FOR OFFICIAL USE

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Total Marks

# X055/201

NATIONAL QUALIFICATIONS 2011

WEDNESDAY, 8 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

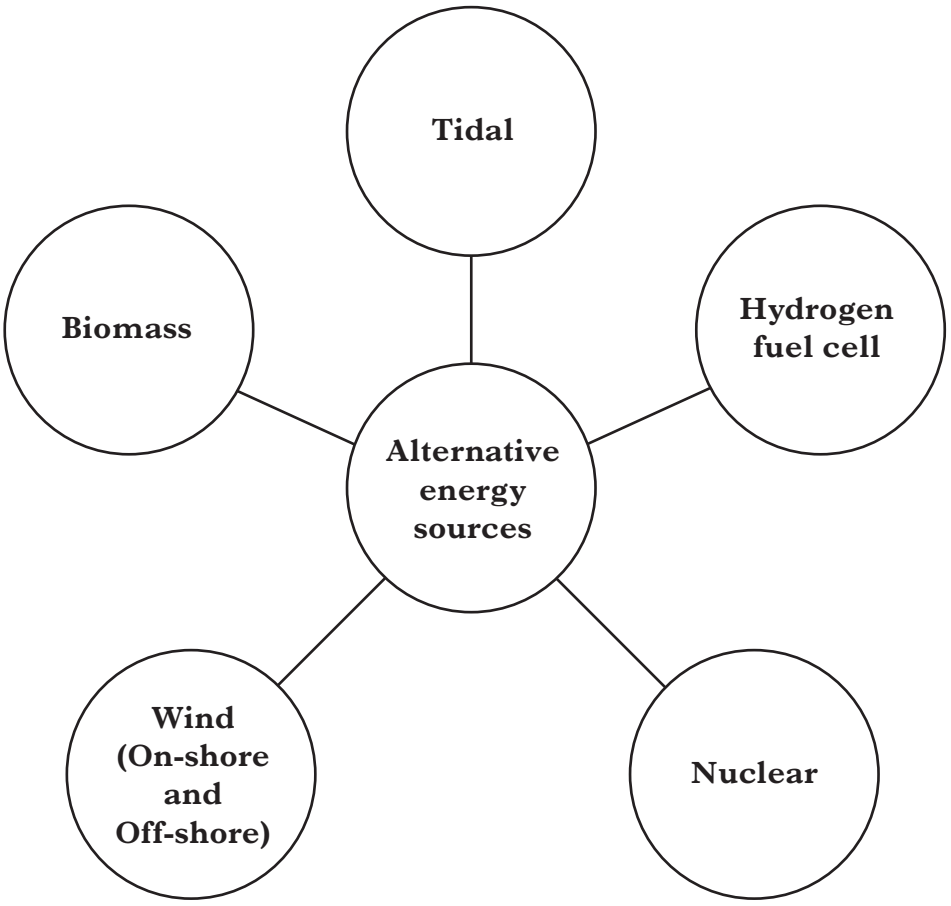
*Marks*

## SECTION 1

**Answer ALL questions in the spaces provided.**

**Use the map extract to answer question 8.**

**1.** The diagram below shows some alternative energy sources which are being considered in Scotland.




(*a*) (i) Name **one** other alternative source of energy.

_____ **1**

(ii) Give **one** reason why Scotland needs to invest in alternative sources of energy.

_____ **1**

(iii) Give **two** ways in which you could personally reduce energy use in your home.

1 _____

2 _____ **1**

*Marks*

**1. (continued)**

(*b*) (i) Give **one** advantage and **one** disadvantage of using nuclear sources of energy.

Advantage _____

_____ **1**

Disadvantage _____

_____ **1**

(ii) Name **one** nuclear fuel.

_____ **1**

(iii) Name **one** European country whose main energy source is nuclear.

_____ **1**

(*c*) Fifteen turbines will be installed on the sea bed of the Pentland Firth in the north of Scotland to harness some of its tidal energy. These turbines will produce 1300 MW of electricity by 2020. During transmission of this electricity to the National Grid, 5% is lost.

(i) Calculate this loss.

*Space for calculation*

_____ MW **1**

(ii) Give **one** negative effect on wildlife of the installation of these turbines.

_____ **1**

(*d*) Suggest **one** advantage of installing an offshore wind farm compared to an onshore wind farm.

_____

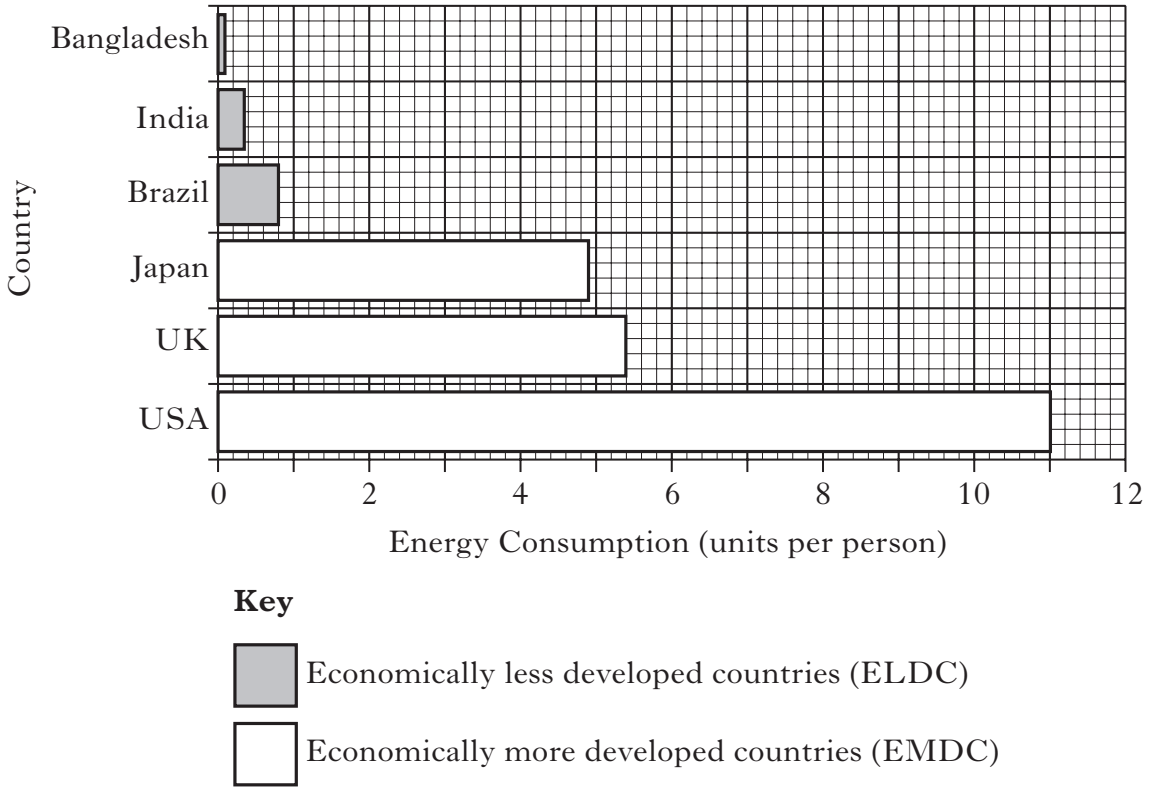
_____ **1**

**[Turn over**

DO NOT WRITE IN THIS MARGIN

*Marks*

**2.** (*a*) The graph below shows energy consumption (units per person) in selected countries.




(i) Give the energy consumption for the UK.

_____ units per person **1**

(ii) State the relationship between energy consumption and the level of economic development in a country.

_____ **1**

(iii) Calculate the number of times greater the energy use in the USA is than that in Bangladesh.

*Space for calculation*

_____ times **1**

(iv) Give **one** major source of energy in an ELDC.

_____ **1**

*Marks*

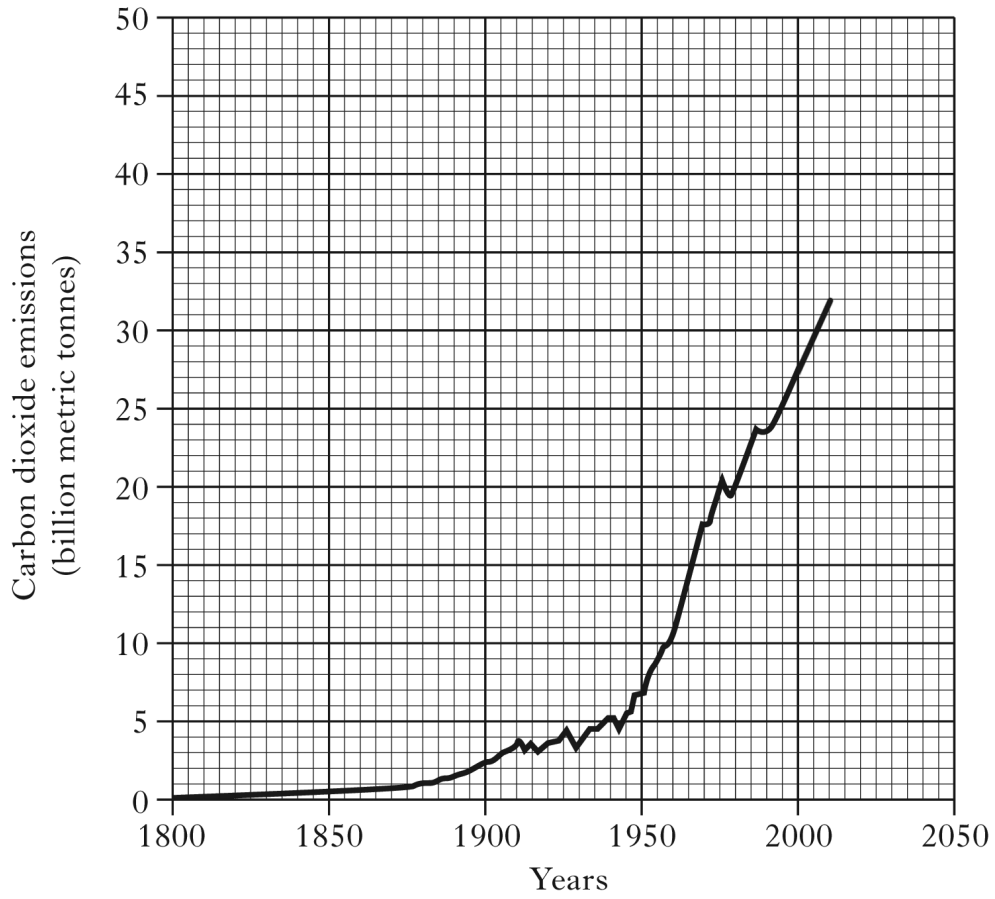
**2. (*a*) (continued)**

(v) Give **two** uses of energy in an ELDC.

1 _____

2 _____ **1**

(*b*) Carbon dioxide is one of the main gases responsible for contributing to the greenhouse effect. The graph below shows the carbon dioxide emissions between 1800 and 2010.




(i) Complete the sentence below to describe the trend in carbon dioxide emissions.

The trend between 1850 and 1950 was _____ and

the trend between 1950 and 2010 was _____. **1**

(ii) Predict the level of carbon dioxide emissions by 2050 and give a reason for your prediction.

Prediction _____ billion tonnes

Reason _____

_____ **1**

DO NOT WRITE IN THIS MARGIN

*Marks*

**2. (continued)**

(*c*) Name **two** fossil fuels.

1 _____

2 _____ **1**

(*d*) Give **one** impact of global warming on:

(i) landscape; _____

_____ **1**

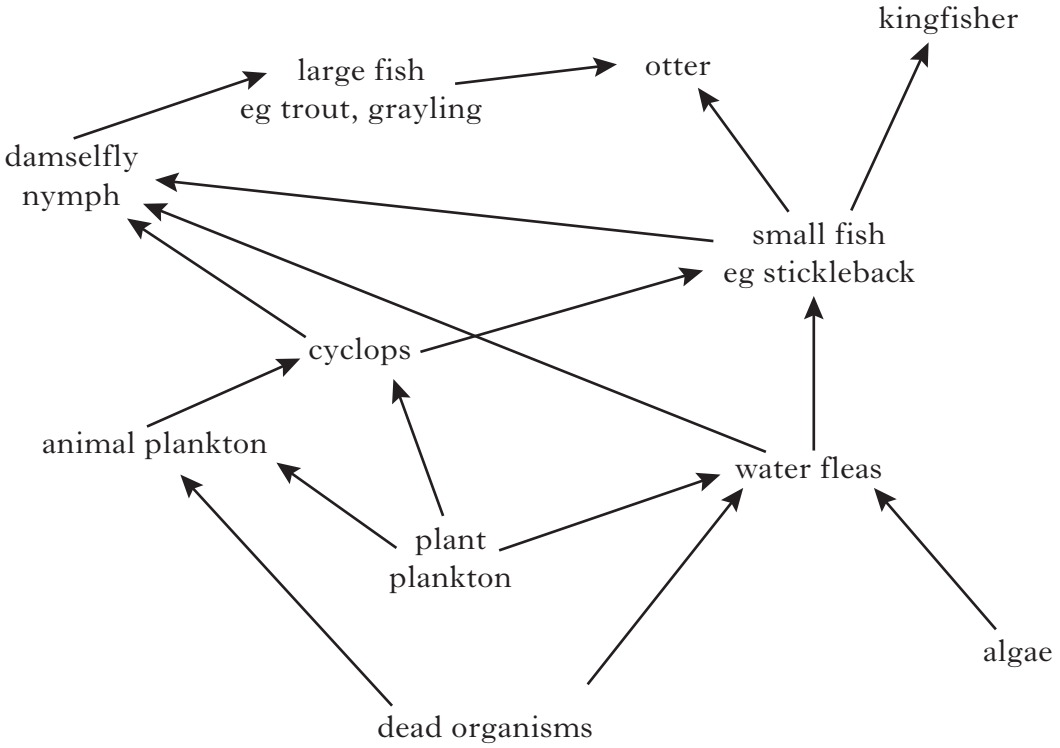
(ii) wildlife. _____

_____ **1**

**[Turn over for Question 3 on *Page eight***

*Marks*

**3.** The diagram below shows some of the organisms in a freshwater food web.




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

(i) Name **two** producers.

_____ and _____ **1**

(ii) Name **one** omnivore.

_____ **1**

(iii) Give **one** example of a predator prey relationship.

Predator _____ Prey _____ **1**

(iv) Predict the effect that an increase in the number of large fish caught by anglers would have on the number of cyclops.

Underline your answer and give a reason for it.

The number of cyclops would *increase* / *decrease* / *stay the same*.

Reason _____

_____ **1**

DO NOT WRITE IN THIS MARGIN

*Marks*

**3. (continued)**

(*b*) Fish lice may be found feeding on the scales and gills of a trout.

Name this special type of feeding relationship.

_____ **1**

(*c*) Name the process by which energy is captured by the producers in a food web.

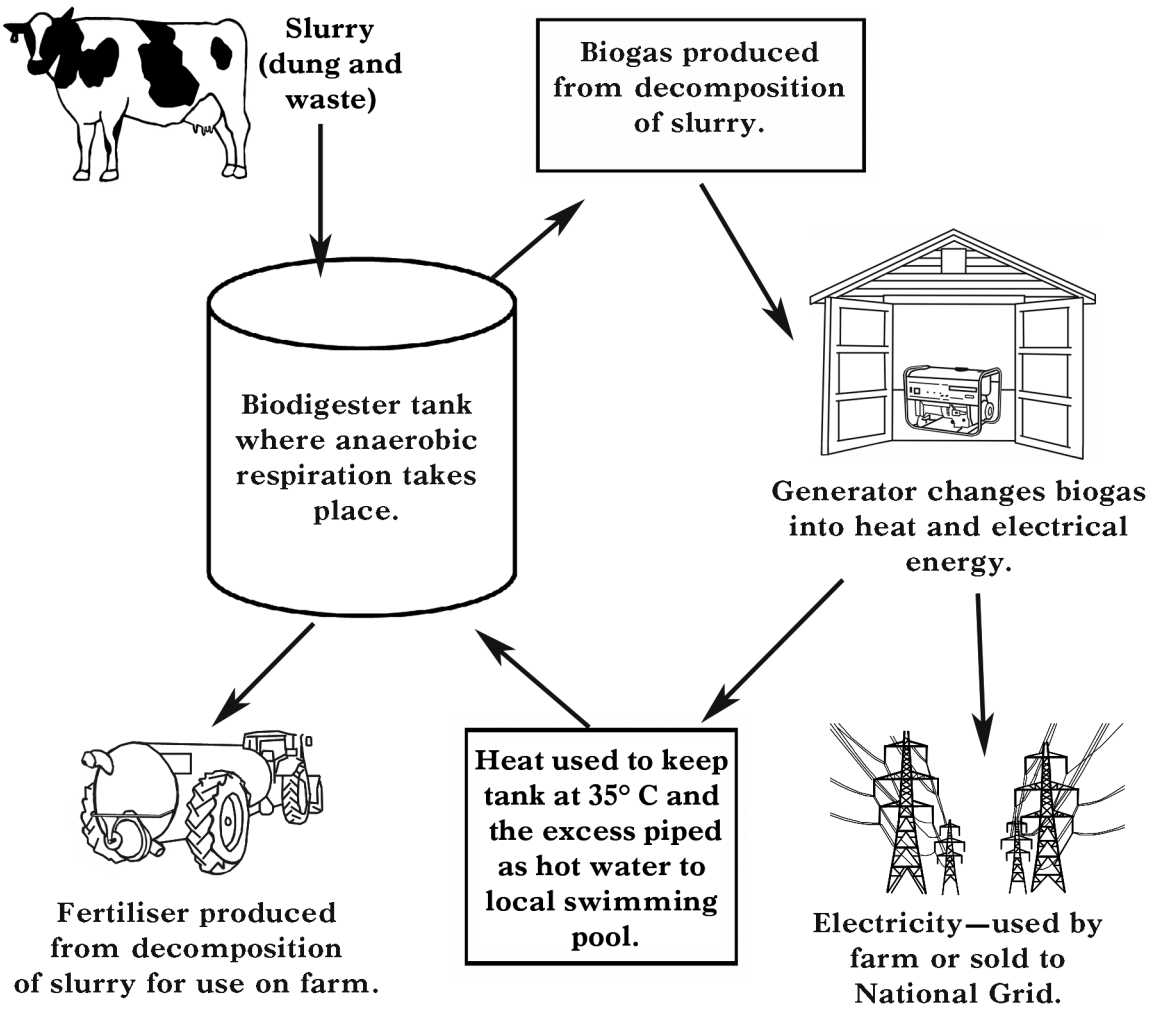
_____ **1**

**[Turn over**

DO NOT WRITE IN THIS MARGIN

*Marks*

**4.** The flow chart below shows some of the processes in biodigestion of waste on a farm. This involves anaerobic respiration to decompose dung and waste (slurry) from cows.




(*a*) Use the information from the flow chart above to answer the following questions.

(i) Give **two** economic advantages of the biodigester to the farmer.

1 _____ **1**

2 _____ **1**

(ii) Explain how this biodigestion of waste is a good example of recycling.

_____

_____ **1**

DO NOT WRITE IN THIS MARGIN

*Marks*

**4. (*a*) (continued)**

(iii) Suggest **one** advantage and **one** disadvantage to the community of having biodigester tanks.

Advantage _____

_____ **1**

Disadvantage _____

_____ **1**

(*b*) Respiration is an important part of the carbon cycle.

(i) Complete the word equation for respiration.

Carbohydrate + _____ → Energy + Water + _____ **1**

(ii) Name **one** type of organism which carries out decomposition.

_____ **1**

(iii) Explain why it is important that nutrients such as carbon are cycled in nature.

_____ **1**

(*c*) One third of the 20 million tonnes of food bought in the UK each year goes to waste. Calculate the mass of waste food.

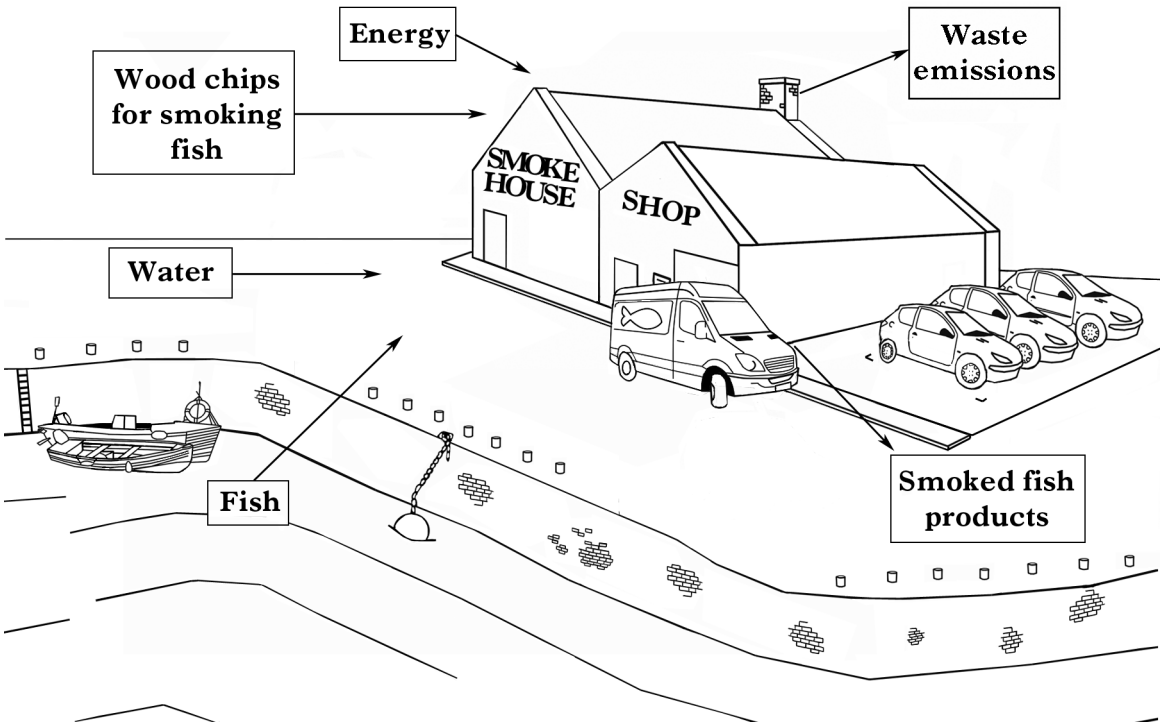
*Space for calculation*

_____ million tonnes **1**

**[Turn over**

*Marks*

**5.** The diagram below shows some of the inputs and outputs of a fish processing business.




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

(i) Give **two** natural resources required by the business.

1 _____ 2 _____ **1**

(ii) Give **two** man-made resources required by the business.

1 _____ 2 _____ **1**

(*b*) Fresh fish is transported to the business and fish products are dispatched by vehicles.

(i) Name **one** natural, non-renewable resource used to make fuel for transport.

_____ **1**

(ii) Name **one** environmentally friendly fuel for transport.

_____ **1**

(iii) Give **one** other way to reduce pollution from transport exhaust fumes.

_____ **1**

DO NOT WRITE IN THIS MARGIN

*Marks*

**5. (continued)**

(*c*) Wood chips are produced when timber is processed in forestry.

Give **one** example of a sustainable forestry method.

_____

_____

_____ **2**

(*d*) Explain why monitoring the waste emissions at the smokehouse is good practice.

_____

_____

_____ **2**

(*e*) The water used for ice-making and cleaning at the smokehouse is metered. On average, 12 units of water are used in one week. Calculate the total **annual** cost in pounds (£) if each unit is 61·2 pence.

*Space for calculation*

£ _____ **1**

(*f*) Give **two** ways in which you personally could save water at home.

1 _____

2 _____ **1**

**[Turn over**

**6.** The diagrams below contain information on four species found in Scotland.

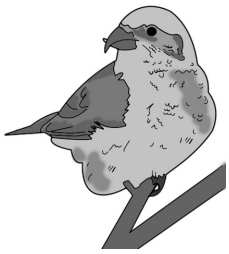
**Scottish Primrose,** *Primula scotica*

- Found only in a few locations
- Protected as it is endemic to Scotland, ie found nowhere else in the world
- Numbers threatened by climate change, competition from other plants, overgrazing and exposure to wind and salt spray

**Ragwort**

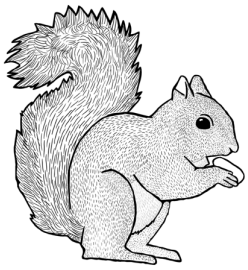
- Widespread in grassland and farmland unless controlled with weedkiller
- The Ragwort Act 2003 states it must be eradicated
- Poisonous to horses and other farm animals

**Scottish Crossbill**



- Numbers reduced due to pine forest destruction and low food availability
- On the World Conservation Union's Red List as it is an endangered species
- Populations and the pine cones on which it feeds are being monitored

**Red Squirrel**



- Numbers reduced due to competition from, and disease carried by, the Grey Squirrel
- Protected by legislation
- Numbers may be increased by culling of Grey Squirrels

DO NOT WRITE IN THIS MARGIN

*Marks*

**6. (continued)**

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

(i) Name the species which is a weed.

_____ **1**

(ii) Name **one** naturalised species.

_____ **1**

(iii) Describe the niche of the Scottish Crossbill.

_____

_____ **2**

(*b*) The Red Squirrel and Scottish Crossbill are protected by national and local biodiversity plans.

(i) Name **one** other plan by which the numbers of an individual species can be conserved.

_____ **1**

(ii) What is meant by biodiversity?

_____ **1**

(*c*) Give the meaning of the term "feral species".

_____

_____ **1**

(*d*) Name **one** piece of legislation used to protect endangered wildlife.

_____ **1**

**[Turn over**

*Marks*

**6. (continued)**

(*e*) The Sea Eagle, a globally threatened species, shown below, has recently been re-introduced into eastern Scotland. This followed a successful re-introduction programme in western Scotland where there are now at least 40 breeding pairs. Between 2009 and 2011, about 100 birds have been released to help boost the Scottish Sea Eagle population.

**Sea Eagle facts**

Wingspan 2–2·4 metres

Pair up for breeding after 3–5 years

Feeding hunts fish, ducks, geese, rabbits, hares

(i) Why has it been necessary to have a re-introduction programme?

_____ **1**

(ii) Suggest **one** reason why conflict could arise between conservationists and gamekeepers over the re-introduction of the Sea Eagle.

_____

_____

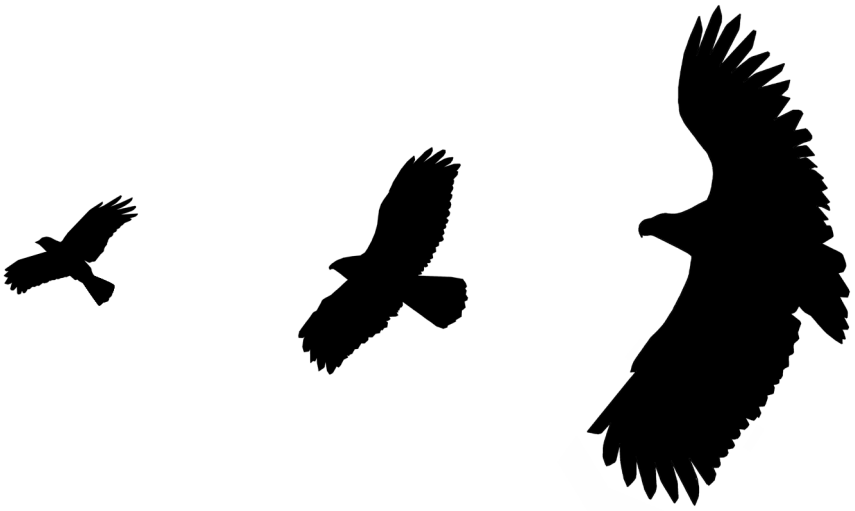
_____ **1**

*Marks*

**6. (continued)**

(*f*) Calculate the simple, whole number ratio of the wing spans for the birds shown in the silhouette diagram below.

| | *Blackbird* | *Buzzard* | *Sea Eagle* |
|---|---|---|---|
| Approximate wingspan | 40 cm | 120 cm | 240 cm |

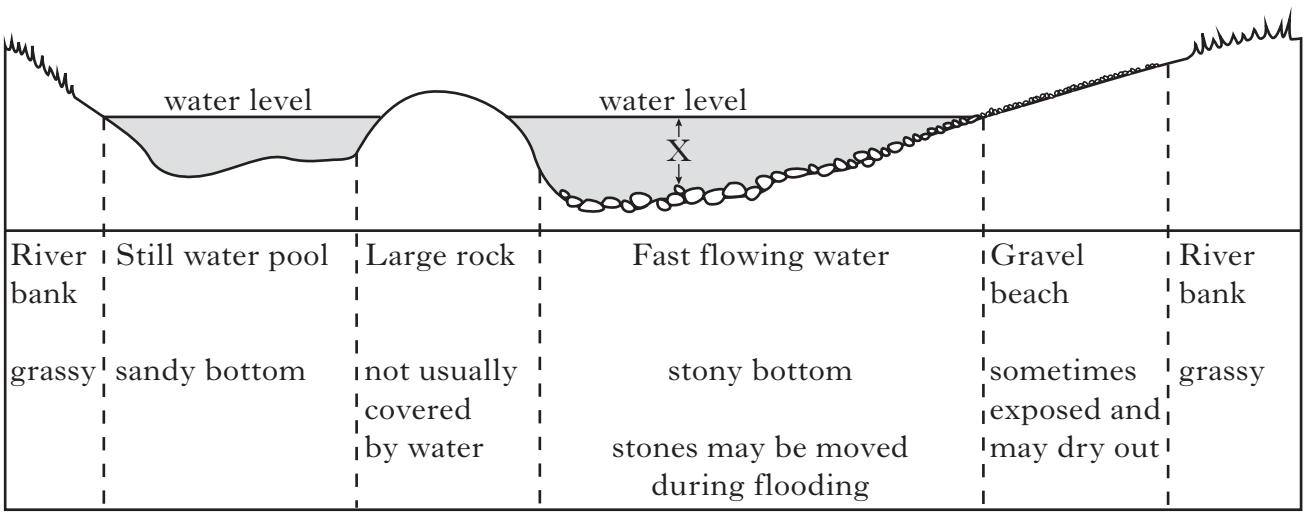


Ratio Blackbird _____: Buzzard _____: Sea Eagle _____ **1**

**[Turn over**

**[BLANK PAGE]**

**7.** (*a*) The diagram below shows a transect from an investigation of a stream ecosystem.




**Scale 1 cm represents 1 metre**

DO NOT WRITE IN THIS MARGIN

*Marks*

(i) Describe **one** habitat shown in the diagram.

_____ **1**

(ii) From the diagram, suggest **one** habitat for freshwater plants and give a reason for your choice.

Habitat _____

Reason _____ **1**

(iii) What is the depth of water at **X**? Circle your choice.

10 cm 1 m 10 m **1**

(iv) Give **two** abiotic factors that affect the distribution of organisms in freshwater ecosystems.

_____ and _____ **1**

**[Turn over**

*Marks*

**7. (continued)**

(*b*) Another investigation was carried out into the abundance of species in two streams, A and B.

The tables below show data for the four indicator species whose abundance was measured in each stream. The data is recorded as a percentage of the total catch.

The relative abundance of indicator species in a freshwater community can be used to assess the level of pollution.

**Stream A**

| *Indicator species* | *Percentage of total catch (%)* |
|---|---|
| Mayfly larvae | 20 |
| Stonefly larvae | 30 |
| Waterlouse | 8 |
| Rat-tailed maggot | 1 |

**Stream B**

| *Indicator species* | *Percentage of total catch (%)* |
|---|---|
| Mayfly larvae | 5 |
| Stonefly larvae | 15 |
| Waterlouse | 20 |
| Rat-tailed maggot | 4 |

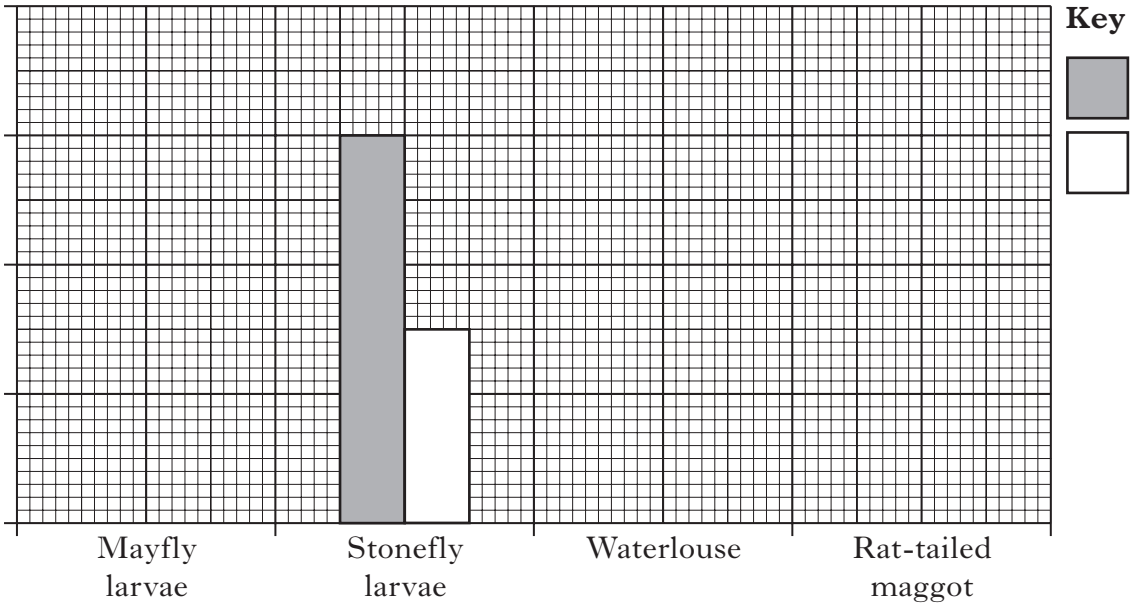
(i) Using information from the tables, complete the bar graph below by:

1 adding the scale and label to the vertical (y) axis;

2 adding a label to the horizontal (x) axis;

3 completing the bar graph and key.

(An additional bar graph can be found on *Page thirty-one*)




**3**

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*Marks*

**7. (*b*) (continued)**

(ii) Which stream is more polluted? Give **two** reasons for your answer.

Stream _____ **1**

Reason 1 _____

Reason 2 _____ **1**

(iii) The samples were taken on the same day, in mid stream during a period of low rainfall.

Give **one** other variable factor which should have been kept the same to increase the validity of the investigation.

_____ **1**

(iv) How could the results of the investigation be made more reliable?

_____ **1**

(v) Describe how a sample of freshwater organisms is collected. You may use a diagram.

_____

_____

_____ **1**

**[Turn over**

*Marks*

**8.** Use the map extract of the Fort William area – Extract No 1884/41 (**separate item**) to answer the following questions.

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

(i) Match each grid reference in the table below with the appropriate environment.

*sea loch* *coniferous plantation* *mountain* *urban*

| *Grid Reference* | *Environment* |
|---|---|
| 0872 | |
| 1174 | |
| 1575 | |
| 1671 | |

**2**

(ii) Give **two** industries, other than tourism, with their grid references found in the Fort William area.

Industry 1 _____ GR _____

Industry 2 _____ GR _____ **2**

(*b*) Topographical features influence the location of transport routes.

(i) Give **two** topographical features that restrict the route of the Caledonian Canal (GR 1582).

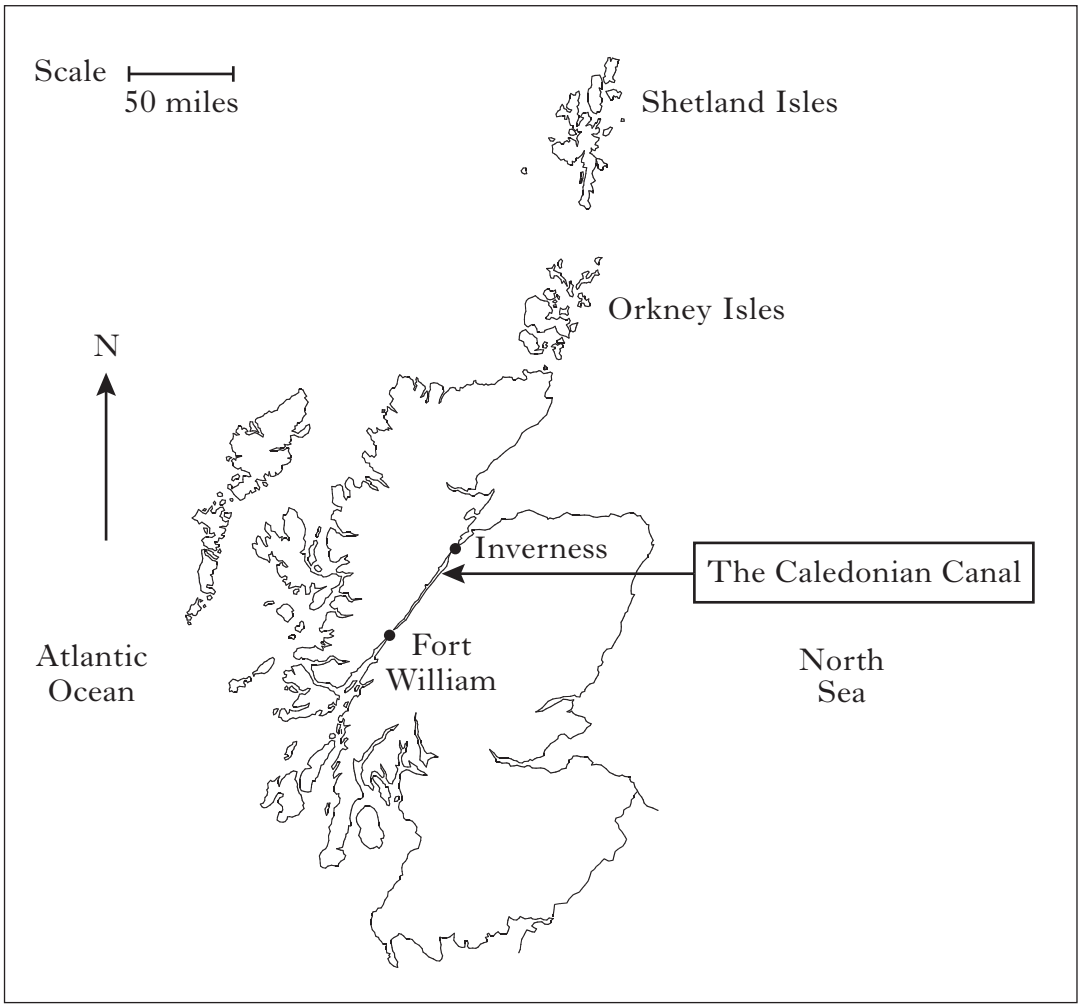
1 _____

2 _____ **1**

*Marks*

**8. (*b*) (continued)**

(ii) The Caledonian Canal was constructed in 1822 and used by naval vessels. At present it is used by sailing boats. The location of the Caledonian Canal is shown on the map below.




Give **one** advantage of this route.

_____ **1**

(*c*) A railway line extends from GR 105743 to GR 210812. Natural features caused problems in its construction but these were solved by engineers.

Identify **one** natural feature along the route and give the solution to the problem.

Natural feature _____

Solution _____ **1**

**[Turn over**

*Marks*

**8. (continued)**

(*d*) Some weather statistics for Fort William in 2008 are shown in the table below.

| *Month* | *Jan* | *Feb* | *Mar* | *Apr* | *May* | *Jun* | *Jul* | *Aug* | *Sept* | *Oct* | *Nov* | *Dec* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average Temperature (° C) | 3 | 2 | 4 | 7 | 12 | 12 | 15 | 14 | 12 | 8 | 5 | 3 |
| Precipitation (mm) | 310 | 170 | 190 | 90 | 30 | 120 | 140 | 189 | 130 | 290 | 140 | 160 |

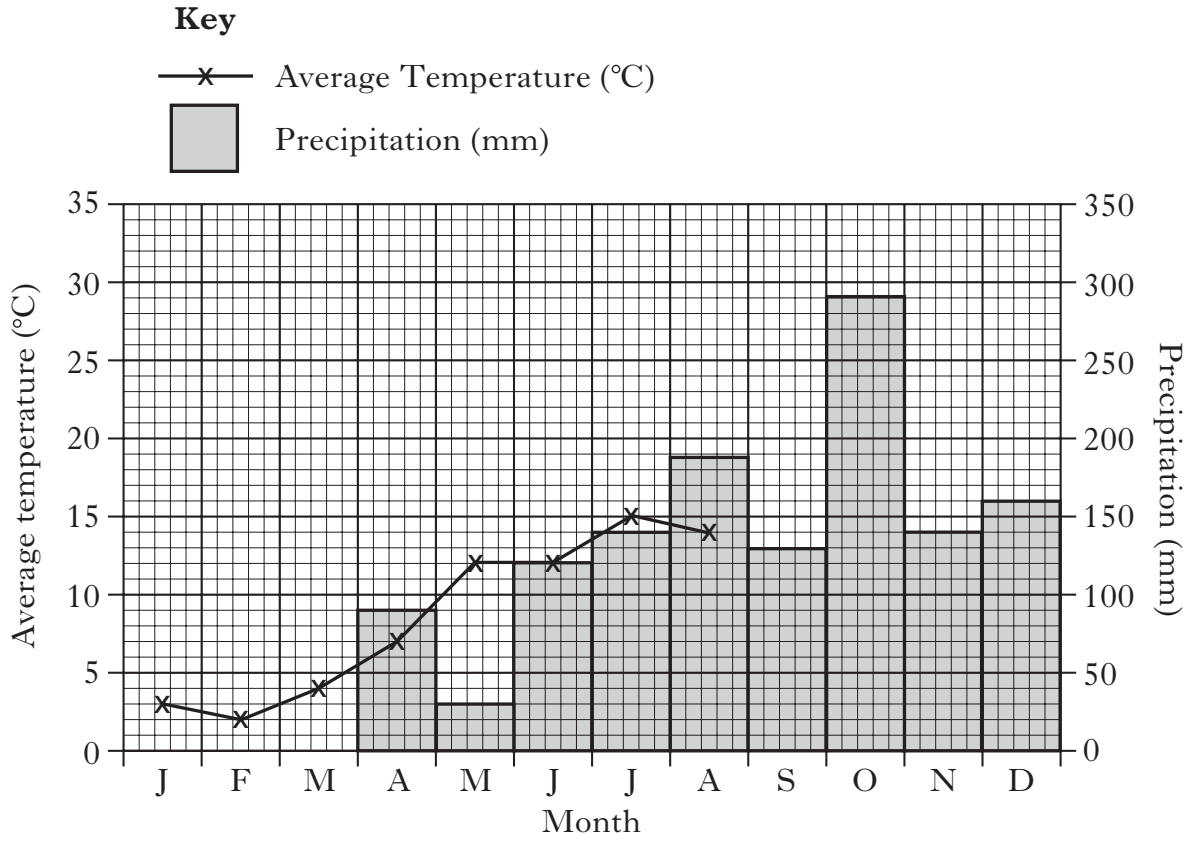
(i) Using information from the table, complete the graph below by:

1 adding the average temperature for September to December;

2 adding the precipitation for January to March.

(An additional graph can be found on *Page thirty-two*)

**Graph for Fort William**




**2**

DO NOT WRITE IN THIS MARGIN

*Marks*

**8. (*d*) (continued)**

(ii) What is the highest average temperature?

_____ °C **1**

(iii) Calculate the total annual precipitation.

*Space for calculation*

_____ mm **1**

(*e*) The major land use in the area is forestry.

(i) Give **two** reasons for this.

1 _____

2 _____ **2**

(ii) Name **two** recreational activities with their grid references in the forested areas shown on the map.

1 _____ GR _____

2 _____ GR _____ **2**

(iii) Suggest **one** forestry operation that may restrict recreational activities.

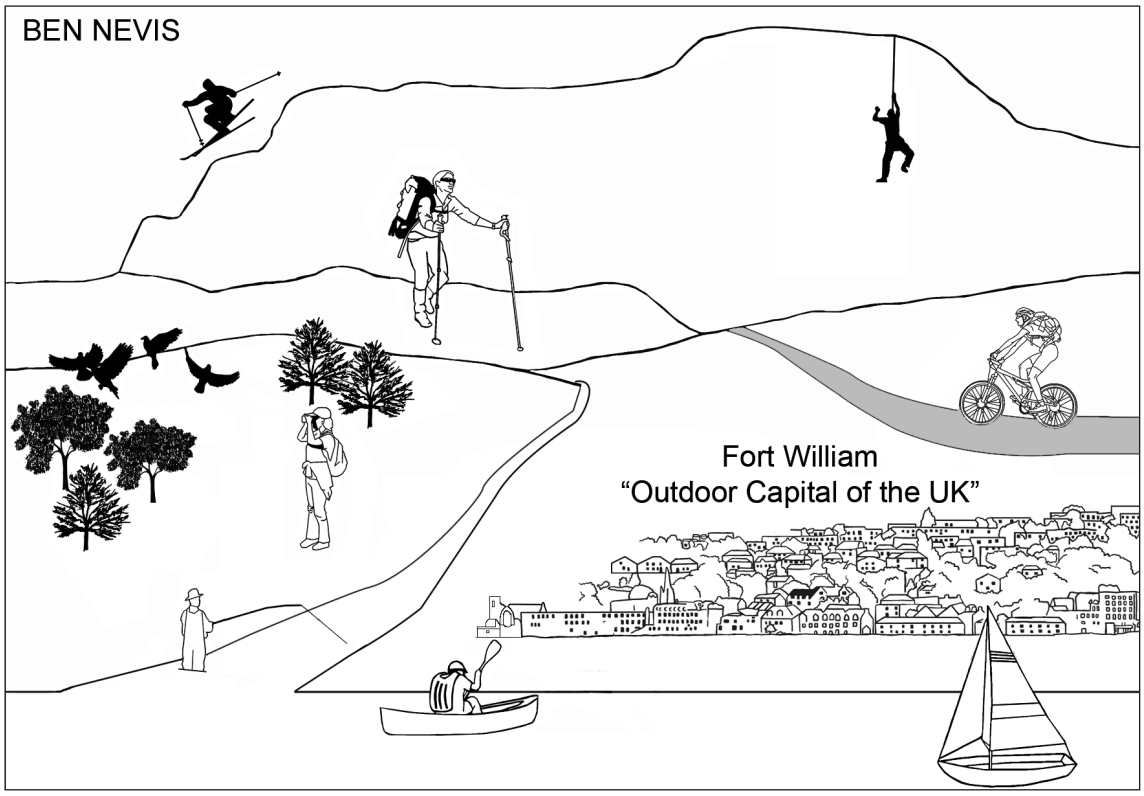
_____ **1**

**[Turn over**

*Marks*

**8. (continued)**

(*f*) The diagram below shows some of the outdoor activities to be found in the Fort William area.




(i) Describe a possible conflict of interest, and its resolution, between **two** named user groups selected from the activities diagram.

Group 1 _____

Group 2 _____

Possible conflict _____

_____

Resolution _____

_____ **2**

DO NOT WRITE IN THIS MARGIN

Marks

**8. (*f*) (continued)**

(ii) Around 110 000 people walk to the summit of Ben Nevis every year. Circle **one** environmental problem created by these visitors from the list below. Describe its detrimental impact on the environment and suggest a management solution to the problem.

*litter* *wild camping* *footpath erosion*

_____

_____

_____

_____

_____ **1**

(iii) The diagram illustrates multi-use and integration in the Fort William area. Describe an example of multi-use integration in your own local area.

_____

_____

_____

_____

_____ **2**

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

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.**
**Diagrams may be used where appropriate.**

### Option A

With reference to Agenda 21, write notes on recycling under the following headings:

(*a*) sustainability; **5**

(*b*) local schemes. **5**

**(10)**

**OR**

### Option B

Discuss pollution **and** possible preventable measures taken in:

(*a*) Scottish beaches; **5**

(*b*) Scottish farms. **5**

**(10)**

**OR**

### Option C

With reference to your local area:

(*a*) describe the techniques used to collect weather data; **5**

(*b*) describe the contribution of geology and soils to its development. **5**

**(10)**

[*END OF QUESTION PAPER*]

DO NOT WRITE IN THIS MARGIN

*Marks*

## SPACE FOR ANSWERS

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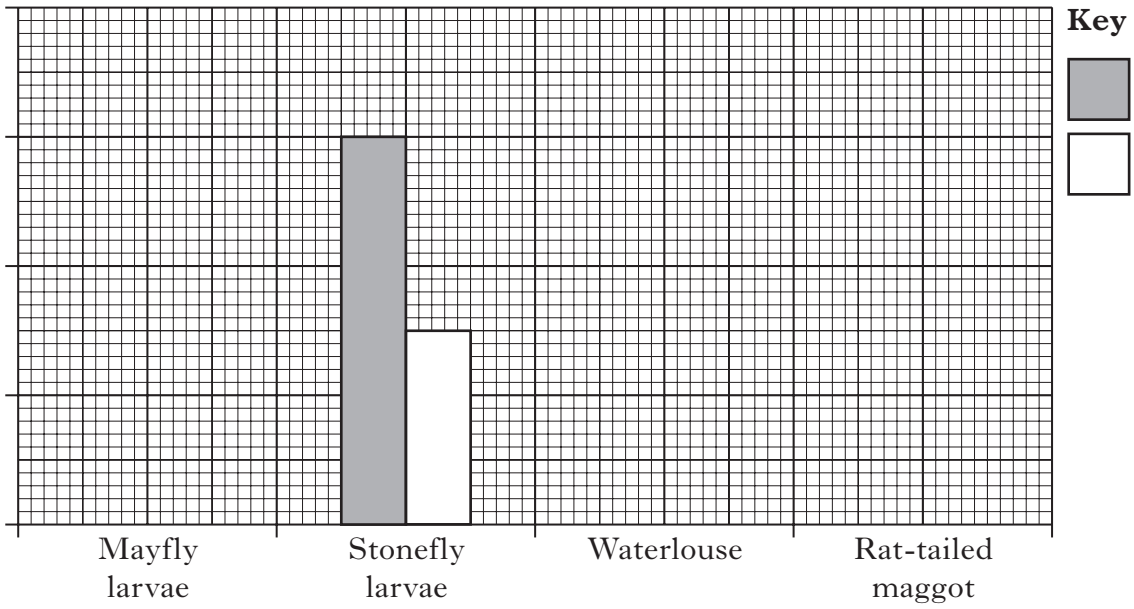
*Marks*

**SPACE FOR ANSWERS**

**ADDITIONAL BAR GRAPH FOR QUESTION 7(*b*)(i)**



**ADDITIONAL GRAPH FOR QUESTION 8(*d*)(i)**

**Graph for Fort William**