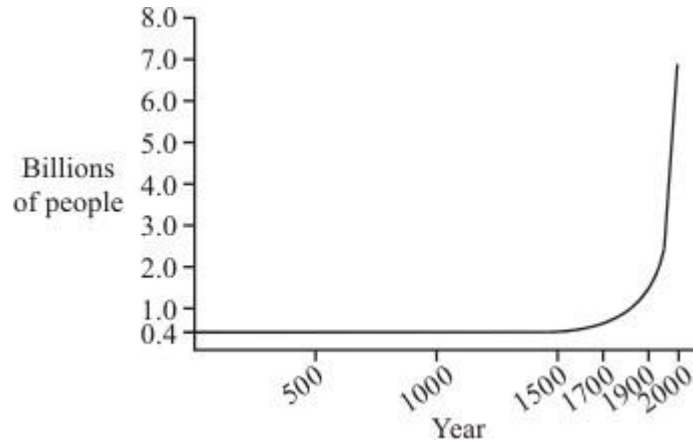


- 1 Improving the quality of life for everyone without damaging the planet for the future is known as sustainable development. One problem is the rapid growth in the Earth's population of humans during the last 500 years. This is shown by the graph.

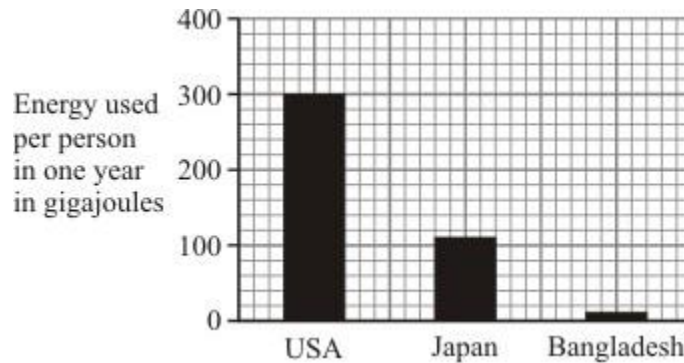


- (a) When the Earth's population was much smaller, the effects of human activities on forests were usually small and local. In the past 500 years there has been large-scale deforestation in some areas. Give **two** reasons for this.

1. _____
2. _____

(2)

- (b) Look at the bar chart. It shows the average amount of energy used by each person in one year in the USA, Japan and Bangladesh.



- (i) Suggest **one** reason why so much more energy is used per person in the USA than in Bangladesh.

(1)

- (ii) Using a lot of resources for energy harms the Earth.
Explain why.

(2)

- (c) As we are using more resources, waste management is becoming more important. In the UK much of the solid waste is still being dumped in landfill sites. In 1996, the UK government introduced a landfill tax because landfill sites were being used up. However, the year after the landfill tax was introduced it was estimated that 18 million tonnes of landfill waste was not reported. The government was trying to encourage other forms of waste management, such as:

- reduce waste
- reuse waste
- recycle waste

- (i) Explain the main problem caused by the landfill tax.

(2)

- (ii) Describe **one** example of how each of the different forms of waste management can be put into practice.

Reduce waste _____

Reduce waste _____

Reduce waste _____

(3)

(Total 10 marks)

2

- (a) Use words from the box to complete the sentences about the water cycle.

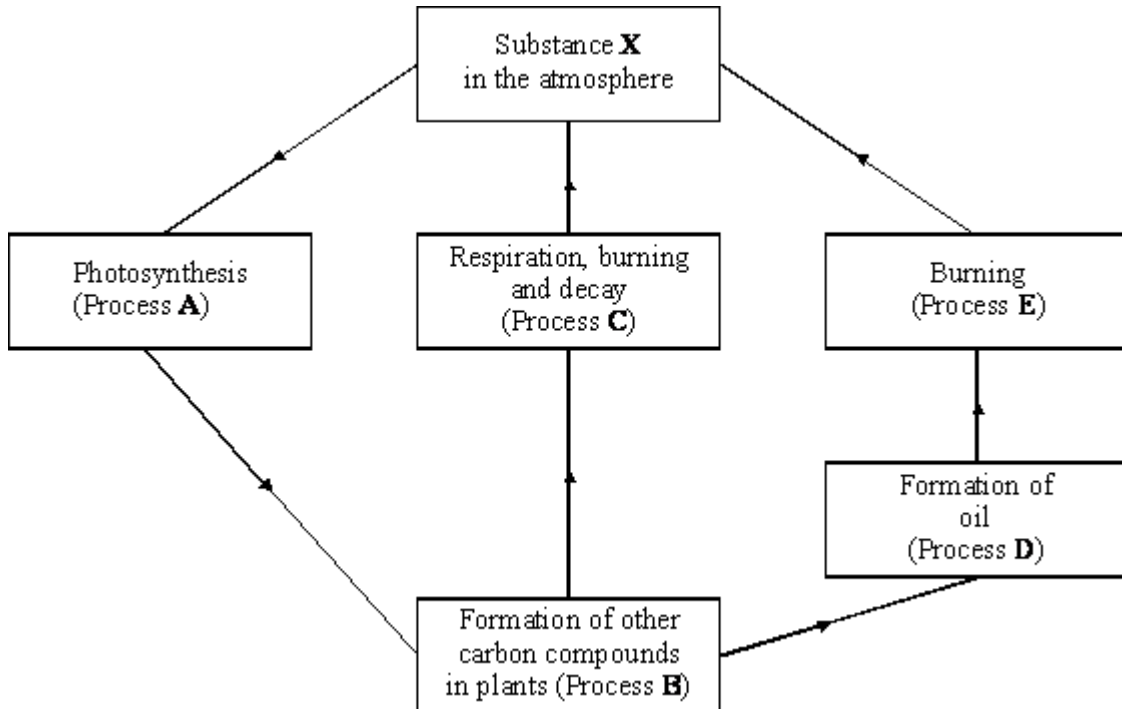
boils	condenses	evaporates	freezes	
melts	rain	sea	Sun	wind

Water _____ from the surface of the _____. Heat from the _____ speeds up this process and so does the _____.

Water vapour in the atmosphere cools down and _____ to form billions of tiny water droplets. Some of the droplets join together and fall as _____.

(6)

(b) The diagram shows some processes in the carbon cycle.



(i) What is the name of substance X?

(1)

(ii) Which process, A, B, C, D or E, takes the **longest** and approximately how long does it take?

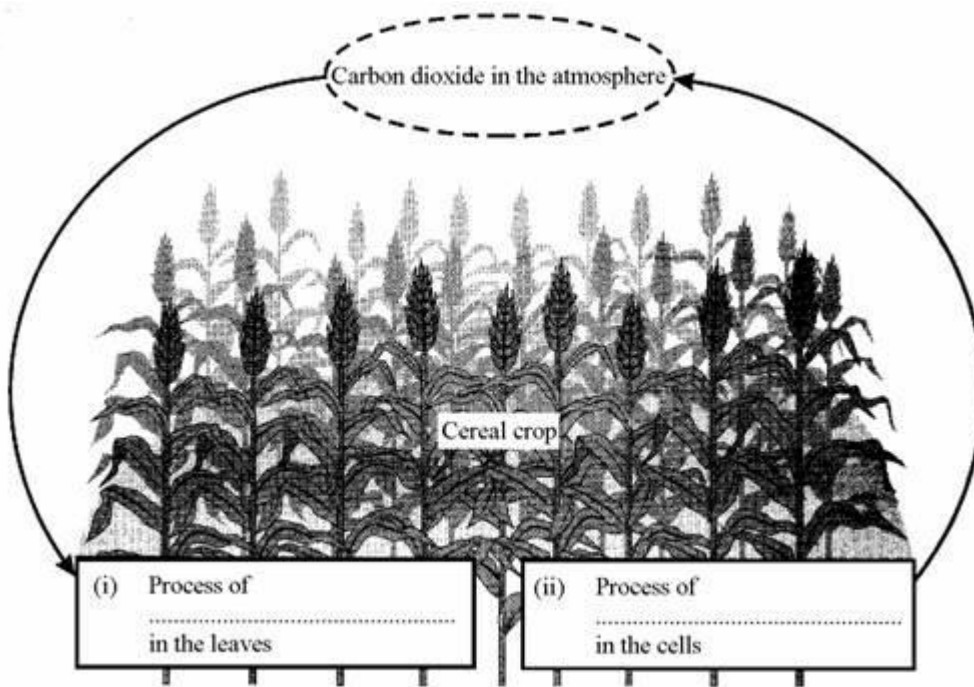
(2)

(Total 9 marks)

3

(a) The diagram shows a cereal crop.

Complete spaces (i) and (ii).



(2)

(iii) What sort of weather may cause the cereal crop to wilt?

(1)

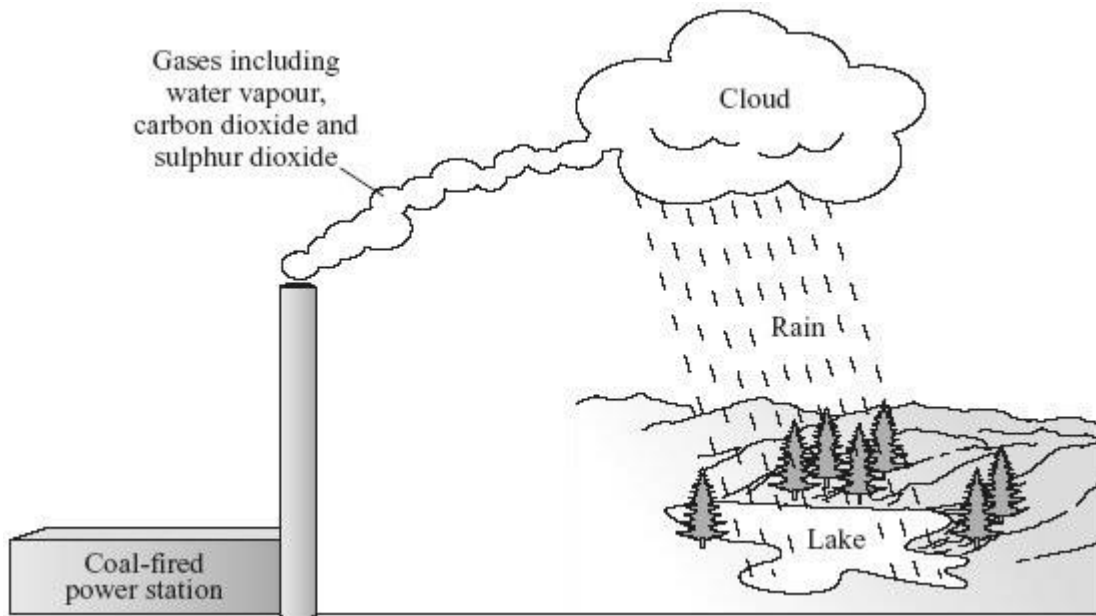
(b) Describe the process of transpiration in plants.

(3)

(Total 6 marks)

4

Coal is used in many power stations.

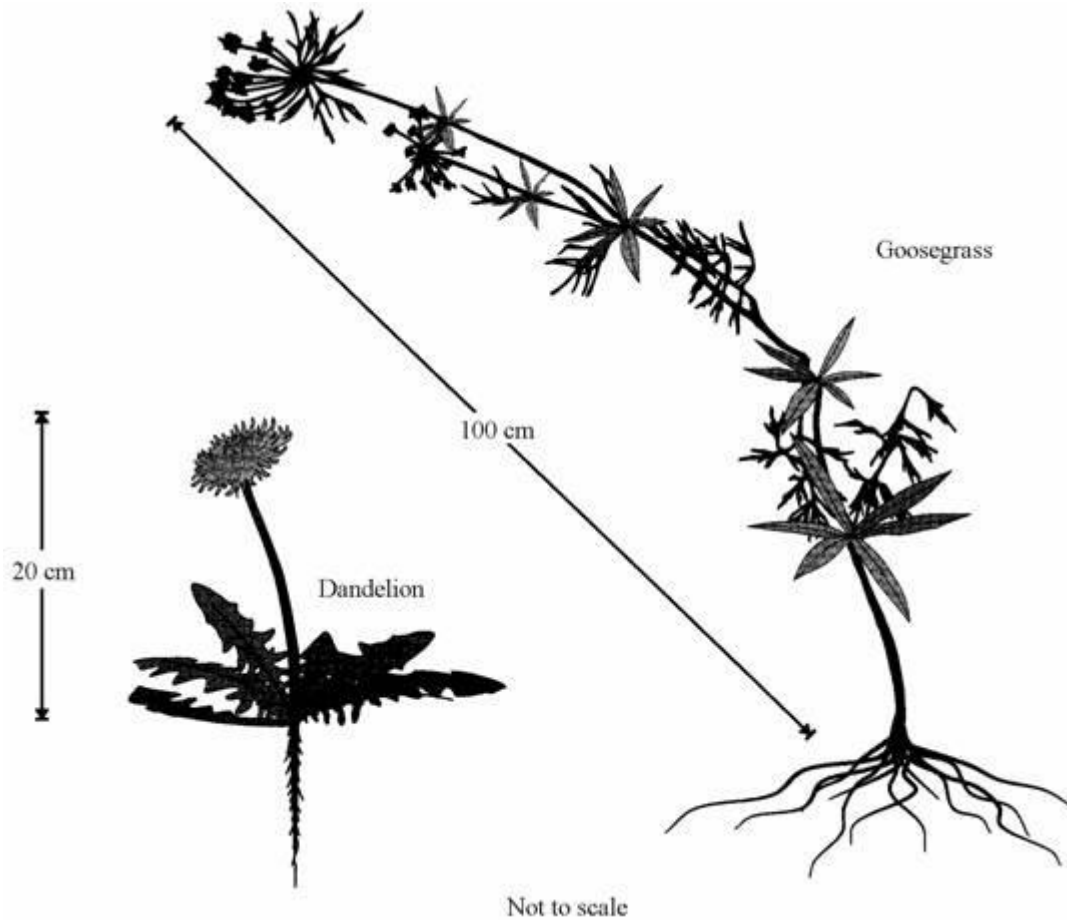


To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

Use information from the diagram to describe, in as much detail as you can, how using coal in power stations can damage the environment.

(Total 4 marks)

- 5 Dandelions have become adapted to live in lawns and grass areas where animals graze. Goosegrass, however, has become adapted to live alongside hedgerows and cannot survive being mown.



(a) Use the information in the drawings to suggest **one** advantage of each of the following adaptations.

- (i) Dandelion leaves lie flat on the ground.

(1)

- (ii) A dandelion has a thick tapered root.

(1)

- (iii) Goosegrass stems are long.

(1)

(iv) Goosegrass roots are thin and very long.

(1)

(b) Dandelions and goosegrass are different species of plants.

(i) What name is given to the unit of inheritance which controls one particular characteristic of a plant or animal?

(1)

(ii) Why would you be unlikely to succeed if you tried to breed a new species of plant by crossing a dandelion with goosegrass?

(1)

(c) Animals as well as plants have become adapted to live in different environments.

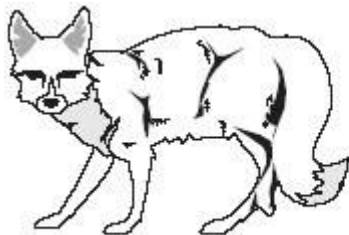
State **one** way a polar bear has become adapted to living in the Arctic, and the reason for the adaptation.

(2)

(Total 8 marks)

6

The drawings show an arctic fox and a fennec fox.



Arctic fox



Fennec fox

(a) The arctic fox lives in cold, snowy conditions.

Explain how each of the following helps the arctic fox to survive in these conditions.

1 Long, thick fur

2 A white coat

(2)

(b) The fennec fox lives in hot deserts.

Explain how each of the following helps it to survive in hot conditions.

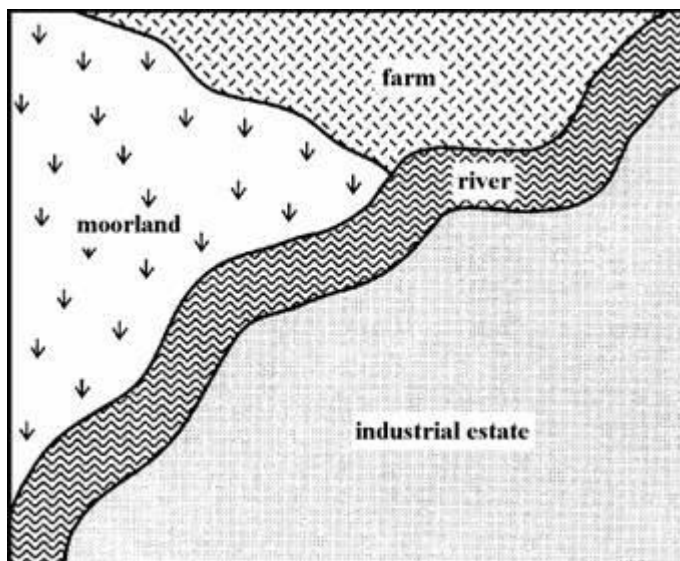
1 Very large ear flaps

2 Hairs on the soles of its feet

(2)

(Total 4 marks)

7 The drawing shows an industrial estate and the neighbouring area.



(a) Use words from the list to complete the sentences about effects on the environment.

- fertilisers** **fuels** **nitrogen** **oxygen**
pesticides **smoke** **sulphur dioxide**

Factories in the industrial estate burn _____ . This pollutes the air with _____ and _____ .

The farm may pollute the river with chemicals such as _____ and _____ .

(5)

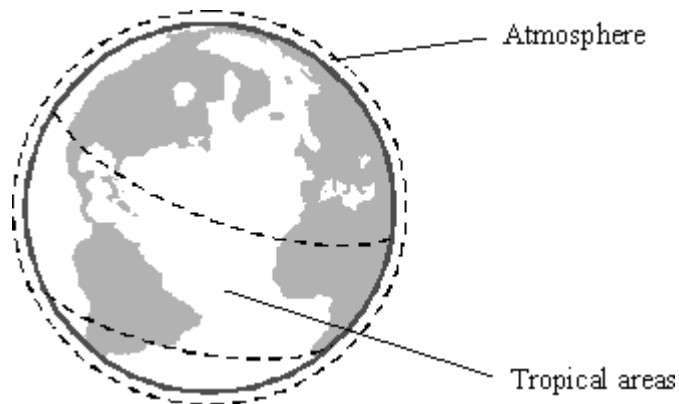
(b) Describe how sulphur dioxide may damage the environment.

(2)

(Total 7 marks)

8

Recently the concentration of carbon dioxide in the Earth's atmosphere has increased slightly. This may be linked to an increase in the 'greenhouse effect'.



- (a) The human population has grown rapidly. This has caused an increase in the amount of land used for agriculture, especially in tropical areas. This has helped to increase the carbon dioxide in the atmosphere.

Give **two** reasons for this.

1. _____

2. _____

(2)

- (b) The increased 'greenhouse effect' has caused an increase in the Earth's average temperature.

Give **two** possible environmental effects of this increased average temperature.

1. _____

2. _____

(2)

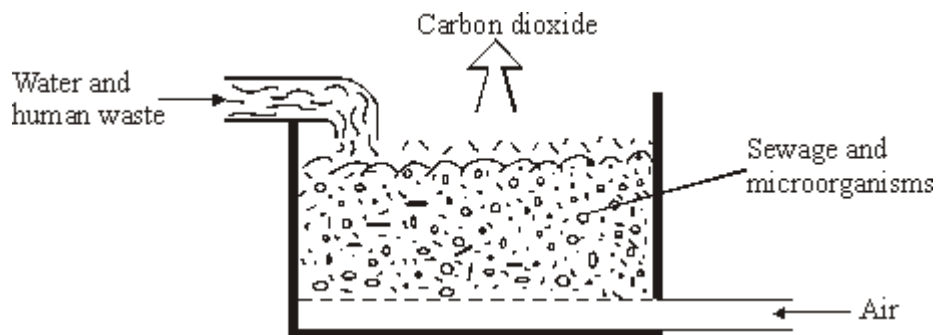
- (c) Name another gas, produced by cattle and rice fields, that also helps cause the 'greenhouse effect'.

(1)

(Total 5 marks)

9

In a sewage works, human waste is broken down by microorganisms. Air is blown through this sewage.



To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

Carbon dioxide is formed from the mixture of sewage, microorganisms and air. Explain how.

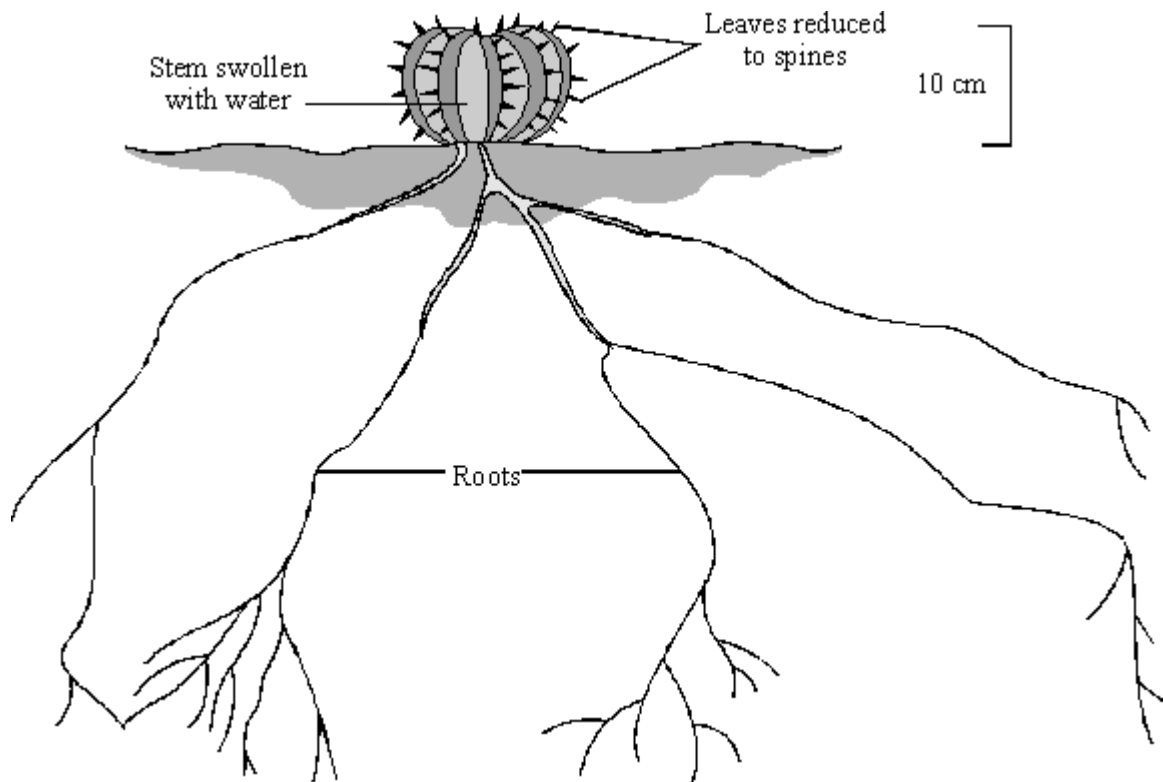
(3)
(Total 3 marks)

10

The concentration of carbon dioxide in the Earth's atmosphere is rising.

The rise in carbon dioxide concentration may cause more of the Earth's surface to become desert.

The drawing shows a plant that is adapted to life in a hot, dry desert.



Suggest **two** ways in which the structure of the plant helps it to survive in a hot, dry desert.

1. _____

2. _____

(Total 2 marks)

Mark schemes

- 1** (a) any two from:
- agriculture
*accept land to grow crops **or** graze cattle*
 - buildings
 - roads
- any 2 different uses for wood for 1
mark each
- accept wood for burning (energy)*
 - accept timber for wood*
- 2
- (b) (i) (USA has) more wealth / technology /
devices / need for electricity
- 1
- (ii) damage done
- e.g. pollutant / mining / non-renewable / deforestation*
- 1
- linked effect
- e.g. greenhouse effect / visual pollution / run out of resources / flooding*
- 1
- (c) (i) **Problem** – because some people did not want to pay the (landfill) tax
- 1
- Waste dumped elsewhere
- 1
- (ii) named example of
- Reduce** – such as less packaging / repairing
- 1
- Reuse** – such as glass bottles / shopping bags / ink jet cartridges
- 1
- Recycle** – such as metals, glass, paper
- Mark as a whole*
- 1

[10]

2	(a)	evaporates	1
		sea	1
		sun	
		<i>accept sun</i>	1
		wind	1
		condenses	1
		rain	1
	(b)	(i) carbon dioxide	
		<i>accept CO₂ provided it is correct in every detail</i>	1
		(ii) (process) D	1
		millions of years	
		<i>a million years upwards</i>	1
3	(a)	(i) photosynthesis	1
		(ii) respiration	
		<i>do not credit combustion</i>	
		<i>do not credit decay</i>	1
		(iii) dry	
		<i>accept hot or windy or drought</i>	1

[9]

(b) any **three** from

* evaporation (of water)

or loss of water vapour

* (mostly) from the leaf / leaves

do not credit incorrect reference to leaves

* through the stomata

accept through each stoma

accept through the stomas(sic)

* causing a pull

or causing an increase in osmotic potential (at the top of the plant)

or causing an increase in water potential (at the top of the plant) or

causing a decrease in osmotic pressure (at the top of the plant)

* (so that) water moves up (through the plant)

do not credit water vapour moves up through the plant

* as the transpiration stream

* water enters through roots (and goes up plants)

3

[6]

4

Quality of Written Communication

1 mark for correct sequencing

burning → named gas → correct

environmental problem

1

any **three** from:

coal / fossil fuel is burned

(water vapour and carbon dioxide and) sulphur dioxide formed
accept nitrogen oxides

(gases) dissolve / react in rain
accept dissolve / react in water vapour

make acid rain

damages trees

*accept harms plants **or** animals **or** damage to buildings*

makes rivers /lakes acidic

*accept carbon dioxide is a greenhouse gas / causes global warming
for 2 marks*

3

[4]

5

(a) (i) to go under teeth **or** mower
*accept not damaged by grazing animals
accept do not get cut or bitten
accept reduces competition by other plants
do not credit maximum surface of leaves facing Sun*

1

(ii) any **one** from

it can force its way through grass roots
accept in competition with grass roots

it is a store of food (to help the plant
recover)
do not credit a good store of water

to reach down to water

to give good anchorage
accept it is hard to pull up

1

(iii) any **one** from

to reach more light

*accept to get out of the shadow of the
hedge **or** tall grass*

to let seeds be caught on animals' coats
(more easily)

*accept improves access **or** visibility **or** ease for pollination
do not credit to help it grow up the hedge*

1

(iv) any one from

(they reach out from hedge) to find
water

*accept increase surface area
accept to find nutrients **or** minerals
do not award mark if food mentioned*

to give good anchorage

1

(b) (i) gene **or** allele

do not credit chromosome

1

(ii) any **one** from

they do not crossbreed **or** interbreed

*accept different species do not breed together **or** do not fertilise
each other*

do not produce fertile offspring

have different numbers or types of chromosomes

*accept genes are incompatible
do not credit have different genes **or** are genetically different
do not credit do not pollinate each other*

1

- (c) one mark is for the adaptation and one is for an appropriate reason

have white fur

for camouflage

are huge

for large volume to surface area

thick layer of fat

for insulation or to reduce heat loss or retain heat

do not credit to stop it losing heat or withstand the cold or keep it warm

have thick fur

for insulation or to reduce heat loss or retain heat

hibernate

to avoid the coldest part of year

is a carnivore

because animals provide high energy food

has big paws or claws

to be able to walk on snow

have small ears

to reduce heat loss

have furry feet

for insulation from the snow

2

[8]

6

- (a) 1 for insulation / prevents heat loss

keeps cold out neutral keeps it warm neutral

1

2 camouflage / other animals cannot see it

1

- (b) 1 heat loss

reject shade

1

2 insulation from hot sand / prevents heat passing from sand / prevents burning

1

[4]

7 (a) fuels
smoke / sulphur dioxide
smoke / sulphur dioxide
pesticide / fertiliser
pesticide / fertiliser
for 1 mark each

5

(b) produces acid (rain)
for 1 mark

which may damage trees (*reject* plants unqualified)
which may make lakes / rivers too acid for animals or plants
which may affect stonework / metals / paint
(*ozone damage or global warming disqualifies the effect mark*)
any one for 1 mark

2

[7]

8 (a) any **two** from

- deforestation reduces carbon dioxide removal from the atmosphere
accept less photosynthesis for reduces carbon dioxide removal
accept cutting down trees for deforestation
ignore cutting down plants
accept there are less trees to remove carbon dioxide
- burning wood / trees (releases carbon dioxide)
- microbes decay / decompose wood / trees (releasing carbon dioxide)

2

(b) may cause a rise in sea level
accept may cause polar / ice caps to melt / flooding
*do **not** accept global warming **or** greenhouse effect **or** erosion*

1

may cause changes in the Earth's climate
*accept causes changes in the weather **or** named, comparative **type** of weather **or** drought*
accept seasonal changes

1

(c) methane
*accept natural gas **or** CH₄*

1

[5]

9 Quality of written communication: One mark for using correct scientific terms microorganisms and respiration 1

(air contains) oxygen 1

(microorganisms break down human waste) by respiration (which releases carbon dioxide) 1

[3]

10 any **two** from

swollen stem stores water (for dry periods)

reduced leaves / spines lose less water /less transpiration / less evaporation

idea of long roots absorb water from deeper / more spread out in soil

[2]