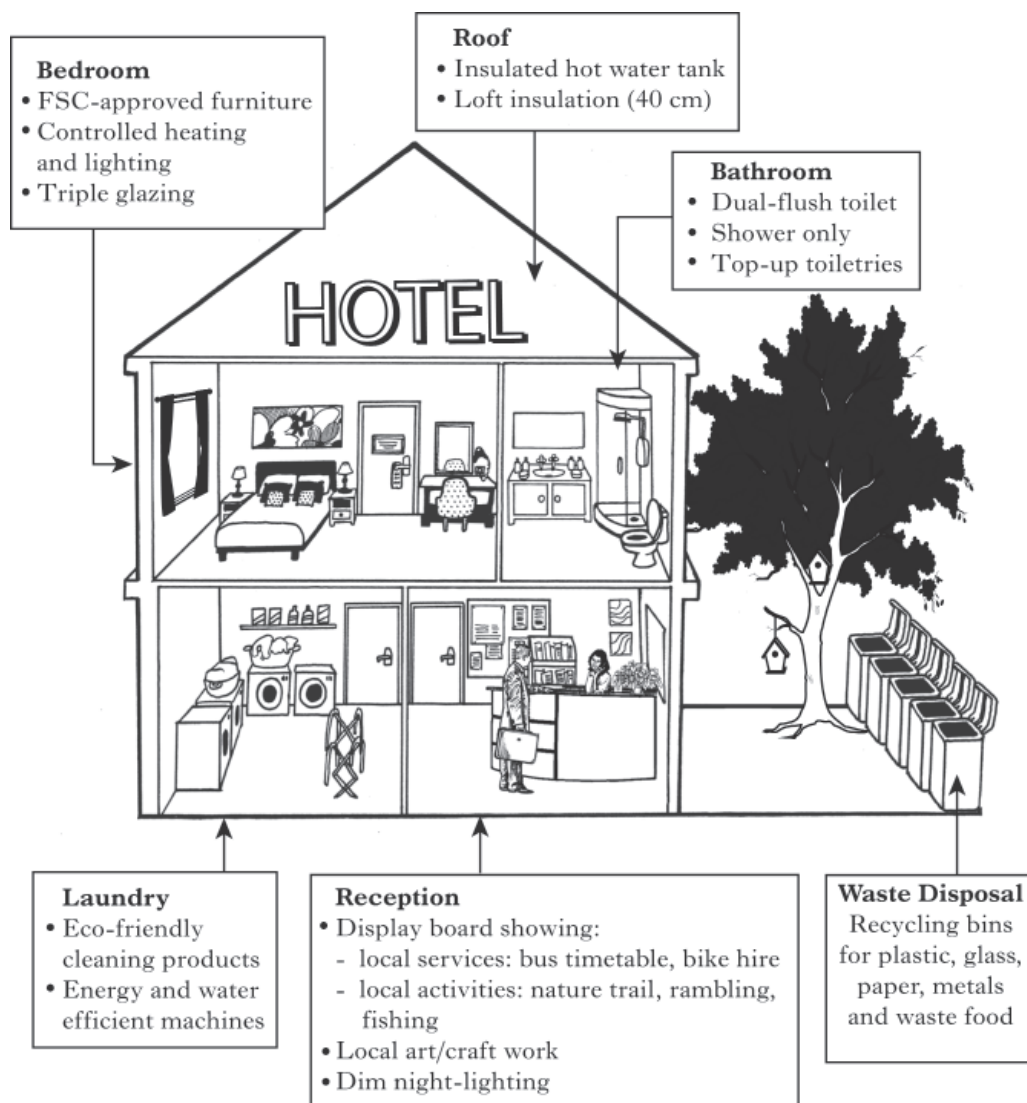


SECTION A

Marks

Answer ALL questions in this section.

1. The diagram below shows a hotel with some of the eco-friendly practices it uses.



- (a) Using information from the diagram above, answer the following questions.

- (i) Give **two** ways in which the hotel uses less water.

1 _____

2 _____

1

- (ii) Give **three** ways in which the hotel reduces energy use.

1 _____

2 _____

3 _____

1

Marks

1. (continued)

- (b) (i) The towels used in the hotel are made from cotton grown in Egypt. Underline the terms that apply to cotton from the list below.

Natural Man-made Renewable Non-renewable

1

- (ii) The materials, energy input and transport required to make, use and dispose of cotton towels have been assessed.

Name this type of assessment procedure.

1

- (c) (i) Plastic bottles are reprocessed to make the filling for the duvets in the hotel's bedrooms. Explain how this illustrates the "reduce, reuse and recycle" principle.

2

- (ii) Name the natural resource from which plastic is made.

1

- (d) The hotel has furniture approved by the Forestry Stewardship Council and identified by its FSC logo.

Describe **one** way in which forestry is managed sustainably.

**1****[Turn over**

1. (continued)

- (e) Green Tourism Awards are given to businesses such as hotels based on their level of eco-friendly practices and their contribution to sustainability. The hotel management carried out its own evaluation of green practices using the checklist below.

<i>Category</i>	<i>Checklist of practices</i>	<i>Currently using green practice ✓ or ✗ or ?</i>
Communication	Does the business support any local social projects?	
Energy	Are machines energy efficient?	✓
	Is there low lighting in appropriate areas?	
	Is loft insulation 30 cm+?	
	Are hot water tanks insulated?	
	No draughts?	✗
Water	No drips from taps?	?
	Reduced flush from toilets?	
	Rain water collection?	
	No sanitary waste flushed?	
Purchasing	Phosphate free, chlorine free soaps, detergents and cleaners?	✓
	Use recycled products in the office/kitchen/bathroom?	✓
	Locally sourced food and drink?	✓
	Promotion of local craft?	✓
	Energy bought from renewable energy supplier?	✓
Waste	Recycle plastic, glass, cans and paper?	
	Avoid packaging by buying in bulk?	✓
	Soap dispensers?	✓
	Composting of waste food?	
Transport	Public transport routes displayed/on website?	✓
	Promote car-free activities such as bike hire?	
Promote natural and cultural heritage	Promote local cultural/natural attractions?	
	Plant native trees on site?	✓
	Have bird/bat/insect boxes on site?	

*Marks***1. (e) (continued)**

- (i) Complete the table using information from the hotel diagram.
- (ii) On the basis of the completed checklist, should the management apply for a Green Tourism Award?

2

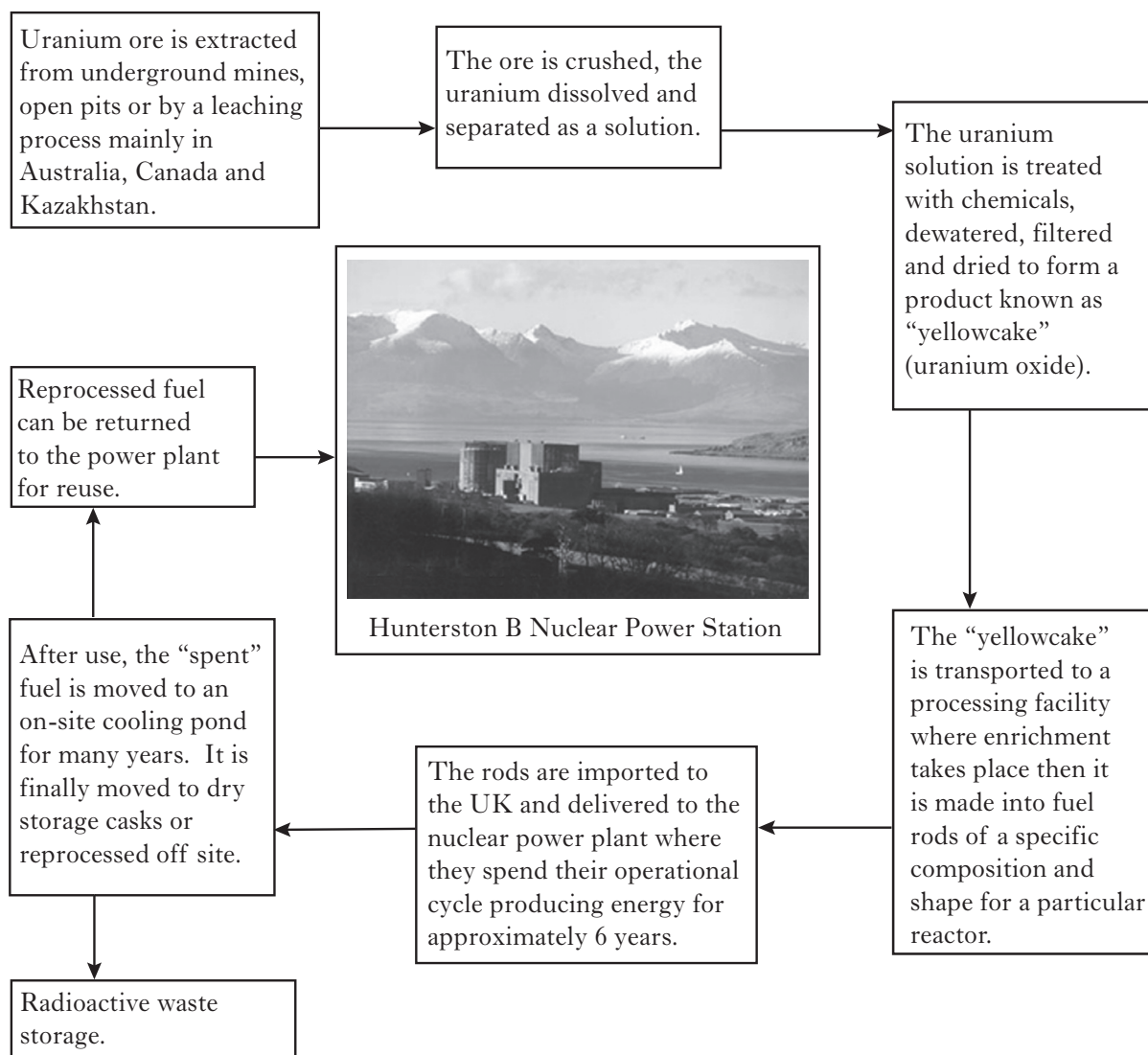
Circle your answer. Yes or No

Justify your decision.

1**[Turn over**

Marks

2. (a) The diagram below shows the nuclear fuel life cycle.



(i) Is uranium a renewable or a non-renewable resource?

Circle your choice and give a reason for your answer.

Renewable

Non-renewable

Reason _____

1

(ii) Explain **one** disadvantage to the environment of producing "yellowcake" from uranium ore.

1

Marks

2. (continued)

- (b) Suggest **two** reasons why some environmental groups oppose the production of nuclear energy.

1 _____

2 _____

2

- (c) Give **two** reasons why the UK Government is considering building new nuclear power stations.

1 _____

2 _____

2

- (d) A large nuclear reactor can produce as much as 30 tonnes of spent fuel per year. In reprocessing, 95% of spent fuel can be recycled.

Calculate the annual tonnage of spent fuel that could be recycled.

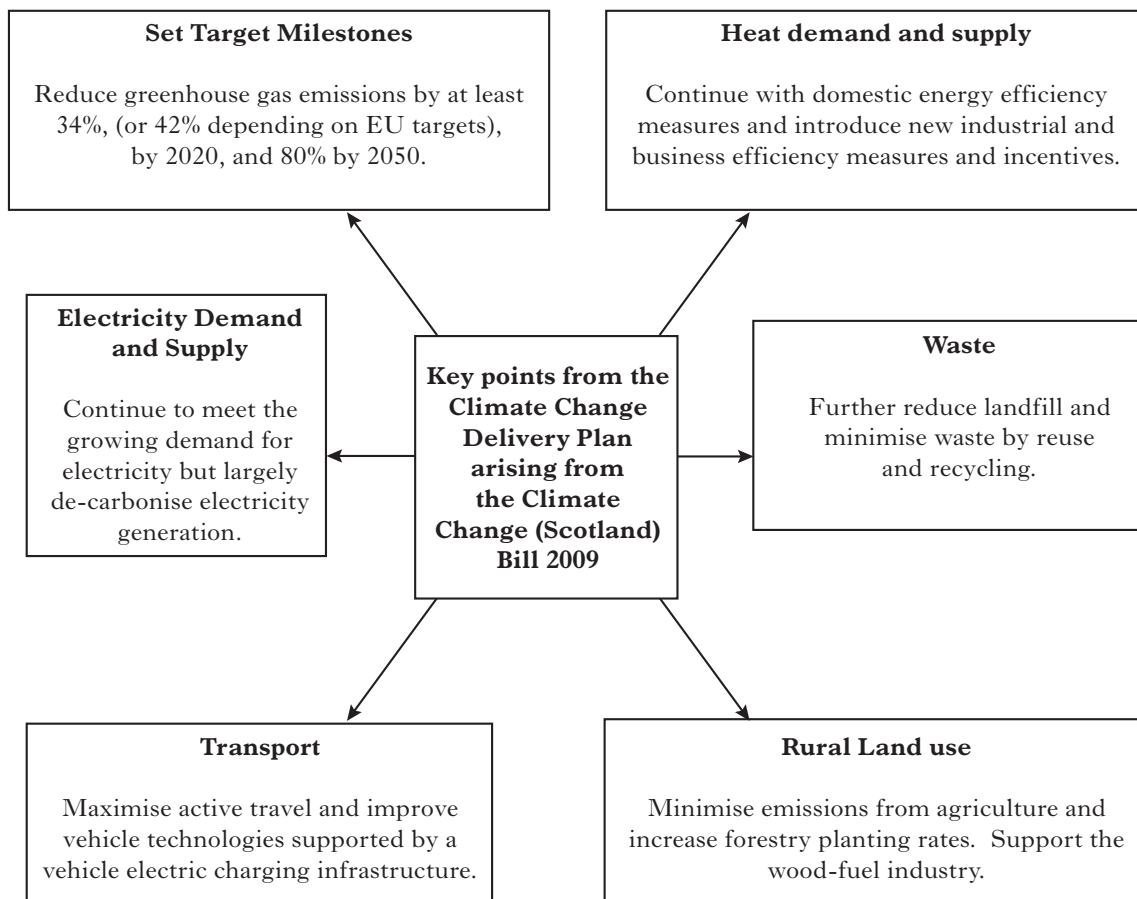
Space for calculation

_____ tonnes **1**

[Turn over

Marks

3. The Climate Change (Scotland) Bill 2009 set a target to reduce greenhouse gas emissions in Scotland. The diagram shows some of the key points for each sector of the Scottish Government's proposed Climate Change Delivery Plan designed to ensure Scotland reaches this target.



- (a) (i) Name **two** greenhouse gases.

_____ and _____ **1**

- (ii) Explain why it is important to reduce greenhouse gas emissions.

_____ **1**

- (iii) Name the international initiative which originally set targets for the reduction of greenhouse gas emissions.

_____ **1**

*Marks***3. (continued)**

- (b) (i) Suggest **one** way in which electricity demand has increased.

_____ **1**

- (ii) Name the piece of existing national legislation which has supported the sustainable sourcing of energy in Scotland.

_____ **1**

- (iii) Name **three** renewable sources of energy.

1 _____

2 _____

3 _____ **1**

- (c) (i) Suggest **two** ways by which a Local Authority could encourage “active travel”.

1 _____

2 _____ **1**

- (ii) Explain how improving vehicle technologies and developing an electric charging infrastructure are interlinked.

_____ **1**

- (d) Explain how energy initiatives can be advantageous to industry and businesses **and** support sustainability.

_____ **2**

[Turn over

*Marks***3. (continued)**

- (e) The Delivery Plan suggests reducing or banning landfill. Give **two** beneficial effects that a landfill ban would have on the environment.

1 _____

2 _____

1

- (f) One target in the plan for rural land use is to sequester (store) more carbon in trees.

- (i) Explain how increasing forestry planting rates will help meet greenhouse gas emission targets and benefit the environment.

1

- (ii) Name the national organisation which oversees forestry planting rates.

1

- (g) The Scottish Rural Development Programme is a current initiative supporting land managers through changes in agricultural practices.

Name **one** other farming initiative.

1

[Turn over for Question 4 on *Page twelve*

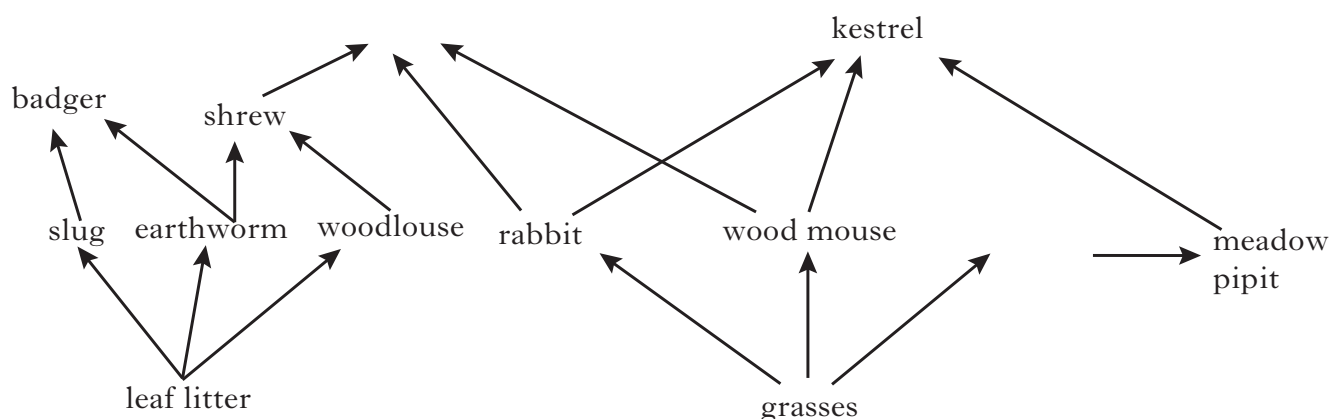
Marks

4. The table below lists some of the organisms in a grassland ecosystem and the food they eat.

<i>Organism(s)</i>	<i>Food they eat</i>
woodlouse, slug, earthworm	leaf litter
rabbit, wood mouse, hoverf y	grasses
badger	slug, earthworm
fox	wood mouse, shrew, rabbit
shrew	woodlouse, earthworm
meadow pipit	hoverf y, grass seeds
kestrel	rabbit, wood mouse, shrew, meadow pipit

- (a) Using information from the table above, answer the following questions.

- (i) Complete the food web below by adding **two** organisms and **two** arrows.



2

- (ii) Name **one** omnivore.

1

- (iii) Give **one** example of inter-specific competition between carnivores for a named food source.

Food source _____

Example _____

1

- (b) Give **two** ways in which energy is lost from a food web.

1 _____

2 _____

1

Marks

4. (continued)

(c) The table below gives information on three types of grassland ecosystem.

	<i>Information on grassland ecosystem</i>		
	<i>Acid</i>	<i>Neutral</i>	<i>Calcareous</i>
pH	Less than 7	7	More than 7
General characteristics of plants	Fewer species	Many species Taller plants	Many species Shorter plants
Examples of plant species found growing in the ecosystem	Tormentil, heath bedstraw and fescue grasses	Lady's bedstraw, bird's-foot trefoil and sweet vernal grass	Thyme, rockrose and bent grass

- (i) Give **two** features that would indicate a calcareous grassland ecosystem.

1 _____

2 _____

1

- (ii) Suggest **one** other abiotic factor that could account for the lower abundance of species in acid grassland.

1

- (d) Give the term used to describe a species whose presence or absence is determined by an abiotic factor.

1**[Turn over]**

Marks

4. (continued)

- (e) The East of Scotland Grassland Management Scheme provides support to restore or maintain special grassland ecosystems. Good management of animal stock levels allows the vegetation to be shortest in the spring for seed germination and longest in the summer to allow plants to flower and seed. Grazing is the preferred management method for nature conservation because trampling, dunging and defoliation by the animals create a variety of new habitats in grassland.

- (i) Suggest when would be the best time of year to cut the vegetation.
Give a reason for your answer.

Time of year _____

Reason _____

1

- (ii) Give **two** benefits of the good management of stock levels. Suggest how these impact on biodiversity.

Benefits

1 _____

2 _____

Impact _____

2

- (iii) The landowner is paid to manage the grassland. The grazing payment rate in 2007 was:

£85 per hectare (ha) for the first 5 ha
£60 per ha for the next 5 ha, and thereafter
£40 per ha.

Calculate how much was paid when 12 ha were grazed.

Space for calculation

£ _____ 1

Marks

4. (continued)

(f) Insects are of such great economic importance as crop pollinators that they contribute 14·2 billion euros to the EU economy. However, the population numbers of honey bees (*Apis mellifera* sp.) have fallen drastically. The parasitic Varroa mite is found only on honey bees and is one of the contributory factors in the decline in honey bee numbers.

(i) Give **two** reasons why honey bee numbers must be maintained at high levels.

1 _____

2 _____

1

(ii) Are parasites considered density dependent or density independent factors?

1

(iii) Suggest **two** reasons why the Varroa mite should not be controlled by the use of pesticides.

1 _____

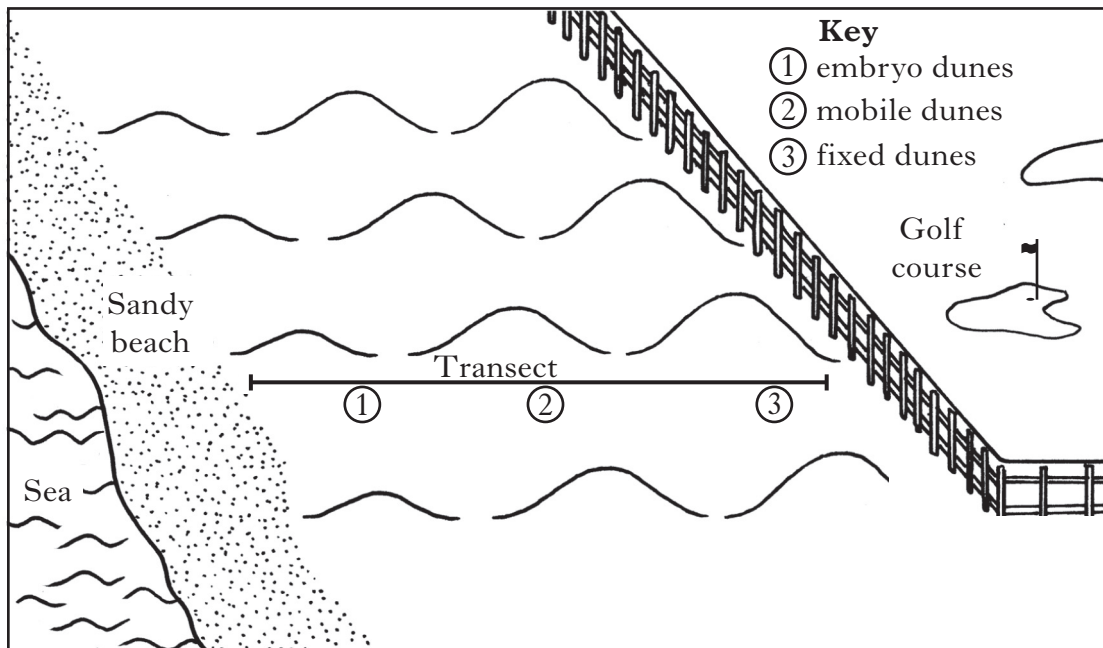
2 _____

1

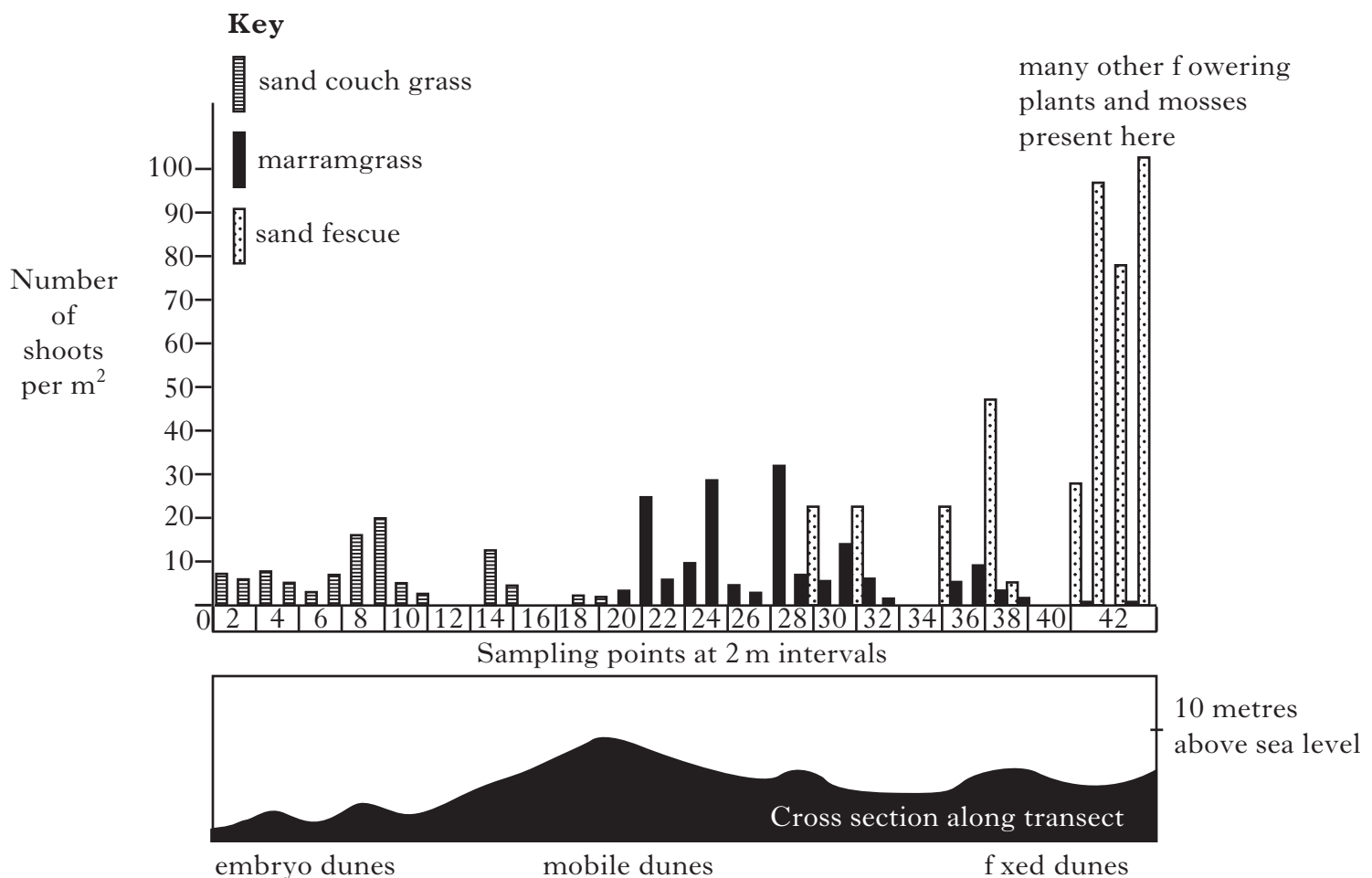
(iv) Describe and explain the effect on insect population numbers of establishing headlands around field margins.

2**[Turn over**

5. (a) The diagram below shows part of the Scottish coastline with sand dunes which were the site for an investigation. Seashore sand is mobile. Some grasses, such as marram grass, are able to stabilise the sand using their specialised root system. This allows more sand to be deposited and a dune to grow.



The investigation was carried out to determine the distribution of three species of grass in the sand dune ecosystem. Using a belt transect, the number of grass shoots of each species which were above the sand was counted. The results are shown in the graph below.



Marks

5. (a) (continued)

(i) Name the species of grass which:

1 produces the greatest number of grass shoots per square metre;

2 is most tolerant of sea water.

1 _____

2 _____

1

(ii) Give **one** way to improve the reliability of the results in the investigation.

1

(iii) Suggest **one** way in which the validity of the investigation could be ensured.

1

(iv) Describe and explain succession in a sand dune ecosystem using examples from the transect.

3

(b) State the biological term which describes characteristics of a species which have become specialised to enable it to exploit the resources in a particular habitat.

1

(c) Suggest **one** environmental impact on the sand dune ecosystem of:

(i) visitors to the beach;

1

(ii) the golf course.

1

Marks

6. (a) Read the information below and answer the questions that follow.

Assynt is an area located in the North West Highlands of Scotland, north of Ullapool. It is renowned for its spectacular mountain scenery, undulating landscape and peculiar geology including the Lewisian Gneiss, one of the oldest rock types in the world.

Assynt:

- is one of the most sparsely populated areas of Scotland with small crofting communities, fishing villages and large estates
- has NSA status, many SSSIs, areas of native woodland and Scotland's first designated Geopark—an area of outstanding geological features
- is dominated by two isolated sandstone mountains—Suilven and Canisp, popular with hill walkers and climbers
- has a complex and variable coastline of sandy beaches, rocky inlets, sea stacks and cliffs
- has a long and varied history, evidenced in the ruin of Ardvreck Castle, stronghold of the MacLeods of Assynt and the limestone “Bone Caves”.



- (i) Give **two** past influences affecting land use in the area.

_____ and _____ **1**

- (ii) Provide **three** pieces of information to justify the inclusion of Assynt in a Geopark.

1 _____

2 _____

3 _____ **1**

- (iii) What does the abbreviation NSA stand for?

_____ **1**

*Marks***6. (continued)**

- (b) Assynt was the first crofting area to be “purchased”, by the Assynt Crofters’ Trust, in 1993, fuelling changes in land ownership.

Describe **three** features of crofting as a rural practice.

1 _____

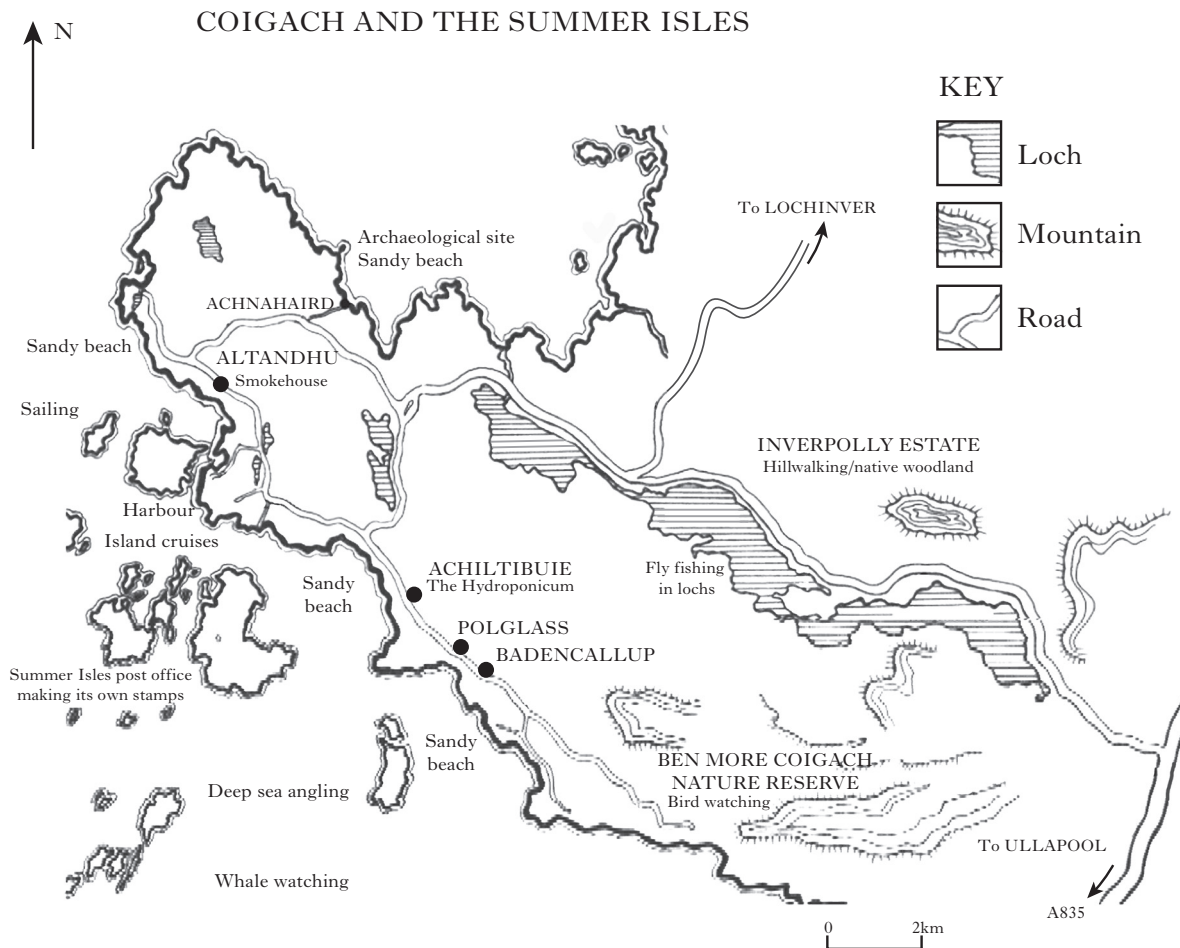
2 _____

3 _____

2**[Turn over**

6. (continued)

- (c) Coigach and the Summer Isles is an area of Assynt favoured by tourists and visitors for recreational and leisure activities. The map below shows some of these.



Marks

6. (c) (continued)

- (i) Suggest **two** reasons why fishing is an established water use in the area.

1 _____

2 _____

1

- (ii) Complete the table below using information from the map.

	<i>Recreational activity —water based</i>	<i>Recreational activity —wildlife based</i>	<i>Tourist attraction —historical/cultural</i>
Example 1			
Example 2			

2

- (iii) Suggest **one** economic benefit and **one** social pressure created by tourism in the area.

Economic benefit _____

Social pressure _____

1

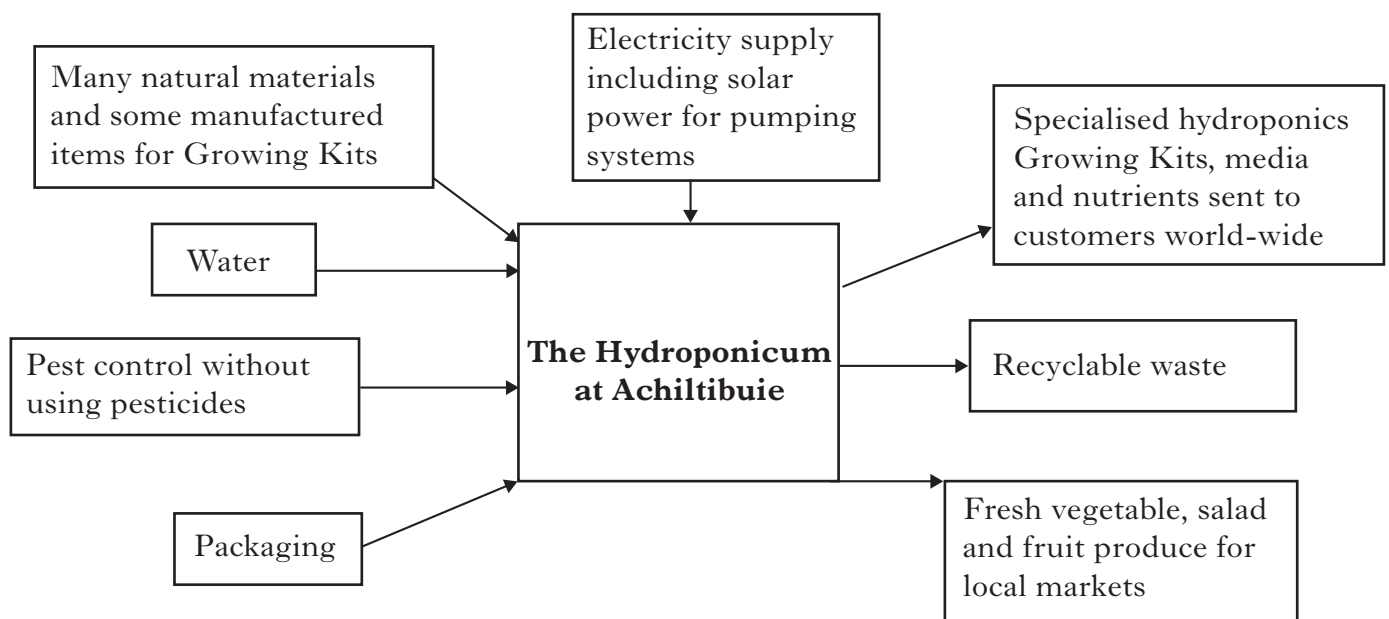
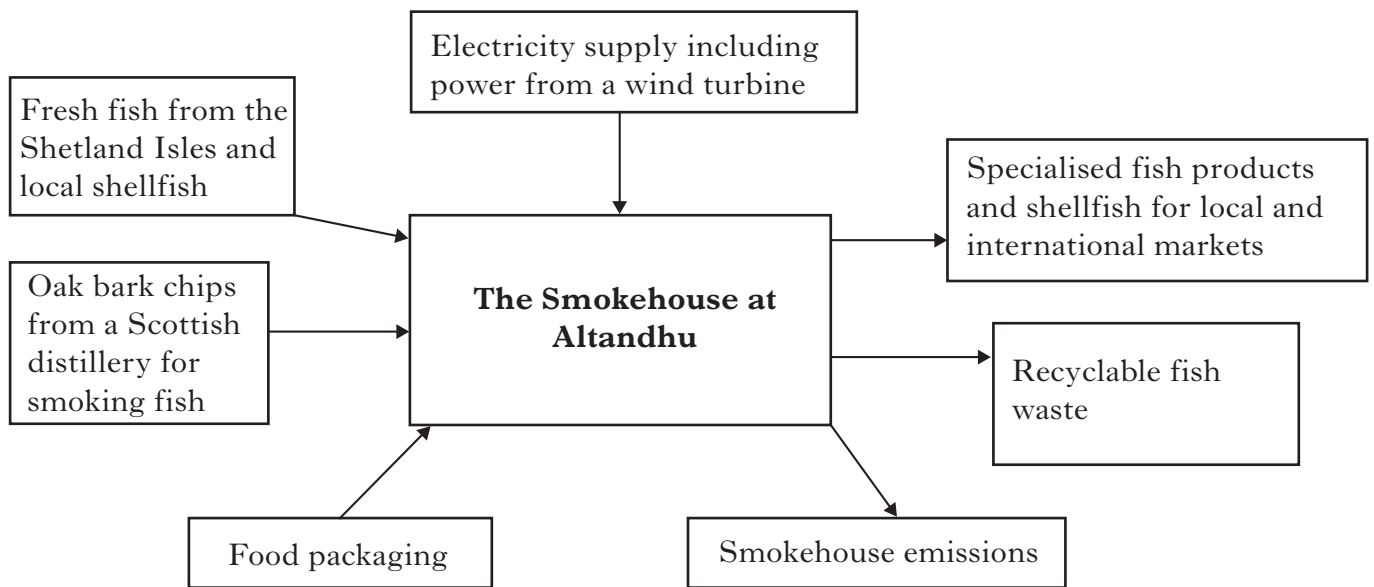
- (iv) Suggest **one** moral responsibility tourists should have towards the community when visiting the area.

1**[Turn over**

6. (continued)

- (d) Two local businesses have developed in Coigach, distributing their products to many areas. One is a smokehouse, producing high quality fish produce. The other is the Hydroponicum. Hydroponics is a specialised method of growing plants, without soil, using nutrient solutions.

The diagrams below show some features of these two businesses.



*Marks***6. (d) (continued)**

Using information from the diagrams opposite, answer the following questions.

- (i) Give **three** sustainable practices used by both businesses.

1 _____

2 _____

3 _____

1

- (ii) Give **one** non-sustainable practice used by both businesses.

1

- (iii) A local skilled workforce is used by both these businesses. Explain why this is a sustainable practice for the whole community.

1

- (iv) Suggest why diversification from traditional land/water uses has been necessary for communities in this area of Scotland.

1**[Turn over**

Marks

7. Scottish Natural Heritage (SNH) was established in 1992 through the Natural Heritage (Scotland) Act 1991. The Act sets out the following purposes for SNH:

- to secure the conservation and enhancement of Scotland's natural heritage
- to foster understanding and facilitate enjoyment of it
- to encourage and sustain its use.



(a) Name **one** other piece of legislation which includes responsibilities for SNH.

_____ 1

(b) Give **two** aspects of Scotland's natural heritage that SNH supports.

1 _____

2 _____ 1

(c) Describe **two** roles of SNH that would help "foster understanding" of Scotland's natural heritage.

1 _____

2 _____

_____ 2

(d) Name **two** types of designated site for which SNH has responsibility.

_____ and _____ 1

Marks

7. (continued)

- (e) The table below shows part of the comparative data collected by SNH and presented in the 1998–2007 Countryside Survey Report (2007).

Habitat	<i>Year</i>					
	<i>1998</i>		<i>2007</i>		<i>1998–2007</i>	
	<i>Area</i> (‘000s ha)	<i>Area of</i> <i>Scotland</i> %	<i>Area</i> (‘000s ha)	<i>Area of</i> <i>Scotland</i> %	<i>Change in</i> <i>area</i> (‘000s ha)	<i>% change</i>
Broadleaved, mixed and yew woodland	229	2·9	251	3·1	22	9·6
Coniferous woodland	1030	12·9	956	11·9	–74	–7·2
Arable and horticulture	618	7·6	534	6·6	–84	–13·6
Improved grassland	831	10·4	907	11·2		

Using information from the table above, answer the following questions.

- (i) Calculate the change in area (‘000 ha) and the percentage change in improved grassland habitat.

Space for calculation

Change in area _____ ha and % change _____ **1**

- (ii) Compare the trends for the woodland habitats and suggest **one** reason for these trends.

Trends _____

Reason _____

_____ **2**

Section B

BOTH questions in this section should be attempted.

Note that each question contains a choice.

Questions 8 and 9 should be attempted on the blank pages which follow.

Supplementary sheets, if required, may be obtained from the Invigilator.

Labelled diagrams may be used where appropriate.

Marks

8. Answer EITHER A OR B.

A. Discuss the positive and/or negative impacts on a named area of freshwater (river, loch, canal) under the following headings:

- | | |
|--|-------------|
| (a) the Scottish Environmental Protection Agency (SEPA); | 5 |
| (b) recreation and leisure activities; | 5 |
| (c) agriculture. | 5 |
| | (15) |

OR

B. Discuss the positive and/or negative impacts on the environment made by:

- | | |
|--|-------------|
| (a) stewards applying the Scottish Access Code; | 5 |
| (b) farmers reducing land drainage and the removal of hedgerows; | 5 |
| (c) members of voluntary conservation agencies. | 5 |
| | (15) |

9. Answer EITHER A or B.

A. Describe the natural cycling of nitrogen in the environment and the impacts that human activities have on it.

(15)

OR

B. Describe soil properties and the factors affecting soil formation.

(15)

[END OF QUESTION PAPER]

Marks

SPACE FOR ANSWERS

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Marks

SPACE FOR ANSWERS

Marks

SPACE FOR ANSWERS

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SPACE FOR ANSWERS

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Marks

SPACE FOR ANSWERS

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SPACE FOR ANSWERS

Marks

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ACKNOWLEDGEMENTS

Question 1(*d*)—FSC Trademark ® FSC Forest Stewardship Council, AC. All rights reserved.

Question 7(*e*)—Table shows part of the comparative data collected by SNH and presented in the 1998-2007 Countryside Survey Report (2007). Public Domain.