FOR OFFICIAL USE

Total Marks

X055/201

NATIONAL QUALIFICATIONS 2010

WEDNESDAY, 9 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.

Marks

1. (*a*) The table below summarises some environmental issues, caused by human activities, which impact on ecosystems.

Environmental issue	*Ecosystem affected*	*Example of impact*
Traffic fumes on a city motorway	Air and urban	Fumes contribute to the formation of acid rain which erodes buildings.
Wind farm on isolated upland area		Building access roads and turbine platforms destroys habitat.
Oil spillage from tanker off a coast	Marine	
Nuclear particles on beaches		

(i) Complete the table. **3**

(ii) Name **one** gas in traffic fumes which contributes to acid rain.

_____ **1**

(iii) Suggest **two** ways in which pollution from traffic fumes could be reduced.

1 _____

2 _____ **2**

DO NOT WRITE IN THIS MARGIN

Marks

1. (continued)

(*b*) Explain how **one** named indicator species can be used to determine the level of pollution.

Named indicator species _____

Explanation _____

_____

_____ **2**

(*c*) Give **two** ways in which levels of litter pollution can be reduced in your local area.

1 _____

2 _____ **2**

[Turn over

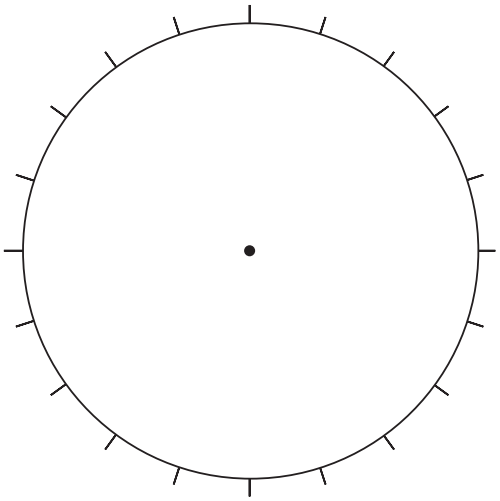
Marks

2. (*a*) The table below gives a summary of Scotland's renewable energy sources and their potential contribution expressed as a percentage (%).

Renewable energy source	*Potential contribution* (%)
Wind : offshore	40
Wind : onshore	18
Tidal	12
Wave	22
Hydro	3
Others	5

(i) Using information from the table complete the pie chart below.

(An additional pie chart can be found on *Page twenty-seven*)



2

(ii) One percent (1%) of energy production could contribute 0·63 gigawatts (GW) of electricity.

Calculate how many GW could be contributed by all the water sources.

Space for calculation

_____ GW **1**

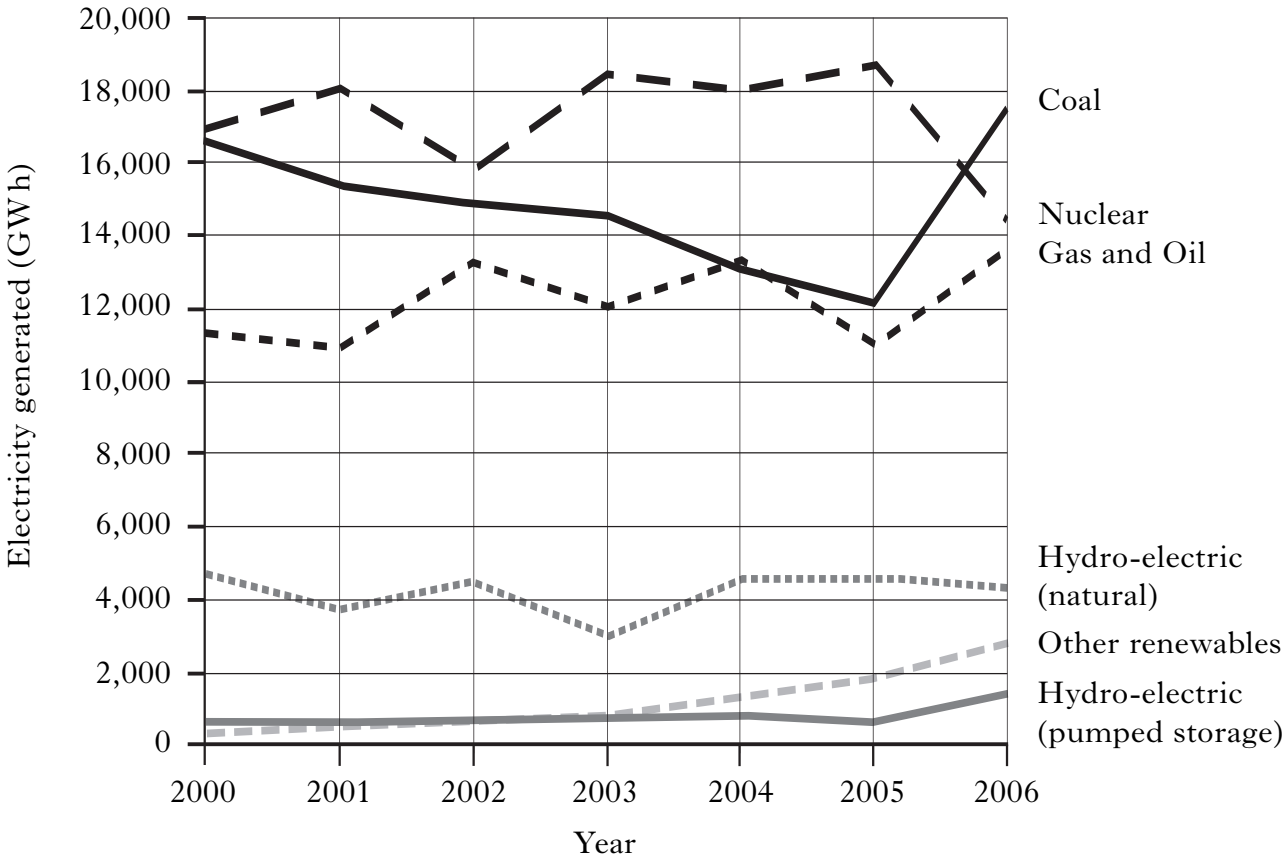
(iii) Name **one** other renewable source of energy.

_____ **1**

Marks

2. (continued)

(*b*) The graph below shows the electricity generation in gigawatt hours (GWh), by source in Scotland, between 2000 and 2006.



(i) Calculate the increase in coal use from 2005 to 2006.

Space for calculation

_____ GWh **1**

(ii) Name the major source of electricity generation between 2000 and 2005.

_____ **1**

(iii) Describe the trend shown in other renewables.

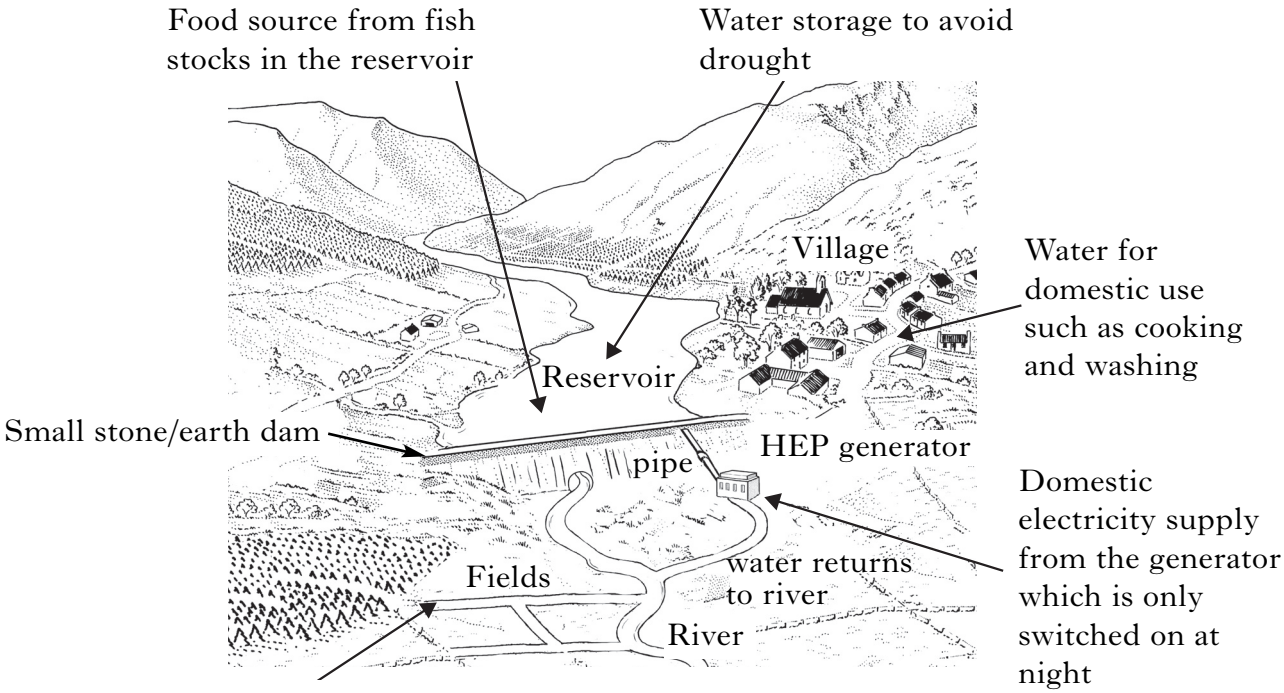
_____ **1**

[Turn over

Marks

2. (continued)

(*c*) The diagram below shows a micro hydro-electric scheme. Such schemes can be built to meet the needs of remote villages in economically less developed countries (ELDCs).



Use the information from the diagram to answer the following questions.

(i) Give **three** examples of how this scheme meets the needs of the villagers.

1 _____

2 _____

3 _____ **2**

(ii) Describe how the HEP generator is used efficiently.

_____

_____

_____ **2**

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2. (*c*) (continued)

(iii) Explain how the micro hydro-electric scheme is a good example of sustainable development.

_____

_____

_____ **2**

(*d*) The main use of energy in an ELDC is usually for domestic purposes.

Give the **two** main uses of energy in an economically more developed country (EMDC).

1 _____

2 _____ **2**

(*e*) Give **two** ways in which you could make a personal contribution to a reduction in the use of electricity.

1 _____

2 _____ **1**

[Turn over

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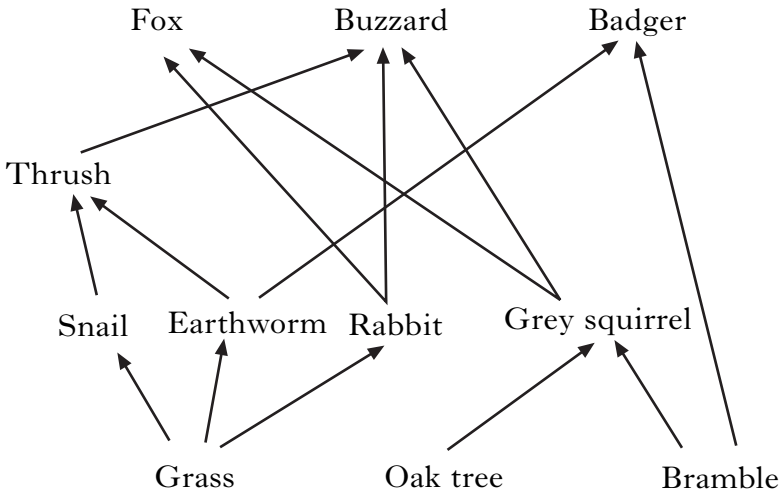
3. The diagram below shows part of a woodland food web.



(*a*) From the food web

(i) Name **one** producer.

_____ **1**

(ii) Complete the table below.

Type of feeding	*Example from the food web*
herbivore	
	badger
	fox

2

(iii) Name **one** prey which the buzzard consumes and the fox does not.

_____ **1**

(iv) Complete the food chain below

	snail	→			**1**

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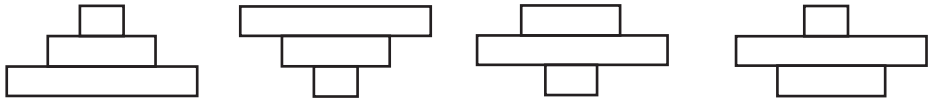
Marks

3. (*a*) (continued)

(v) Circle the correct pyramid of numbers for the food chain below.

Oak tree ⟶ grey squirrel ⟶ fox



A B C D **1**

(*b*) Give **two** ways in which energy can be lost from a food chain.

1 _____

2 _____ **1**

[Turn over

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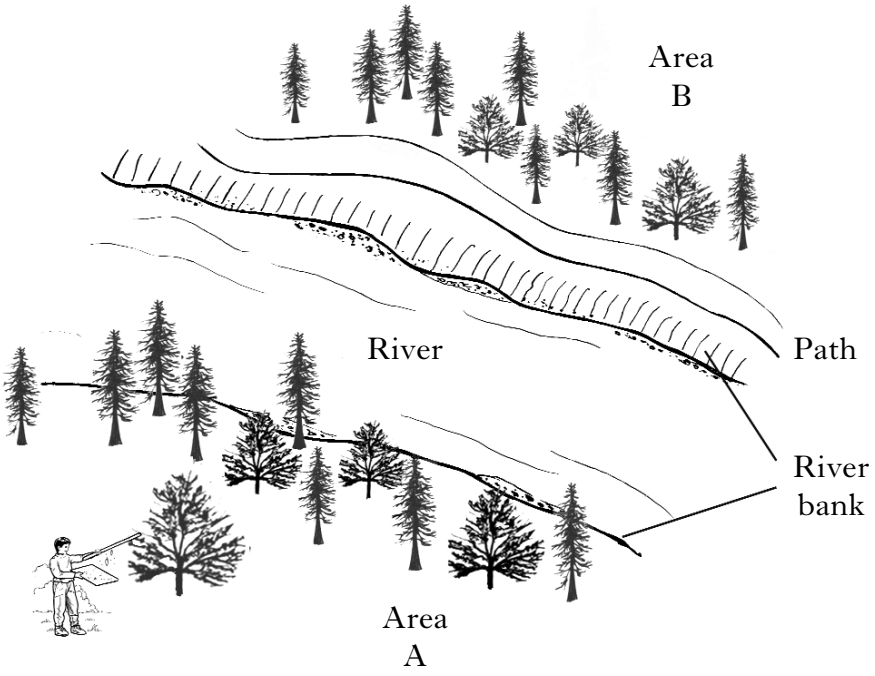
4. (*a*) Students carried out an investigation into the numbers of certain types of invertebrate found living on trees in two areas, A and B, of mixed woodland shown in the diagram below.



Five trees were sampled in each area using the technique of tree beating. The results are shown in the table below.

Type of invertebrate	*Average number of invertebrates at Area A*	*Average number of invertebrates at Area B*
Aphids	200	50
Shield bugs	45	5
Caterpillars	140	0
Spiders	28	22

(i) Using the data in the table, which area supports greater biodiversity?

Area _____ **1**

(ii) Using the information above, suggest a reason for greater biodiversity in this area.

_____

_____ **1**

Marks

4. (*a*) (continued)

(iii) Give **one** way in which the results were made more reliable.

_____ **1**

(*b*) Describe **one** technique which could be used to sample plants on the woodland floor.

_____

_____

_____ **2**

(*c*) The Oak, *Quercus rober*, is a native species found in mixed woodland.

(i) What is meant by a native species?

_____ **1**

(ii) Name **one** naturalised species of animal found in mixed woodland.

_____ **1**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

5. (*a*) Read the passage below and answer the questions that follow.

The Barn Owl

Barn Owls, *Tyto alba*, are birds of prey that prefer an open habitat of rough grassland with good leaf litter. They often nest or roost in old farm buildings. From an analysis of owl pellets, their diet consists mainly of mice, voles and shrews. They hunt in low light conditions, flying about 3 metres above the ground over their grassland habitat, along field edges and drainage ditches.

The Barn Owl population size in Scotland is about 800, compared with around 4000 in the UK as a whole. It is an endangered species, being listed in Schedule 1 of the Wildlife and Countryside Act (1981). This gives additional protection against wilful and reckless disturbance.

Local Authorities, in partnership with other agencies, have produced Local Biodiversity Action Plans (LBAPs) to help protect endangered species such as the Barn Owl. Voluntary organisations like the Scottish Wildlife Trust (SWT) can help create new habitats. Also, artificial nest boxes can be installed. Leaf litter layers and log piles can be created to improve small mammal populations. Wooden floats can be placed in water troughs to reduce deaths by drowning and non-toxic pesticides can be used.

(i) Describe the niche of the Barn Owl.

_____

_____ **2**

(ii) Give the abiotic factor required for the owls to hunt.

_____ **1**

(iii) Calculate, as a simple whole number ratio, the population size of the Barn Owl in Scotland to that of the UK.

Space for calculation

Scotland ____ : ____ UK **1**

DO NOT WRITE IN THIS MARGIN

Marks

5. (*a*) (continued)

(iv) Name **two** organisations which help in the protection of Barn Owls.

1 _____

2 _____ **1**

(v) Predict an effect the conversion of old farm buildings into houses could have on the size of the Barn Owl population and give a reason for your answer.

Prediction _____

Reason _____

_____ **1**

(vi) Suggest **one** farming practice which is a threat to the Barn Owl.

_____ **1**

(*b*) The availability of roosting/nesting sites is one example of a biotic factor affecting Barn Owls.

Name **one** other biotic factor.

_____ **1**

[Turn over

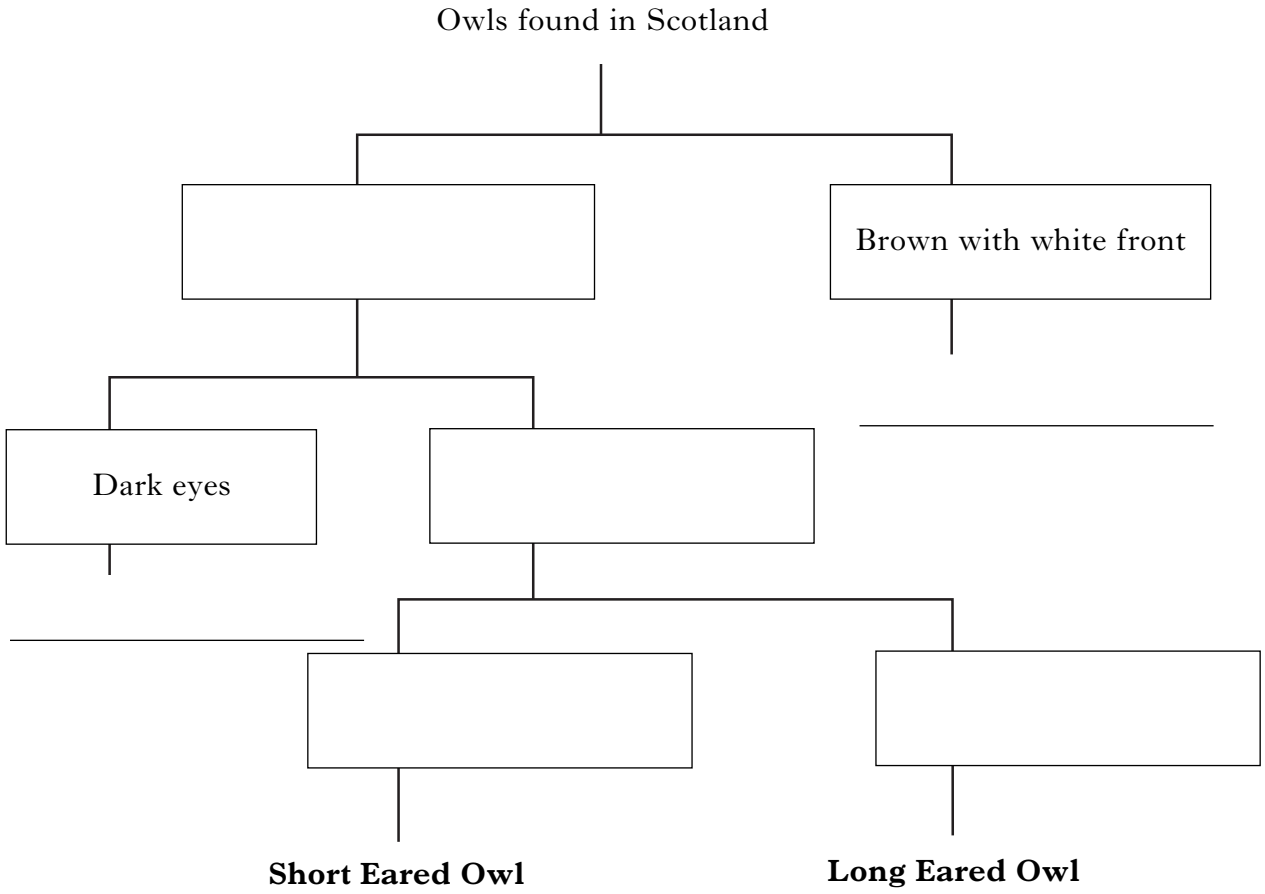
Marks

5. (continued)

(*c*) The table below gives information about four species of owl found in Scotland.

Species	*Appearance*	*Eye colour*	*Habitat*
Barn Owl	Pale brown back with white front	Dark eyes	Open/rough grassland
Tawny Owl	Mainly brown	Dark eyes	Mixed woodland/ parks and gardens
Short Eared Owl	Mainly brown but paler under wings	Yellow eyes	Moorland
Long Eared Owl	Mainly brown with dark brown streaks	Orange eyes	Coniferous woodland

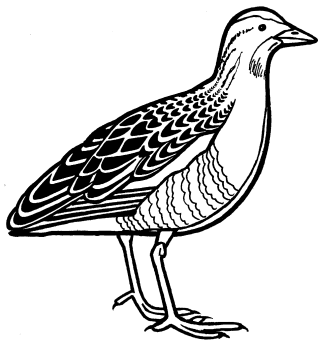
Use the information from the table to complete the key.



3

6. What has happened to the corncrake?

The corncrake lives in tall grass where it nests on the ground. It is found in some remote areas of Scotland where there are damp meadows or traditionally farmed hayfields. It eats small invertebrates and seeds. There were 890 males in 1978, but this went down to 445 in 1993. This decrease was partly linked to mechanisation in farming. A species enhancement action plan was implemented in 1992. In 2006, the number of males was 1150.



Species enhancement action plan.

Grass is cut, starting from the centre of the field and working outwards. This allows the corncrake to escape from the grass mower.

Grazing of grass by farm animals is managed so that long grass is always available during the corncrake breeding season.

The spread of predators such as mink is prevented.

(*a*) Describe the habitat of the corncrake.

_____ **1**

(*b*) Underline the correct answer.

Between 1978 and 1993 the number of corncrakes

halved *doubled* *stayed the same* **1**

(*c*) In 1993, the corncrake was an endangered species. What does this mean?

_____

_____ **1**

(*d*) Suggest why mechanised grass cutting resulted in a decrease in the number of corncrakes.

_____

_____ **1**

(*e*) Give **two** ways in which the action plan helped increase the corncrake population.

1 _____

2 _____ **2**

DO NOT WRITE IN THIS MARGIN

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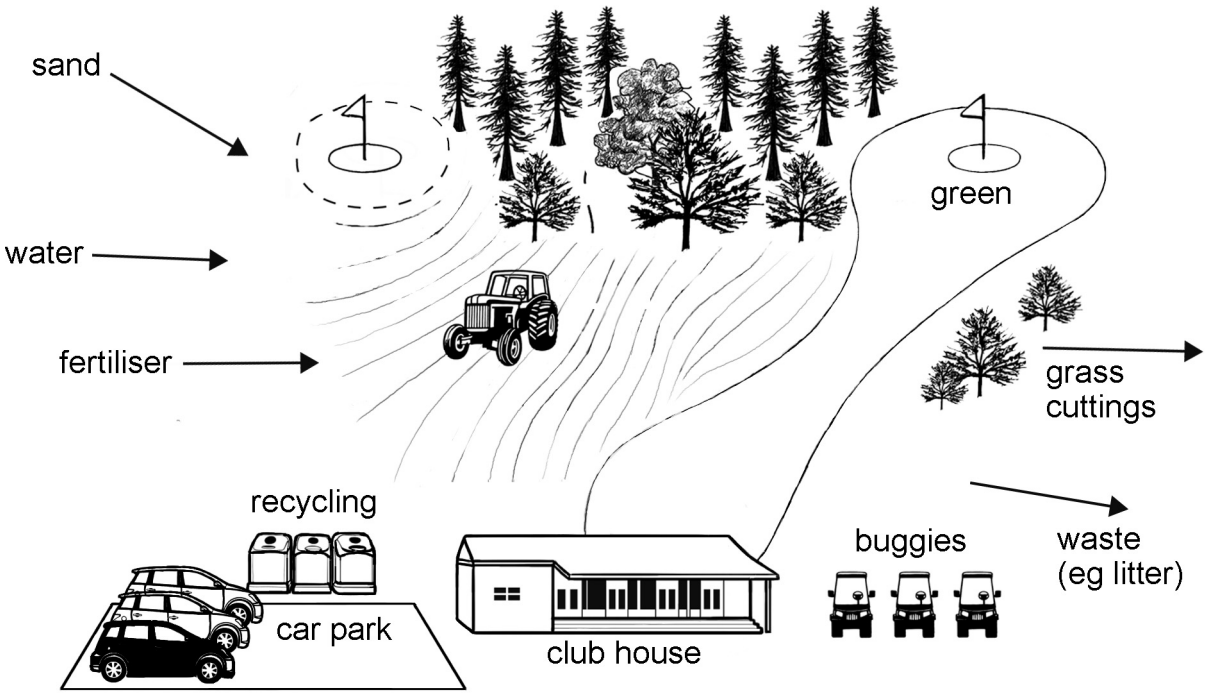
7. (*a*) The diagram below shows some of the inputs and outputs of a golf course.



Use the information from the diagram to answer the following questions.

(i) Give **two** man-made resources required by the golf course.

1 _____

2 _____ **1**

(ii) Give **one** natural resource required by the golf course.

_____ **1**

(iii) Give **one** other natural resource, not shown in the diagram, on which green plants such as grass depend.

_____ **1**

(*b*) The green keeper applies 2 kg fertiliser per 100 m^2 of grass.

Calculate the weight of fertiliser required for 1500 m^2 of grass.

Space for calculation

_____ kg **1**

Marks

7. (continued)

(*c*) Suggest **one** way of recycling the grass cuttings.

_____ **1**

(*d*) Name the initiative which encourages recycling.

_____ **1**

(*e*) The table below gives information on three types of grass which grow on the greens at the golf course.

Type of grass	Fescue	Sports Rye	Kentucky Blue
Characteristics	Drought resistant Slow growing	Bright green all year Hard wearing	Soft texture Shade tolerant

Select **one** characteristic of each grass and explain why it is suitable for a golf course.

Fescue characteristic _____

Explanation _____

Sports Rye characteristic _____

Explanation _____

Kentucky Blue characteristic _____

Explanation _____ **2**

(*f*) A competition has been organised at the golf course. It will attract a large number of competitors and spectators. Suggest **one** problem this may create for local people and suggest how it might be resolved.

Problem _____

Resolution _____

_____ **2**

[Turn over

Marks

8. Use the map extract of Loch Leven – Extract No 1790/58 (**separate item**) to answer the following questions.

(*a*) The map extract shows different slope features.

Complete the table by choosing the correct description of the slope.

steep slope *gentle slope* *flat land*

Grid reference	*Description of slope*
1499	
1505	
1804	

1

(*b*) (i) Slope affects the development of the soil.

Match each soil description in the table with the appropriate grid reference (GR).

GR: *1900* *1803*

Soil description	*Grid reference*
A. Thin rocky soil, free draining	
B. Good fertile soil but may be prone to flooding	

1

(ii) Suggest **two** reasons why some land in the Loch Leven area may become flooded.

Reason 1 _____

Reason 2 _____ **2**

(iii) Over 100 years ago, the water level of Loch Leven was artificially lowered to

1 provide more farmland, and

2 control the flow of the River Leven out of the loch.

What evidence of this historic change is shown at GR 2000?

_____ **1**

Marks

8. (continued)

(*c*) (i) Give **one** piece of evidence from the map which shows that Loch Leven is an important conservation area.

_____ **1**

(ii) Large areas of the loch are very shallow, less than 10 m deep.

Explain why this helps to support a wide variety of plants in large numbers.

Wide variety _____

_____ **1**

Large numbers _____

_____ **1**

(iii) Loch Leven is protected internationally because of the large number of wildfowl (ducks, geese and swans) that visit the area to breed.

Suggest **two** reasons why St Serf's Island (GR 1500/1600) is an attractive site for wildfowl to breed.

Reason 1 _____ **1**

Reason 2 _____ **1**

(iv) The Royal Society for the Protection of Birds (RSPB) manages Vane Farm Nature Centre (GR 159990).

In addition to a shop, café, car park and toilets, what other benefit could a centre provide for visitors?

_____ **1**

(*d*) There is much pressure to provide new housing in Kinross.

(i) With reference to the map extract, give **two** features that restrict the building of new houses to the east of Kinross (GR 1202 and 1203).

Feature 1 _____ **1**

Feature 2 _____ **1**

Marks

8. (*d*) (continued)

(ii) An alternative way to provide new houses is the conversion of farm buildings, that are no longer needed, as "steading developments". These developments require flat land and good road access.

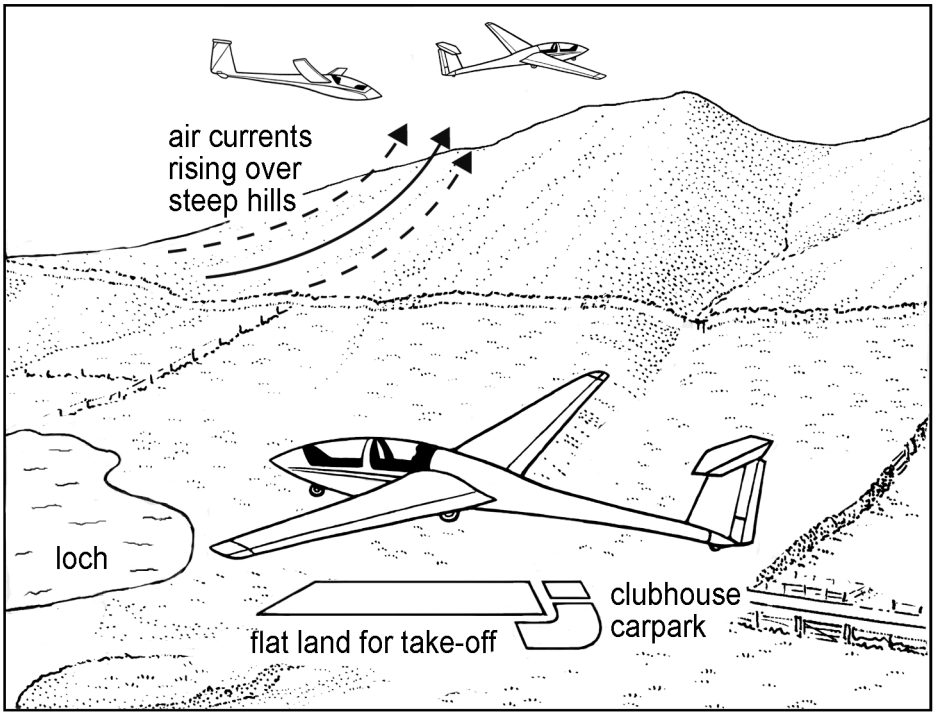
Choose **one** of the following sites that you consider suitable for steading development and give a reason for your choice.

Orwell (GR 149041) or West Feal (GR 202033)

Site chosen_____

Reason_____ **1**

(*e*) Gliding is a popular sport at Loch Leven. The diagram below shows some of the requirements for gliding.



(i) Select **one** feature from the map and give a reason why it has influenced the location of the gliding centre and club house at GR 178002.

Feature _____

Reason_____ **1**

(ii) Name **two** dangers to low-flying aircraft that can be found at grid reference 1497.

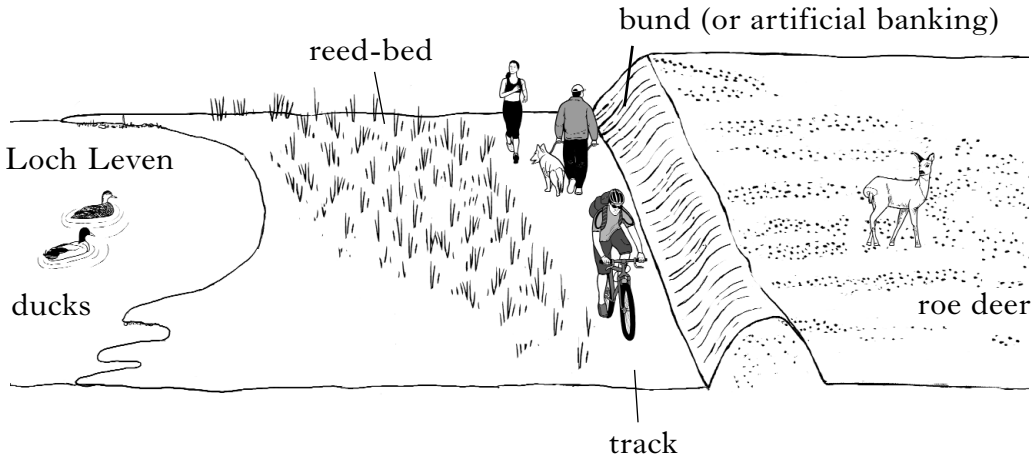
1 _____

2 _____ **2**

Marks

8. (continued)

(*f*) Loch Leven Heritage Trail is suitable for walkers, cyclists and horse riders. It will eventually circle Loch Leven. In some areas, the wildlife is very sensitive to disturbance by people. The diagram below shows measures taken at one part of the trail to screen any possible disturbance.



(i) Use the information from the diagram to answer the following questions.

1 Give **one** natural method of screening.

_____

2 Give **one** man-made method of screening.

_____ **1**

(ii) Explain how the trail is a good example of multi-use.

_____

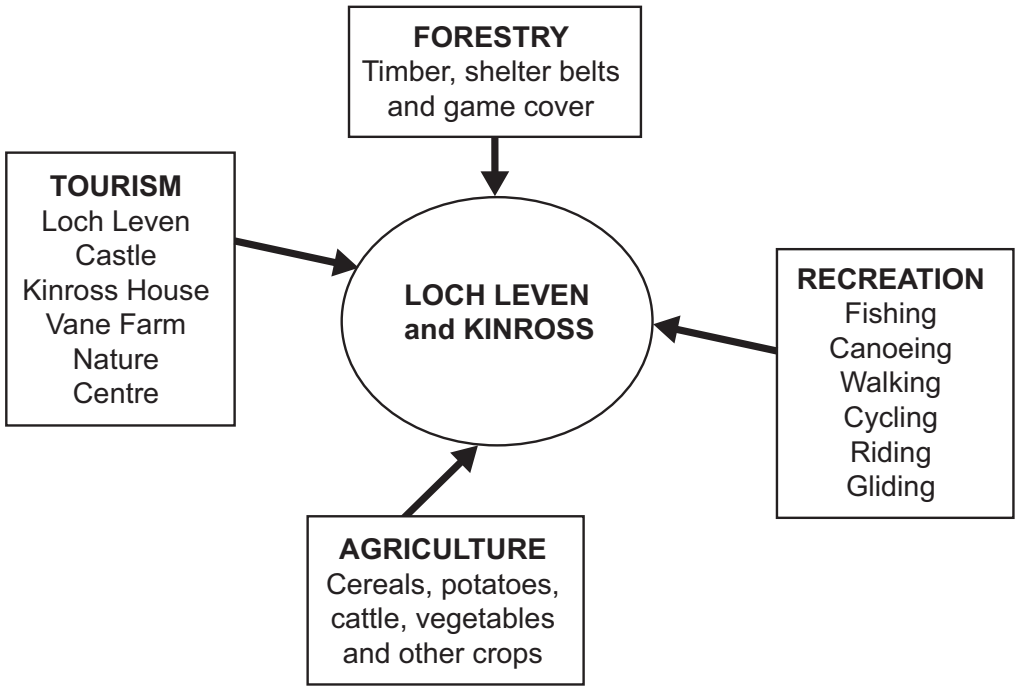
_____ **1**

[Turn over

Marks

8. (continued)

(*g*) The diagram below shows some of the uses of the Loch Leven and Kinross area.



(i) Choose **one** use and give **two** ways in which this use benefits the local area.

Use _____

Benefit 1 _____ **1**

Benefit 2 _____ **1**

(ii) Suggest **one** recreational activity which may cause conflict. Give a reason for your answer.

Activity _____

Reason _____

_____ **1**

(iii) Suggest how this conflict could be avoided.

_____ **1**

[Turn over for Section 2 on *Page twenty-four*

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SECTION 2

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

Write your answers on the pages which follow.
Diagrams may be used where appropriate.

Option A

Using the following headings, describe how the use of non-renewable resources can be reduced.

(*a*) Recycling **6**

(*b*) Environmental education programmes **2**

(*c*) Energy efficiency schemes **2**

(10)

OR

Option B

(*a*) Describe the Nitrogen Cycle **5**

(*b*) Discuss the use of fertilisers **5**

(10)

OR

Option C

With reference to an investigation in your area:

(*a*) describe how you carried out a land use survey; **5**

(*b*) discuss the results you obtained from the land use survey. **5**

(10)

[*END OF QUESTION PAPER*]

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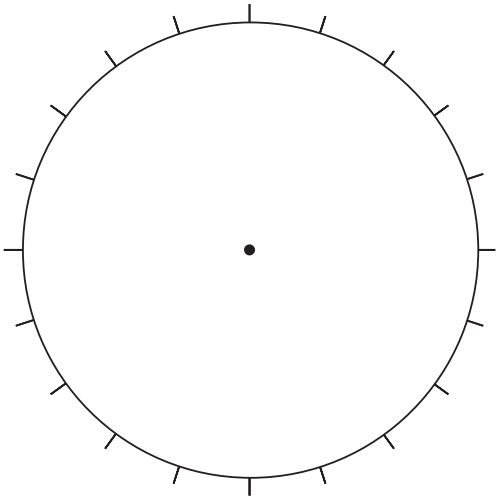
SPACE FOR ANSWERS

DO NOT WRITE IN THIS MARGIN

Marks

SPACE FOR ANSWERS

ADDITIONAL PIE CHART FOR QUESTION 2(*a*)(i)



ACKNOWLEDGEMENTS

Question 5(*a*)—Photograph of a barn owl is reproduced by kind permission of Tim Knight.