AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.3.1

Biodiversity

Past-paper questions

Tier	**Higher**
Question groups	**14**
Available paper years	**2007–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.7.3.1 Biodiversity

Question 01

January 2007 | BLY1H | Original Q2 | Legacy

2 Deforestation affects the environment in many ways.

(a) Deforestation increases the amount of carbon dioxide in the atmosphere.

Give **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

(b) Deforestation also results in a loss of *biodiversity*.

(i) What is meant by *biodiversity*?

.....

.....

(1 mark)

(ii) Give **one** reason why it is important to prevent organisms from becoming extinct.

.....

.....

(1 mark)

4

4.7.3.1 Biodiversity

Question 02

November 2008 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

The table gives information about the number of species of organisms in the world today.

	Total number of known species
plants	400 000
animals	1 400 000
species which live in tropical rainforests	720 000

5A The rate of extinction of species in tropical rainforests is currently 0.5% per year. This rate is predicted to increase to 5% per year.

How many species will become extinct next year if the predicted rate takes place?

1 3600

2 20 000

3 36 000

4 70 000

5B What is the main cause of the extinction of rainforest species?

1 pollution

2 loss of habitat

3 overcrowding

4 increase in sustainable development

5C Deforestation also damages the environment because . . .

1 less oxygen is released into the atmosphere.

2 less carbon dioxide is released into the atmosphere.

3 less carbon is 'locked-up' in timber.

4 more methane is released into the atmosphere.

4.7.3.1 Biodiversity

5D One reason often given for clearing forests is that it provides an income for the local population.

Which of the following is **not** an economic reason for deforestation?

1 The forest could be developed for tourism.

2 Some plants in the forest may be sources of useful drugs.

3 The local people can conserve the forest for future generations.

4 Some trees in the forest may be valuable.

Turn over for the next question

4.7.3.1 Biodiversity

Question 03

June 2009 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

Organic foods have become popular in recent years. They are grown without the use of pesticides and artificial fertilisers. But a government report in 2007 showed that the production of some organic foods is more damaging to the environment than their non-organic equivalents. However, supporters of organic farming claim that it is better than non-organic farming in conserving biodiversity and is better for the soil.

9A Biodiversity is . . .

1 the ability of plants and animals to adapt to a wide variety of different environments.

2 the ability of two plants or animals to live alongside each other for their mutual benefit.

3 the existence of a wide variety of plants and animals.

4 the existence of two different environmental adaptations of the same species of plant.

The table compares some of the effects of non-organic and organic food production on the environment.

Environmental effect and units	Amount in kg of production on farm					
	Sheep meat		Chicken		Milk	
	Non-organic	Organic	Non-organic	Organic	Non-organic	Organic
Energy used in MJ	23	18	12	16	2.5	1.6
Global warming potential in grams of CO_2 equivalent	17 400	10 100	4750	6680	1060	1230
Freshwater pollution by fertiliser potential in grams of phosphate equivalent	200	584	49	86	6.3	10.3
Acidification potential in grams of sulfur dioxide equivalent	380	1510	173	264	16.2	26.4
Land use in hectares	0.0014	0.003	0.64	1.4	0.001	0.002

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9B The information in the table indicates that . . .

1 all organic food production uses more energy than non-organic farming methods.

2 changing completely to organic methods will at least double the amount of land used for food production.

3 organic food production improves the environment.

4 organic farming reduces the amount of pollution resulting from sulfur dioxide.

4.7.3.1 Biodiversity

9C A change from non-organic farming methods to the organic production of chicken and milk may . . .

1 contribute to an increase in acid rain.

2 help to reduce pollution of freshwater.

3 help to reduce global warming.

4 reduce the amount of energy consumed in the production of the food.

9D Which of the foods in the table is responsible for the greatest increase in environmental pollution when it is produced organically rather than non-organically?

1 sheep meat

2 chicken

3 milk

4 it is impossible to tell from this data

END OF TEST

4.7.3.1 Biodiversity

Question 04

March 2010 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

The Lua tribe of the Philippines rely on 'slash and burn' agriculture. They cut down and burn an area of forest big enough to grow their crops. After about two years they move on to use another area of the forest. The Lua tribe has survived in the same region for many years. Their agriculture has to be managed very carefully.

8A The population of the tribe increased, so they burned a bigger area of the forest in which they lived.

What would be the most likely effect on the species that normally live in the region?

1 The animals would live at a higher population density in the remaining forest.

2 The animals would move away from the farmed area but die in the remaining forest because there would be too much competition.

3 There would be more types of native species because new areas of forest had been cleared.

4 There would be no effect on the native species.

The agricultural methods used by the Lua tribe had little effect on the carbon dioxide concentration in the air.

8B The most likely reason for this is that . . .

1 their population was not growing fast enough.

2 when the Lua tribe burns the forest, oxygen is taken in and carbon dioxide is released.

3 the Lua tribe did not plant rice on the cleared land.

4 the amount of carbon dioxide released by burning was the same as the amount of carbon dioxide reabsorbed by the crops.

4.7.3.1 Biodiversity

Question 04 · continued

8C A forestry company was given the right to harvest the mature trees in the area, but also burned other areas.

Why was the company accused of increasing the chance of climate change?

1 Cutting down trees causes an increase in the temperature of the atmosphere.

2 Burning trees releases the 'locked up' carbon as carbon dioxide into the atmosphere, which then traps heat.

3 Using the trees for timber releases carbon dioxide into the atmosphere more quickly than photosynthesis can absorb it.

4 Fewer trees in the area allows more space for microorganisms to respire and release carbon dioxide.

8D Deforestation by the forestry company led to a reduction in biodiversity.

Why should society be concerned about this decrease?

1 A greater biodiversity reduces the chance of climate change.

2 The forest food chains would be shorter.

3 Some of the organisms that were lost may have been of future use.

4 There may be an increased use of herbicides in the area.

4.7.3.1 Biodiversity

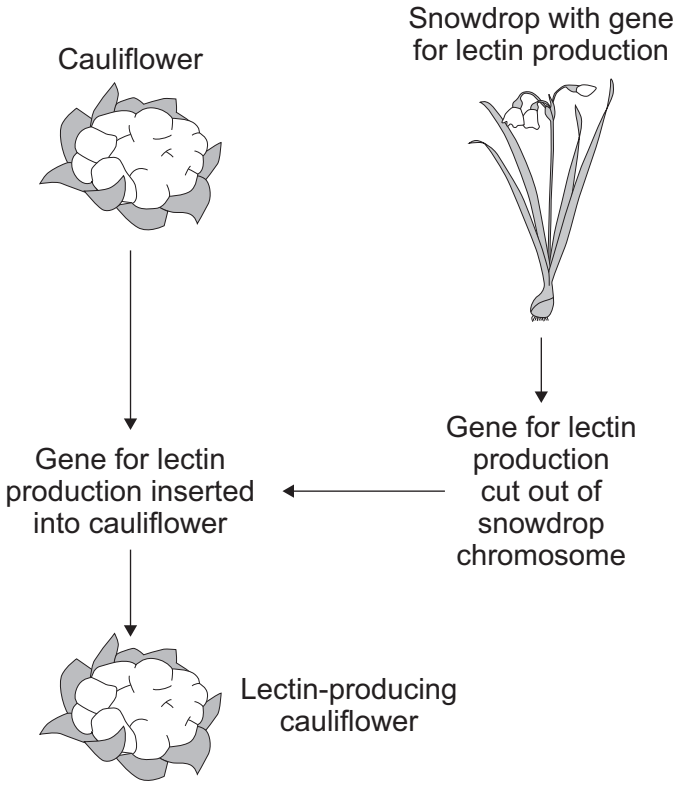
Question 05

June 2010 | BLY1BP | Original Q4 | Legacy

QUESTION FOUR

Up to 40 % of cauliflower crops may be eaten by insects.
Snowdrops can survive attacks by insects because they produce a substance called lectin.
Lectin interferes with the insect's digestive system.

The diagram shows one method of introducing the gene for lectin production into cauliflowers.



4A The gene for lectin production is cut from the snowdrop chromosome using . . .

1 lectin.

2 a herbicide.

3 an enzyme.

4 an electric shock.

4B The technique used to transfer the gene from the snowdrop to the cauliflower is called . . .

1 biodiversity.

2 embryo transplant.

3 cloning.

4 genetic engineering.

4.7.3.1 Biodiversity

4C What is the main benefit to the environment of farmers growing lectin-producing cauliflowers?

1 More snowdrops will survive.

2 Less pesticide will be used.

3 Insects will eat something else.

4 Less fertiliser will be needed.

4D An ethical concern about this technique is that . . .

1 it will make farmers richer.

2 it will increase biodiversity.

3 it is interfering with nature.

4 it is sustainable.

Turn over for the next question

4.7.3.1 Biodiversity

Question 06

March 2011 | BLY1BP | Original Q3 | Legacy

QUESTION THREE

The picture shows part of a forest burning in Mexico.



3A The main reason for burning forests like this is to . . .

1 reduce the need for fertilisers.

2 use the land for agriculture.

3 use the land for roads.

4 reduce the 'greenhouse effect'.

4.7.3.1 Biodiversity

3B Many scientists believe that large-scale deforestation has led to an increase in the carbon dioxide concentration in the atmosphere.

Which row in the table shows the effects of deforestation?

	Amount of carbon dioxide locked up in wood	Amount of carbon dioxide released by burning	Amount of carbon dioxide released by microorganisms
1	increases	decreases	increases
2	decreases	increases	increases
3	increases	increases	increases
4	decreases	decreases	decreases

3C Deforestation affects biodiversity.

What does the biodiversity of a habitat measure?

1 the total number of all living things in the habitat

2 the number of animal and plant species that have become extinct in the habitat

3 the number of different species in the habitat

4 the total number of animals of the most common species in the habitat

3D Sometimes cattle may be kept on areas that have been deforested.

Which gas in the atmosphere is produced in large amounts by cattle but not by humans?

1 carbon dioxide

2 methane

3 oxygen

4 sulfur dioxide

4.7.3.1 Biodiversity

Question 07

June 2011 | BLY1BP | Original Q3 | Legacy

QUESTION THREE

There are only a few unmapped and unexplored places on Earth. Scientists looking at satellite images on the internet have discovered a new giant forest area in Mozambique.

The scientists have made the first expedition to this giant forest area in Mozambique.

The scientists discovered several new species.

3A Only in the past 20 years have scientists been able to investigate the distribution of animals and plants by . . .

1 looking for fossil evidence.

2 going on an expedition.

3 searching the internet.

4 doing laboratory experiments.

3B The scientists say that the newly discovered giant forest has 'a very large biodiversity'.

Biodiversity is . . .

1 the total number of plant and animal species in an area.

2 the number of undiscovered plants and animals in the giant forest.

3 the number of plants and animals already known to scientists.

4 the number of plants and animals known to local villagers.

3C Why is it important to maintain a high level of biodiversity?

1 so that the forest is not cut down

2 so that many plant and animal specimens can be collected and stored

3 so that scientists may discover new plants to use as drugs and to use in different ways in the future

4 so that the locations of plants and animals can be recorded

4.7.3.1 Biodiversity

3D Some people think that it was not ethical for scientists to go on the expedition to the giant forest because . . .

1 scientists may discover new species.

2 scientists may help to map the area.

3 scientists may put information about the area's food chains on the internet.

4 scientists may carry new diseases to the people in the area.

Turn over for the next question

4.7.3.1 Biodiversity

Question 08

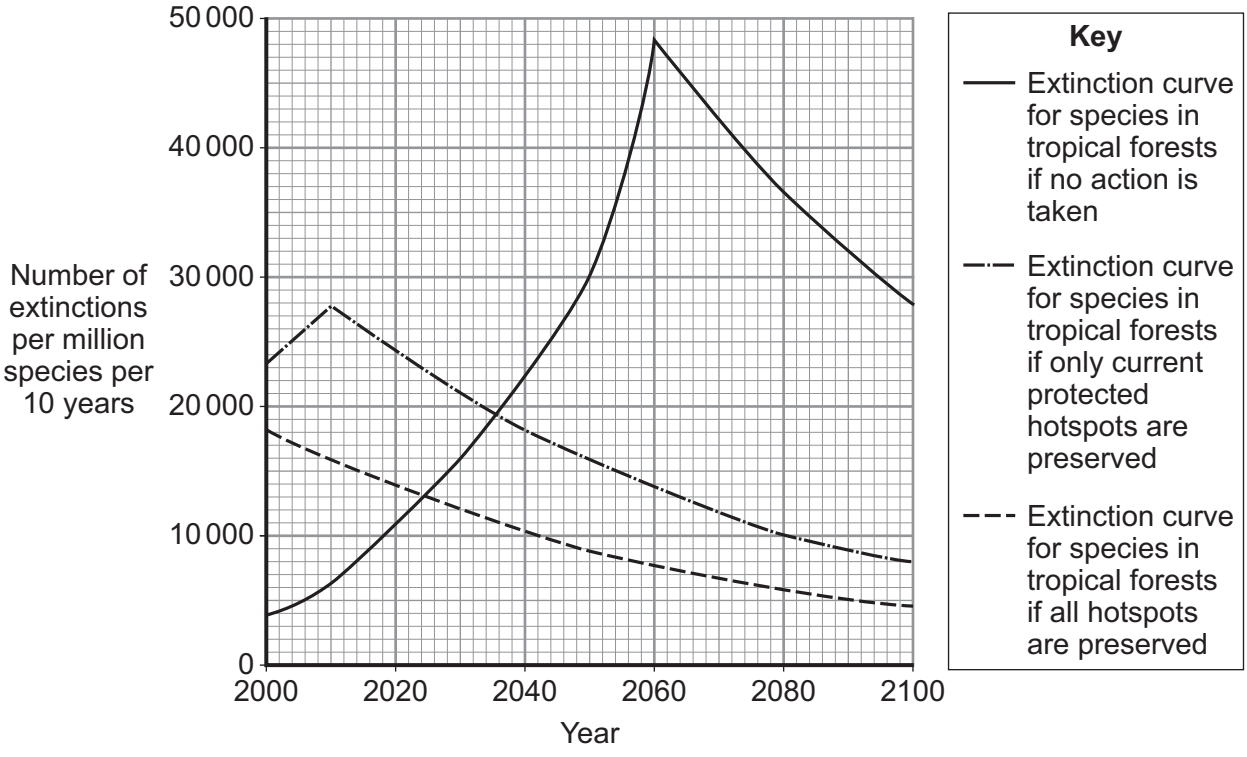
June 2011 | BLY1BP | Original Q6 | Legacy

QUESTION SIX

The graph shows the predicted number of extinctions of species in tropical forests in the 21st century.

A decade is 10 years.

Hotspots are areas with a very large biodiversity.



Scientists estimate that now there are about 10 000 000 species in the tropical forests.

6A How many of these species are likely to become extinct in the decade beginning 2010 if only current protected hotspots are preserved?

1 80 000

2 180 000

3 280 000

4 480 000

4.7.3.1 Biodiversity

Question 08 · continued

6B If no action is taken, the number of extinctions in tropical forests will begin to drop after 2060.

This is because . . .

1 Earth is warming up.

2 there will be less pollution.

3 we will have found new sources of energy.

4 most of the hotspots will have been destroyed by 2060.

6C Disease has little effect as a cause of organisms becoming extinct.

This is probably because . . .

1 new diseases do not have much effect.

2 immunity to disease is inherited.

3 diseases cannot spread from one species to another.

4 organisms have developed resistance to most diseases.

6D Alien species are plants and animals that have been introduced to a new environment.

Alien species may cause extinction of organisms in tropical forests because alien species . . .

1 have the same distribution in the forests.

2 are similar to existing predators in the forests.

3 are similar to existing competitors in the forests.

4 may be better adapted to the forests.

4.7.3.1 Biodiversity

Question 09

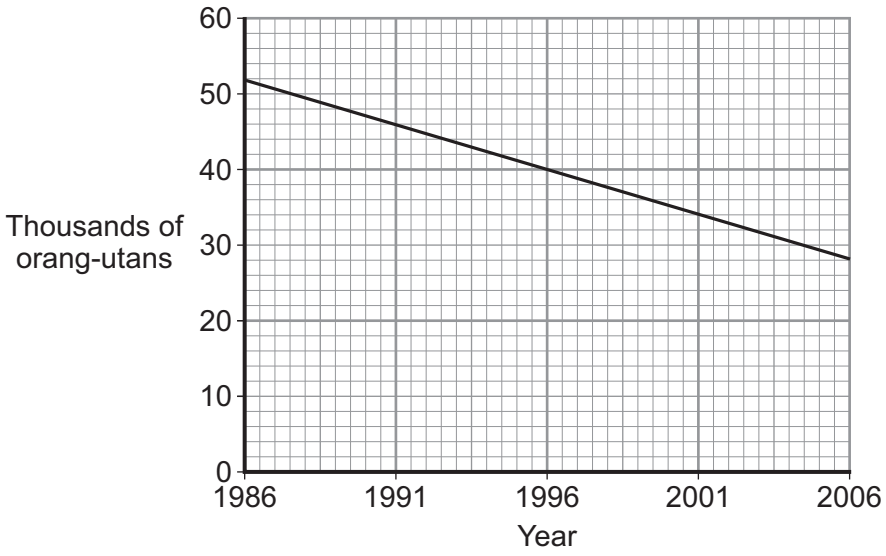
November 2011 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

The decrease in the total area of tropical rainforest on Earth is reducing biodiversity and affecting the climate.

Scientists surveyed the numbers of orang-utans in Borneo.

Their results are shown in the graph.



8A What was the annual rate of decrease in orang-utan numbers between 1986 and 2006?

1 1200 per year

2 2400 per year

3 2800 per year

4 5200 per year

8B Biodiversity is . . .

1 the number of different species living in a habitat.

2 the number of individuals living in a habitat.

3 the maintenance of tropical rainforests.

4 the number of endangered species in a habitat.

4.7.3.1 Biodiversity

Question 09 · continued

8C Forests in Borneo are being cut down to clear land for growing crops.

Keeping forests rather than cutting them down for growing crops helps to reduce global warming because . . .

1 carbon dioxide can be 'locked-up' in wood for many years.

2 growing crop plants increases the number of microorganisms in the soil.

3 forests release large amounts of carbon dioxide.

4 some crop plants remove sulfur dioxide from the atmosphere.

8D How does an increase in the amount of greenhouse gases in the atmosphere lead to an increase in global warming?

1 More of the radiation from the Sun passes into the atmosphere.

2 The atmosphere radiates more energy back to Earth.

3 The Earth radiates more energy back into the atmosphere.

4 The sea absorbs more energy from the Sun.

4.7.3.1 Biodiversity

Question 10

June 2014 | BL3HP | Original Q2 | Legacy

2 **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Deforestation affects the environment.

Deforestation is causing a change in the amounts of different gases in the atmosphere. This change causes global warming and climate change.

Figure 2 shows an area of deforestation.

Figure 2



Give the reasons why deforestation is taking place.

Describe how deforestation is causing the change in the amounts of different gases in the atmosphere.

[6 marks]

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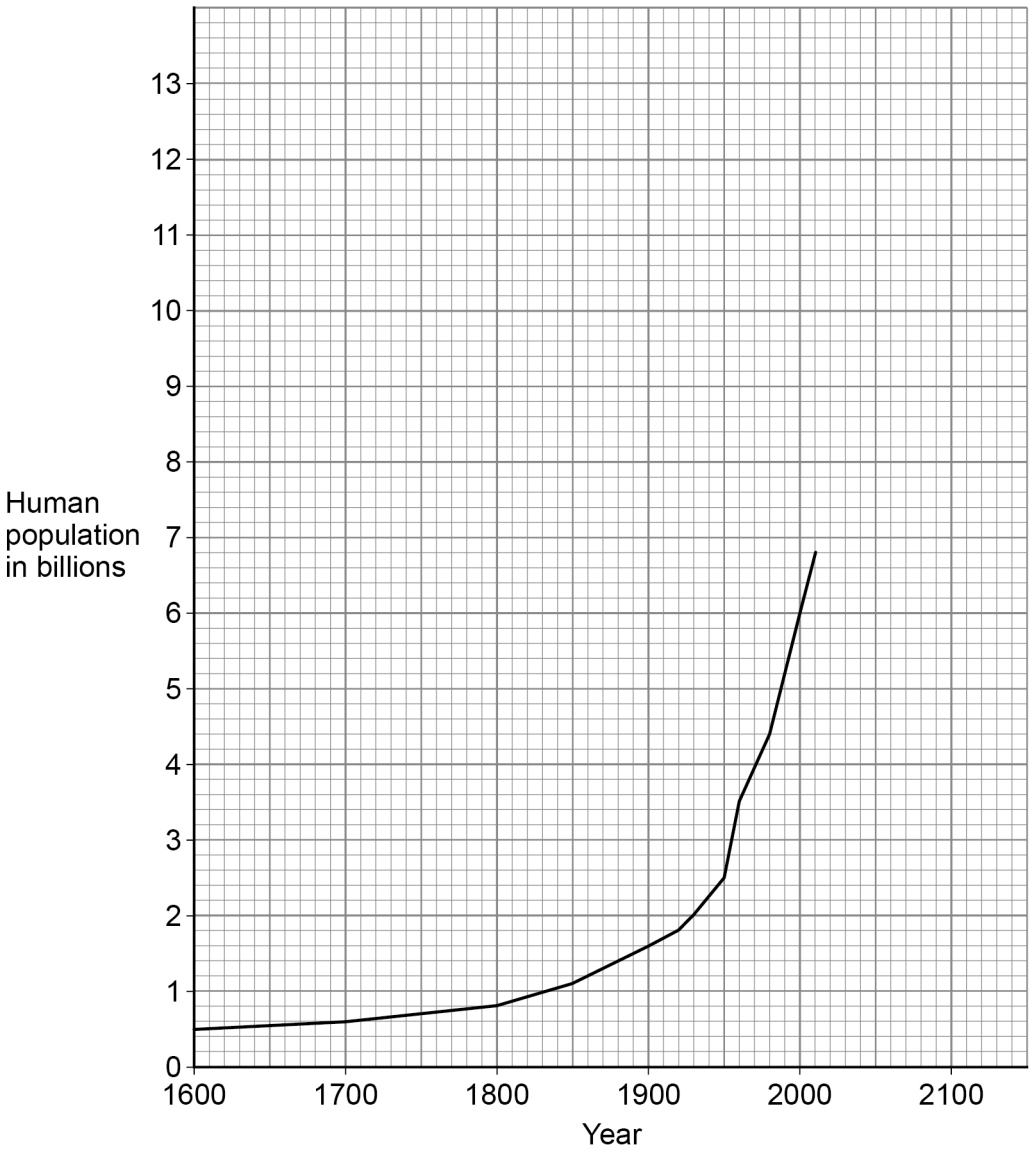
4.7.3.1 Biodiversity

Question 11

November 2020 | 8461/2H | Original Q2

0 2 **Figure 2** shows the human population from 1600 to 2010.

Figure 2



In 1900 the human population was 1.6 billion.

0 2 . 1 Calculate how many times greater the human population was in the year 2000 compared with the year 1900.

[2 marks]

Number of times greater = _____

Question 11 · continued

0 2 . 2 In 1950 the human population was 2.5 billion.

Calculate the mean annual increase in the human population between 1900 and 1950.

[2 marks]

Mean annual increase = _____ billion per year

0 2 . 3 Predict the human population in 2050 if the current rate of population increase continues.

You should draw an extrapolation line on **Figure 2**.

[2 marks]

Predicted human population = _____

0 2 . 4 The increasing human population has caused a decline in fish stocks.

Describe how fishing quotas can help to return fish stocks to a sustainable level.

[2 marks]

Question 2 continues on the next page

4.7.3.1 Biodiversity

Question 11 · continued

0 2 . 5 Farming techniques have changed in recent years.

Describe:

- why more land is being used for farming
- how increased farming has decreased biodiversity.

[6 marks]

4.7.3.1 Biodiversity

Question 11 · continued

0 2 . 6 Genetic modification of crop plants can help meet the demands of the increasing human population.

Golden rice is a genetically modified (GM) crop.

What is the advantage of golden rice compared with non-GM rice?

[1 mark]

Tick (✓) **one** box.

Golden rice contains protein-rich mycoprotein ☐

Golden rice has improved nutritional value ☐

Golden rice produces human insulin ☐

0 2 . 7 Suggest **one** reason why some people are concerned about the use of golden rice.

[1 mark]

_____

_____

16

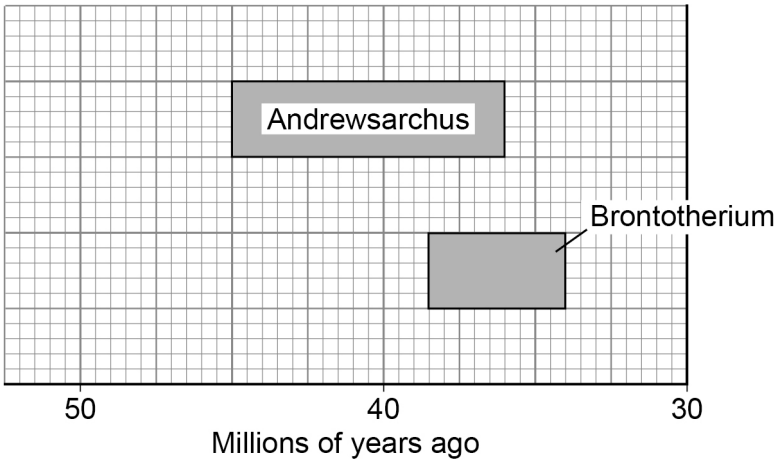
4.7.3.1 Biodiversity

Question 12

November 2020 | 8461/2H | Original Q8

0 8 **Figure 8** shows when two mammals existed in Asia.

Figure 8



0 8 . 1 Determine the number of years both Andrewsarchus and Brontotherium existed together.

[2 marks]

Time = _____ years

0 8 . 2 The oldest fossils of human ancestors found in this area are 700 000 years old.

Andrewsarchus was a carnivore and Brontotherium was a herbivore.

Suggest how the extinction of Andrewsarchus could have resulted in the extinction of Brontotherium.

[3 marks]

0 8 . 3 Information about extinct animals is often **not** clear because the fossil record is incomplete.

Give **three** reasons why the fossil record is **not** clear for older species.

[3 marks]

1

2

3

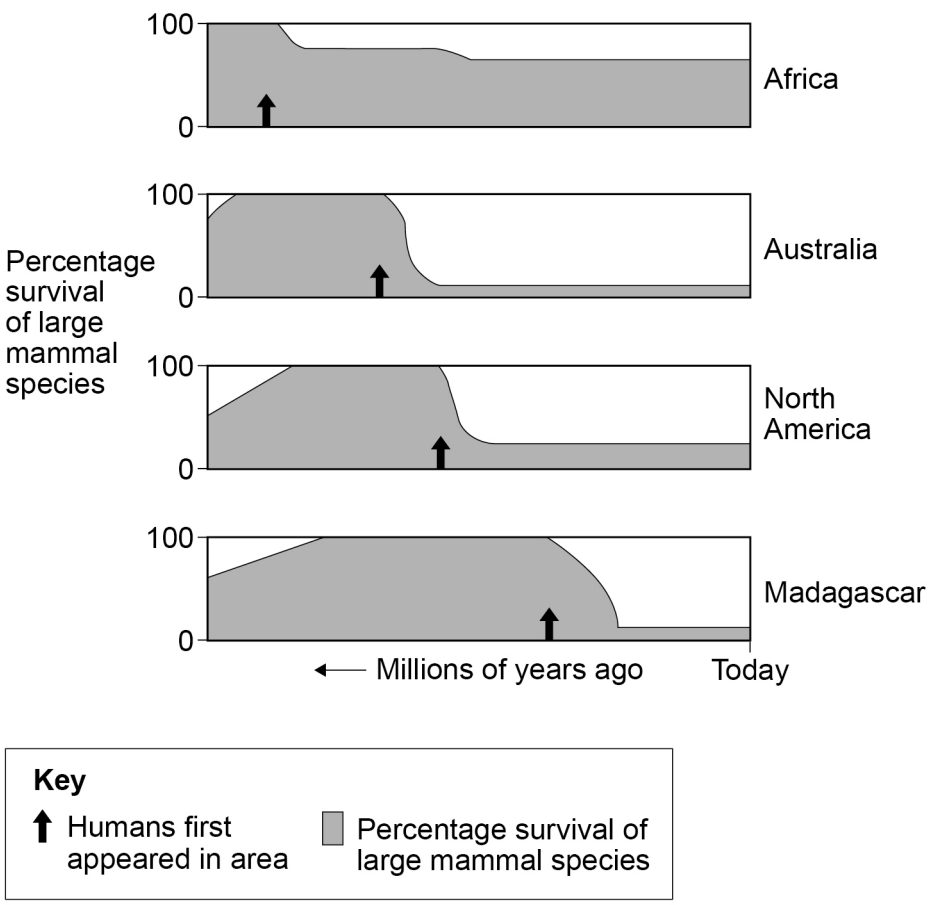
Question 8 continues on the next page

Question 12 · continued

Figure 9 shows the percentage (%) survival of large mammal species in four areas of the world.

The time at which humans first appeared in each of the four areas is also shown.

Figure 9



4.7.3.1 Biodiversity

Question 12 · continued

A mass extinction is a rapid decrease in biodiversity on Earth.

0 8 . 4 A student stated:

'The data in **Figure 9** shows that humans caused mass extinctions.'

Evaluate the student's statement.

[6 marks]

Question 8 continues on the next page

4.7.3.1 Biodiversity

Question 12 · continued

November 2020 | 8461/2H | Original Q8

0 8 . 5 Give **one** disadvantage and **one** advantage of mass extinction events.

Answer in terms of evolution.

[2 marks]

Disadvantage _____

_____

Advantage _____

_____

16

4.7.3.1 Biodiversity

Question 13

June 2023 | 8461/2H | Original Q6

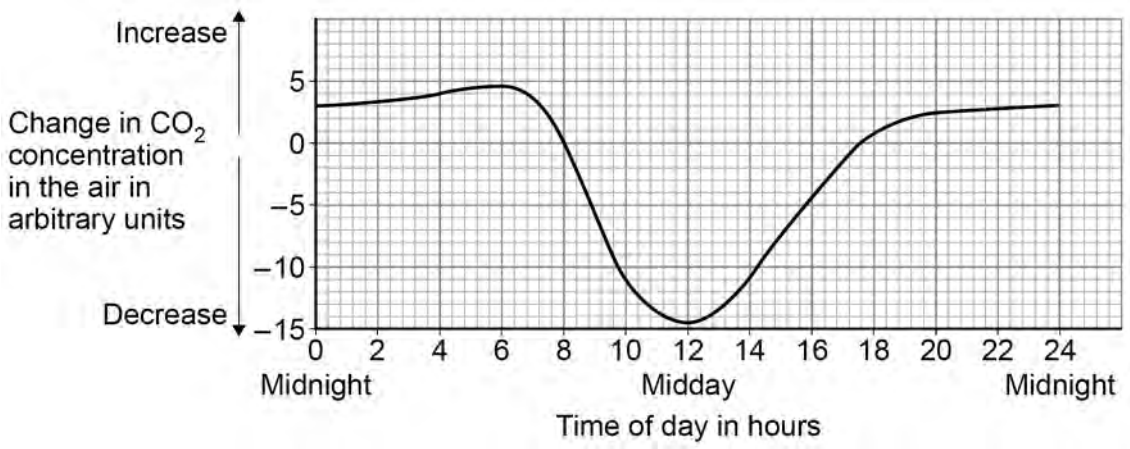
0 6 This question is about the effects of deforestation and agriculture.

The processes of photosynthesis and respiration affect the carbon dioxide concentration in the air.

Figure 9 shows the changes in the carbon dioxide concentration in the air in a tropical rainforest during one day.

The data are mean daily values over a whole year.

Figure 9



0 6 . 1 Explain what causes the changes in the carbon dioxide concentration in the air:

- from 0 to 6 hours
- from 8 to 12 hours.

Use information from **Figure 9**.

[4 marks]

0 to 6 hours _____

_____

_____

_____

8 to 12 hours _____

_____

_____

_____

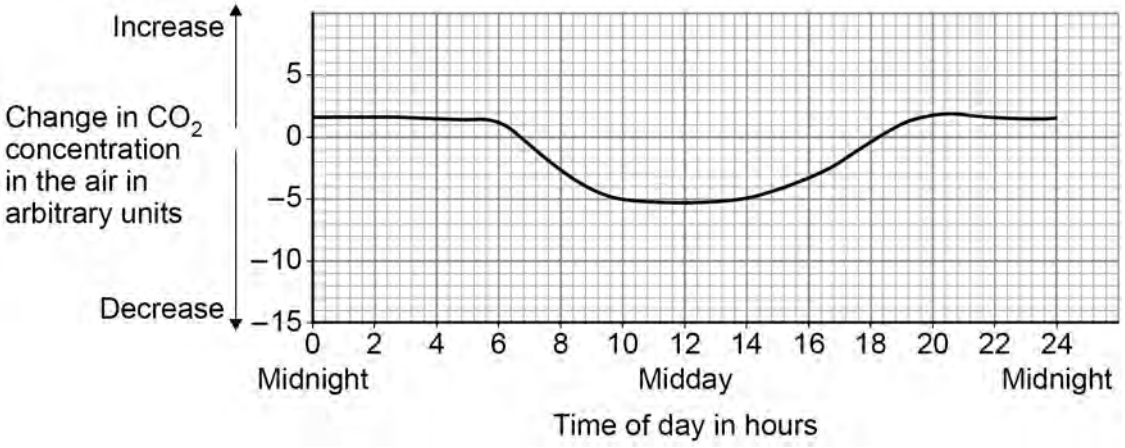
0 6 . 2 An area of rainforest is cut down and replaced with a field of maize plants.

Only one crop of maize is grown each year.

Figure 10 shows the changes in the carbon dioxide concentration in the air in the field of maize during one day.

The data are mean daily values over the 6-month growing period.

Figure 10



The maize grows for only 6 months of the year.

Explain why replacing rainforest with maize will increase the carbon dioxide concentration in the air after one year.

Use information from **Figure 9** and **Figure 10**.

[2 marks]

Question 6 continues on the next page

Question 13 · continued

A tropical rainforest can contain over 1000 different tree species.

Large areas of tropical rainforest have been cut down during the last 100 years so crops can be grown.

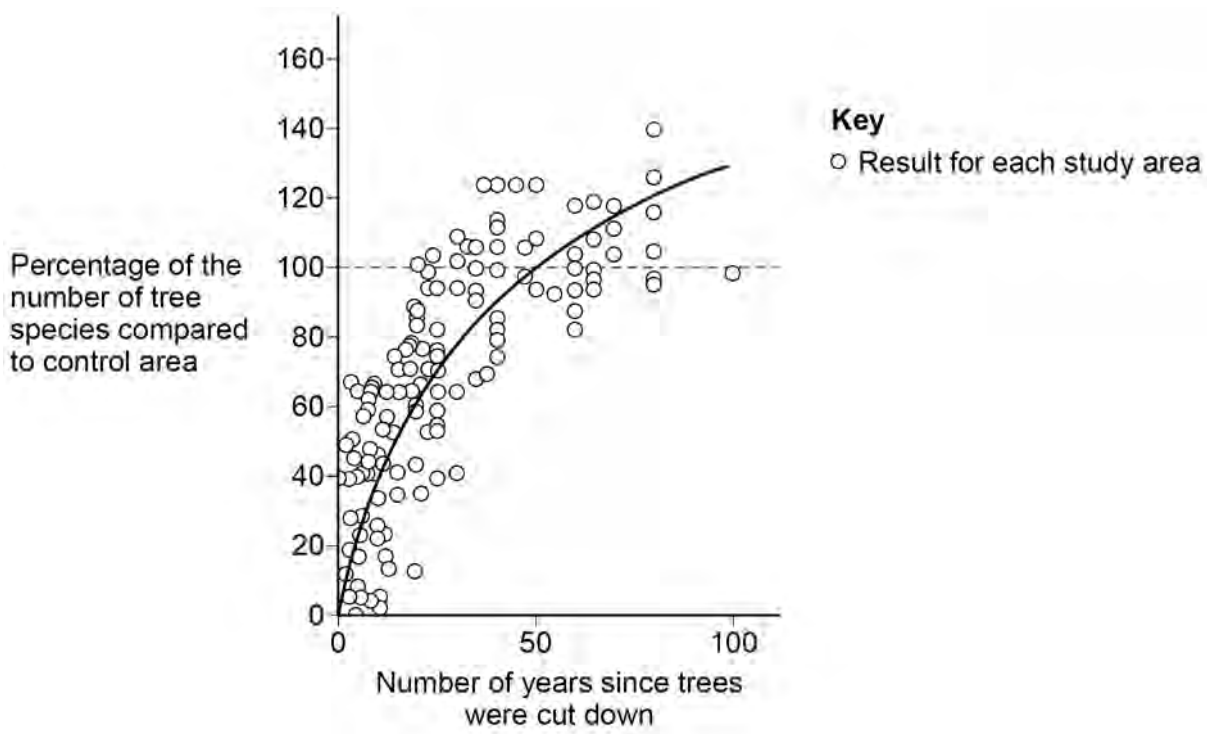
Scientists studied the regeneration of different areas of tropical rainforest.

The scientists:

- investigated areas of rainforest that had been cut down at different times during the previous 100 years
- recorded the number of tree species that re-grew in each area
- compared each area with a control area next to it. The control areas were undisturbed rainforest which had never been cut down.

Figure 11 shows the scientists' results.

Figure 11



4.7.3.1 Biodiversity

Question 13 · continued

0 6 . 3 The values plotted in **Figure 11** are percentages of the results for the control areas.

Explain why the scientists presented their results as **percentages**.

[2 marks]

During the 100 years, the biodiversity of trees in the regenerating rainforest increases.

0 6 . 4 Give **one** other conclusion you can make from **Figure 11**.

[1 mark]

0 6 . 5 Give **two** reasons why an increase in the diversity of trees in the rainforest leads to an increase in animal diversity.

[2 marks]

1

2

11

4.7.3.1 Biodiversity

Question 14

June 2025 | 8461/2H | Original Q5

0 5 Peat bog is a specialised habitat for some living organisms.

0 5 . 1 Peat has been removed from peat bogs so that the land can be used for farming or forestry.

Give **two** uses of the peat removed from peat bogs.

[2 marks]

1 _____

_____

2 _____

_____

The destruction of peat bogs can affect biodiversity.

0 5 . 2 What is meant by 'biodiversity'?

[1 mark]

_____

_____

4.7.3.1 Biodiversity

Question 14 · continued

0 5 . 3 Explain how the destruction of peat bogs can affect biodiversity:

- in the local area
- globally.

[6 marks]

Extra space

9