FOR OFFICIAL USE

N5

National
Qualifications
SPECIMEN ONLY

Mark

SQ14/N5/01 Environmental Science

Date — Not applicable

Duration — 2 hours

SQ14N501

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Number of seat

Date of birth

Day	Month	Year
DD	MM	YY

Scottish candidate number

Total marks — 80

Read all questions carefully before attempting.

Use **blue** or **black** ink.

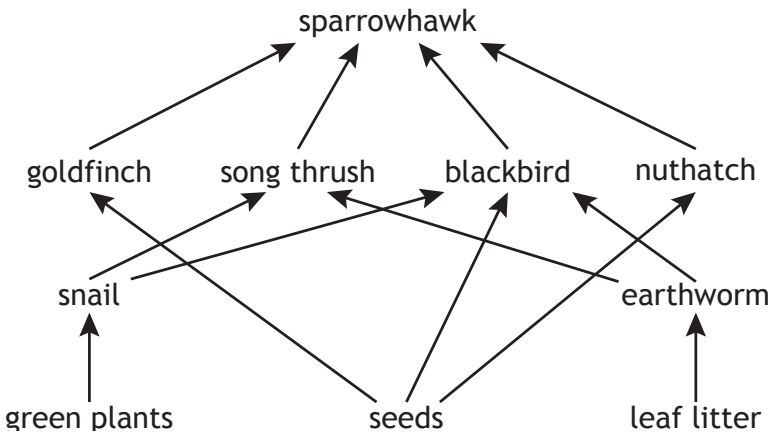
Write your answers in the spaces provided. Additional space for answers and rough work is provided at the end of this booklet. If you use this space, write clearly the number of the question you are attempting. Any rough work must be written in this booklet. You should score through your rough work when you have written your fair copy.

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

SQA ©

MARKS | DO NOT WRITE IN THIS MARGIN

1. (a) The diagram below shows some of the organisms found in a garden food web.



Use information from the diagram to answer the following questions.

(i) State which type of feeder is represented by the blackbird. **1**

_____

(ii) The number of song thrushes caught by sparrowhawks is increasing. Predict what impact this will have on the number of earthworms.

Choose **one** of the possible outcomes from the list below, and provide a reason for your choice. **1**

- Increase
- Decrease
- Stay the same

Outcome _____

Reason _____

_____

(iii) Name **two** species which are in competition for seeds. **1**

1 _____

2 _____

MARKS | DO NOT WRITE IN THIS MARGIN

1. (continued)

(b) State **one** way in which energy can be lost from a food web. **1**

_____

(c) Leaf litter is broken down by decomposers. Explain the importance of this within an ecosystem. **1**

_____

_____

Total marks 5

MARKS DO NOT WRITE IN THIS MARGIN

2. (a) Some people provide extra bird food, such as seeds, in their garden. The seed types preferred by some garden birds are shown in the table below.

Bird species	*Seed types*				
	Wheat	**Peanuts**	**Niger**	**Sunflower**	**Kale**
Greenfinch	✓			✓	
Great tit		✓		✓	
Goldfinch	✓		✓	✓	
Chaffinch	✓				✓
Bullfinch				✓	✓
Siskin		✓			
Great spotted woodpecker		✓			
Nuthatch		✓		✓	

Use information from the table to answer the following questions.

(i) Name the seed type that is preferred by most bird species. **1**

_____

(ii) State which seed type should be provided to increase the number of goldfinches **only**, and provide a reason for your choice. **1**

Seed type _____

Reason _____

_____

(iii) Explain why providing a mixture of different seed types is beneficial. **2**

_____

_____

_____

(iv) Suggest **one** other way to encourage more birds to visit gardens. **1**

_____

2. (continued)

(b) In 2000, it was estimated that there were 200 000 breeding pairs of goldfinches in the UK. A survey in 2010 found that the numbers had increased by 40%.

Calculate the number of breeding pairs estimated to be present in 2010. **1**

Space for calculation

_____ estimated number of breeding pairs

2. (continued)

(c) Information on five seed types suitable for feeding garden birds is provided in the table below.

Seed type	*Colour*	*Shape*	*Groove on surface*
Niger	Black	Elongated	Absent
Wheat	Brown	Elongated	Present
Kale	Brown	Round	Absent
Sunflower	Black and white stripes	Elongated	Absent
Peanut	Brown	Elongated	Absent

Use the information from the table to complete the key below. **2**

1 Seed round ..... **Kale**

Seed elongated ..... Go to 2

2 Seed brown ..... Go to 3

Seed not brown ..... Go to 4

3 [ ] ..... **Wheat**

[ ] ..... **Peanut**

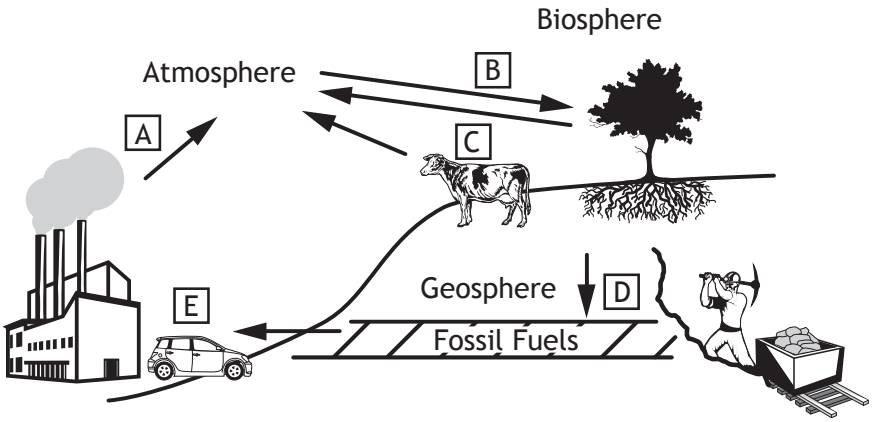
4 Seed black ..... [ ]

Seed black and white stripes ..... [ ]

Total marks 8

MARKS | DO NOT WRITE IN THIS MARGIN

3. The diagram below represents part of the carbon cycle.



(a) (i) State which letter represents respiration. **1**

Letter _____

(ii) Describe how the combustion of fossil fuels has a negative impact on the environment. **2**

_____

_____

_____

(iii) Describe **one** way in which atmospheric pollution from industry could be minimised. **1**

_____

_____

(iv) Photosynthesis is the process in plants which involves the conversion of light energy into chemical energy. Complete the word equation for this process. **1**

_____ + _____ $\xrightarrow[\text{chlorophyll}]{\text{light}}$ _____ + _____

(b) Name **one** national organisation with responsibility for the protection of the environment in Scotland. Describe **one** activity this organisation carries out to meet this role. **1**

Organisation _____

Activity _____

Total marks 6

4. Giant hogweed is a non-native species which can be found growing in many areas. It can reach heights of up to three metres and particularly favours riverbanks.

Giant hogweed

Dandelion

A group of students noticed that wherever giant hogweed was present there seemed to be a reduction in the number of other plant species.

The students wanted to find out how giant hogweed affects the distribution of dandelions. They selected two sites: Site A where giant hogweed was present, and site B where giant hogweed was absent. Each site was sampled ten times using a 1 m^2 quadrat. The results are shown in the table.

Sample no.	*Number of dandelions per m^2*	
	Site A	*Site B*
1	2	3
2	1	5
3	0	1
4	3	4
5	2	7
6	1	2
7	1	6
8	2	3
9	1	5
10	2	4

(a) (i) Each site was sampled ten times to increase the reliability of the results.

Describe **one** other way the students could further increase the reliability of their results. **1**

_____

_____

4. (a) (continued)

(ii) Each sample site covered a total of 1000 m^2.

Using the information in the table, calculate the estimated total number of dandelions in the site where giant hogweed is present. **2**

Space for calculation

Total number of dandelions _____

(b) The giant hogweed and the dandelion compete for light.

Describe how light intensity can be measured. **1**

_____

_____

(c) Giant hogweed is a non-native species.

Name **one** other non-native species and describe its impact on an ecosystem. **1**

_____

_____

(d) The dandelion is found in many different locations, including meadows, and produces large quantities of seeds throughout most of the year. It produces lots of nectar which is an important source of food for many insects.

Describe **one** conflict that might occur between conservationists and a land-based activity over the dandelion. **1**

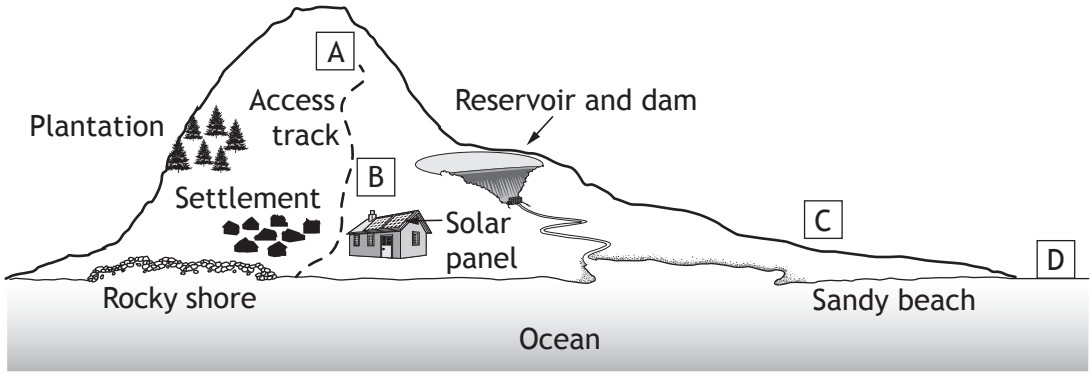
_____

_____

Total marks 6

MARKS | DO NOT WRITE IN THIS MARGIN

5. The diagram below shows an island where renewable sources of energy are used to generate electricity for the islanders.



(a) Sites A, B, C and D show possible locations for a wind farm.

Choose **one** site and give **one** disadvantage of using this location for siting a wind farm. **1**

Site _____

Disadvantage _____

_____

(b) A dam and a reservoir have been constructed on the island.

(i) Other than the dam and reservoir, suggest **one** other way in which water could be used to generate electricity. **1**

_____

_____

(ii) Explain how energy sources from water can be sustainable. **1**

_____

5. (continued)

(c) The school on the island has installed a new biomass boiler to provide heat. The wood pellets that are used to power the boiler come from a sustainably managed source on the island.

(i) The annual cost of heating the school was £20 000. Installation of the biomass boiler has reduced this cost by 80%.

Calculate the new annual cost of heating the school. **1**

Space for calculation

£ _____

(ii) The government has set a target to reduce greenhouse gas emissions. The biomass boiler replaced an oil-fired boiler.

Compare the greenhouse gas emissions from burning biomass with those from burning oil. **1**

_____

_____

(d) Fisheries play a major part in the economy of the island.

Describe **one** way in which stocks of fish and shellfish can be conserved. **1**

_____

Total marks 6

MARKS | DO NOT WRITE IN THIS MARGIN

6. Rocks on Earth can be classified as igneous, sedimentary or metamorphic.

(a) Tick the box(es) beside the correct statement(s). **1**

Metamorphic rocks are formed from molten rock ☐

Fossils are commonly found in igneous rocks ☐

Limestone is an example of a sedimentary rock ☐

(b) One of the following steps shows the correct order for the formation of sedimentary rocks.

Circle the letter showing the correct order. **1**

A cementation – sedimentation – compaction

B compaction – sedimentation – cementation

C sedimentation – compaction – cementation

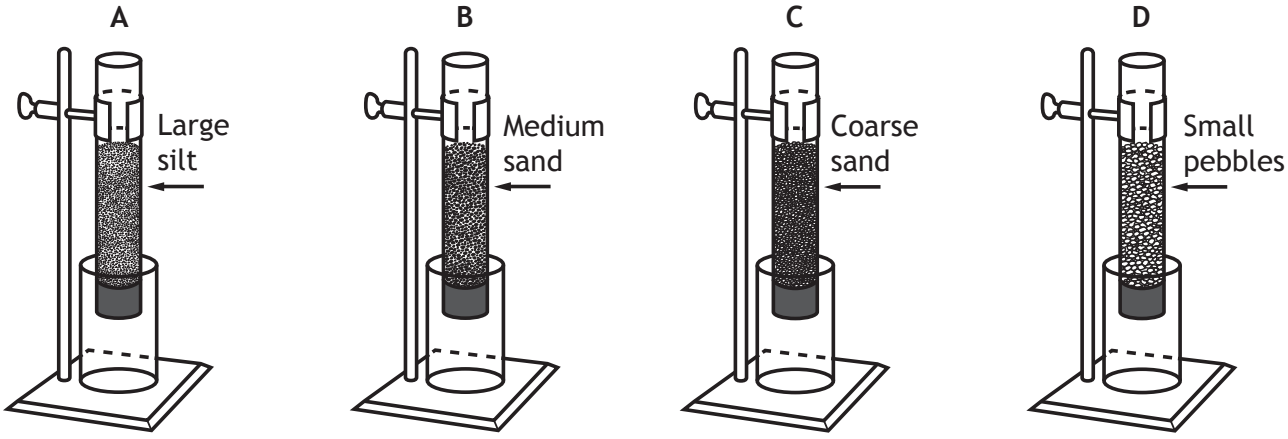
D sedimentation – cementation – compaction

6. (continued)

(c) Sedimentary rocks have different grain sizes, which affect their permeability and porosity.

An experiment was set up to investigate the effect of grain size on permeability.

The diagram below shows four columns. The grains in each column were of uniform size and were dried thoroughly before the experiment was started.



The same volume of water was poured into each column.

(i) State which column the water will drain through most quickly. Suggest a reason for your choice. **1**

Column _____

Reason _____

_____

(ii) Explain why it is good experimental practice to ensure the grains are dry at the start of the experiment. **1**

_____

_____

(iii) Permeability is closely related to porosity.

Explain why a rock may have a low permeability but a high porosity. **2**

_____

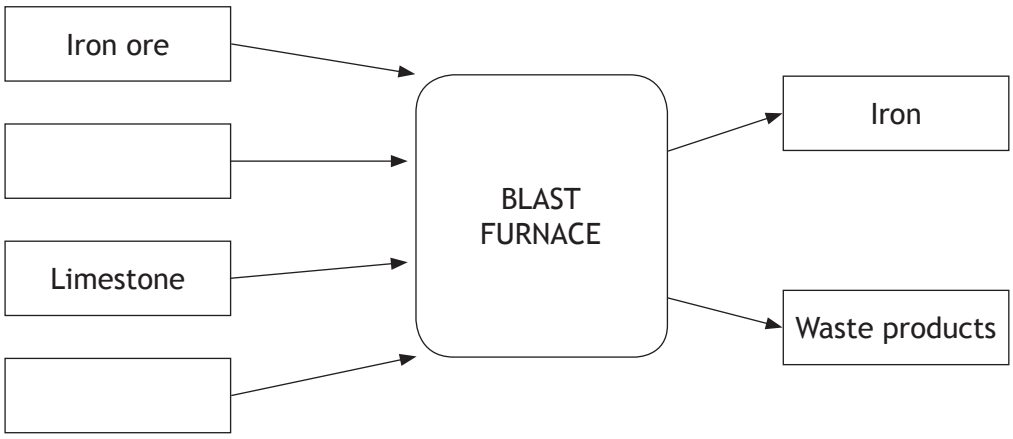
_____

_____

Total marks 6

MARKS DO NOT WRITE IN THIS MARGIN

7. Iron is extracted from iron ore by smelting the ore in a blast furnace. The process is outlined in the diagram below.



(a) (i) Complete the boxes in the diagram above to show the inputs in the iron smelting process. **1**

(ii) Iron ore contains different ore minerals, such as siderite and haematite.

Explain the difference between an ore and an ore mineral. **1**

(b) Iron is **one** of the most common elements on Earth and has many uses.

State **one** way to increase the usefulness of iron. **1**

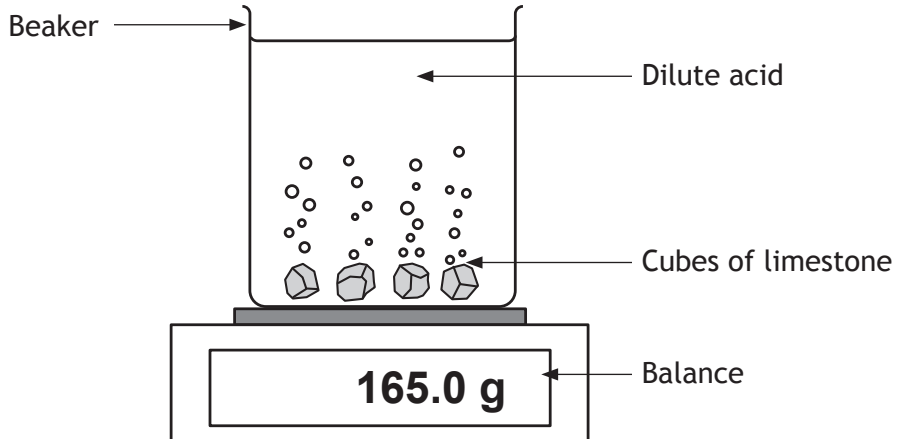
(c) Limestone is used in iron smelting. State **one** other use of limestone. **1**

7. (continued)

(d) Rainwater is a naturally occurring weak acid. Atmospheric pollution can cause rainwater to become more acidic.

Rainwater reacts with limestone. During this reaction, the mass of limestone reduces and carbon dioxide is produced.

The apparatus shown in the diagram below can be used to measure this loss in mass of limestone as it reacts with acid.



The table below shows the loss in mass of the flask and contents over time.

Time (seconds)	*Mass of flask and contents* (g)	*Decrease in mass* (g)
0	150·0	0·0
100	147·5	2·5
200	144·0	3·5
300	140·0	4·0
400	135·7	4·3
500	131·2	4·5
600	126·7	4·6

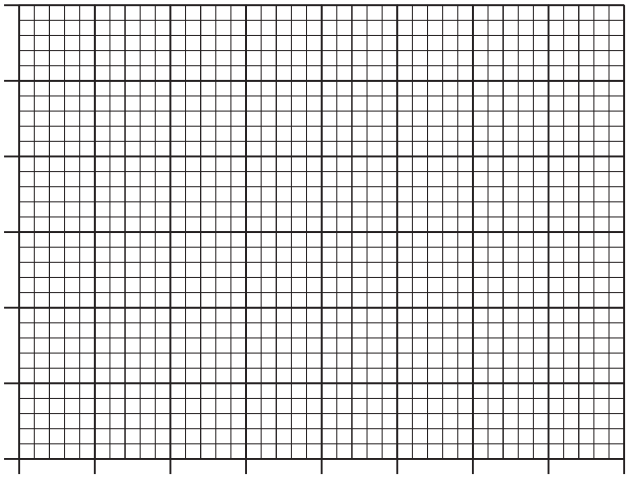
7. (d) (continued)

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

1 adding the scale and label to the horizontal (x) axis; **1**

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

3 completing the line graph to show the decrease in mass over time. **1**



(Spare grid available on *Page twenty-eight*.)

(ii) Predict the decrease in mass at 800 seconds. **1**

Decrease in mass _____ g

(iii) Describe what impact atmospheric pollution could have on limestone. **1**

_____

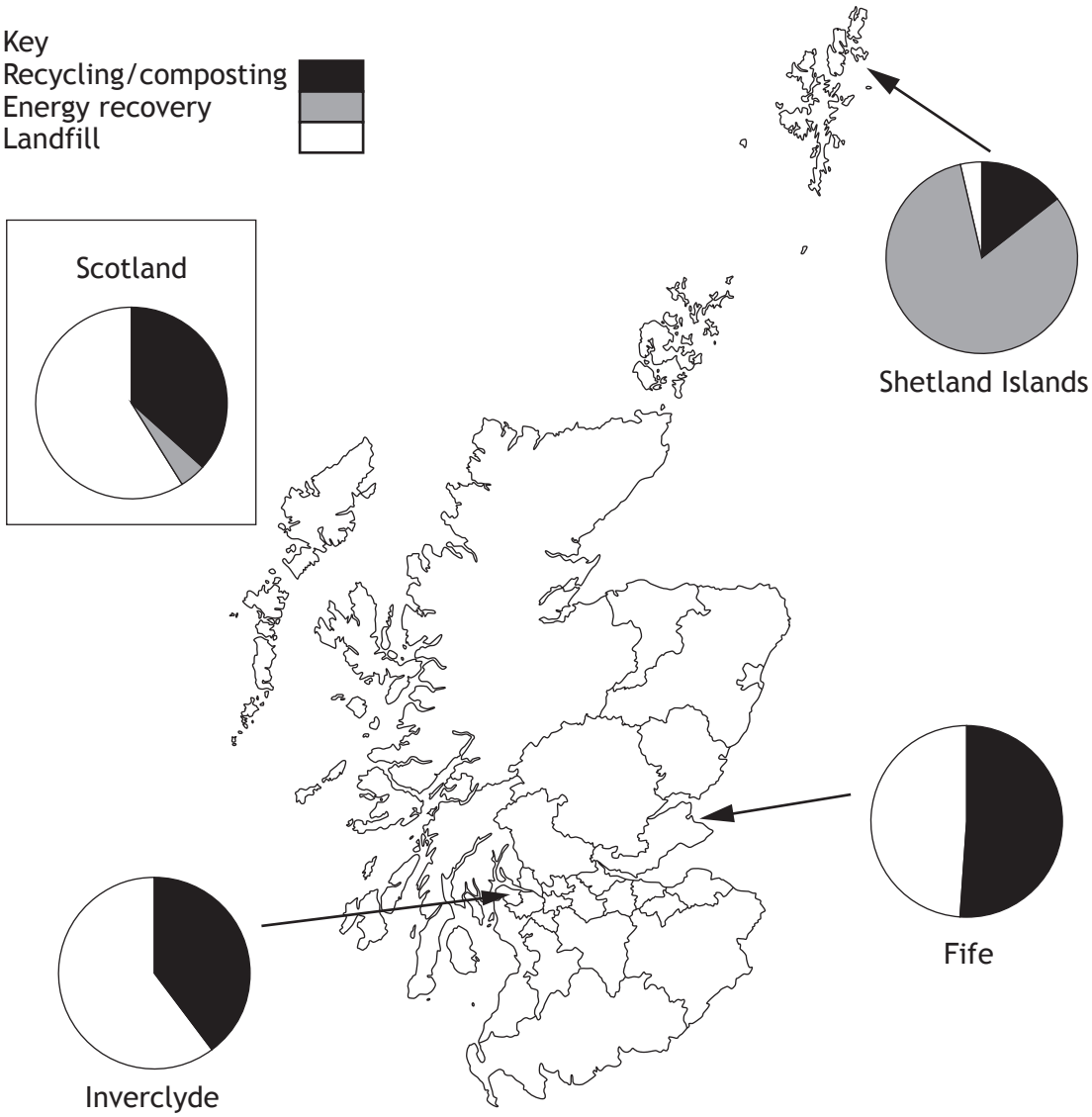
_____

Total marks 9

8. In its Zero Waste Plan, the Scottish Government has set a target of 70% recycling and a maximum 5% to landfill for all Scotland's waste by 2025.

The map below shows how three Scottish local authority areas dealt with their waste from Oct–Dec 2011. The information is also given for Scotland over the same period.

The methods of waste handling reported were: landfill, energy recovery and recycling/composting.



8. (continued)

(a) Use the information in the map to answer the following questions.

(i) Suggest which of the three local authorities is contributing the most towards meeting the Scottish Government's targets. Provide a reason for your choice. **1**

Local authority _____

Reason _____

_____

(ii) Between October and December 2011, the Shetland Islands local authority sent 82% of its waste to an energy recovery plant.

Suggest why the Shetland Islands might have opted for energy recovery more than either of the other methods. **2**

_____

_____

_____

_____

(iii) Energy recovery may be appropriate for the Shetland Islands.

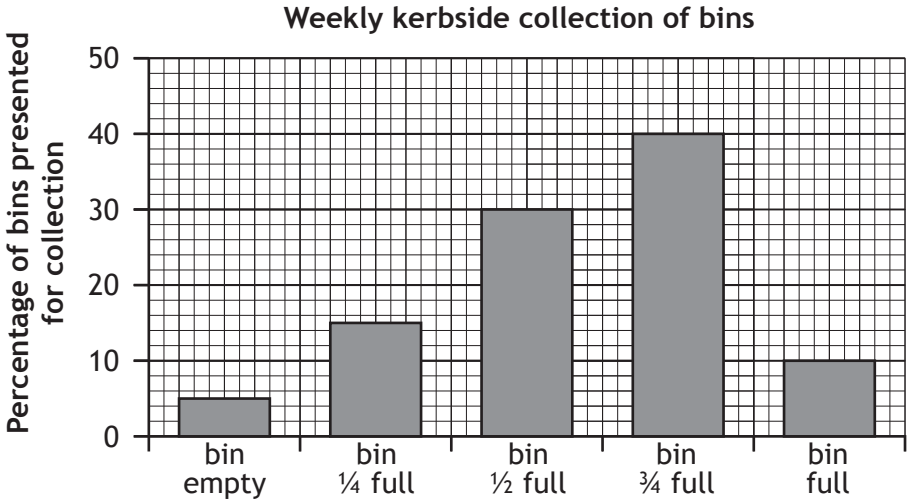
Explain why this may not be sustainable, in the long term, across mainland Scotland. **1**

_____

_____

8. (continued)

(b) The graph below shows how households in one local authority area present their waste for kerbside collection each week.



Use the information above to answer the following questions.

(i) Calculate, as a simple whole number ratio, the percentage of bins presented ¾ full to the number of bins presented ¼ full. **1**

Space for calculation

¾ full _____ : _____ ¼ full

(ii) The local authority is considering switching from weekly to fortnightly kerbside collections.

Select which collection method you think is most appropriate. Circle your answer and state a reason for your choice. **1**

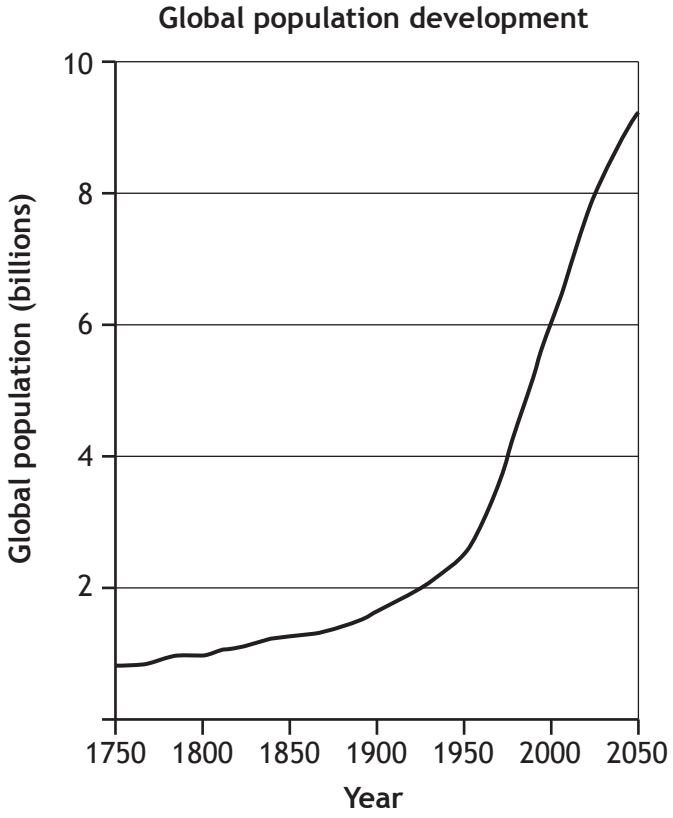
Fortnightly ***Weekly***

Reason _____

_____

Total marks 6

9. The global population currently stands at over seven billion people and is growing at a rate of around 1% per year. The graph below shows population growth since 1750 and projected figures to 2050.



(a) State **one** reason why the human population has increased so dramatically since the 1750s. **1**

(b) The population increase has had a major impact on the environment.

State **one** example of an environmental impact brought about by the increasing human population. **1**

9. (continued)

(c) Genetically modified (GM) crops are grown in many countries. Supporters of GM crops believe that the crops will help relieve the pressure on food supplies brought about by the increasing global population.

A 2010 survey found that 70% of European citizens are against growing GM crops or importing GM foods into Europe.

(i) Suggest **one** reason why so many Europeans may have this view. **1**

_____

_____

(ii) Other than growing GM crops, state **two** farming strategies that would help to provide food supplies for the increasing global population.

1 _____ **1**

2 _____ **1**

(d) Produce which was previously seasonal is now found all year round in some shops. For example, some strawberries are sourced from local producers, while others are imported from countries such as Spain.

(i) Compare the sustainability of importing seasonal produce with that of growing it locally. **1**

_____

_____

(ii) Strawberries can be grown using organic farming methods.

Give **one** advantage and **one** disadvantage of using organic farming methods.

Advantage _____

_____ **1**

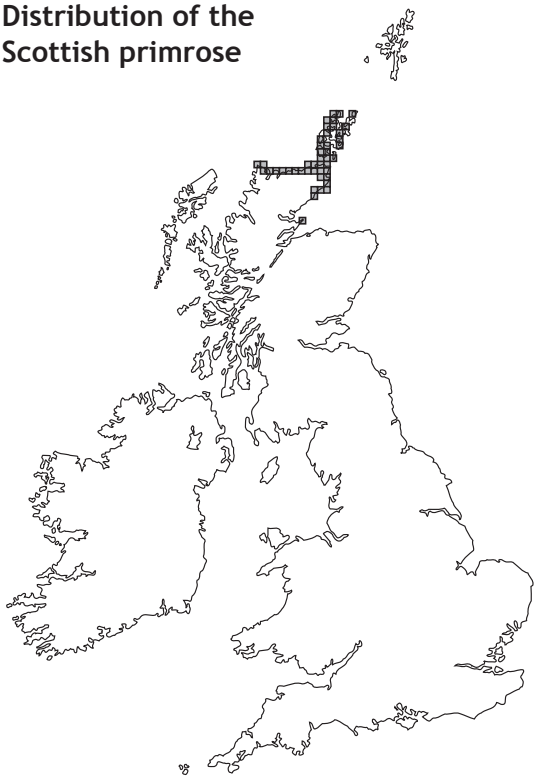
Disadvantage _____

_____ **1**

Total marks 8

10. It is predicted that the average temperature across Scotland will rise by around 2°C by the 2050s. This increase could have a significant impact on the distribution of many species, including the Scottish primrose (*Primula scotica*) and the large skipper butterfly (*Ochlodes sylvanus*).

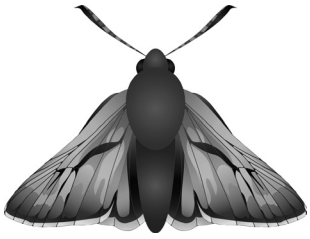
Distribution of the Scottish primrose



The Scottish primrose is a plant native to Scotland. It is adapted to a cold climate with short summers, and is mostly found on the coasts of Caithness and north-west Sutherland and in the Orkney Isles. The Scottish primrose produces more seedlings in warmer periods but these are easily out-competed by other species.

Distribution of the large skipper butterfly

The large skipper butterfly is widespread in England and Wales and is also found in the south-west of Scotland. It is mostly found in sheltered areas of grassland, hedgerows and roadside verges, but can also be found in urban parks and churchyards. As temperatures rise, it is predicted that the species will spread northwards.



10. (continued)

(a) (i) Describe the impact an increase in temperature could have on the distribution of the Scottish primrose. **1**

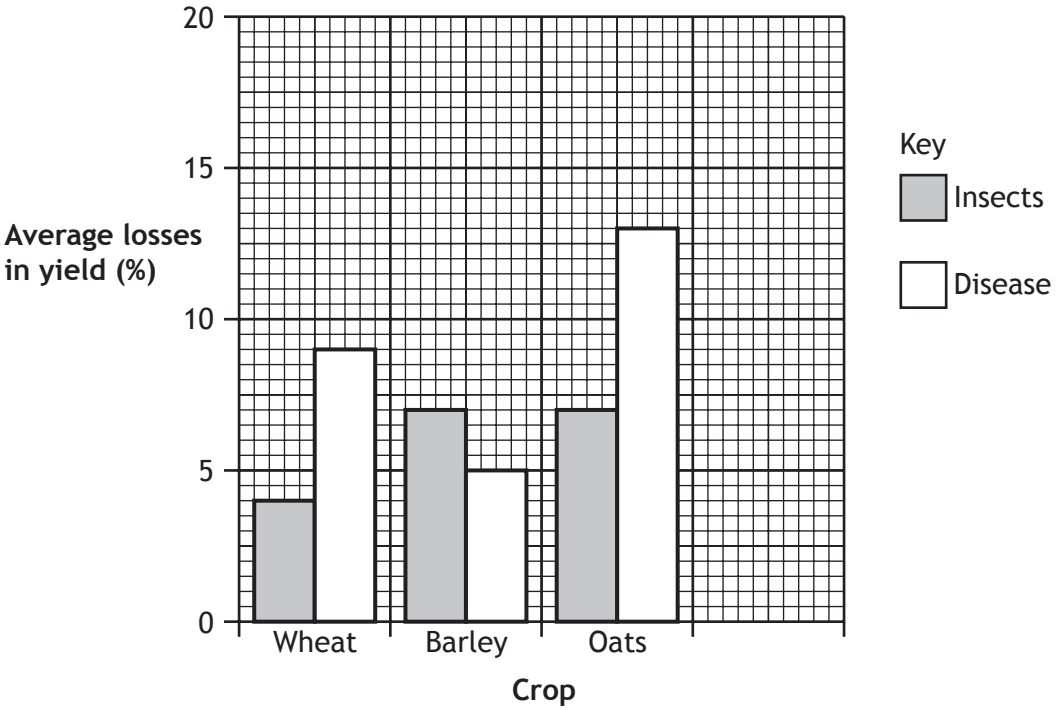
_____

_____

(ii) State **one** biotic factor that could limit the predicted spread of the large skipper butterfly. **1**

_____

(b) The predicted temperature increase may also result in a rise in pests and diseases which affect crops. The graph below shows the average annual losses in percentage yield caused by insects and disease in the production of three types of crop in Scotland.



(i) Oilseed rape is a common crop which has average annual losses of 9% to insects and 12% to disease.

Use this information to complete the graph by adding a label and bars in the space provided. **1**

10. (b) (continued)

(ii) State which crop has the lowest combined percentage loss from these two causes. **1**

Space for working

Crop _____

(iii) Explain why it would **not** be a valid conclusion to say that disease caused more tonnes of oats to be lost than any of the other crops named. **1**

_____

_____

(c) State **one** national policy or piece of legislation that has had an impact on food production in a country you have studied. **1**

_____

Total marks 6

MARKS | DO NOT WRITE IN THIS MARGIN

Write your answers to questions 11 and 12 on the following pages. Diagrams may be used where appropriate.

11. Select and answer **one** of the following questions.

a) Petroleum (crude oil and natural gas) is a non-renewable resource of global importance.

Describe the formation, extraction and processing of petroleum. **7**

OR

b) Nitrogen constitutes around 78% by volume of the Earth's atmosphere and has many uses.

Describe the importance of nitrogen and its compounds in our everyday lives. **7**

12. Select and answer **one** of the following questions.

a) Water in a river may become contaminated by human activity.

Describe **two** ways this may occur and suggest measures which could be taken to minimise this contamination. **7**

OR

b) The Scottish Government aims to cut Scotland's greenhouse gas emissions.

Describe and explain ways in which **individuals** could contribute towards this reduction. **7**

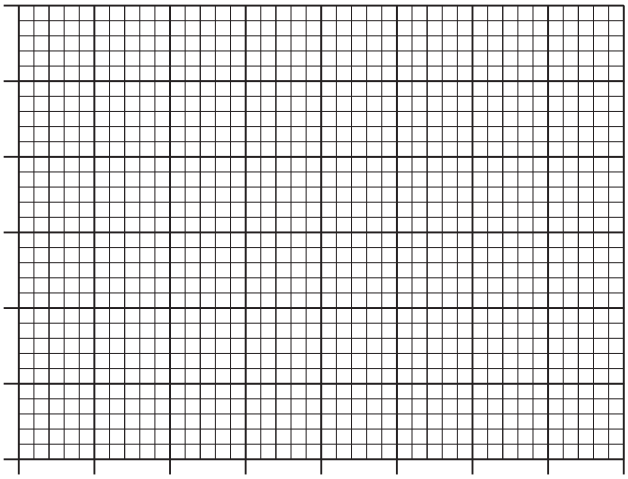
SPACE FOR ANSWERS

SPACE FOR ANSWERS

SPACE FOR ANSWERS

[END OF SPECIMEN QUESTION PAPER]

Additional grid for Question 7 (d) (i)



Acknowledgement of Copyright
Question 4 Image of Giant Hogweed and woman. Reproduced by kind permission of UK Weed Control Ltd.

National Qualifications
SPECIMEN ONLY

SQ14/N5/01 Environmental Science

Marking Instructions

These Marking Instructions have been provided to show how SQA would mark this Specimen Question Paper.

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Part One: General Marking Principles for National 5 Environmental Science

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question. The marking schemes are written to assist in determining the "minimal acceptable answer" rather than listing every possible correct and incorrect answer.

(a) Marks for each candidate response must always be assigned in line with these General Marking Principles and the specific Marking Instructions for the relevant question.

(b) Marking should always be positive, ie marks should be awarded for what is correct and not deducted for errors or omissions.

(c) There are no half marks awarded.

(d) Where a candidate makes an error at an early stage in a multi-stage calculation, credit should normally be given for correct follow-on working in subsequent stages, unless the error significantly reduces the complexity of the remaining stages. The same principle should be applied in questions which require several stages of non-mathematical reasoning.

(e) Unless a numerical question specifically requires evidence of working to be shown, full marks should be awarded for a correct final answer (including unit) on its own.

(f) Where a wrong answer (for which no credit has been given) is carried forward to another step, credit will be given provided the end result is used correctly.

Part Two: Marking Instructions for each question

Question			Expected response	Max mark	Additional guidance
1	a	i	Omnivore.	1	
1	a	ii	Increase—fewer eaten by thrushes. Stay the same—fewer eaten by thrushes but more eaten by blackbirds.	1	
1	a	iii	Goldfinch/blackbird/nuthatch.	1	Any two.
1	b		Heat/movement/undigested food.	1	Any one.
1	c		Decomposition releases nutrients back into ecosystem.	1	
2	a	i	Sunflower.	1	
2	a	ii	Niger—seed is eaten only by goldfinches, so no competition.	1	
2	a	iii	Different birds prefer different food types/are specialist feeders. Increases the number of bird species/biodiversity.	2	One mark for each part.
2	a	iv	Provide nest boxes/bird bath/control predators (or example)/other correct response.	1	Any one.
2	b		280 000	1	
2	c		Groove on surface present—wheat. Groove on surface absent—peanut. Seed black—niger. Seed black and white stripes—sunflower.	2	One mark for each complete paired statement.
3	a	i	C	1	
3	a	ii	Increased carbon dioxide levels lead to increased global temperatures/climate change/global warming/enhanced greenhouse effect. Carbon dioxide/nitrogen	2	One mark—product of combustion. One mark—negative impact on the environment.

			oxides/sulphur dioxide dissolving in rainwater results in acid rain. Particulates affect air quality.		
3	**a**	**iii**	Fit scrubbers to the chimneys/adapt industrial process/other correct response.	1	
3	**a**	**iv**	Water + carbon dioxide (+ chlorophyll + light) → carbohydrate/glucose/sugar/starch + oxygen	1	
3	**b**		SEPA/SNH/FCS or other correct response. Monitoring/advice/education/ enforcing legislation/research /dealing with pollution incidents /other correct response.	1	SEPA/SNH/FCS all carry out the roles mentioned but another national organisation might have different roles. Both parts for one mark.
4	**a**	**i**	Find another pair of sites elsewhere where giant hogweed is present/investigate other abiotic factors.	1	
4	**a**	**ii**	Calculate mean first = 1·5 1·5 × 1000 = 1500 OR Calculate total = 15 then multiply by 100 = 1500	2	
4	**b**		Use a light meter, held in an appropriate place, making sure the sensor is not covered.	1	Piece of equipment used + how to use it properly.
4	**c**		Grey squirrel/red signal crayfish/*Rhododendron ponticum*/American mink/other correct organism. Out-competes/preys on native species/other correct response.	1	Name species + impact for mark
4	**d**		Dandelion is a weed. Farmers/gardeners will want to get rid of it; conservationists will want to keep it because of its value as a food source and as a species in its	1	Must mention another group/activity and why each would want to act over the dandelion.

			own right.		
5	**a**		A—high point so difficult to reach/visible to all, risk to birds of prey B—visible to settlement and/or noisy C—close to sandy beach so visible/noisy/difficult to install on sand D—more difficult to build offshore/causes sediment disturbance, changes in tidal currents/wave patterns, increased risk of coastal erosion Any other correct responses.	1	Name site + disadvantage for one mark
5	**b**	**i**	Tidal/wave power.	1	Any one
5	**b**	**ii**	**Sustainable** Hydroelectric Power (HEP). Dam construction is environmentally damaging but only needs to be built once. OR Tidal. Move away from barrages, which can damage estuarine ecosystems, to submerged turbines. Any other correct responses.	1	
5	**c**	**i**	£4000	1	
5	**c**	**ii**	Biomass—carbon neutral; maintains balance of gases. Oil—releases locked-in carbon at a faster rate than can be harnessed; enhances the greenhouse effect.	1	
5	**d**		Fishing quotas, exclusion zones, net management, legislation.	1	
6	**a**		Limestone is an example of a sedimentary rock.	1	
6	**b**		C: sedimentation—compaction—	1	

			cementation		
6	**c**	**i**	Column D—because pebbles have large interconnected pore spaces which will allow the water to flow through.	1	Both correct for one mark.
6	**c**	**ii**	Reliability of results—if wet/damp, extra water could affect results.	1	Anything to do with potential impact of residual water.
6	**c**	**iii**	High porosity because rock has a high % of pore space between the grains and will hold liquid/gas. Low permeability because the pores are not very well connected and liquid/gas cannot flow through easily.	2	One mark for explaining permeability. One mark for explaining porosity.
7	**a**	**i**	Inputs: coal/coke plus air/oxygen	1	Both correct for one mark.
7	**a**	**ii**	Ore mineral is the native form in which the metal exists. Ore is an ore mineral from which a metal can be extracted commercially.	1	
7	**b**		Can be alloyed with other metallic and non-metallic substance. Any other correct response.	1	
7	**c**		Cement/decorative stonework/flux/building material /filler/absorbent/agriculture/other correct response.	1	
7	**d**	**i**	x-axis—scale 0 to 600, label time (seconds) y-axis—scale 0 to 4·6, label mass (grammes) line graph—points clear and connected with straight line	3	Ensure scales start with 0. Points should be plotted accurately. Connecting lines should be drawn with a ruler/straight edge.
7	**d**	**ii**	4·6-4·9	1	
7	**d**	**iii**	Nitrogen oxides or sulphur dioxide react with rainwater, forming acid rain and increasing loss of limestone.	1	Any one of these.

			Particulates (soot, ash etc) could settle on limestone, causing staining. Any other correct response.		
8	**a**	**i**	Shetland Islands—very little to landfill/recovering energy from existing waste/other reasonable response. OR Fife—high recycling/composting rate or other correct response.	1	Both parts for one mark.
8	**a**	**ii**	High energy recovery—deals with waste and making use of energy locally. Low recycling/compost—difficulty in collecting across islands or transportation of waste to mainland/Shetland climate results in low decomposition rate. Low landfill—lack of suitable sites. Any other correct response.	2	Any two of these.
8	**a**	**iii**	Less waste being sent to landfill so resource will eventually run out.	1	
8	**b**	**i**	8 : 3	1	
8	**b**	**ii**	Weekly—50% of bins are more than half full each week and fortnightly collections would see bins overflowing or causing increase in fly-tipping, or other correct response. Fortnightly—50% of bins are more than half full each week but could change people's behaviour, or other correct response.	1	Answer should mention that 50% of bins are currently half full.
9	**a**		Better health/welfare/access to food, water, medicines. Any other correct response.	1	

9	**b**		Destruction of habitats/litter/contamination of land or water/other correct response.	1	
9	**c**	**i**	Informed citizens/health/environmental concerns. Any other correct response.	1	
9	**c**	**ii**	Improved irrigation/change of agricultural practice /mechanisation/appropriate use of fertilisers or pesticides/other correct response.	2	Any two.
9	**d**	**i**	Imported may have an earlier or longer growing season/require no additional heat or light, but will involve emissions from transportation/food miles. OR Locally produced food will have fewer associated food miles but may require more energy inputs to grow the produce.	1	
9	**d**	**ii**	Advantages—less use of pesticides and fertilisers; less potential for run-off of nitrates/phosphates into water courses. Disadvantages—labour intensive/more expensive.	2	One mark for each.
10	**a**	**i**	May result in extinction due to change in temperature or increased competition.	1	
10	**a**	**ii**	Access to food plants for caterpillars/butterflies.	1	
10	**b**	**i**	Correct label (oil seed rape). Accurate drawing and shading of bars.	1	Bars should be drawn with a ruler/straight edge.
10	**b**	**ii**	Barley.	1	

10	**b**	**iii**	Don't know total yield/tonnes /amount for other crops.	1	
10	**c**		CAP. Any other correct response.	1	Must include name of country.
11	**a**		Formation—partial decomposition of sea plants/animals (under low oxygen/anaerobic conditions). Remains are buried under sediments → compression + heat → petroleum. Takes millions of years. Extraction—seismic surveys used to locate reservoirs. Well drilled into reservoir. Pipe placed into bore hole. Natural pressure may be sufficient to extract oil/natural gas, otherwise can be displaced using injected fluids/pumped gases/steam. Processing— petroleum sent to refinery to be separated into different fractions by distillation. Then further refined by fractionation and solvent extraction. Any other correct response.	7	Formation—max of three marks Extraction—max of three marks Processing—max of three marks
11	**b**		Multiple uses, either as pure nitrogen or compound: • Food preservation • Electrical components • In light bulbs • Manufacture of stainless steel • In fuel systems • On top of liquid explosives • Inert filler for tyres • Pressurizing beer containers • Injectant down oil wells • Refrigeration • Cryogenic liquid for preservation of biological samples • Fertilisers	7	

			Any other correct response.		
12	**a**		Contamination—sewage, fertiliser/pesticide run-off or leaching, industrial waste, leachate from landfill, recreation. Minimisation—improved/more appropriate application of fertilisers or pesticides; improved waste processing at industrial plants, monitoring, legislation. Any other correct response.	7	Contamination—max of four marks. Minimisation—max of four marks.
12	**b**		Domestic • Turn down heating/boiler • Energy efficient light bulbs • Draught-proof/insulate house • Install solar panels/PV/small-scale renewable technology Transport • Use public transport • Use park and ride • Car share • Active transport (walk/cycle) • Fuel efficient/electric/hybrid cars Other • Buy locally produced food • Buy seasonal food • Composting waste food/not sending to landfill • Planting trees • Reduce Any other correct response.	7	

[END OF SPECIMEN MARKING INSTRUCTIONS]