FOR OFFICIAL USE

Total Marks

X055/201

NATIONAL QUALIFICATIONS 2009

WEDNESDAY, 10 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.

SECTION 1

Answer ALL questions in the spaces provided.

Use the map extract to answer Question 8.

1. The diagram below gives information about some non-native (alien) species found in Scotland.

Mink

- Introduced for production of mink fur
- Released/escaped from fur farms
- Preys on a wide variety of species such as tern and feeds on birds' eggs
- Predation has led to the extinction of some bird species on Scottish Islands.

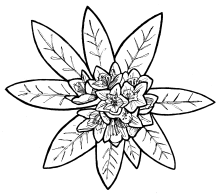
Grey Squirrel

- Introduced from North America
- Competes for food with native red squirrel
- Carries a virus lethal to red squirrel

Non-native (alien) species found in Scotland

Rhododendron

- Introduced as a garden plant
- Very invasive and rapidly replaces native vegetation
- Grows very densely cutting out light to other plants such as grasses



Himalayan Balsam

- Introduced as a garden plant
- Escaped and spread rapidly to the wild
- Very hard to eradicate
- Out-competes native plants, especially grasses

DO NOT WRITE IN THIS MARGIN

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1. (continued)

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

(i) Which term describes species that have always lived in Scotland?

_____ **1**

(ii) Complete the following to give **two** examples of competition.

Plants _____ and _____

compete for _____ . **1**

Animals _____ and _____

compete for _____ . **1**

(iii) Give an example of a predator/prey relationship.

Predator _____ Prey _____ **1**

(iv) The spread of Himalayan Balsam has destroyed natural communities.

Explain this effect.

_____

_____ **1**

(v) Mink predation on some Scottish Islands has resulted in conservationists trying to get rid of this animal completely.

1 Explain why this is necessary.

_____ **1**

2 Suggest **one** way in which this could be achieved.

_____ **1**

(*b*) Competition is an example of a biotic factor.

Name **one** other biotic factor.

_____ **1**

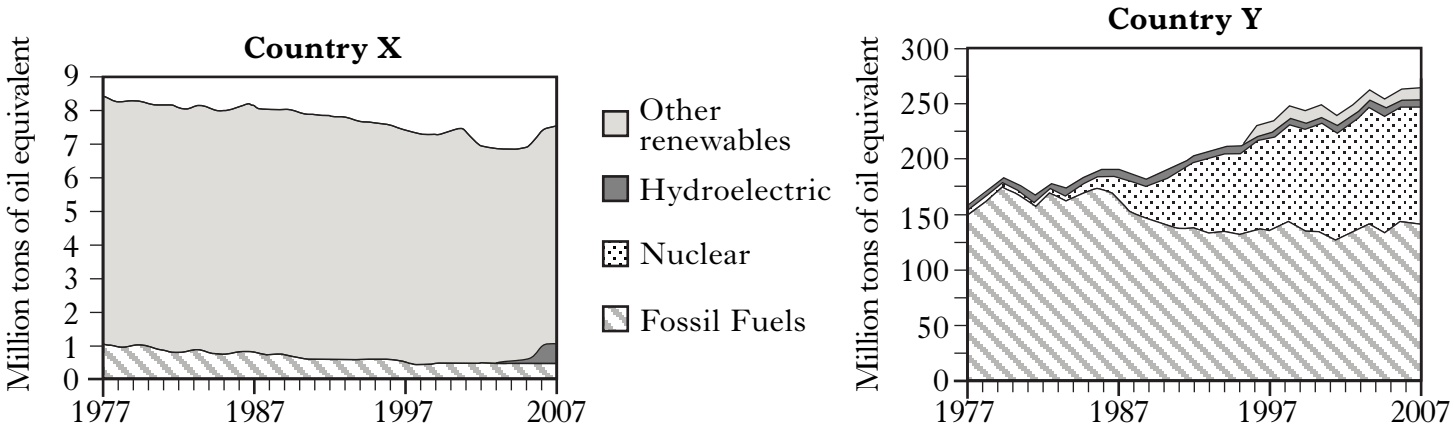
(*c*) The Rhododendron is a well established species in Scotland.

What is the correct term for describing such non-native (alien) species?

_____ **1**

[Turn over

2. The graphs below show the total energy consumption of two countries, **X** and **Y**, between 1977 and 2007.



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(*a*) (i) How much energy from fossil fuels was consumed by Country Y in 1977?

_____ Million tons of oil equivalent. **1**

(ii) Which country, X or Y, consumes more energy?

Country _____ **1**

(iii) Give **two** differences in the sources of energy used by the two countries.

1 _____

_____

2 _____

_____ **2**

(iv) Which country, X or Y, is an economically less developed country (ELDC)?

Country _____ **1**

(v) Suggest **one** reason why Country X started to use hydroelectric as an energy source in 2003.

_____ **1**

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2. (continued)

(*b*) Name **two** sources of energy that could be included in the "other renewables" category.

1 _____

2 _____ **1**

(*c*) Give **one** advantage and **one** disadvantage of using a nuclear energy source.

Advantage _____ **1**

Disadvantage _____ **1**

(*d*) Give **two** recent changes in sources used to generate electricity by the UK.

1 _____

2 _____ **2**

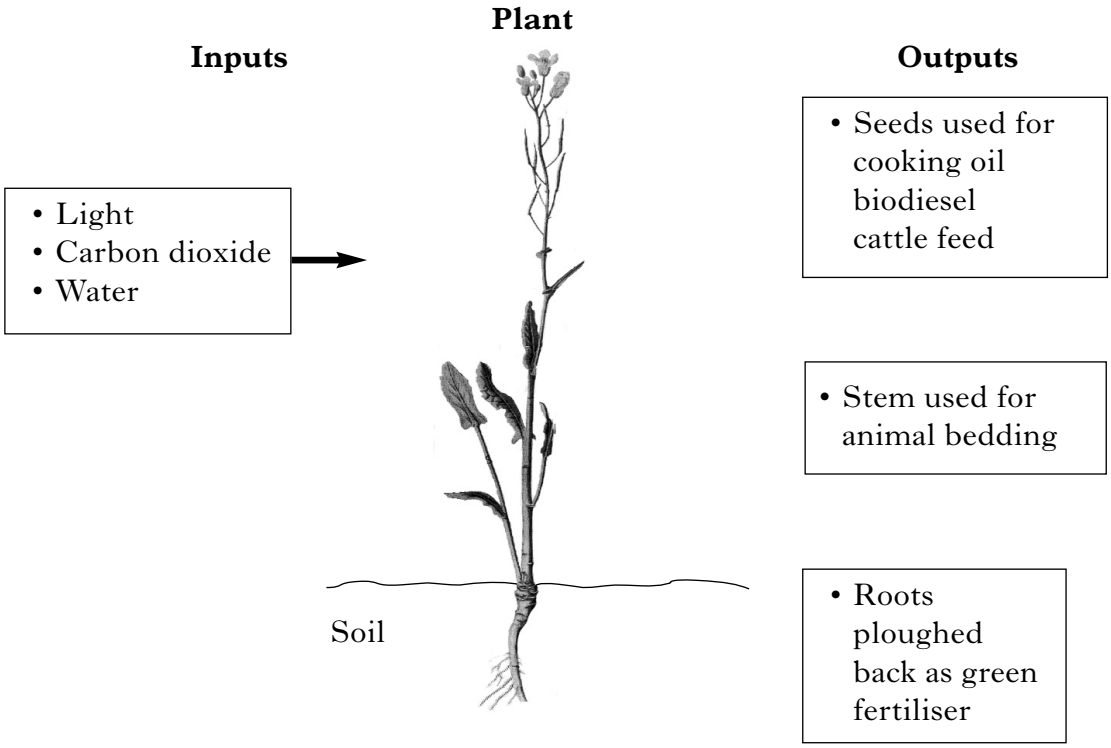
(*e*) Name **one** greenhouse gas produced by burning fossil fuels.

_____ **1**

[Turn over

Marks

3. The diagram below shows the inputs and outputs of a rapeseed oil plant which is grown as a crop in Scotland.



(*a*) (i) Name the process by which the plant uses natural resources to convert light energy into chemical energy.

_____ **1**

(ii) Explain why the outputs make the rapeseed plant an energy efficient crop for farmers to grow.

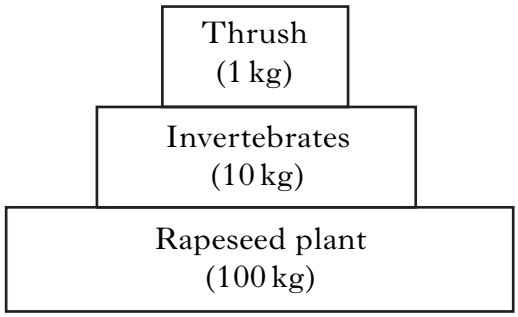
_____

_____ **1**

Marks

3. (continued)

(*b*) The diagram below shows the relationship between rapeseed and the rest of a food chain found in a farmland ecosystem.



(i) What is this type of diagram called?

_____ **1**

(ii) Give **one** way in which energy can be lost from this food chain.

_____ **1**

(iii) Some organisms living on a rapeseed plant cause it harm and may even destroy it.

What term describes this special feeding relationship?

_____ **1**

(*c*) Name the natural resource from which diesel and petrol are produced.

_____ **1**

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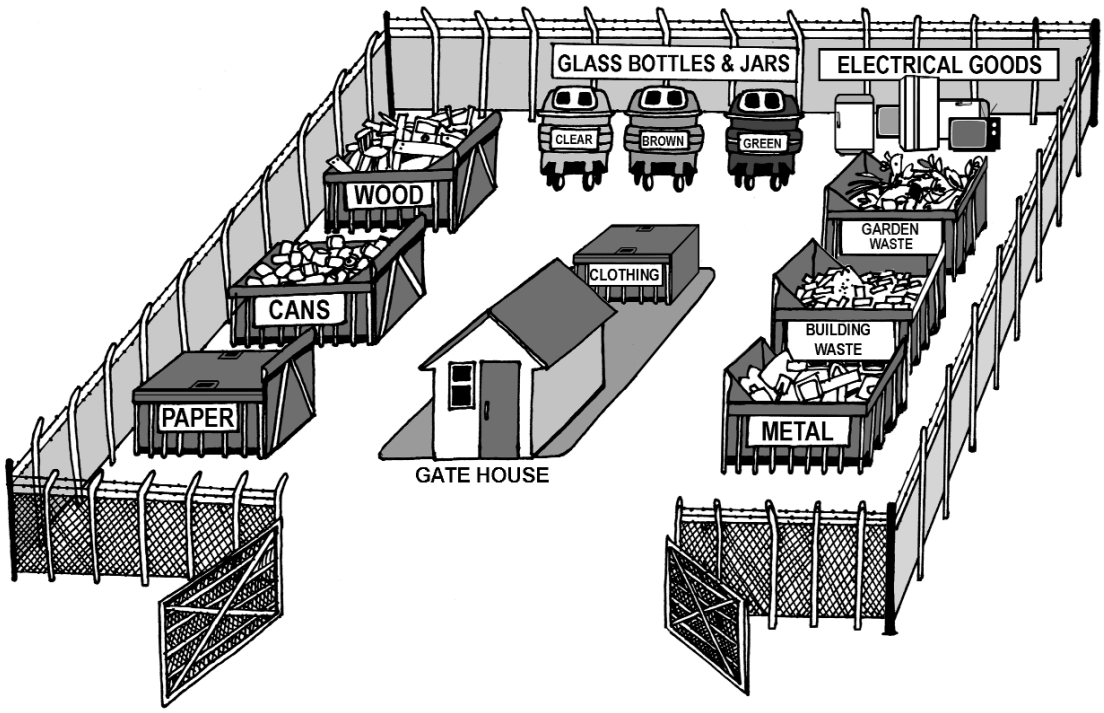
4. The sketch below shows a local centre for recycling items of domestic waste.



(*a*) (i) Name **two** items of household waste that originated from natural resources.

1 _____ 2 _____ **1**

(ii) Suggest **one** item of household waste, not included in the picture, which should be recycled.

_____ **1**

(iii) State **two** advantages of the site to the local community.

1 _____

2 _____ **1**

(iv) Suggest **one** disadvantage the site may have for the local community.

_____ **1**

(v) Suggest **one** other way in which the local authority can make recycling easier for the local community.

_____ **1**

(vi) Name the process by which garden waste is recycled.

_____ **1**

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4. (continued)

(*b*) Explain how recycling contributes to sustainable development.

_____

_____ **2**

(*c*) Name the local initiative under which recycling schemes have been introduced.

_____ **1**

(*d*) Give **two** personal initiatives, other than recycling, and explain how they could contribute to energy conservation.

Personal initiative 1 _____

Personal initiative 2 _____ **1**

Explanation _____

_____ **1**

[Turn over

Marks

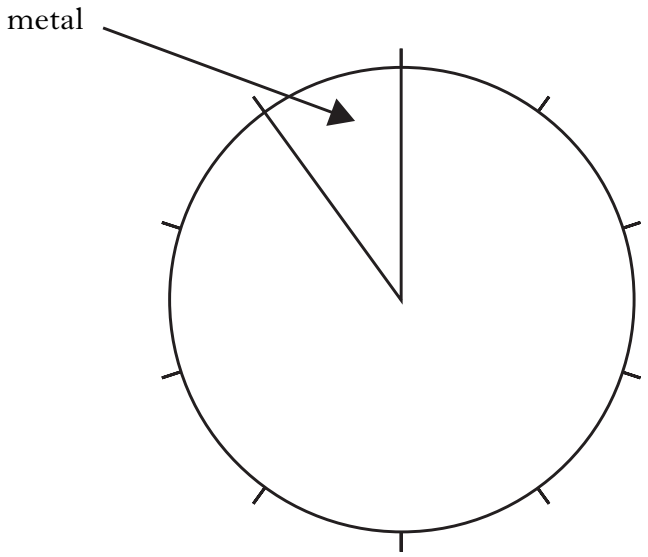
4. (continued)

(*e*) The table below shows the percentage of waste collected in a month at a local recycling centre.

Item of waste	*Percentage by volume* (%)
Glass bottles	20
Electrical / "white" goods	10
Building materials (bricks, concrete)	20
Wood	10
Metal	10
Garden waste	15
Paper	12
Textiles (clothes, bedding, etc)	3

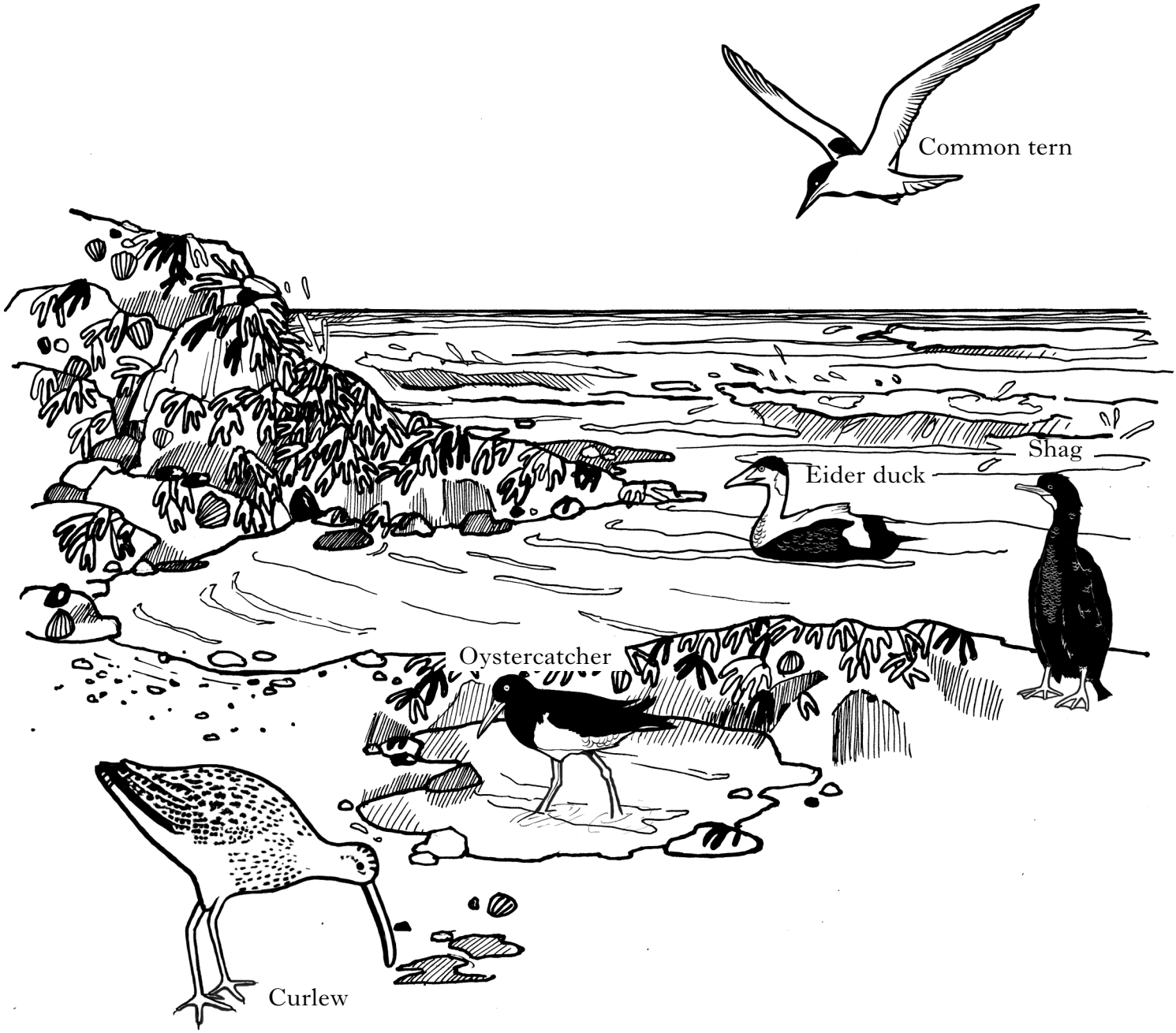
Complete the pie chart below using information from the table.

(An additional pie chart can be found on page 27.)



2

5. The diagram below shows a sea shore ecosystem. Additional information on the five bird species is found in the table on the next page.



(Diagram:
not to scale)

[Turn over

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5. (continued)

Seabird	*Distinctive features*	*Feeding method*
Oystercatcher	Mainly black upper parts and white under parts. Long pink legs and straight red beak.	Uses its beak to break open mussels.
Eider duck (male)	Mainly white plumage on upper parts with black cap and black under parts. Stout, wedge-shaped beak.	Uses its beak to stir up mussels, crabs and sea urchins for food.
Curlew	Grey-brown plumage on upper parts and spotted under parts. Long grey legs and long curved beak.	Uses its beak to probe and locate bristle worms in sand and mud.
Shag	Black plumage with a green metallic sheen. Short, webbed feet and yellow patch at base of beak.	Dives from the surface and chases medium-sized fish such as sand eels under water.
Common Tern	Mainly white plumage with black cap. Red legs and pointed orange-red beak with black tip.	Dives head first into shallow water to catch small fish.

(*a*) Use the diagram and table of information to complete the key.

Key for some seashore birds

1 Black plumage with a green metallic sheen ..... [ ]

1 Plumage not all black ..... Go to 2

2 Black cap present ..... Go to 3

2 Black cap absent ..... Go to 4

3 [ ] ..... Common Tern

3 [ ] ..... Eider duck

4 Long grey legs ..... [ ]

4 [ ] ..... Oystercatcher

3

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5. (continued)

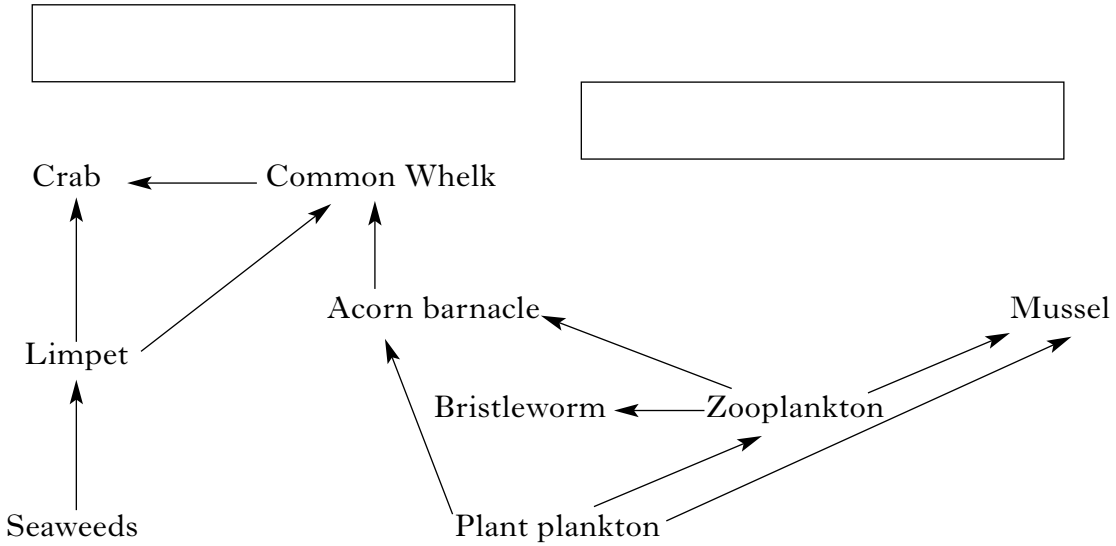
(*b*) Describe **one** adaptation of the curlew.

_____ **1**

(*c*) (i) Use information from the table to complete the food web below by

1 adding **two** named seabirds to the blank boxes and

2 adding **two** arrows.



2

(ii) Name **one** producer in this food web.

_____ **1**

(iii) Name **one** omnivore in this food web.

_____ **1**

(iv) Describe the niche of the limpet.

_____

_____ **2**

(v) Name the source of energy for this food web.

_____ **1**

[Turn over

Marks

5. (continued)

(*d*) Wave action is an abiotic factor affecting the distribution of organisms on a sea shore.

Name **one** other abiotic factor.

_____ **1**

(*e*) The spillage of oil can have devastating effects upon a seashore ecosystem.

Suggest **one** possible effect on seabirds and seaweed and give a reason for your answers.

1 Effect on seabirds _____

Reason _____ **1**

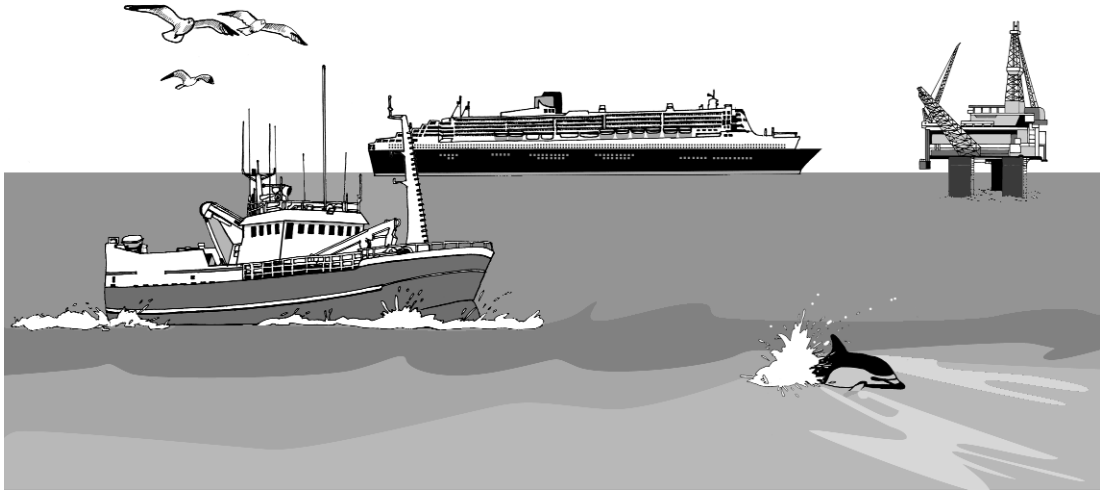
2 Effect on seaweed _____

Reason _____ **1**

[Turn over for Question 6 on *Page sixteen*

6. (*a*) Read the following passage about the multi-use of the marine environment and answer the questions which follow.

All at sea



The marine environment is used in many different ways for human activities.

Commercial fishing reduces targeted species such as cod, haddock and herring. The removal of large numbers of primary consumers can affect the species further along the food chain. In addition, other animal species, for example dolphin, get caught and die in nets.

There has been a great increase in marine ecotourism, up eighty per cent in the past five years. Ecotourism promotes understanding of many environmental issues but it must be carefully managed to avoid damage to natural ecosystems. For example, there are speed and distance restrictions when viewing whales and sharks.

In energy production, oil extraction can result in accidental spillage and wave and tidal energy barrages can affect the natural tidal movement. These impact on marine communities. For example, barrages across estuaries can reduce inter-tidal bird feeding areas. Oil and gas platforms provide a new habitat for shellfish.

An increase in the volume of shipping is linked to greater loss of cargo and more dumping at sea. Dead birds washed up on coasts are found to have swallowed as many as twenty-three pieces of plastic. Ship propellers can kill or injure large sea mammals such as dolphins and porpoises.

Extending sea walls as coastal defences built to defend against rising sea levels can cause loss of habitat.

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6. (*a*) (continued)

(i) Explain why removing large numbers of targeted fish can affect the species further along the food chain.

_____

_____ **1**

(ii) Explain why ecotourism must be carefully managed.

_____

_____ **1**

(iii) Suggest **one** way in which ecotourism can help educate the public about the marine environment.

_____ **1**

(iv) Dumping of litter at sea must be reduced. Suggest **one** way this could be achieved.

_____ **1**

(v) Explain why the marine environment is not a good illustration of multi-use integration.

_____

_____

_____ **1**

(*b*) Sea levels are rising in some parts of the world. Explain why this is happening.

_____

_____

_____ **2**

[Turn over

Marks

7. An investigation was carried out to determine the effects of raw sewage that had accidentally entered a river. Samples were taken from 5 sites at 50 m intervals and the results are shown below.

Sample site	*Concentration of bacteria*	*Oxygen level*	*Number of animal species*
1	Low	High	7
2	Low	High	8
3	High	Low	2
4	Medium	Medium	4
5	Low	High	7

(*a*) (i) Between which **two** sample sites did the sewage enter the river?

_____ and _____ **1**

(ii) Predict the concentration of bacteria there would be at a site 50 m down river from sample site 5.

Concentration of bacteria _____

Reason _____

_____ **1**

(iii) Give a conclusion relating the number of animal species to the oxygen level of the water.

_____

_____ **1**

(iv) Rat tailed maggots and blood worms were the only two species of animal found at sample site 3. These organisms are examples of indicator species.

What is meant by an indicator species?

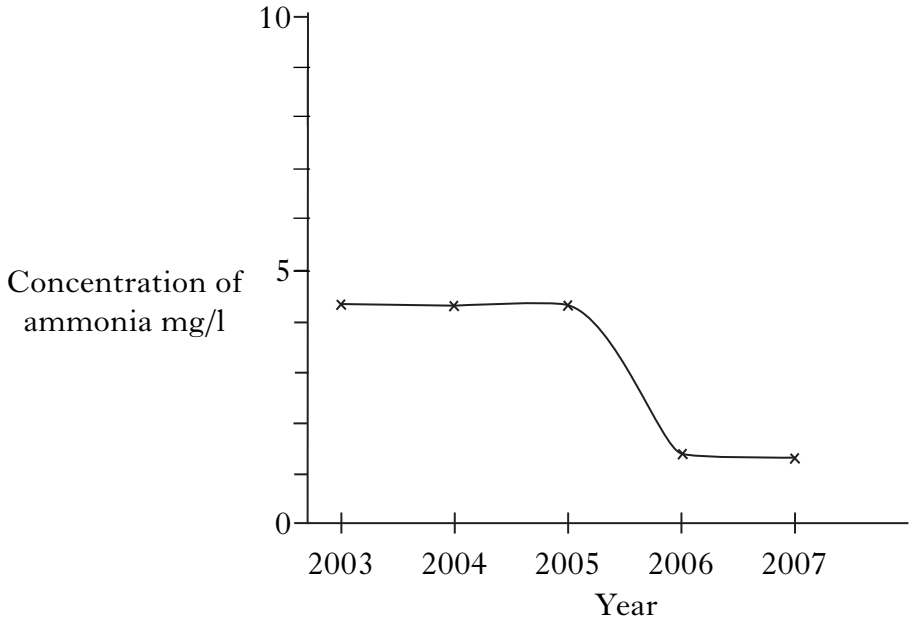
_____

_____ **1**

Marks

7. (continued)

(*b*) Biodegradable domestic waste is converted into ammonia at sewage treatment works. This ammonia is then released as effluent into a river. An upgrade of a sewage treatment works was completed in 2005. The graph below shows the concentration of ammonia in the river between 2003 and 2007.



(i) Describe and explain the trend in the concentration of ammonia between 2003 and 2007.

_____

_____

_____ **2**

(ii) Name a type of organism responsible for converting biodegradable waste into ammonia.

_____ **1**

(iii) What effect will the change in concentration of ammonia have on biodiversity in the river?

Underline your answer and give a reason for it.

Biodiversity will *increase* / *decrease*

Reason _____

_____ **1**

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8. Use the map extract of the Moffat area – Extract No 1747/78 (**separate item**).

(*a*) (i) The map extract shows different archaeological and historic sites.

Match each grid reference in the table with the appropriate archaeological or historic feature.

Standing Stones *Settlement* *Motte and Bailey*

Grid reference	*Archaeological or Historic feature*
0607	
0803	
094058	

2

(ii) Suggest why the Roman road (0606) is located on high ground.

_____ **1**

(iii) The A74(M) and the railway line cross this map extract.

Explain why the two transport routes are so close together.

_____ **1**

(*b*) Moffat originated as a spa town based on a well, located at GR 093072, and is still a tourist centre.

(i) Is the well a natural or a man-made resource? _____

Reason _____ **1**

(ii) Give **two** pieces of map evidence which indicate that Moffat is still a tourist centre.

1 _____

2 _____ **2**

(iii) The Southern Upland Way, a long distance footpath, passes to the south of Moffat.

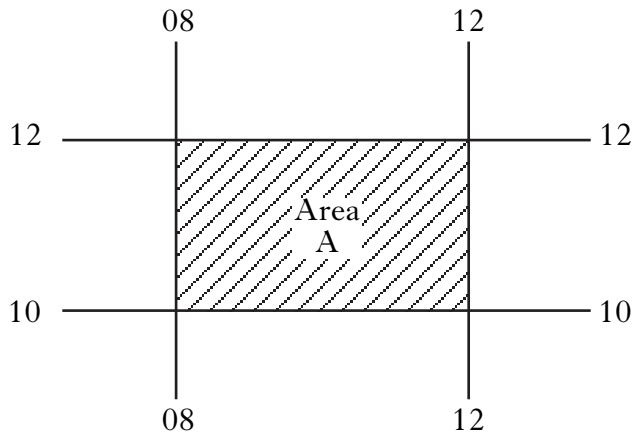
Suggest **one** benefit this may bring to the area.

_____ **1**

Marks

8. (continued)

(*c*) Study area A on the map.



(i) Underline which **one** of the following is the most likely type of agriculture in area A and give a reason for your answer.

Arable (cereal crops)

Pastoral (sheep)

Horticultural (fruit and vegetables)

Reason _____

_____ **1**

(ii) This area is considered suitable for the location of a wind farm.
Give **one** climatic advantage of this area.

_____ **1**

(iii) Give **one** disadvantage of this area for wind farm construction.

_____ **1**

(*d*) A large area of commercial forest is found north-east of Moffat.

(i) What type of tree has been planted here?

_____ **1**

(ii) Suggest **one** use of the timber from this forest.

_____ **1**

[Turn over

Marks

8. (*d*) (continued)

(iii) Suggest **one** way in which the forest is managed to promote sustainable forestry.

_____ **1**

(iv) Give **one** recreational use of the forest.

_____ **1**

(*e*) Two birdwatchers visited Black Craig (GR 1310, 1311) to help in the protection of the nest of a rare bird of prey.

(i) Circle **three** phrases from the list below to describe the topography (relief) of Black Craig.

steep slope *gentle slope* *rocky slope*

slope facing SW *slope facing NE* **2**

(ii) One of the birdwatchers fell from the crag and was injured. His companion tried to phone for help using his mobile phone.

Explain why mobile reception may be difficult at that location.

_____ **1**

(iii) Describe the route taken by the Mountain Rescue Team from Moffat to reach the casualty.

_____

_____ **2**

(*f*) Name **one** piece of legislation which protects rare birds, other animals and plants.

_____ **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.

Option A

Describe:

(*a*) how acid rain is formed; **4**

(*b*) the environmental effects of acid rain; **3**

(*c*) ways of reducing acid rain. **3**

(10)

OR

Option B

Describe:

(*a*) what is meant by an ecosystem; **4**

(*b*) methods of sampling plants and animals in an ecosystem. **6**

(10)

OR

Option C

Describe:

(*a*) recreational land uses in your named local area; **5**

(*b*) a conflict of interest between local groups of people and its resolution. **5**

(10)

[*END OF QUESTION PAPER*]

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SPACE FOR ANSWERS

[Turn over

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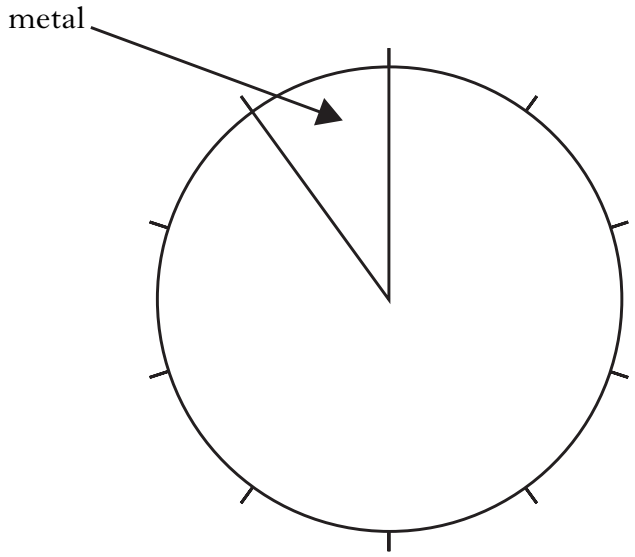
SPACE FOR ANSWERS

ADDITIONAL PIE CHART FOR QUESTION 4(*e*)



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