CAMBRIDGE IGCSE BIOLOGY · 0610

# BIOLOGY



EXAM QUESTION PACK

## TOPIC 20: HUMAN INFLUENCES ON ECOSYSTEMS

| SCORE | PERCENTAGE |
| --- | --- |
| / | % |

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# Human influences on ecosystems – 2023 November IGCSE 0610

**1.** Nov/2023 /Paper_ 0610/11/No.38

What can increase as a result of deforestation?

1 extinctions

2 flooding

3 biodiversity

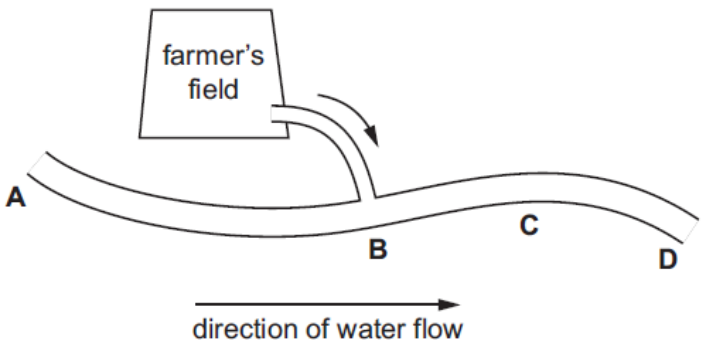
**A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

**2.** Nov/2023 /Paper_ 0610/11/No.39

The diagram shows the position of a farmer's field near a river.

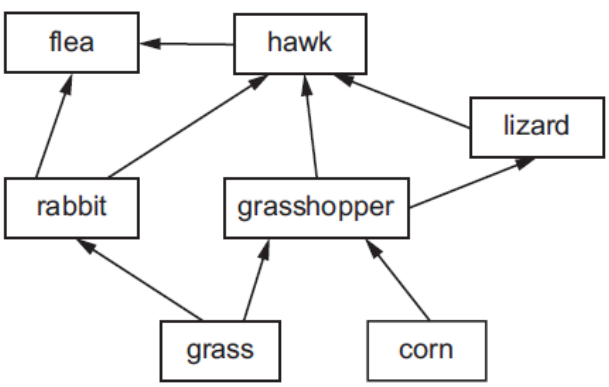
The farmer uses chemical fertilisers that drain into the river, causing pollution. High concentrations of the chemical fertiliser result in increased growth of aquatic plants.

At which point is the growth of aquatic plants the **least** affected by fertilisers?




**3.** Nov/2023 /Paper_ 0610/11/No.40

The diagram shows a food web.




Which food chain shows a correct flow of energy through the web?

**A** corn → grasshopper → hawk → lizard

**B** grass → grasshopper → hawk → rabbit

**C** grass → rabbit → hawk → flea

**D** corn → grass → rabbit → hawk

**4.** Nov/2023 /Paper_ 0610/21/No.38

During eutrophication, what causes the death of fish?

**A** increased growth of producers

**B** increased photosynthesis by producers

**C** decreased concentration of carbon dioxide in the water

**D** decreased concentration of oxygen in the water

**5.** Nov/2023 /Paper_ 0610/21/No.40

Some ways in which humans make use of organisms are listed.

1 using yeast to produce ethanol

2 artificial selection of sheep with thick wool

3 using bacteria to produce human substances

What are examples of genetic modification?

**A** 1 and 3 **B** 1 only **C** 2 and 3 **D** 3 only

**6.** Nov/2023 /Paper_ 0610/22/No.39

One method of conserving fish stocks is to have a minimum mesh size for fishing nets.

How is the mesh size chosen to conserve a particular fish species?

**A** The holes in the net must be small enough to catch only young fish.

**B** The holes in the net must be small enough to catch all fish old enough to reproduce.

**C** The holes in the net must be large enough to catch some fish of all ages.

**D** The holes in the net must be large enough to allow young fish to escape.

**7.** Nov/2023 /Paper_ 0610/23/No.37

An increased concentration of nitrates in water may result in the death of fish because of eutrophication.

Some stages of eutrophication are given.

1 increased aerobic respiration by decomposers

2 increased decomposition after death of producers

3 increased growth of producers

4 reduction in dissolved oxygen

What is the order of these stages that results in the death of fish?

**A** $1 \rightarrow 4 \rightarrow 3 \rightarrow 2$

**B** $1 \rightarrow 2 \rightarrow 4 \rightarrow 3$

**C** $3 \rightarrow 2 \rightarrow 1 \rightarrow 4$

**D** $3 \rightarrow 4 \rightarrow 2 \rightarrow 1$

**8.** Nov/2023 /Paper_ 0610/23/No.38

Which word describes the number of different species in an area?

**A** biodiversity

**B** community

**C** ecosystem

**D** population

**9.** Nov/2023 /Paper_ 0610/31/No.4

Fig. 4.1 is a photograph of part of a kitchen.



**Fig. 4.1**

**(a)** Describe methods of maintaining hygiene in the home that reduce the spread of disease.

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.....

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..... [4]



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**(b)** State **two** ways that pathogens can be transmitted indirectly.

1 .....

2 .....

[2]

**(c)** State **three** body defences against infection.

1 .....

2 .....

3 .....

[3]

[Total: 9]



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**10.** Nov/2023 /Paper_ 0610/31/No.8(a _ b)

**(a)** Humans have developed modern farming methods to increase food production.

Explain how the use of herbicides and chemical fertilisers has increased food production.

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..... [4]



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**(b)** Fig. 8.1 shows intensive farming of chickens.



**Fig. 8.1**

State **three** disadvantages of intensive livestock production.

1 .....

.....

2 .....

.....

3 .....

.....

[3]



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11. Nov/2023 /Paper_ 0610/33/No.7(c _ d)

**(c)** Lionfish are an example of a foreign species that has been accidentally introduced to many marine habitats.

Describe the harmful consequences of introducing a foreign species to a habitat.

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..... [3]

**(d)** Removing introduced species from habitats is one method of conserving endangered species.

Describe other methods of conserving endangered species.

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..... [3]



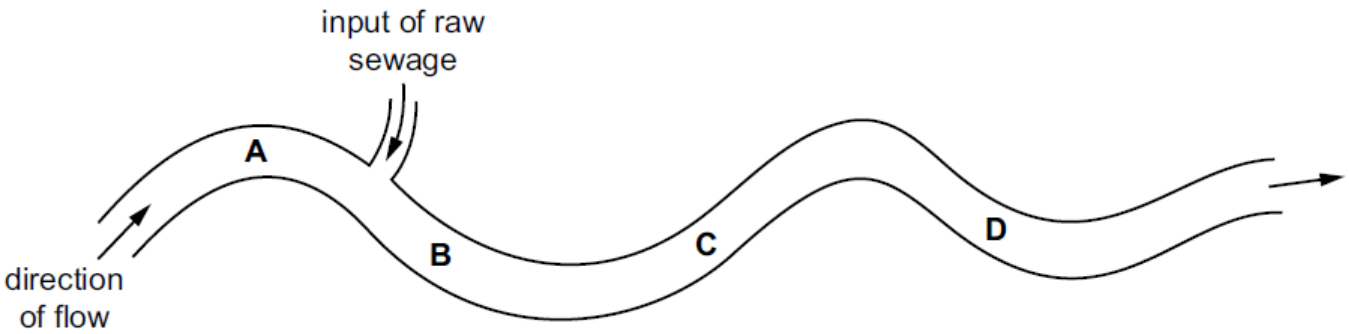
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**1.** June/2023/Paper_0610/11,21/No.39, 38

The bloodworm is an organism that is found in heavily polluted water.

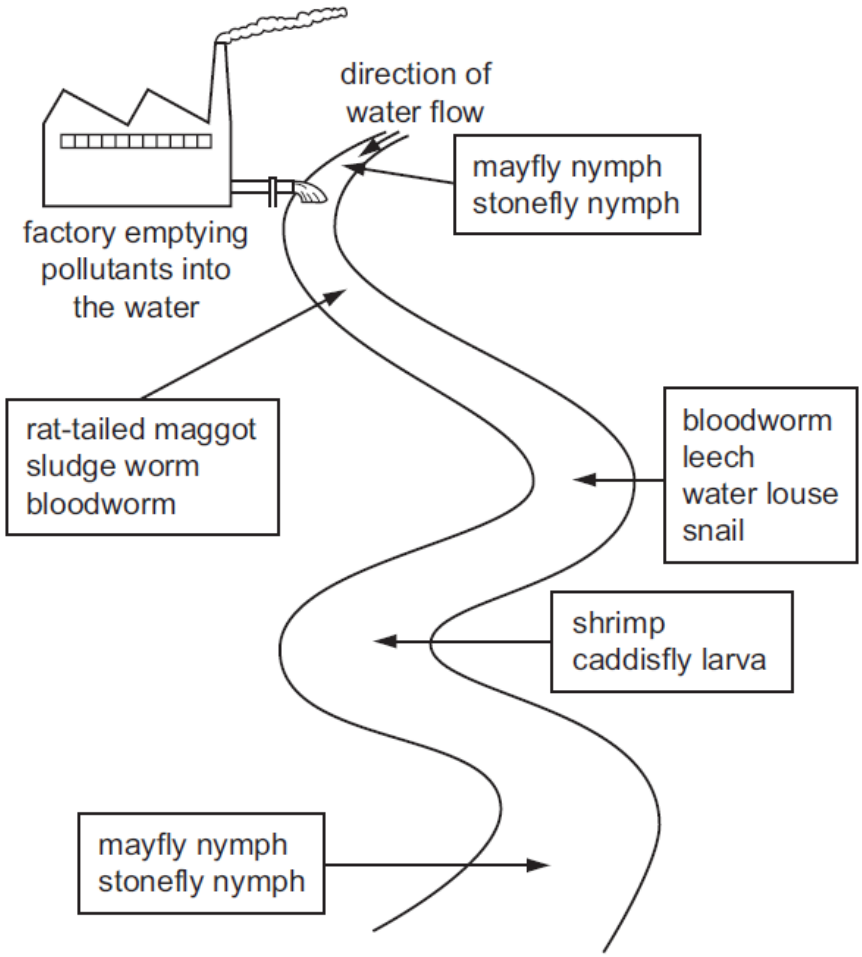
The diagram shows where raw sewage flows into a river.

Where would there be fewest bloodworms?



**2.** June/2023/Paper_0610/12/No.39

The diagram shows the results of a survey on the types of animals found along a stretch of river near to a factory.




Which animal lives in the least polluted water?

**A** bloodworm

**B** caddisfly larva

**C** leech

**D** stonefly nymph



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**3.** June/2023/Paper_0610/13/No.39

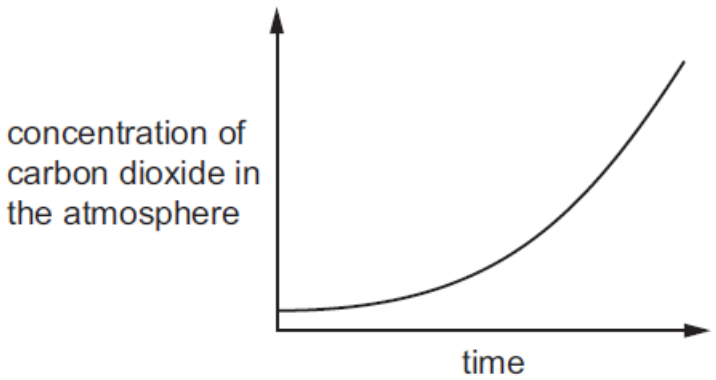
Three human activities are listed.

1 burning fossil fuels

2 deforestation

3 replanting forests

Which activities can cause the change shown in the graph?




**A** 1, 2 and 3 **B** 1 and 2 only **C** 1 only **D** 2 and 3 only

**4.** June/2023/Paper_0610/21/No.37

The number of Atlantic bluefin tuna fish found in the Atlantic Ocean has significantly decreased in the last 50 years.

Which method would make the biggest improvement in the conservation of tuna fish stocks?

**A** decreasing the size of holes in fishing nets

**B** genetic modification of tuna

**C** introducing fishing quotas

**D** selective breeding of tuna



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**5.** June/2023/Paper_0610/22/No.37

What is a negative impact on the environment caused by deforestation?

**A** decrease in land for livestock production

**B** decreased levels of carbon dioxide in the air

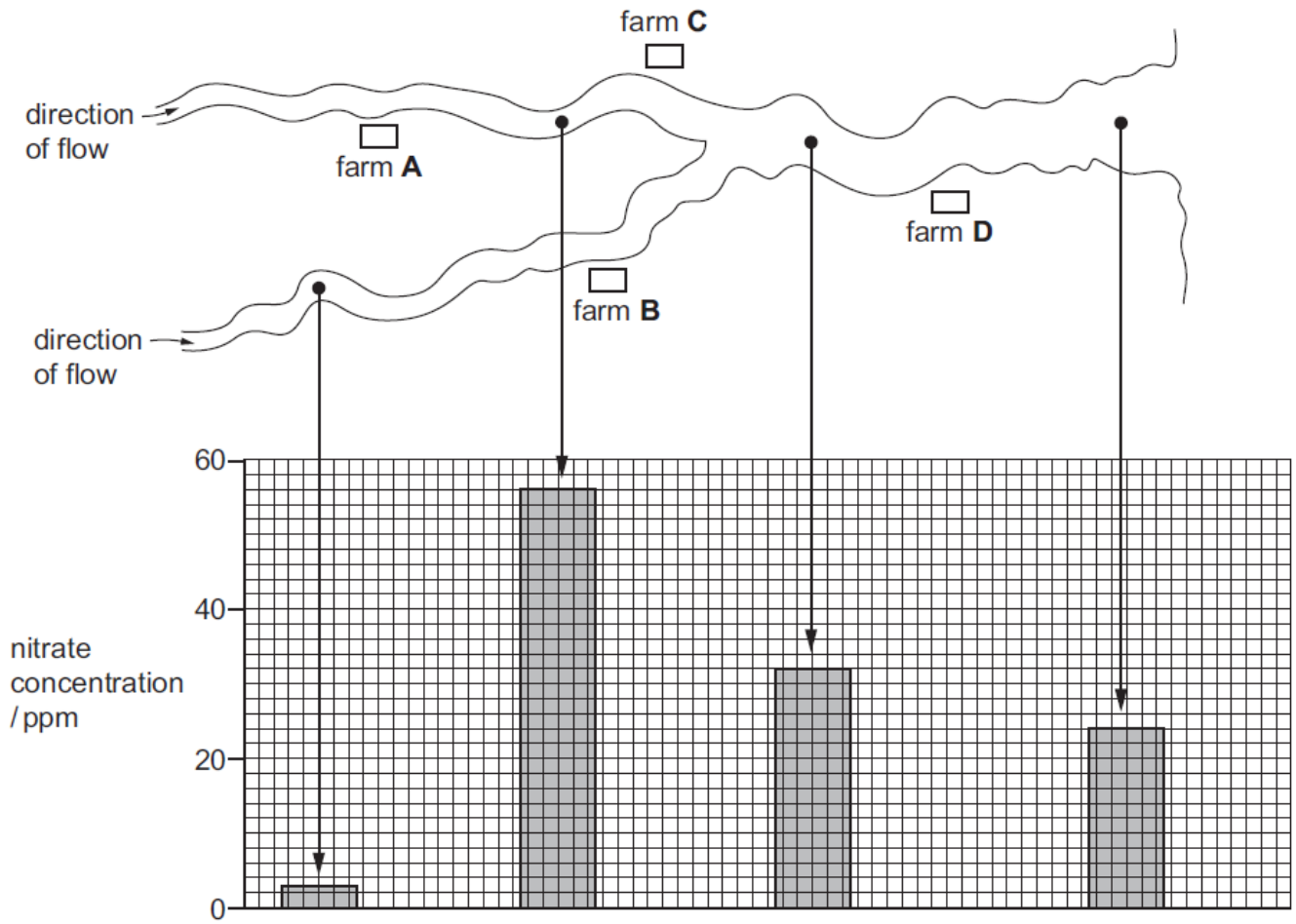
**C** increase in flooding

**D** increased levels of soil

**6.** June/2023/Paper_0610/22/No.38

The diagram shows the positions of four farms and the concentrations of nitrate at different points in a river.

Which farm is likely to have been using too much fertiliser on its land?






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**7.** June/2023/Paper_0610/23/No.37

Which substance is an enzyme used in fruit juice production?

**A** lactase

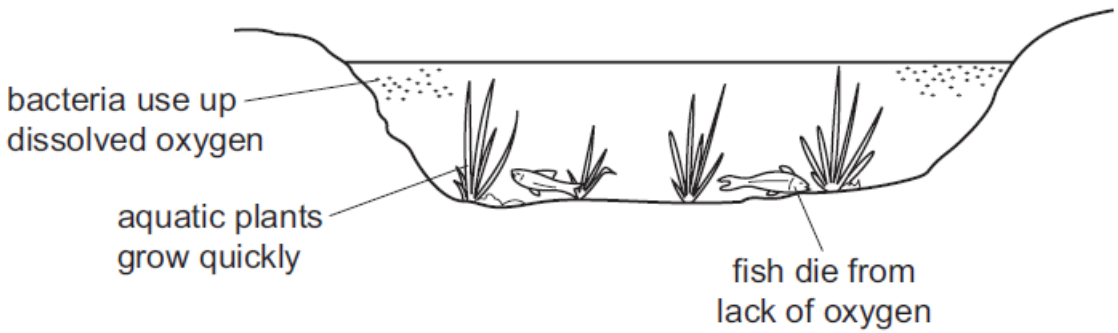
**B** maltose

**C** pectinase

**D** pepsin

**8.** June/2023/Paper_0610/23/No.38

The diagram shows some of the effects of human activity on a river.




What could have caused these effects?

**A** air pollution

**B** deforestation

**C** over-use of fertilisers

**D** presence of herbicides



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9. June/2023/Paper_0610/31/No.6

**(a)** Fig. 6.1 is a graph that shows the concentration of dissolved oxygen in the water at increasing distances along a river.

Untreated sewage is released into the river. This is marked on the graph in Fig. 6.1.

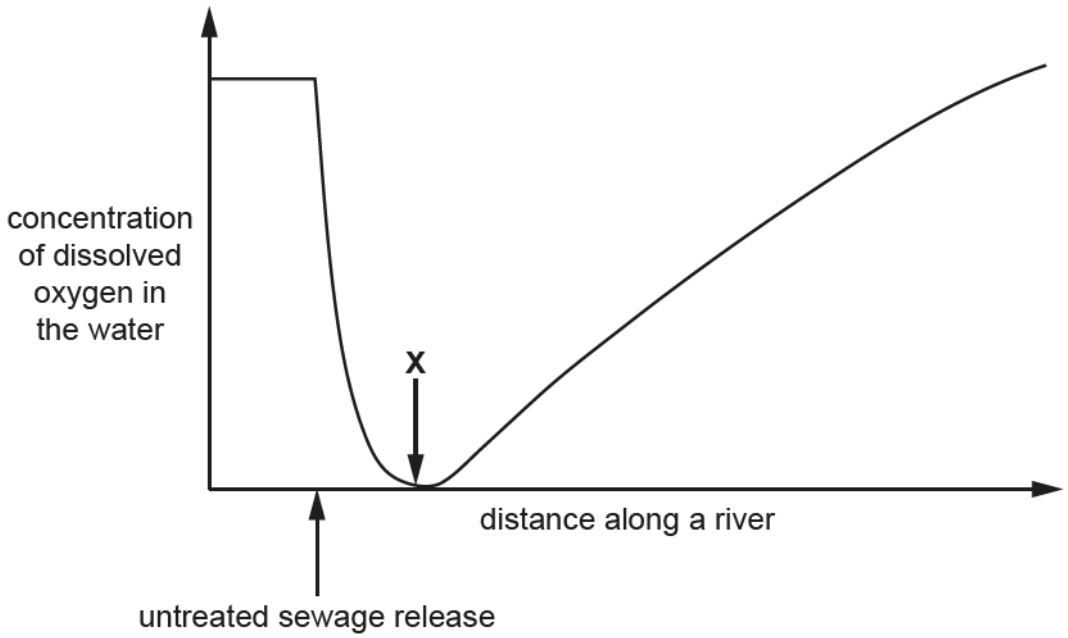



**Fig. 6.1**

**(i)** Describe the results shown in Fig. 6.1.

.....

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..... [3]



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**(ii)** Predict **and** explain the effect on the organisms in the river of the dissolved oxygen concentration at **X** in Fig. 6.1.

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.....

..... [2]

**(b)** Describe why it is important for humans that sewage is treated before entering rivers.

.....

.....

..... [1]

**(c)** Pollution can cause organisms to become extinct.

State **three** other factors that can cause extinction.

1 .....

2 .....

3 .....

[3]

[Total: 9]



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**10.** June/2023/Paper_0610/43/No.6

**(a)** Fig. 6.1 shows the percentage of land covered by forest in a country from 1660 until 2000.

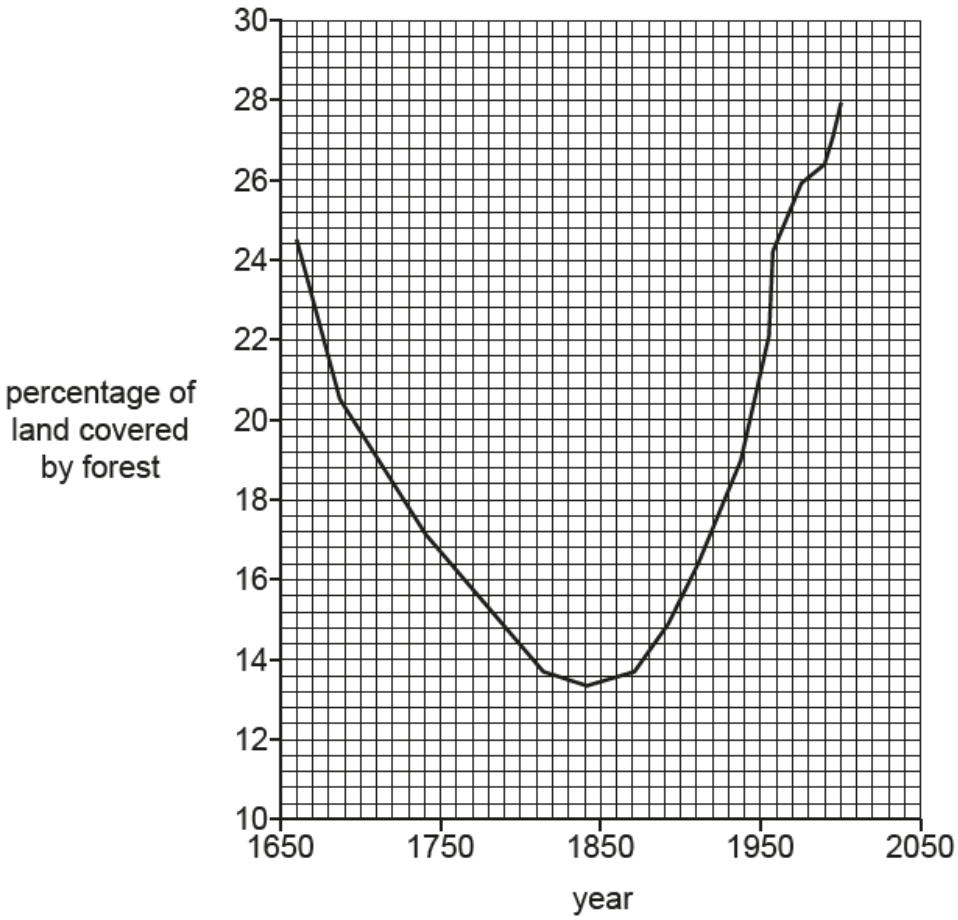



**Fig. 6.1**

**(i)** Using the information in Fig. 6.1, state which 10-year period had the highest increase in the percentage of land covered by forest.

..... [1]

**(ii)** Outline how human activities could cause the change in the percentage of land covered by forest from 1660 to 1800 shown in Fig. 6.1.

.....

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.....

.....

..... [3]



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**(b)** It is estimated that 40% of plant species are at risk of extinction.

Seed banks can store seeds from many species for a long time.

Table 6.1 shows some information about one plant species that is stored in a seed bank.

**Table 6.1**

| mass of one seed / g | percentage oil content | percentage protein content |
|---|---|---|
| 1.96 | 71 | 11 |

**(i)** Using the data shown in Table 6.1, calculate the mass of protein in one seed.

..... g [1]

**(ii)** Suggest why many plants can easily be conserved using seed banks.

.....

.....

.....

.....

..... [2]



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**11.** March/2023/Paper_ 0610/22/No.37

Untreated sewage is accidently released into a river for several weeks.

How will this affect the number of bacteria, the oxygen concentration of the water and the number of fish?

| | number of bacteria | oxygen concentration | number of fish |
|---|---|---|---|
| **A** | decrease | decrease | increase |
| **B** | increase | decrease | decrease |
| **C** | decrease | increase | decrease |
| **D** | no change | no change | no change |

**12.** March/2023/Paper_ 0610/22/No.38

Fish stocks can be conserved in various ways.

Which method of conservation ensures that mainly large fish are caught?

**A** having closed seasons

**B** having protected areas

**C** having a minimum mesh size for nets

**D** setting legal fishing quotas

# Human influences on ecosystems – 2022 November IGCSE 0610 Biology

**1.** Nov/2022/Paper_11/No.39

Biological washing powders can remove stains from clothes.

What must a washing powder contain, to remove an oil stain from a t-shirt?

**A** amylase

**B** lipase

**C** pectinase

**D** protease

**2.** Nov/2022/Paper_12/No.40

What could be undesirable effects of deforestation?

1 extinction of species

2 increased flooding

3 reduction of atmospheric carbon dioxide

**A** 1 and 2 only **B** 1 and 3 only **C** 1, 2 and 3 **D** 2 and 3 only

**3.** Nov/2022/Paper_13/No.40

What are undesirable effects of deforestation?

**A** a decrease in soil erosion and a decrease in carbon dioxide in the atmosphere

**B** a decrease in soil erosion but an increase in carbon dioxide in the atmosphere

**C** an increase in soil erosion but a decrease in carbon dioxide in the atmosphere

**D** an increase in soil erosion and an increase in carbon dioxide in the atmosphere

**4.** Nov/2022/Paper_21/No.39

Which statement about sustainable resources is correct?

**A** They include fossil fuels.

**B** They include non-renewable resources.

**C** Their production rate is equal to their removal rate.

**D** Their production rate is smaller than their removal rate.

**5.** Nov/2022/Paper_21/No.40

What is the **least** sustainable method of helping to maintain a population of fish in a lake?

**A** Only allow female fish to be caught and eaten.

**B** Only allow fishing at certain times of the year.

**C** Only allow fishing in certain areas of the lake.

**D** Only allow the largest fish to be caught and eaten.

**6.** Nov/2022/Paper_22/No.38

The list shows some of the steps in the production of human insulin by genetic engineering.

1 The human insulin gene is inserted into a bacterial plasmid using DNA ligase.

2 A recombinant plasmid is inserted into a bacterium.

3 The bacterium containing the recombinant plasmid replicates.

4 The insulin gene is removed from human DNA using a restriction enzyme.

What is the correct sequence of these steps?

**A** $1 \rightarrow 2 \rightarrow 4 \rightarrow 3$

**B** $2 \rightarrow 4 \rightarrow 3 \rightarrow 1$

**C** $3 \rightarrow 2 \rightarrow 1 \rightarrow 4$

**D** $4 \rightarrow 1 \rightarrow 2 \rightarrow 3$

**7.** Nov/2022/Paper_22/No.39

Deforestation results in an increase in the concentration of carbon dioxide in the atmosphere.

What is the correct explanation?

**A** There is less decay.

**B** There is less photosynthesis.

**C** There is less respiration.

**D** There is less transpiration.

**8.** Nov/2022/Paper_22/No.40

Which definition of sustainable development is correct?

**A** providing for the needs of an increasing human population without harming the environment

**B** using a resource more quickly than it can be replaced

**C** using increasing areas of land for crops, livestock production and housing

**D** conservation of endangered species by captive breeding programmes and seed banks

**9.** Nov/2022/Paper_23/No.40

What is a consequence of deforestation?

**A** flooding due to reduced transpiration by trees

**B** increased carbon dioxide concentration in the atmosphere due to increased photosynthesis

**C** reduced carbon dioxide concentration in the atmosphere due to increased decomposition of dead trees

**D** reduced oxygen concentration in the atmosphere due to reduced respiration of trees



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**(c)** Biofuels can be made from ethanol which is a type of alcohol.

Ethanol is produced during anaerobic respiration in yeast.

The volume of biofuels produced by seven countries was measured.

Fig. 6.1 shows the percentage of biofuels produced by each country.

The countries are labelled **A** to **G**.

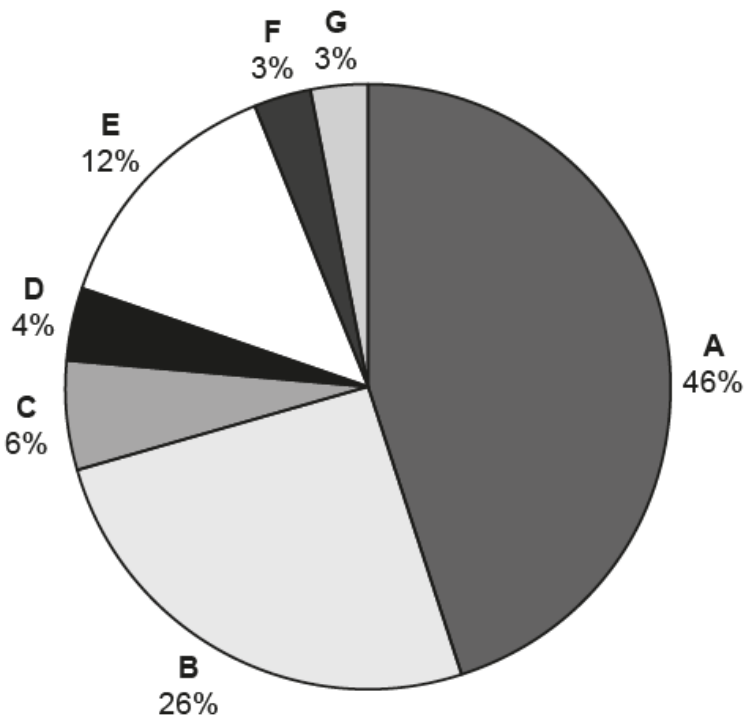



**Fig. 6.1**

**(i)** Complete the sentences to describe the results shown in Fig. 6.1.

Country ..... produces the largest percentage of biofuels.

Countries ..... and ..... produce the smallest percentages of biofuels.

Country **E** produces twice as much biofuel as country ..... .

[4]

**(ii)** State the name of **one** product of anaerobic respiration in yeast, other than alcohol.

..... [1]

**(iii)** State **one** use by humans of anaerobic respiration in yeast, other than to produce biofuels.

..... [1]



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**11.** Nov/2022/Paper_33/No.4

**(a)** Fig. 4.1 shows a small pond.



**Fig. 4.1**

A student investigated a pond ecosystem and found that:

- Frogs eat pond snails.
- The pond contains aquatic plants.
- Pond snails eat aquatic plants.

Construct a food chain for these organisms. Do **not** draw the organisms.

.....

[2]



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**(b)** The student then investigated a seashore ecosystem.

The food web for this seashore is shown in Fig. 4.2.

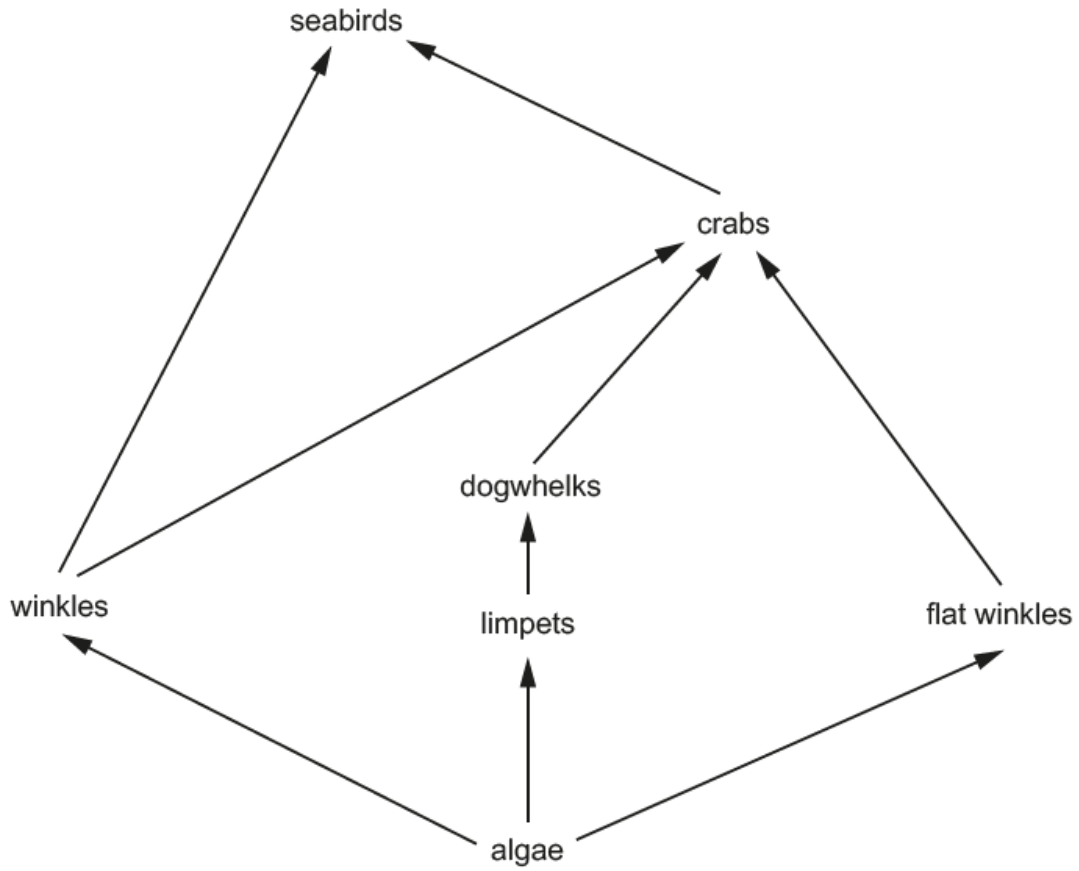



**Fig. 4.2**

**(i)** Complete Table 4.1 by counting the number of each type of organism in the food web.

**Table 4.1**

| description | number of each type of organism in the food web |
|---|---|
| carnivore | |
| consumer | |
| herbivore | |
| producer | |

[4]



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**(ii)** A new species of starfish was introduced to the seashore food web in Fig. 4.2.

The starfish species eats limpets.

Predict what would happen to the number of dogwhelks and algae in this area after the starfish were introduced.

dogwhelks .....

.....

algae .....

.....

[2]

**(c)** Some bacteria that live on the seashore feed on dead material.

State the term used to describe organisms that get energy from dead or waste organic material.

..... [1]

[Total: 9]



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**12.** Nov/2022/Paper_41/No.5

Fires release carbon dioxide into the atmosphere.

**(a) (i)** State **one** other natural process that releases carbon dioxide into the atmosphere.

.....

.....

..... [1]

**(ii)** Carbon dioxide is a greenhouse gas.

State the name of **one** other greenhouse gas.

..... [1]

**(b)** Data scientists used satellite images to analyse the occurrence of fires globally, during a 14-year period. They tracked all fires that were larger than 0.21 $km^2$ and therefore visible from space.

Table 5.1 summarises some of their data, categorising the fires by location. The locations include natural ecosystems and land that is managed by people. The expansion rate is the speed at which each fire becomes larger.

**Table 5.1**

| location of fire | estimated total number of fires | estimated average expansion rate of fires / $km^2$ per day | estimated average duration of fires / days |
|---|---|---|---|
| natural boreal forest | 197 124 | 0.6 | 5.4 |
| natural temperate forest | 178 909 | 0.4 | 4.1 |
| natural savannah (grassland with few trees) | 9 809 719 | 0.7 | 4.6 |
| managed land being deforested | 909 826 | 0.3 | 3.8 |
| managed agricultural land | 1 631 918 | 0.3 | 3.4 |



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**(i)** Using the information in Table 5.1, compare the data for the two managed locations with the data for the three natural locations.

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.....

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.....

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..... [3]

**(ii)** Describe how the data in Table 5.1 could be used to estimate the total area that was burnt during the 14-year period, for each location.

.....

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..... [2]

**(iii)** Burning large areas of forest is a cause of habitat destruction.

Describe the possible consequences of habitat destruction.

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..... [3]

[Total: 10]



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**(a)** Fig. 4.1 shows a dandelion plant, *Taraxacum officinale*, in a field. The flower stalk is called a scape.




**Fig. 4.1**

**(i)** The scape of a dandelion responds to sunlight by growing upwards.

State the name of this growth response.

..... [1]

**(ii)** The scapes of dandelions keep the plant upright without the need for structures such as bones.

Explain how cells in plant scapes and stems keep plants upright.

.....

.....

.....

.....

..... [2]



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**(b)** Fig. 4.2 is part of a cross-section through the scape of a dandelion.

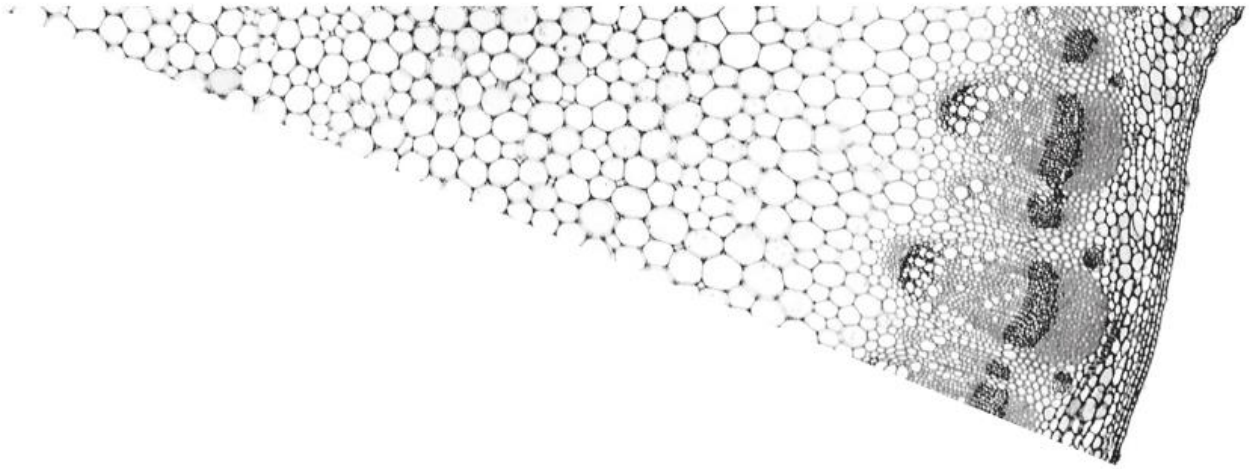


**Fig. 4.2**

Draw a line and add a label **on Fig. 4.2** to identify one area of **xylem** tissue. [1]

**(c)** Describe the function of **phloem** tissue.

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.....

.....

..... [3]



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**(d)** A dandelion scape was cut into long strips for an osmosis investigation.

Immediately after the scape was cut, the pieces of scape bent outwards, as shown in Fig. 4.3.

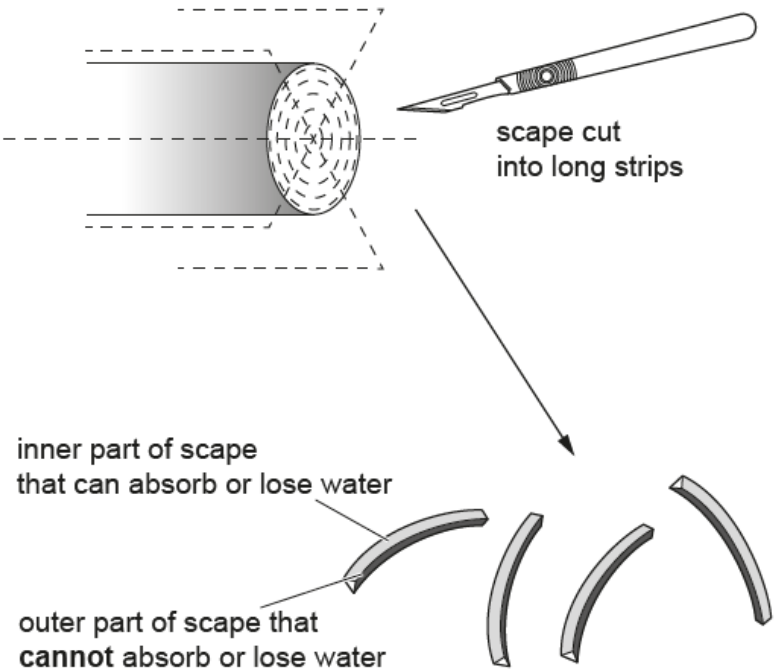



**Fig. 4.3**



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Strips of dandelion scape were placed in four dishes, **A**, **B**, **C** and **D**, for 30 minutes.

Each dish contained a different concentration of salt solution.

Fig. 4.4 shows the appearance of the four strips of scape after 30 minutes.

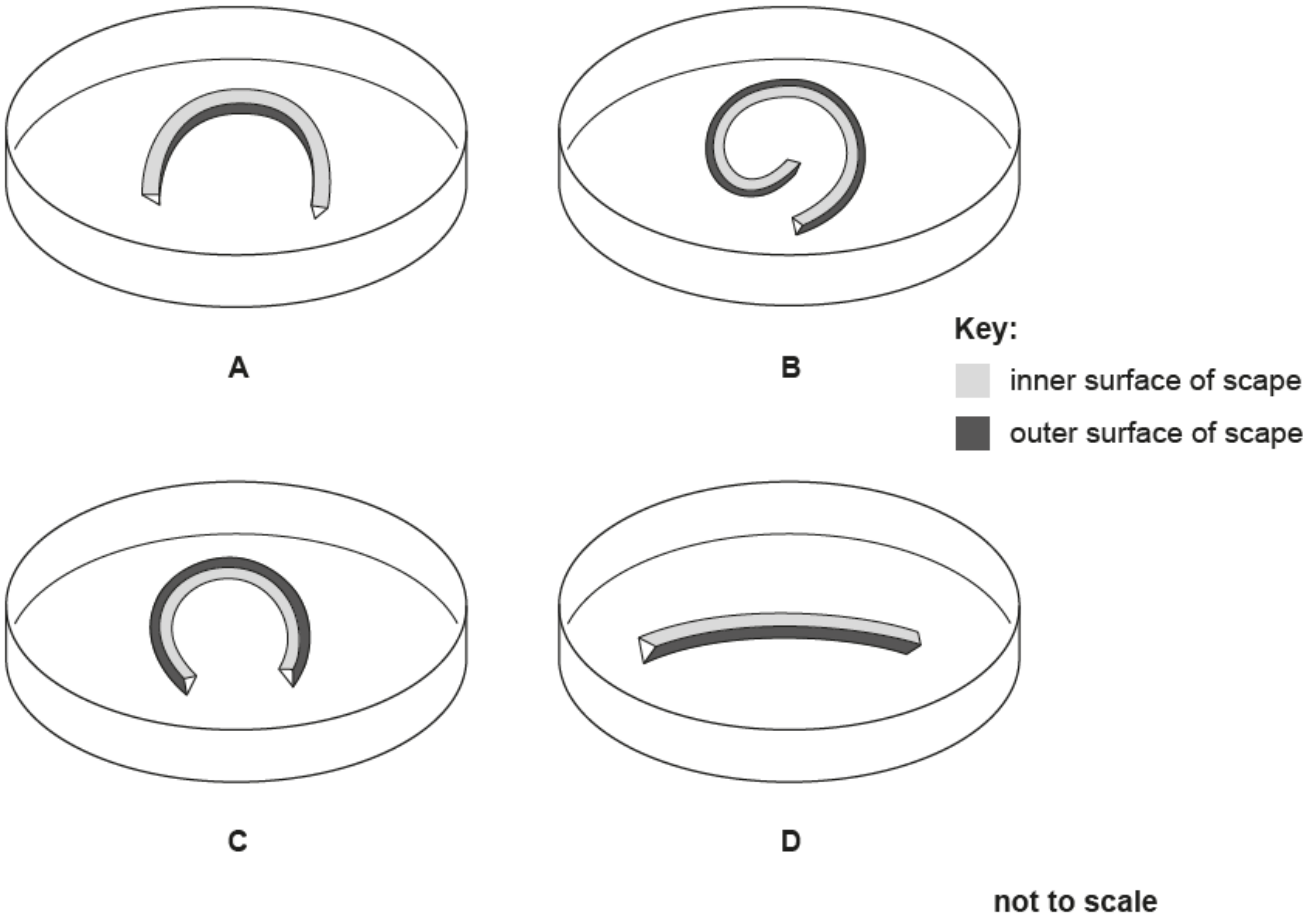



**Fig. 4.4**

Using the information in Fig. 4.3 and Fig. 4.4, deduce and explain which strip of scape was in the most concentrated salt solution.

strip of scape .....

explanation .....

.....

.....

.....

.....

[3]

[Total: 10]



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**14.** Nov/2022/Paper_43/No.5(c)

**(c)** The researchers monitored the water in the lake for pollution.

Outline how sewage should be treated so that the water it contains is safe to put into the lake.

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..... [5]



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# Human influences on ecosystems – 2022 June IGCSE 0610

1. June/2022/Paper_ 21/No.39
What is a reason for conserving plant species?

**A** to absorb oxygen from the air

**B** to decrease rainfall

**C** to obtain drugs for medicinal use

**D** to release carbon dioxide into the air



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**2.** June/2022/Paper_ 32/No.4(b_ c)

**(b)** Conservationists counted the number of organisms in each feeding level for one of the food chains in a rainforest.

The data were used to draw a pyramid of numbers. Table 4.1 shows the data.

**Table 4.1**

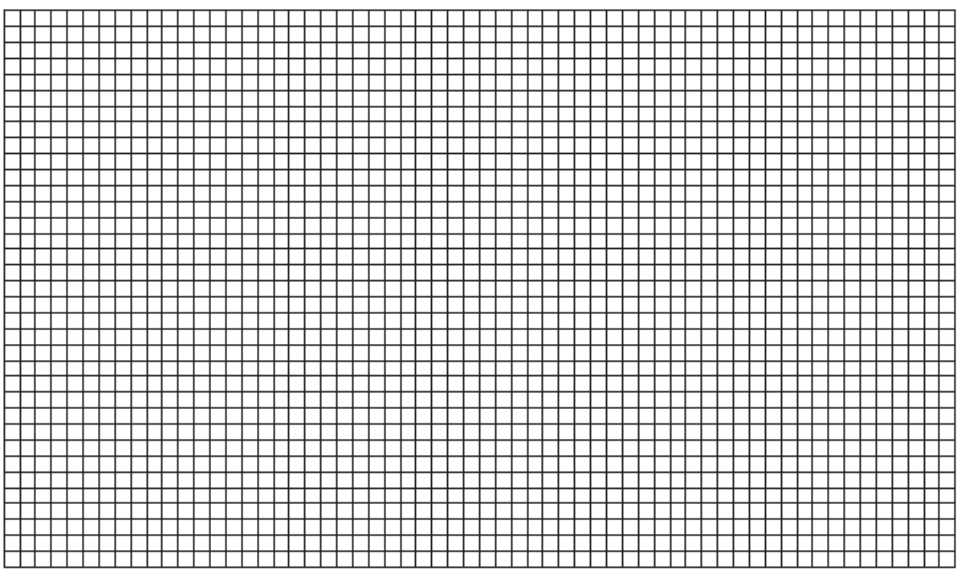
| feeding level | number of organisms | width of the bar in the pyramid of numbers / cm |
|---|---|---|
| producer | 4 | 0.4 |
| primary consumer | 100 | 10.0 |
| secondary consumer | 26 | |
| tertiary consumer | 8 | 0.8 |

**(i)** Complete Table 4.1 by calculating the width of the bar for the secondary consumer feeding level.

..... cm [1]

**(ii)** Using the information in Table 4.1 and your answer to **4(b)(i)**, draw a pyramid of numbers on the grid. Each small square on the grid is 0.2 cm wide.

Label each bar with the feeding level.



[4]



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**(c)** Deforestation is a cause of habitat loss for many organisms.

List **three** other undesirable effects of deforestation.

1 .....

2 .....

3 .....

[3]



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**3.** June/2022/Paper_ 33/No.4(a_ c)

Sewage treatment reduces water pollution.

**(a)** **(i)** State the names of **two** of the stages of sewage treatment.

1 .....

2 .....

[2]

**(ii)** Raw sewage is a major source of water pollution.

State the name of **one other** source of water pollution.

..... [1]

**(b)** Urea is found in sewage. Urea is made in the human body and excreted in urine.

**(i)** State the name of the biological molecules that are broken down to make urea.

..... [1]

**(ii)** State the name of the organ that produces urea.

..... [1]

**(c)** Raw sewage can be produced by intensive livestock farming.

State **two other** negative impacts of intensive livestock farming.

1 .....

.....

2 .....

.....

[2]



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**4.** June/2022/Paper_ 41/No.4(a_ b)

Researchers investigated the effect of adding cattle manure (cattle faeces) to fields where snap bean plants, *Phaseolus vulgaris*, were grown. Cattle manure contains some protein.

**(a)** Explain how protein in the cattle manure is converted to the type of ions that plants can absorb.

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..... [5]

**(b)** Snap bean plants are legumes which have root nodules that contain nitrogen-fixing bacteria.

Fig. 4.1 shows some root nodules.

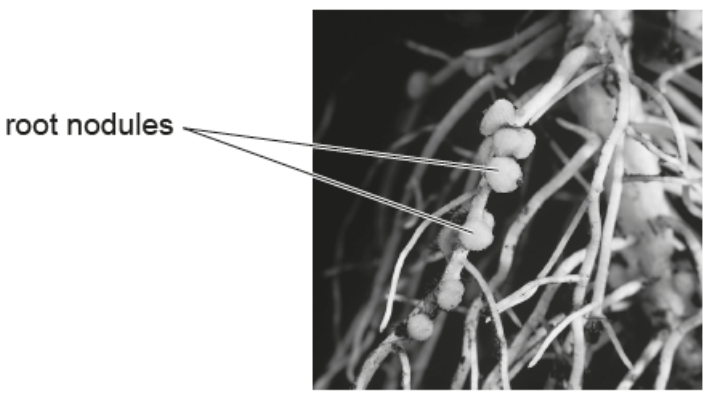



**Fig. 4.1**



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(i) Suggest the advantage to farmers of having snap bean plants that have a large number of root nodules.

.....

.....

..... [1]



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**(ii)** The researchers investigated the effect of adding cattle manure to fields of snap bean plants.

- Field 1 was treated with a small quantity of cattle manure.
- Field 2 was treated with a medium quantity of cattle manure.
- Field 3 was treated with a large quantity of cattle manure.
- Field 4 was not treated with any cattle manure.

The researchers counted the number of root nodules on samples of plants from each field when the snap beans were harvested.

The results of the investigation are shown in Fig. 4.2.

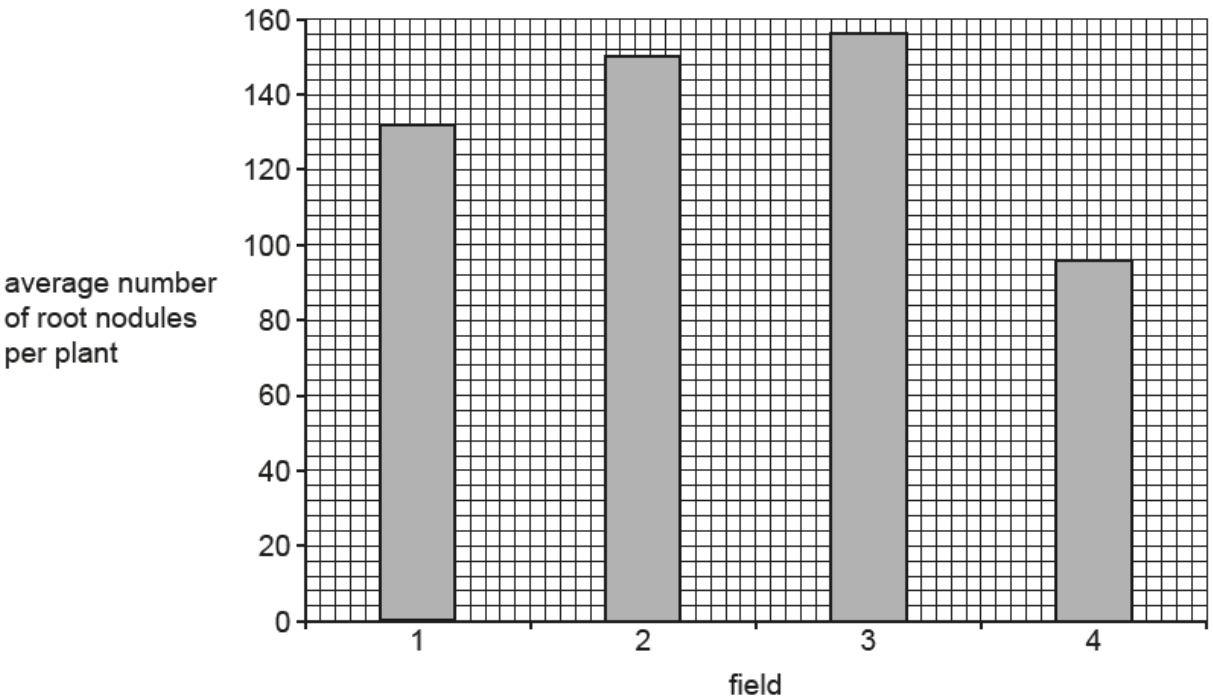



**Fig. 4.2**

Calculate the percentage increase in the average number of root nodules per plant when snap bean plants were grown with a large quantity of cattle manure (field 3) compared with no cattle manure (field 4).

Give your answer to **two** significant figures.

Space for working.

.....%

[3]

**(iii)** When large quantities of manure are put on fields it can lead to eutrophication of streams and rivers. This can lead to the death of fish.

Describe how eutrophication of streams and rivers can lead to the death of fish.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]



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**5.** June/2022/Paper_ 41/No.5(b_ d)

**(b)** Explain the undesirable effects of deforestation on habitats that are on mountains, such as Mount Mulanje.

.....

.....

.....

.....

.....

.....

..... [3]

**(c)** Scientists in Malawi are working to prevent the extinction of the Mulanje cedar tree in its natural habitat.

Explain the benefits to other organisms on Mount Mulanje of conserving the Mulanje cedar tree in its natural habitat.

.....

.....

.....

.....

..... [2]

**(d)** The seeds of many endangered tree species are kept in seed banks.

Suggest why it is important to collect seeds from many individual trees of each species rather than just one tree.

.....

.....

.....

.....

..... [2]



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**6.** June/2022/Paper_ 43/No.3(a_ d)

Acid rain has destroyed many forests including the forest shown in Fig. 3.1.



**Fig. 3.1**

**(a)** Describe how acid rain destroys forests.

.....

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.....

..... [3]



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**(b)** Explain the negative consequences to the environment of destroying forests.

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..... [4]

**(c)** Acid rain can also damage aquatic organisms such as the amphibian shown in Fig. 3.2.



**Fig. 3.2**

Suggest why amphibians are vulnerable to pollutants such as acid rain.

.....

.....

.....

.....

..... [2]



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**(d)** Many countries have strict laws to prevent acid rain.

Describe how countries have reduced acid rain.

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.....

..... [3]



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# Human influences on ecosystems – 2021 IGCSE 0610

**1.** Nov/2021/Paper_11/No.40

What is an effect of an increase in the use of insecticides?

**A** decreased competition between crop plants and weeds

**B** decreased numbers of extinctions

**C** decreased numbers of pollinators

**D** decreased use of fertilisers

**2.** Nov/2021/Paper_13/No.37

Which combination of factors would cause the greatest reduction in the population growth of an animal species?

| | disease | food source | predators |
|---|---|---|---|
| **A** | decrease | decrease | decrease |
| **B** | increase | decrease | increase |
| **C** | decrease | increase | decrease |
| **D** | increase | increase | increase |

**3.** Nov/2021/Paper_13/No.40

What is meant by a sustainable resource?

**A** a resource that is produced by non-intensive farming and is rarely used

**B** a resource that is removed from a habitat without changing the environment

**C** a resource that does not pollute the environment

**D** a resource that is produced as rapidly as it is removed from the environment

**4.** Nov/2021/Paper_21/No.39

What is an effect of an increase in the use of insecticides?

**A** decreased competition between crop plants and weeds

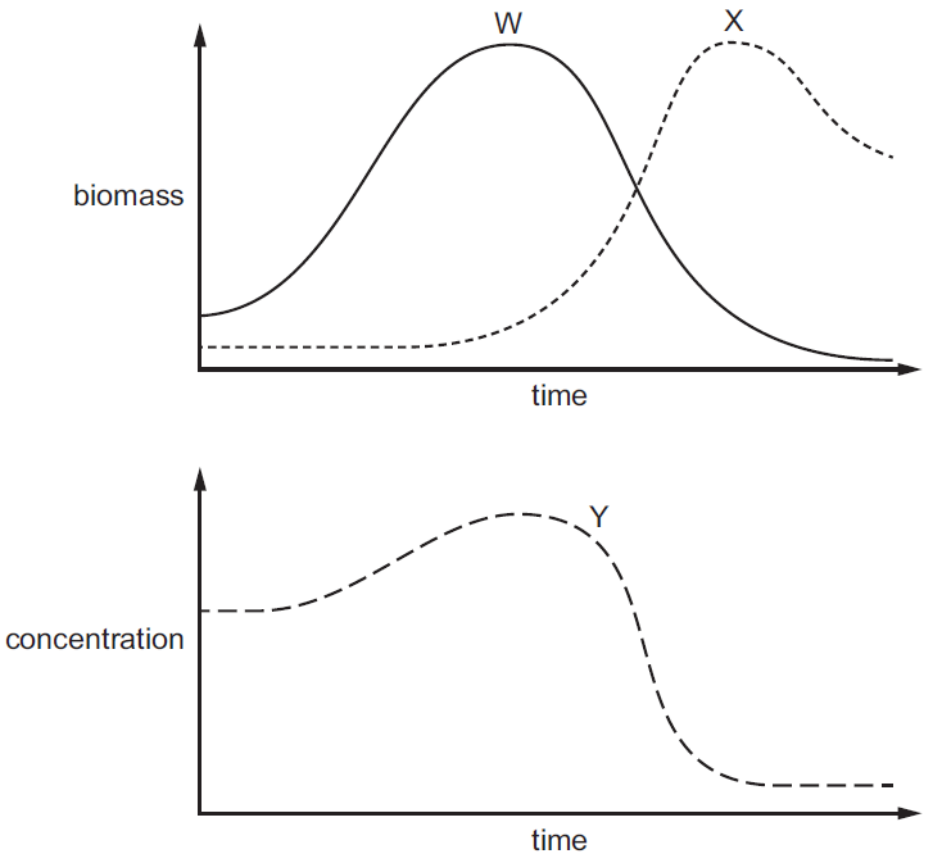
**B** decreased numbers of extinctions

**C** decreased numbers of pollinators

**D** decreased use of fertilisers

**5.** Nov/2021/Paper_21/No.40

The graphs show changes that occur in a lake during the process of eutrophication.




What are the labels for W, X and Y?

| | W | X | Y |
|---|---|---|---|
| **A** | decomposers | producers | oxygen |
| **B** | decomposers | producers | sulfur dioxide |
| **C** | producers | decomposers | oxygen |
| **D** | producers | decomposers | sulfur dioxide |



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**6.** Nov/2021/Paper_22/No.40

If the nitrate concentration in a lake increases, fish may die due to the events listed.

1 increased aerobic respiration by decomposers

2 increased decomposition of dead producers

3 increased growth of producers

4 reduction in dissolved oxygen

Which sequence of events would lead to the death of the fish?

**A** 1 → 3 → 2 → 4

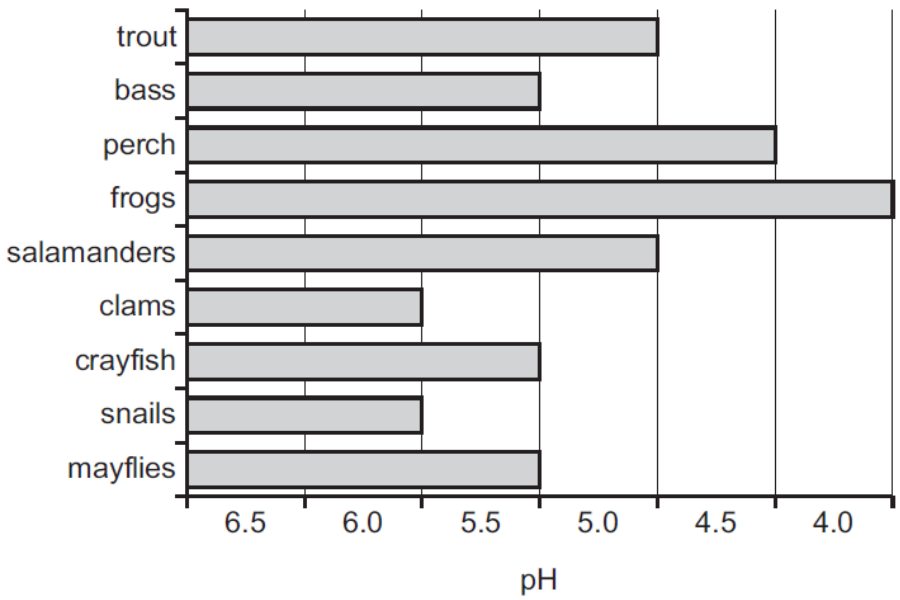
**B** 2 → 1 → 4 → 3

**C** 3 → 2 → 1 → 4

**D** 3 → 4 → 1 → 2

**7.** Nov/2021/Paper_23/No.39

The bar chart shows the tolerance of some river organisms to different levels of pH.




Which organisms would be most affected if the pH of a river decreased from pH 6.0 to pH 5.5?

**A** crayfish and mayflies

**B** frogs and perch

**C** snails and clams

**D** trout and salamanders



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**8.** Nov/2021/Paper_23/No.40

What is meant by a sustainable resource?

**A** a resource that is produced by non-intensive farming and is rarely used

**B** a resource that is removed from a habitat without changing the environment

**C** a resource that does not pollute the environment

**D** a resource that is produced as rapidly as it is removed from the environment

Many crop plants are grown as monocultures.

Fig. 6.1 shows the destruction of a monoculture of maize as a result of drought.



**Fig. 6.1**

**(a)** Describe the negative impacts to an ecosystem of large-scale monocultures, such as the one shown in Fig. 6.1.

.....

.....

.....

.....

.....

.....

..... [3]



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**(b)** The fruits of maize are produced on structures called cobs. Each cob has many fruits.

Fig. 6.2 shows how the maize cobs have changed over thousands of years as a result of selective breeding.

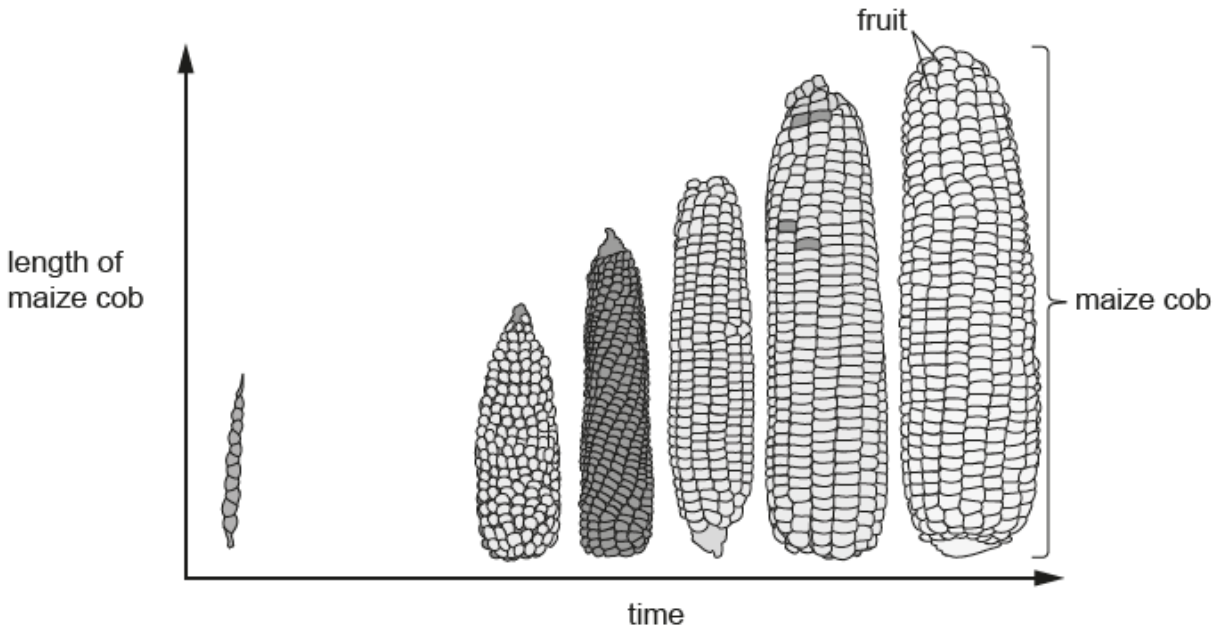



**Fig. 6.2**

State **two** desirable features, visible in Fig. 6.2, that have been selected from the more ancient varieties of maize.

1 .....

2 .....

[2]



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**(c)** The process of selective breeding involves a series of steps, as shown in Fig. 6.3.

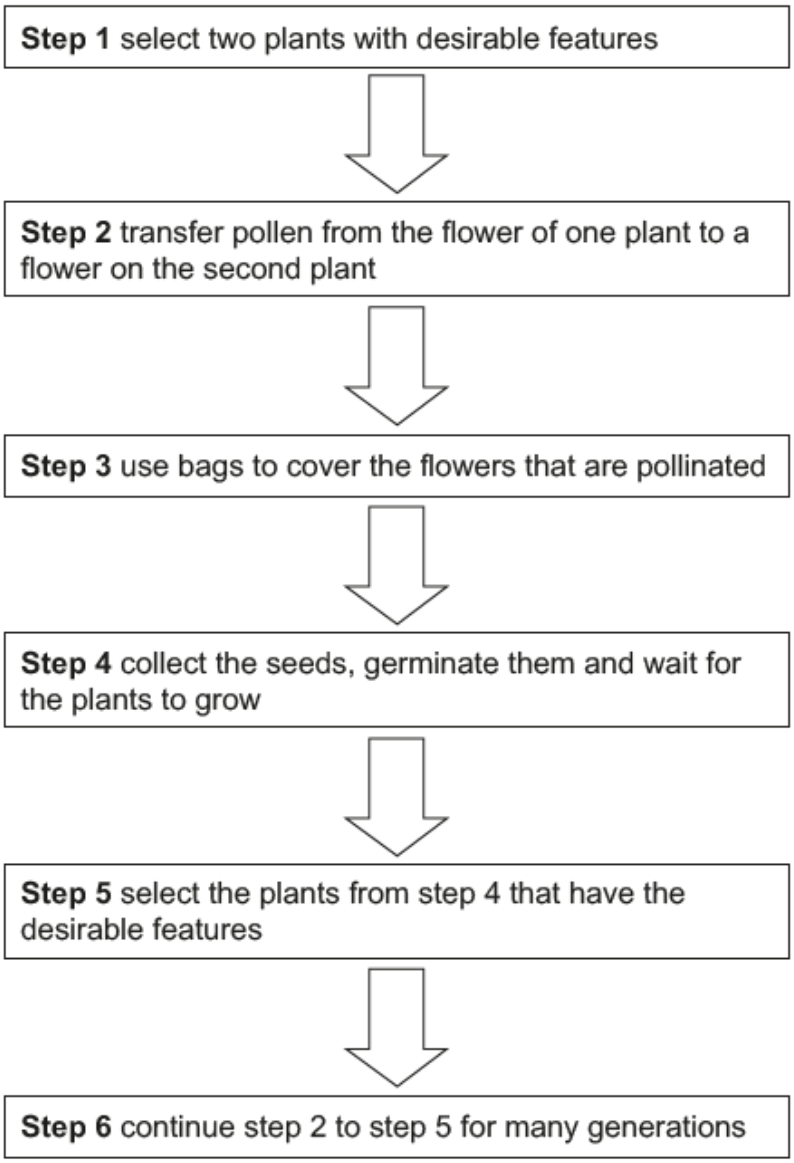



**Fig. 6.3**

**(i)** Explain why the flowers are covered with bags in step 3.

.....

.....

..... [1]



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**(iii)** Explain why some of the plants in step 5 may show features **not** visible in the parent plants.

.....

.....

..... [1]

**(iv)** Suggest why selective breeding should continue for many generations (step 6).

.....

.....

.....

.....

..... [2]

**(v)** State how new features, which did **not** exist in ancient varieties of a crop plant, could appear.

.....

.....

..... [1]

[Total: 12]



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**10.** Nov/2021/Paper_43/No.5

**(b)** Fig. 5.2 shows the location of a chemical factory near a river.

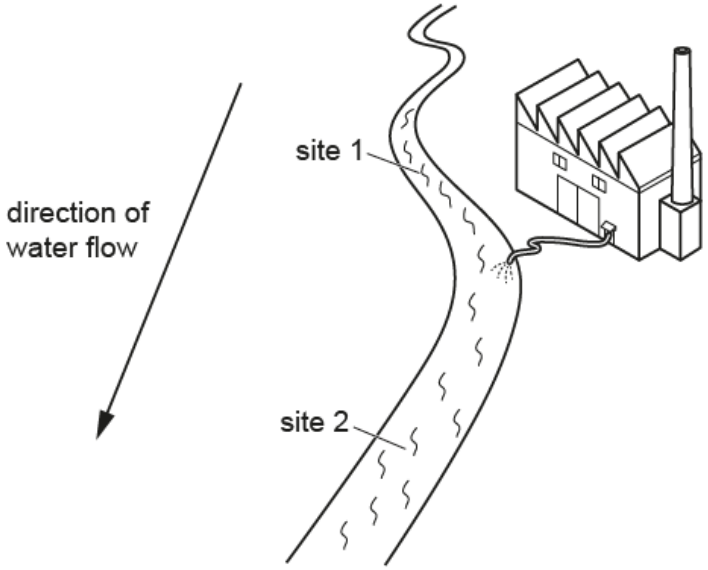



**Fig. 5.2**

Fig. 5.3 shows the sex ratio of the fish, *Catostomus commersonii*, in the river at site 1 and site 2. Intersex fish have both female and male reproductive organs.

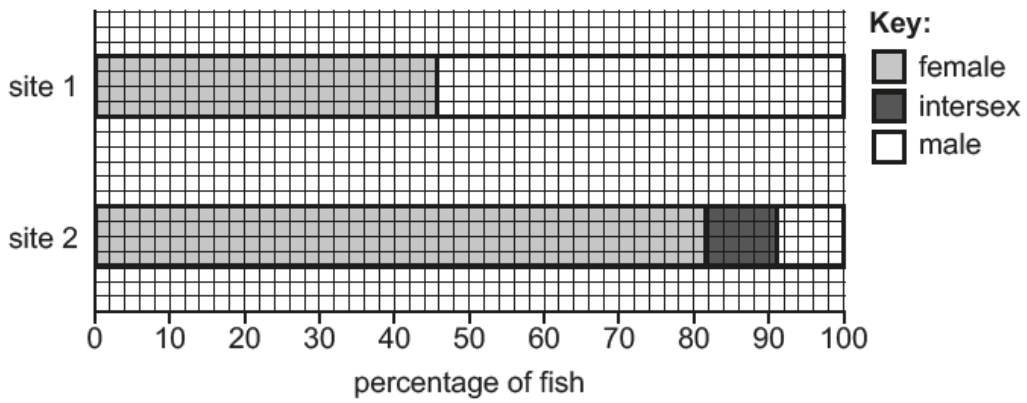



**Fig. 5.3**

State **and** explain what type of chemical the factory could be releasing into the river that would cause the effects shown in Fig. 5.3.

type of chemical .....



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explanation .....

.....

.....

[2]

**(c)** State how sex is inherited in humans.

..... [1]

[Total: 9]



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# Human influences on ecosystems – 2021 IGCSE 0610

**1.** March/2021/Paper_12/No.35

What is the principal source of energy input into food chains?

**A** glucose

**B** heat

**C** soil

**D** sunlight

**2.** March/2021/Paper_12/No.36

What would be the effect of cutting down forests, on the carbon dioxide concentration in the atmosphere?

**A** Carbon dioxide concentration would fall because of less photosynthesis.

**B** Carbon dioxide concentration would fall because of more photosynthesis.

**C** Carbon dioxide concentration would rise because of less photosynthesis.

**D** Carbon dioxide concentration would rise because of more photosynthesis.

**3.** March/2021/Paper_12/No.37

What is an example of a population?

**A** all the arthropods in a pond

**B** all the chital deer found in a forest

**C** all the lions that lived from 1950–2000

**D** all the flowering plants in a wood

**4.** March/2021/Paper_12/No.38

During the extraction of apple juice, ripe apples are crushed and the enzyme pectinase is added.

Which observation shows that pectinase has been used to produce the apple juice?

| | volume of juice obtained / $dm^3$ | appearance of the juice |
|---|---|---|
| **A** | 0.6 | cloudy |
| **B** | 1.2 | cloudy |
| **C** | 0.4 | clear |
| **D** | 2.8 | clear |



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**5.** March/2021/Paper_12/No.40

During the treatment of sewage, what is removed by screening?

**A** bacteria

**B** fats and grease

**C** large plastics

**D** urine

**6.** March/2021/Paper_22/No.39

When nitrates enter a lake they cause rapid growth of algae on the surface of the water. This causes the following changes in the lake:

1 The concentration of dissolved oxygen in the water decreases.

2 Fish and other aquatic animals die.

3 Aerobic respiration in decomposers increases.

4 Producers die and decomposition increases.

In which order do these changes occur?

**A** $1 \rightarrow 2 \rightarrow 4 \rightarrow 3$

**B** $3 \rightarrow 1 \rightarrow 2 \rightarrow 4$

**C** $4 \rightarrow 2 \rightarrow 3 \rightarrow 1$

**D** $4 \rightarrow 3 \rightarrow 1 \rightarrow 2$

**7.** June/2021/Paper_11/No.40

Which factors are believed to have contributed to the rise in sea levels?

**A** pollution of the air by carbon dioxide only

**B** pollution of the air by carbon dioxide and methane

**C** pollution of the sea by plastics only

**D** pollution of the sea by insecticides and nuclear fall-out

**8.** June/2021/Paper_12/No.40

An area of forest was destroyed by a forest fire. Eventually the forest regrew.

What is likely to happen to the amount of soil erosion and flooding when the forest has regrown?

**A** Soil erosion increases and flooding increases.

**B** Soil erosion decreases and flooding decreases.

**C** Soil erosion increases and flooding decreases.

**D** Soil erosion decreases and flooding increases.

**9.** June/2021/Paper_13/No.37

Human activities are changing the carbon dioxide concentration in the atmosphere.

Which activities will increase the carbon dioxide concentration in the atmosphere?

1 burning fossil fuels

2 burning cut-down trees

3 fossilisation of cut-down trees

4 planting replacement trees

**A** 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

**10.** June/2021/Paper_13/No.40

What happens when deforestation takes place?

**A** The number of habitats is increased.

**B** The number of species becoming extinct is increased.

**C** The possibility of flooding is decreased.

**D** The volume of soil present is increased.

**11.** June/2021/Paper_21/No.40

Which hormones can cause the feminisation of male fish?

**A** adrenaline and progesterone

**B** adrenaline and testosterone

**C** oestrogen and progesterone

**D** oestrogen and testosterone

**12.** June/2021/Paper_22/No.40

The process of eutrophication begins with the increased availability of nitrate ions and other ions in water.

The processes involved in eutrophication are listed.

1 increased aerobic respiration by decomposers

2 increased death of producers due to lack of light

3 rapid growth of producers

4 oxygen concentration in the water decreases and more organisms die

What is the correct sequence?

**A** $3 \rightarrow 2 \rightarrow 1 \rightarrow 4$

**B** $3 \rightarrow 4 \rightarrow 2 \rightarrow 1$

**C** $4 \rightarrow 1 \rightarrow 2 \rightarrow 3$

**D** $4 \rightarrow 1 \rightarrow 3 \rightarrow 2$

**13.** June/2021/Paper_23/No.40

**14.** June2021/Paper_31/No.7

**(a)** Modern technology has improved food production.

Table 7.1 shows some of the ways that food production has been improved.

Complete Table 7.1 by writing an example for each description.

**Table 7.1**

| example of technology | description of how it has improved food production |
|---|---|
| | used to farm larger areas of land |
| | used to improve growth in plants by providing nutrients |
| | used to improve yield by removing animal pests |
| | used to remove competition by weeds |

[4]

**(b)** Intensive livestock production is used to improve food production.

Describe the negative effects of intensive livestock production.

.....

.....

.....

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.....

.....

..... [3]



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**(c)** Selective breeding can be used to improve the yield of meat from livestock.

Sentences **A** to **E** in Table 7.2 describe the selective breeding of chickens to improve meat quantity.

The sentences are **not** in the correct order.

**Table 7.2**

| | |
|---|---|
| Breed the chickens together. | **A** |
| Observe the chickens to identify those that will yield the most meat. | **B** |
| Observe the offspring and select the offspring that will yield the most meat. | **C** |
| Repeat the process over many generations. | **D** |
| Select one male and one female chicken. | **E** |

Put the letters from Table 7.2 into the correct order.

One has been done for you.

| | | | | |
|---|---|---|---|---|
| | | **A** | | |

[2]

**(d)** Lack of food can affect the population size of animals in ecosystems.

State **two other** factors that could decrease population size.

1 .....

2 .....

[2]

[Total: 11]



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**15.** June2021/Paper_33/No.8

Fig. 8.1 shows an area of land where the trees have been cut down.



**Fig. 8.1**

**(a) (i)** List **three** undesirable effects of deforestation.

1 .....

2 .....

3 .....

[3]

**(ii)** Deforested land may be used for growing monocultures of crop plants.

Describe the negative impacts to an ecosystem of large-scale monocultures of crop plants.

.....

.....

.....

.....

..... [2]



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**(b)** Replanting trees in deforested areas can help to conserve endangered species.

Describe **two** other ways that endangered species can be conserved.

1 .....

.....

.....

2 .....

.....

.....

[2]

[Total: 7]

**16.** June2021/Paper_41/No.2

Large quantities of plastic waste are polluting the oceans.

**(a)** A survey published in March 2018 showed the increase in plastic waste in the Pacific Ocean. One area of the Pacific Ocean is known as the Great Pacific Garbage Patch (GPGP).

Data were collected from areas inside and outside the GPGP between 1965 and 2015 to estimate the quantity of plastic waste.

The results are shown in Fig. 2.1.



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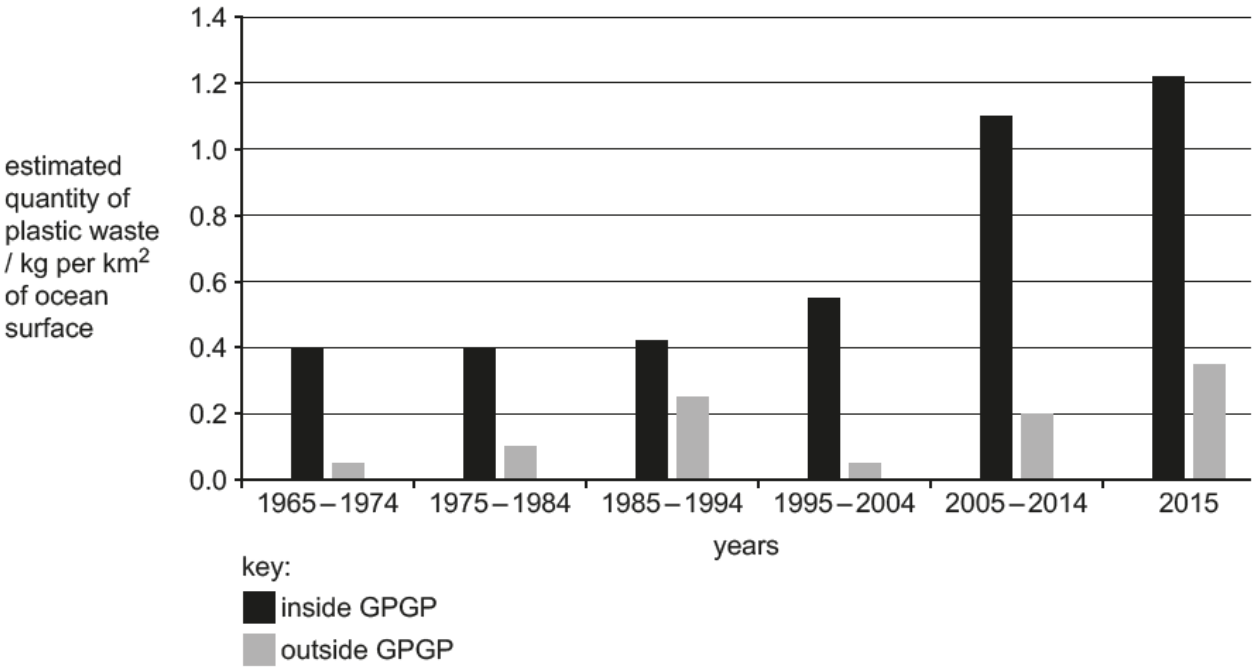



**Fig. 2.1**

Describe the results of the survey shown in Fig. 2.1.

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.....

..... [4]



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**(b)** The green turtle, *Chelonia mydas*, is a species of marine animal that is harmed by plastic waste.

Fig. 2.2 shows a green turtle swimming past a plastic bag in the Pacific Ocean.



**Fig. 2.2**

**(i)** Turtles are classified as reptiles.

State **one** feature shown by all reptiles that is **not** found in amphibians.

..... [1]

**(ii)** Outline the dangers of non-biodegradable plastic waste to marine animals, such as green turtles.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]



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**(iii)** Suggest ways to reduce the quantity of plastic waste.

.....

.....

.....

.....

..... [2]

[Total: 11]



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**17.** June2021/Paper_42/No.4

**(a)** Climate change is one reason why a plant species could become endangered.

**(i)** State **other** reasons why a plant species could become endangered.

.....

.....

.....

.....

.....

.....

..... [3]

**(ii)** Describe how human actions are causing climate change.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]



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**(b)** Seed banks are used to conserve endangered plant species.

Fig. 4.1 shows some of the steps involved in managing a seed bank.




**Fig. 4.1**



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**(i)** Explain why seeds from one species are collected from many populations to store in a seed bank.

.....

.....

.....

.....

.....

.....

..... [3]

**(ii)** Seeds are X-rayed before they are stored to check that they contain an embryo.

State **one** possible consequence of using ionising radiation on seeds.

.....

..... [1]

**(iii)** Seeds stored at low temperatures have very low respiration rates.

Explain why.

.....

.....

.....

.....

..... [2]



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**(c)** One purpose of seed banks is to reintroduce plant species into their natural environment.

A survey was done to find out why some reintroduction programmes are not successful.

Fig. 4.2 shows the results of the survey.

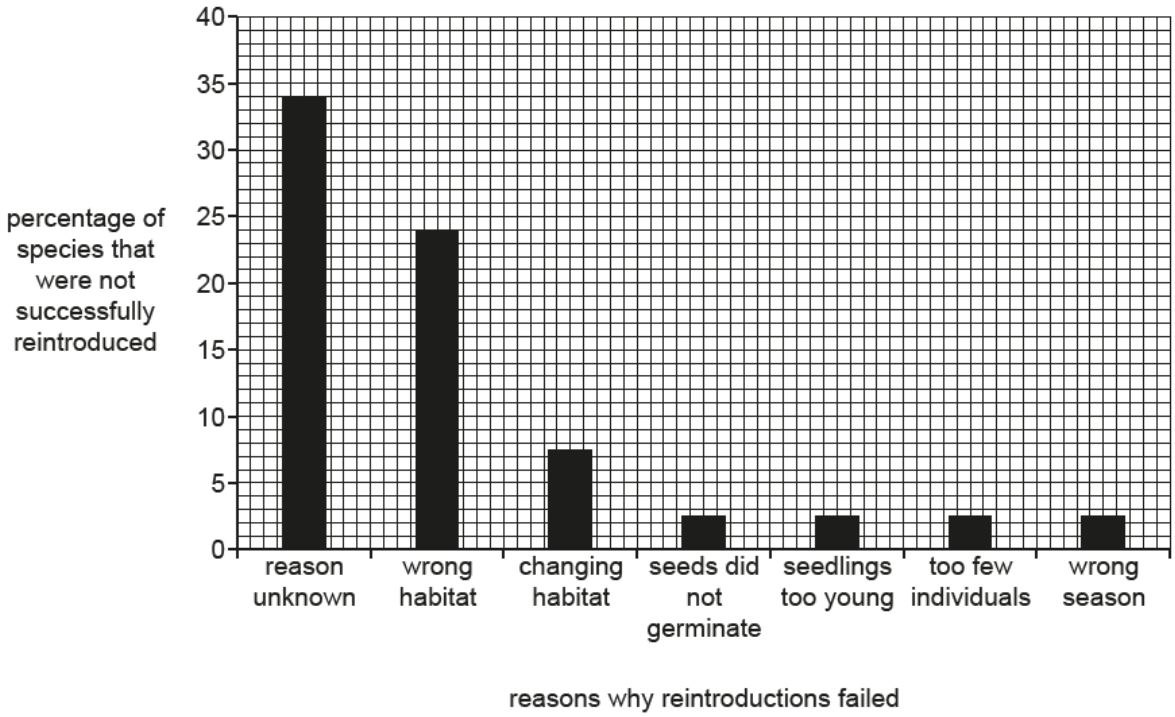



**Fig. 4.2**



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**(i)** Some of the seeds in the reintroduction programmes did not germinate.

State the conditions that are necessary for seeds to germinate.

.....

.....

.....

..... [3]

**(ii)** Some reintroduction programmes failed because the seedlings were too young. Young seedlings only have a few small roots.

Explain why it would be important to reintroduce plants with many large roots.

.....

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.....

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..... [4]

**(iii)** The low number of individuals also caused some reintroduction programmes to fail.

State the name of the phase in a population growth curve where the number of individuals is very low.

..... [1]

[Total: 21]



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**18.** June2021/Paper_43/No.4

There are three species of rhinoceros in Asia. Fig. 4.1 shows an Indian rhinoceros, *Rhinoceros unicornis*, in a national park being observed by tourists who are riding on an elephant.



**Fig. 4.1**

The International Union for Conservation of Nature (IUCN) collects data on animal species and places them into categories based on estimated numbers.

Table 4.1 summarises the conservation status of the three species of rhinoceros, as available in 2020.

**Table 4.1**

| species | location | approximate number in the wild | approximate number in captivity | IUCN category |
|---|---|---|---|---|
| Indian rhinoceros *Rhinoceros unicornis* | national parks in south Nepal and north India | 3588 | 160 | vulnerable |
| Javan rhinoceros *Rhinoceros sondaicus* | one national park in Java, Indonesia | 72 | 0 | critically endangered |
| Sumatran rhinoceros *Dicerorhinus sumatrensis* | national parks in Sumatra and Borneo in Indonesia | <80 | 7 | critically endangered |



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**(a)** Outline the reasons why large mammals, such as some species of rhinoceros, are endangered.

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.....

..... [5]

**(b)** In 2013, Cincinnati Zoo in the USA announced that they were hoping to breed together rhinoceros that were brother and sister as part of their captive breeding programme.

**(i)** Discuss the problems that using such closely related animals might have for the conservation of rhinoceros.

.....

.....

.....

.....

.....

..... [2]



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**(ii)** Captive breeding programmes often use artificial insemination.

Outline the process of artificial insemination.

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.....

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.....

.....

..... [3]

[Total: 10]



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# Human influences on ecosystems – 2020 IGCSE 0610

**1.** Nov/2020/Paper_11/No.39

Yeast carries out anaerobic respiration, making carbon dioxide and ethanol as end products.

Which end products can be used to make biofuel and bread?

| | biofuel | bread |
|---|---|---|
| **A** | carbon dioxide | carbon dioxide |
| **B** | carbon dioxide | ethanol |
| **C** | ethanol | carbon dioxide |
| **D** | ethanol | ethanol |

**2.** Nov/2020/Paper_11/No.40

What is the effect of replacing tropical rainforest with plantations of oil palm trees, which are grown as crop plants?

**A** increased carbon dioxide in the atmosphere

**B** increased flooding

**C** reduced number of species

**D** reduced pollution

**3.** Nov/2020/Paper_12/No.38

What can be used to reduce competition between crop plants and weeds?

**A** fertilisers

**B** herbicides

**C** insecticides

**D** pollinators

**4.** Nov/2020/Paper_12/No.39

Large areas of forest are cut down in order to clear the land for other uses.

If the land is **not** replanted with trees or crops, what effect does this have on the atmosphere?

**A** Carbon dioxide remains the same.

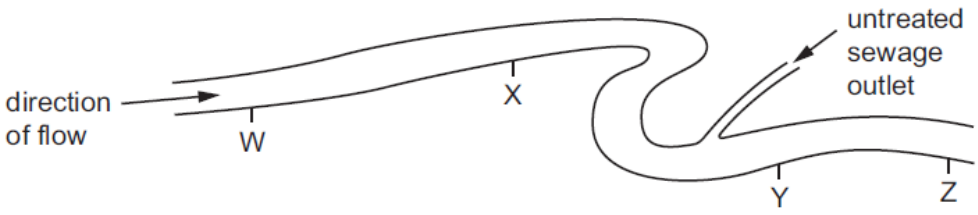
**B** Carbon dioxide increases.

**C** Oxygen increases.

**D** Water vapour increases.

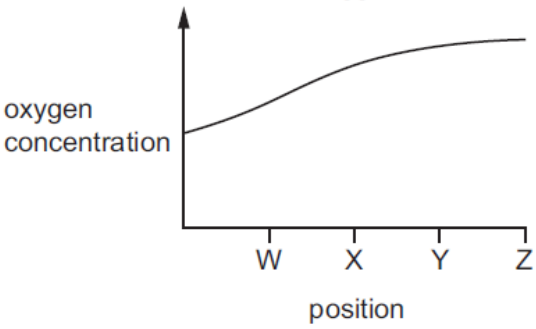
**5.** Nov/2020/Paper_12/No.40

The diagram shows four positions on a river where water samples were taken.

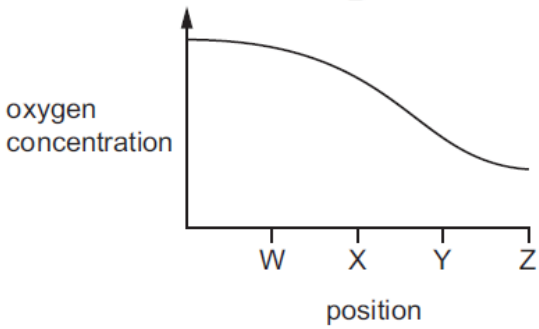



Which graph shows oxygen concentrations in the river?

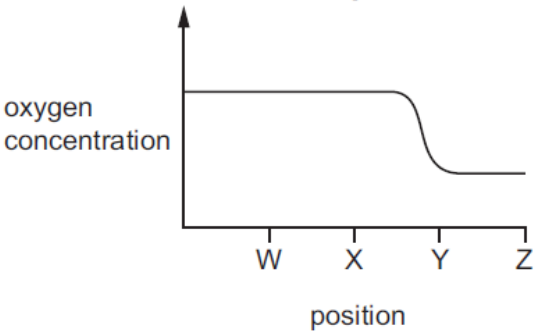
**A**



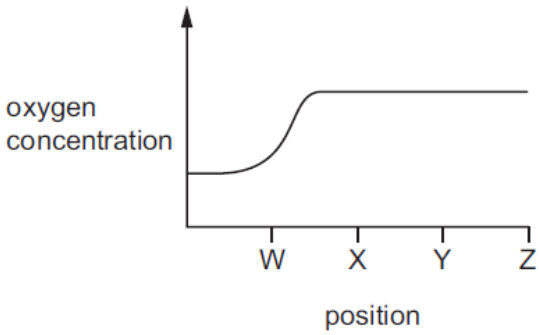

**B**




**C**




**D**





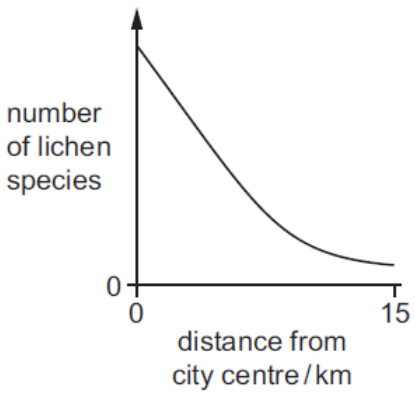

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**6.** Nov/2020/Paper_13/No.39

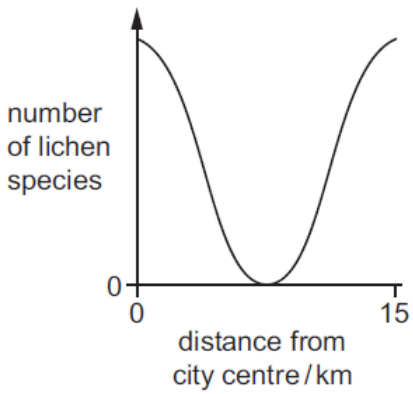
Lichens are organisms that do **not** grow well in polluted air.

Which graph shows the change in the number of lichen species from the centre of a polluted city to the unpolluted countryside 15 km away?

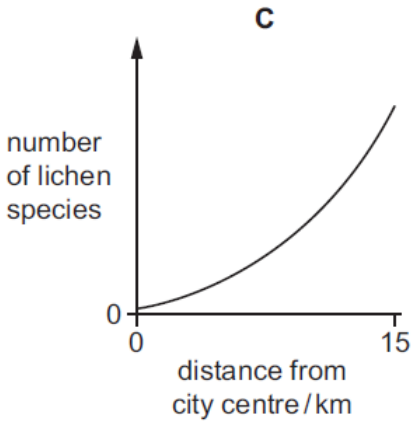
**A**



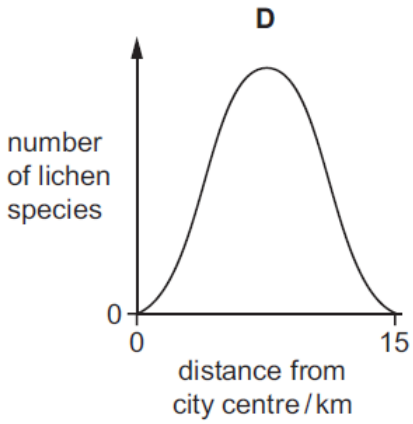

**B**




**C**




**D**






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**7.** Nov/2020/Paper_13/No.40

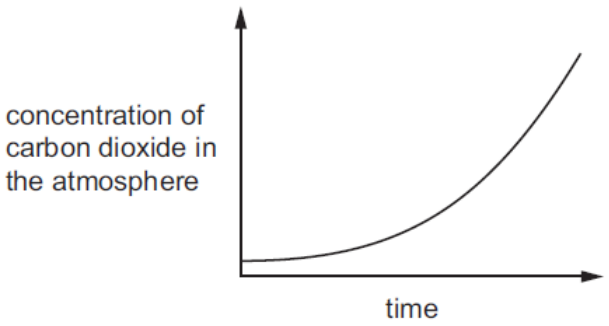
Three human activities are listed.

1 burning fossil fuels

2 deforestation

3 replanting forests

Which activities can cause the change shown in the graph?




**A** 1, 2 and 3 **B** 1 and 2 only **C** 1 only **D** 2 and 3 only

**8.** Nov/2020/Paper_21/No.40

The number of Atlantic bluefin tuna fish found in the Atlantic Ocean has significantly decreased in the last 50 years.

Which method would make the biggest improvement in the conservation of tuna fish stocks?

**A** decreasing the size of holes in fishing nets

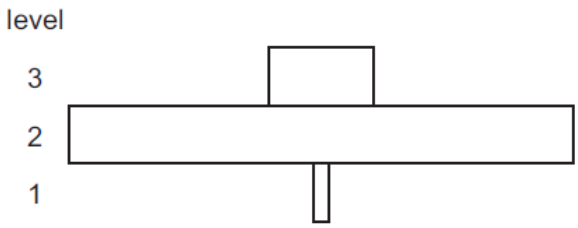
**B** genetic engineering of tuna

**C** introducing fishing quotas

**D** selective breeding of tuna

**9.** Nov/2020/Paper_22/No.35

The diagram shows a pyramid of numbers.




What is the correct description of the trophic levels?

| | trophic level | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| **A** | producers | primary consumers | secondary consumers |
| **B** | producers | secondary consumers | tertiary consumers |
| **C** | secondary consumers | primary consumers | producers |
| **D** | secondary consumers | tertiary consumers | producers |

**10.** Nov/2020/Paper_22/No.36

Bacteria are active in the nitrogen cycle.

Which process in the nitrogen cycle is carried out by nitrifying bacteria?

**A** the conversion of nitrogen gas to ammonia

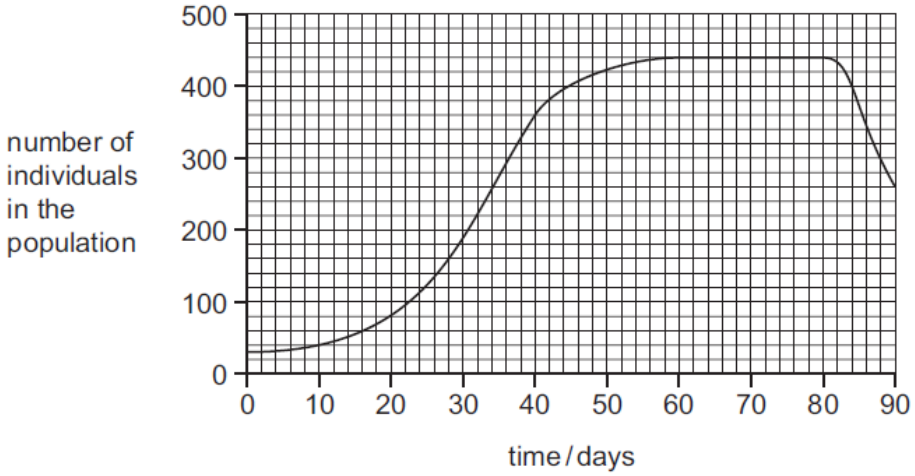
**B** the conversion of nitrogen gas to nitrates

**C** the conversion of ammonia to nitrates

**D** the conversion of nitrates to nitrogen

**11.** Nov/2020/Paper_22/No.37

The diagram shows a population growth curve.




How long does the population remain in the stationary phase?

**A** 8 days

**B** 12 days

**C** 23 days

**D** 48 days

**12.** Nov/2020/Paper_22/No.39

What is an example of sustainable use of resources?

**A** allowing only young fish to be caught

**B** cutting down a forest and not replanting trees

**C** controlling the number of fish caught with quotas

**D** planting deforested areas with one species of crop plant

**13.** Nov/2020/Paper_23/No.39

The table shows some of the processes that occur during eutrophication.

Which row shows the correct increase or decrease of each process?

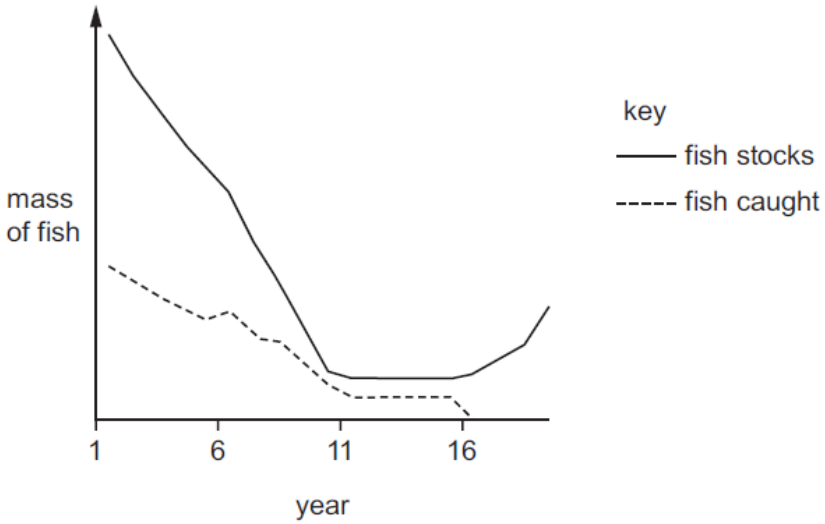
| | nitrate ion availability in the water | light availability in the water | rate of respiration by decomposers | oxygen availability in the water |
|---|---|---|---|---|
| **A** | increases | decreases | decreases | increases |
| **B** | increases | decreases | increases | decreases |
| **C** | decreases | increases | increases | increases |
| **D** | decreases | increases | decreases | decreases |



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**14.** Nov/2020/Paper_23/No.40

The graph shows the effect of fishing on fish stocks over 20 years. In year 11, a fishing quota was introduced followed by a total ban on fishing in year 16.




What effects did these conservation measures have on the fish population?

**A** The fish population became extinct.

**B** The fish population started increasing immediately after the fishing quota was introduced.

**C** The fish population started increasing only after a total ban on fishing was introduced.

**D** There was no effect on the fish population.



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**15.** Nov/2020/Paper_32/No.5

Recycling rates in one country were monitored every ten years.

The percentages of different types of recycled materials were recorded.

Fig. 5.1 shows the results.

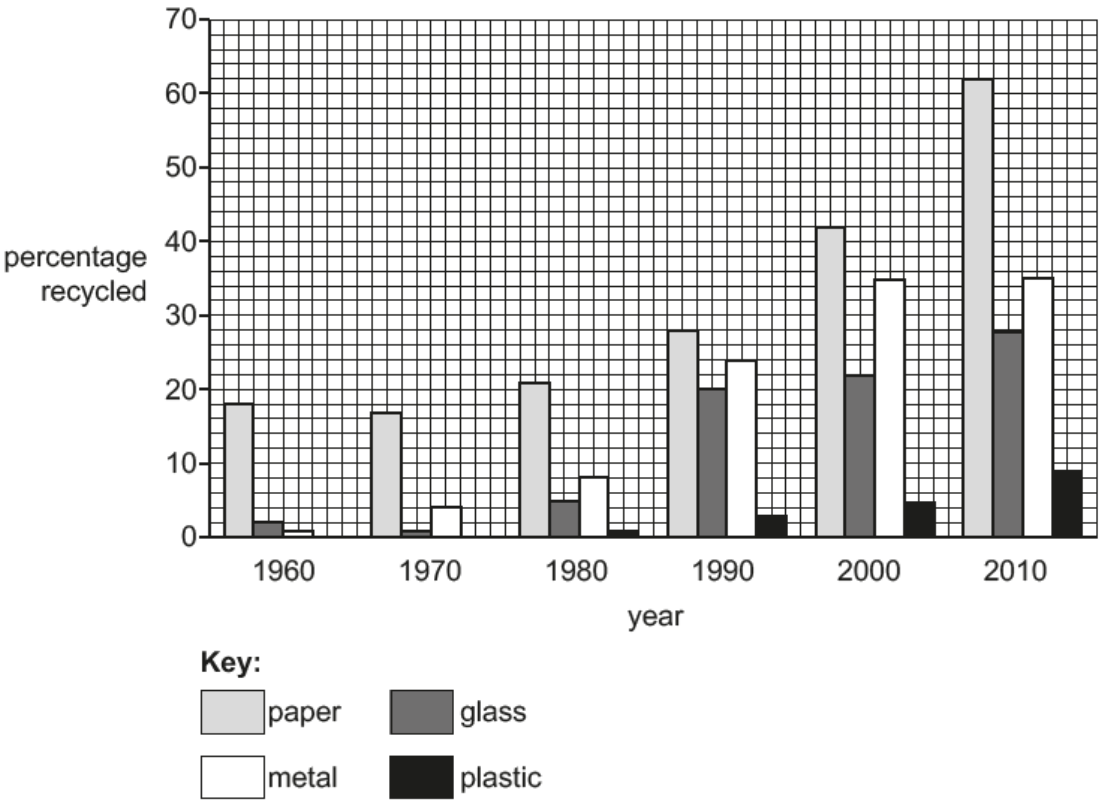



**Fig. 5.1**

**(a)** Complete the sentences using the data shown in Fig. 5.1.

The general trend shows that between 1970 and 2000 the percentage of materials recycled has ..... . The most commonly recycled material is ..... .

In 1970 ..... was **not** recycled.

The percentage of ..... recycled did not change between 2000 and 2010.

[4]



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**(b)** Calculate the increase in the percentage of glass recycled between 1960 and 1990.

..... % [1]

[Total: 5]



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**16.** Nov/2020/Paper_32/No.9

Fig. 9.1 is a photograph of a fish farm. Fish are kept in small cages in the sea and are fed.

This is an example of intensive livestock production.



**Fig. 9.1**

**(a)** Describe the negative impacts of intensive livestock production.

.....

.....

.....

.....

.....

.....

..... [3]



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**(b)** Define the term sustainable resource.

.....

.....

..... [2]

**(c)** Circle **two** examples of sustainable resources from the list.

**coal** **fish stocks** **natural gas** **crude oil** **forests** [1]

[Total: 6]



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**17.** Nov/2020/Paper_32/No.4

**(a)** Complete the sentences about human influences on ecosystems.

Use words from the list.

Each word may be used once, more than once, or not at all.

| | | |
|---|---|---|
| **deforestation** | **fertilisers** | **herbicides** |
| **insecticides** | **livestock** | **monoculture** |
| **pectinases** | **pollinate** | **pollute** |

When one type of crop of the same species is grown on a large scale it is called a

..... .

Chemical ..... add mineral ions to the soil to increase the yield of crops.

Weeds can be killed by ..... .

Crop damage by insects can be reduced by the use of ..... . One disadvantage is that this kills useful insects which ..... flowers.

[5]

**(b)** State the names of **two** greenhouse gases that are produced as a consequence of farming.

1 .....

2 .....

[2]

[Total:7]



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**18.** Nov/2020/Paper_42/No.6

**(a)** Researchers investigated four different insecticides to determine how effective they were at removing three different species of insects, **A**, **B** and **C**, from crop plants.

They tested different concentrations of each insecticide to find the minimum dosage required to remove 95% of each insect population in two hours.

Each insecticide had the same cost per gram.

The results are shown in Table 6.1.

**Table 6.1**

| species of insect | minimum dosage required /mg per $dm^3$ | | | |
|---|---|---|---|---|
| | insecticide **1** | insecticide **2** | insecticide **3** | insecticide **4** |
| **A** | 3 | 51 | 5 | 58 |
| **B** | 31 | 27 | 2 | 75 |
| **C** | 10 | 2 | 3 | 65 |

**(i)** Use the information in Table 6.1 to decide which **one** of the four different insecticides and which dosage would be the best choice for removing insects **A**, **B** and **C** from a field of crop plants.

Explain your choices.

insecticide ..... dosage .....

explanation .....

.....

.....

.....

.....

.....

[3]



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**(ii)** Discuss factors, other than dosage, that should be considered to prevent the insecticide damaging the environment.

.....

.....

.....

.....

.....

.....

..... [3]

**(b) (i)** Describe the advantages to farmers of using insecticides.

.....

.....

.....

.....

..... [2]

**(ii)** Farmers also use other chemicals on their crop plants.

State the names of chemicals, other than insecticides, that are used by farmers on crop plants **and** explain their benefits.

.....

.....

.....

.....

.....

.....

..... [3]



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**(c)** Insecticides are often made from chemicals that occur naturally in plants. Tobacco plants are one example of this.

**(i)** Suggest why having a natural insecticide is an adaptive feature of plants.

.....

.....

..... [1]

**(ii)** Describe why people find it difficult to stop smoking tobacco.

.....

.....

.....

.....

..... [2]

**(iii)** State the names of **two** diseases that can be caused by smoking tobacco.

1 .....

2 .....

[2]

**(iv)** State the name of the component of tobacco that can damage alveoli.

..... [1]

[Total: 17]



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# Human influences on ecosystems – 2020 IGCSE 0610

**1.** March/2020/Paper_12/No.39

Which effect is **most** likely to occur as a result of deforestation?

**A** an increase in the number of species

**B** an increase in soil erosion

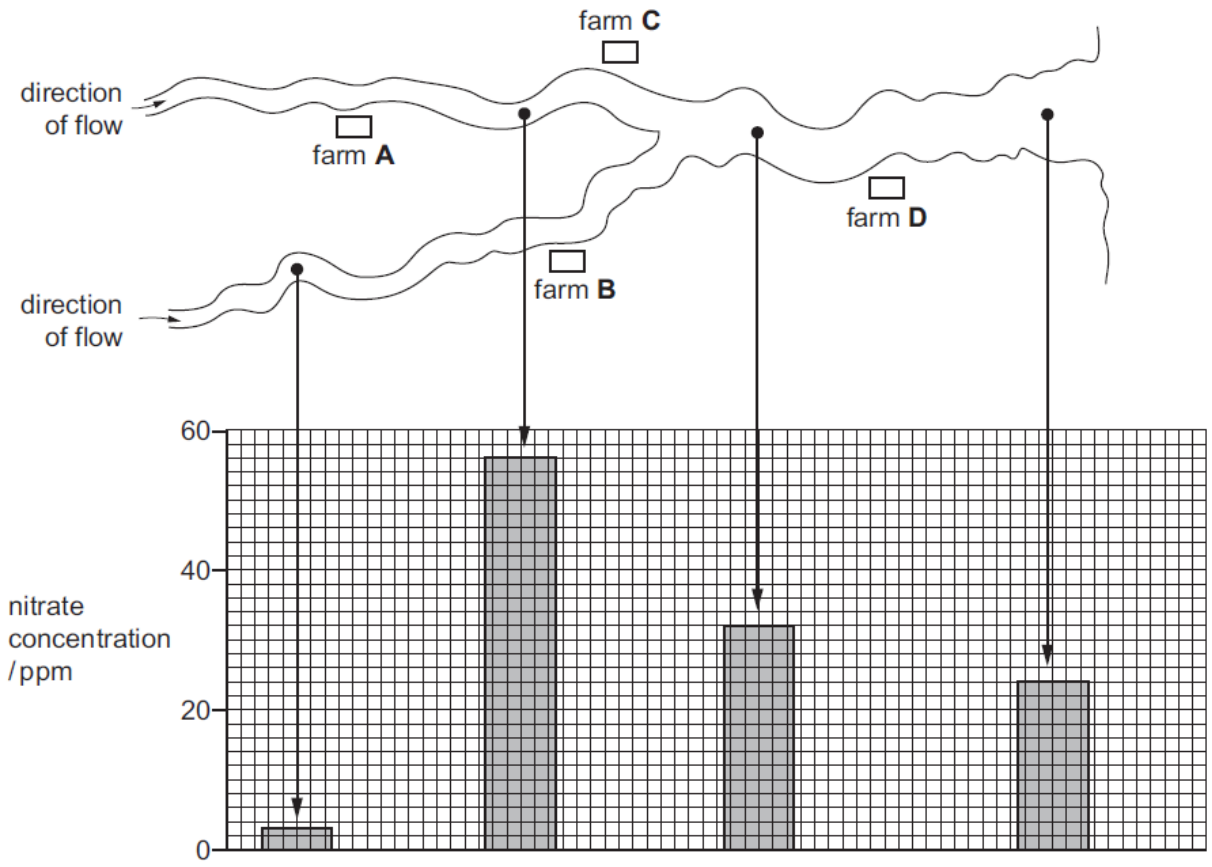
**C** a decrease in the level of carbon dioxide in the atmosphere

**D** a decreased risk of flooding

**2.** March/2020/Paper_12/No.40

The diagram shows the positions of four farms and the concentrations of nitrate at different points in a river.

Which farm is likely to have been using too much fertiliser on its land?



**3.** March/2020/Paper_32/No.8

**4.** March/2020/Paper_42/No.6

**(iii)** Suggest reasons for the trend shown between 1990 and 1995.

.....

.....

.....

.....

.....

.....

..... [3]

**(iv)** Explain how fish stocks can be conserved by restocking.

.....

.....

.....

.....

.....

.....

..... [3]

**(b)** Fish have adaptive features that enable them to live successfully in their environment.

Fig. 6.2 is a photograph of a great white shark, *Carcharodon carcharias*.

Great white sharks are efficient predators and have very good eyesight to see in poor light conditions underwater.



**Fig. 6.2**

**(i)** Describe **two** features, other than eyesight, visible in Fig. 6.2 that suggest that great white sharks are efficient predators.

1 .....

2 .....

[2]

**(ii)** Describe how the ancestors of the great white shark developed adaptive features such as good eyesight.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [5]

[Total: 15]

**5.** June/2020/Paper_11/No.40

Wheat is often grown in large areas as a monoculture.

What is a negative environmental impact of this method of farming?

**A** The variety of species in the area is reduced.

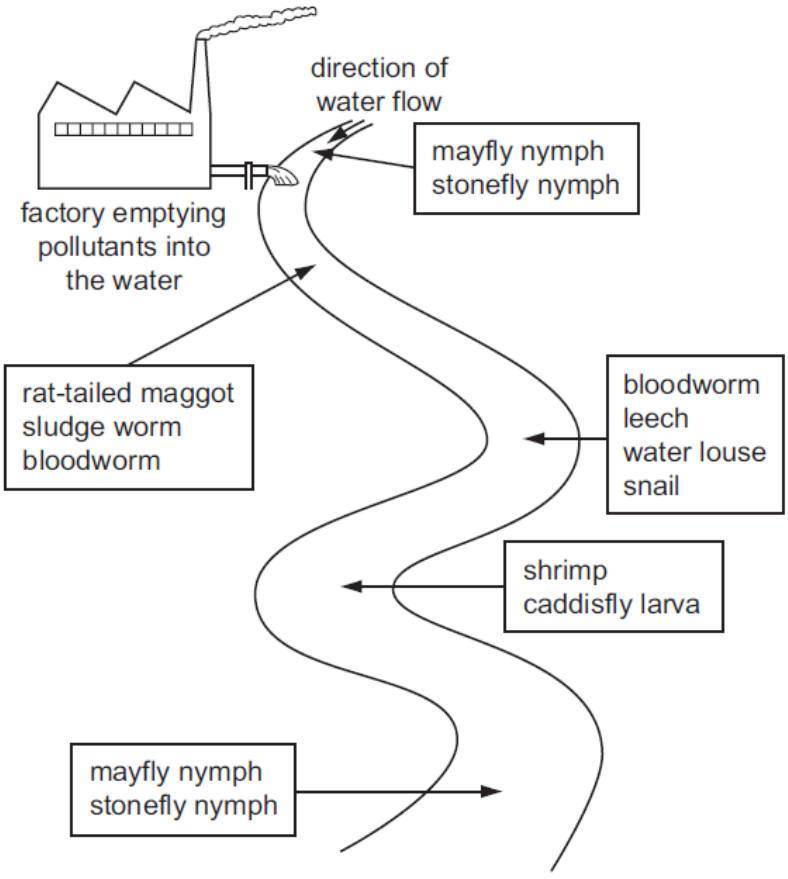
**B** Fewer types of pesticide are needed.

**C** Larger harvests can be produced.

**D** Specialist machinery can be used.

**6.** June/2020/Paper_12/No.39

The diagram shows the results of a survey on the types of animals found along a stretch of river near to a factory.




Which animal lives in the least polluted water?

**A** bloodworm

**B** caddisfly larva

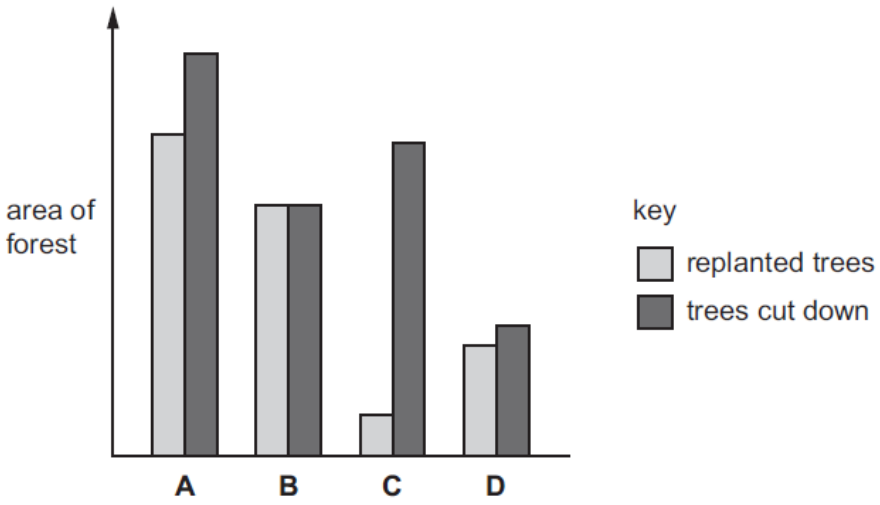
**C** leech

**D** stonefly nymph

**7.** June/2020/Paper_12/No.40

The graph shows four areas of forest that were cut down and then replanted with trees in one part of the world between 1995 and 2015.

Which area of forest was used most sustainably?




**8.** June/2020/Paper_13/No.38

A crop plant has been genetically modified to make it resistant to herbicides.

Which is a possible disadvantage of introducing this new crop plant?

**A** Loss of weeds reduces competition.

**B** Some weeds might become resistant to the herbicide.

**C** The crop plant is unharmed and produces a higher yield.

**D** The new gene will appear in new generations of the crop.

**9.** June/2020/Paper_13/No.39

Chickens are birds that are farmed to produce eggs for human consumption.

A type of chicken has been bred to lay **more** eggs.

Which method would be used to produce this type of chicken?

**A** asexual reproduction

**B** biotechnology

**C** natural selection

**D** selective breeding

**10.** June/2020/Paper_13/No.40

Sewage treatment involves a number of stages. Three of the stages are listed.

1 filter beds with anaerobic microbes to digest sewage

2 screens to trap large objects

3 settlement tanks to let insoluble particles sink

What is the correct order for treating sewage?

**A** $1 \rightarrow 2 \rightarrow 3$ **B** $2 \rightarrow 3 \rightarrow 1$ **C** $3 \rightarrow 2 \rightarrow 1$ **D** $3 \rightarrow 1 \rightarrow 2$

**11.** June/2020/Paper_21/No.40

When a river is polluted by fertiliser, the following processes may occur.

1 increased aerobic respiration of decomposers

2 increased growth of producers

3 decreased oxygen concentration in the water

What is the correct sequence for these processes?

**A** $1 \rightarrow 2 \rightarrow 3$ **B** $1 \rightarrow 3 \rightarrow 2$ **C** $2 \rightarrow 1 \rightarrow 3$ **D** $2 \rightarrow 3 \rightarrow 1$

**12.** June/2020/Paper_22/No.40

When a river is polluted by fertiliser, the following processes may occur.

1 increased aerobic respiration of decomposers

2 increased growth of producers

3 decreased oxygen concentration in the water

What is the correct sequence for these processes?

**A** $1 \rightarrow 2 \rightarrow 3$ **B** $1 \rightarrow 3 \rightarrow 2$ **C** $2 \rightarrow 1 \rightarrow 3$ **D** $2 \rightarrow 3 \rightarrow 1$

**13.** June/2020/Paper_23/No.36

What is defined as 'all of the populations of different species in an ecosystem'?

**A** community

**B** environment

**C** habitat

**D** trophic level

**14.** June/2020/Paper_23/No.39

Chickens are birds that are farmed to produce eggs for human consumption.

A type of chicken has been bred to lay **more** eggs.

Which method would be used to produce this type of chicken?

**A** asexual reproduction

**B** biotechnology

**C** natural selection

**D** selective breeding

**15.** June/2020/Paper_23/No.40

When a river is polluted by fertiliser, the following processes may occur.

1 increased aerobic respiration of decomposers

2 increased growth of producers

3 decreased oxygen concentration in the water

What is the correct sequence for these processes?

**A** $1 \rightarrow 2 \rightarrow 3$ **B** $1 \rightarrow 3 \rightarrow 2$ **C** $2 \rightarrow 1 \rightarrow 3$ **D** $2 \rightarrow 3 \rightarrow 1$

**16.** June/2020/Paper_31/No.7

**(b)** Fig. 7.2 is a graph showing the estimated area of trees that have been removed from tropical forests between 2001 and 2017.

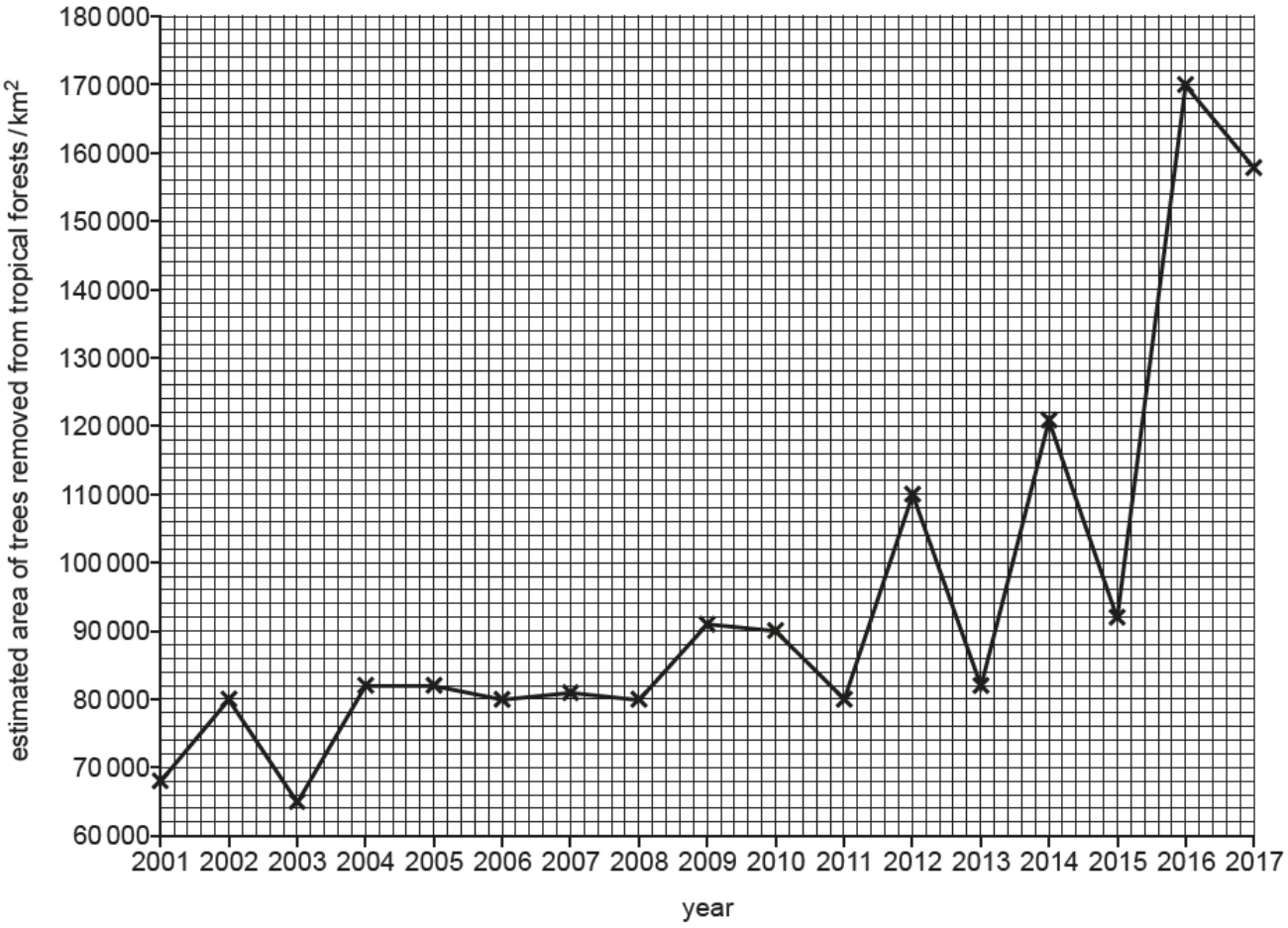



**Fig. 7.2**

**(i)** State the year which had the lowest estimated area of trees removed from tropical forests on Fig. 7.2.

..... [1]

**(ii)** State the area of trees removed in 2012 on Fig. 7.2.

..... $km^2$ [1]

**(iii)** A student made three statements about the data in Fig. 7.2:

**1** The number of trees cut down increases every year.

**2** The number of trees cut down in 2014 was three times more than the number of trees cut down in 2003.

**3** Fewer trees were cut down in 2017 than in 2016.

Complete Table 7.1 by using the data in Fig. 7.2 to decide if each statement is true or false and state the evidence that supports your decision.

**Table 7.1**

| statement number | true or false | evidence from Fig. 7.2 |
|---|---|---|
| **1** | ..... | ..... ..... ..... |
| **2** | ..... | ..... ..... ..... |
| **3** | ..... | ..... ..... ..... |

[3]

**(c)** Fig. 7.3 shows pollution in a marine environment and Fig. 7.4 shows pollution in a land environment.

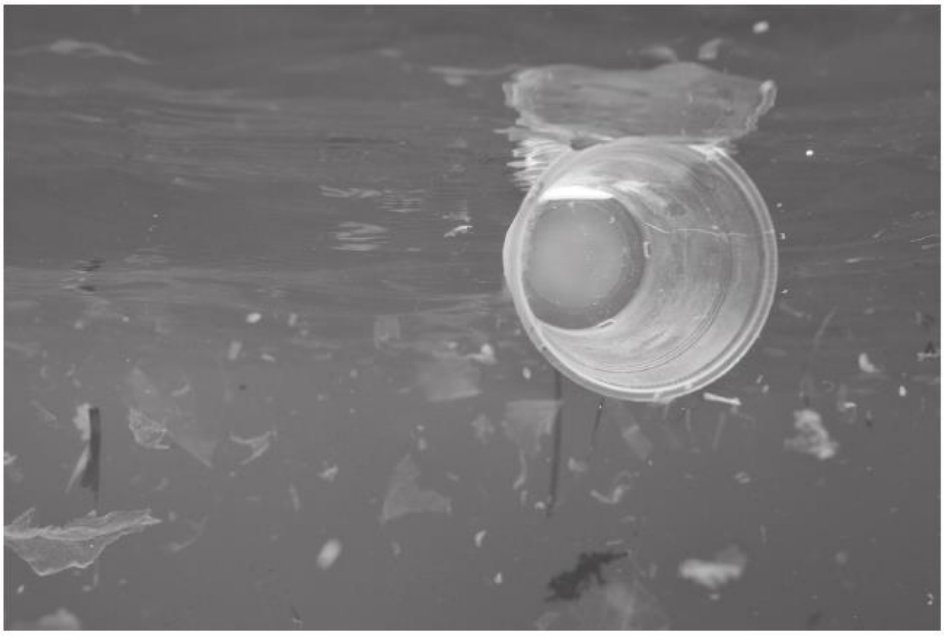


**Fig. 7.3**



**Fig. 7.4**

State the name of **one** source of pollution for each of the environments shown in Fig. 7.3 and Fig. 7.4.

marine .....

land .....

[2]

[Total: 10]

**17.** June/2020/Paper_32/No.4

Fig. 4.1 shows some of the processes involved in the treatment of sewage.

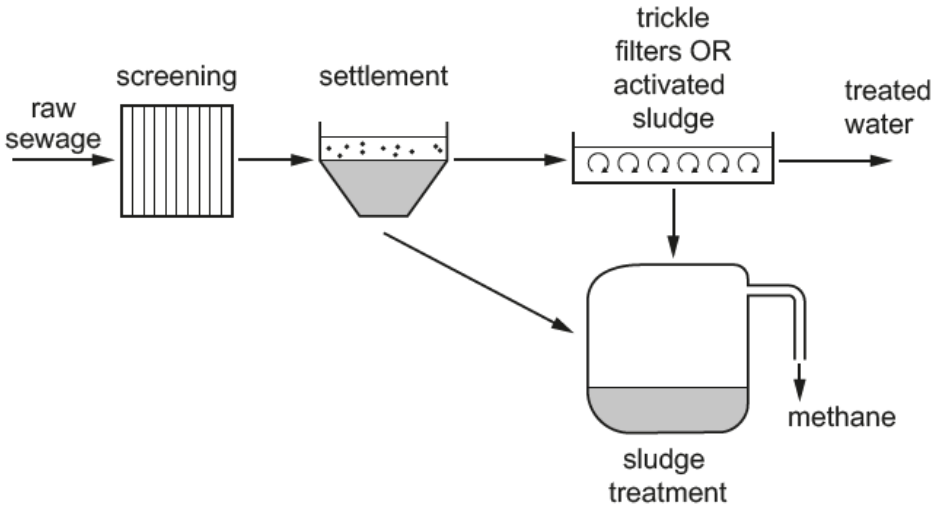



**Fig. 4.1**

**(a)** Complete Table 4.1 by placing ticks (✓) in the correct boxes to show what is involved in each process during the treatment of sewage.

The first row has been completed for you.

**Table 4.1**

| process | process involves: | | | |
|---|---|---|---|---|
| | aeration | removal of large solids | separating liquid waste from solid waste | the use of microorganisms |
| production of methane | | | | ✓ |
| screening | | | | |
| settlement | | | | |
| sludge treatment | | | | |
| trickle filters OR activated sludge | | | | |

[4]

**(b)** Describe **two** reasons why it is necessary to treat sewage before returning the water to the environment.

1 .....

.....

2 .....

.....

[2]

[Total: 6]

**18.** June/2020/Paper_32/No.7

Researchers investigated the effects of using a fertiliser on the number of leaves grown by plants.

The fertiliser contained nitrate and magnesium ions.

Plants in group 1 were grown in soil with fertiliser.

Plants in group 2 were grown in soil without fertiliser.

The results are shown in Fig. 7.1.

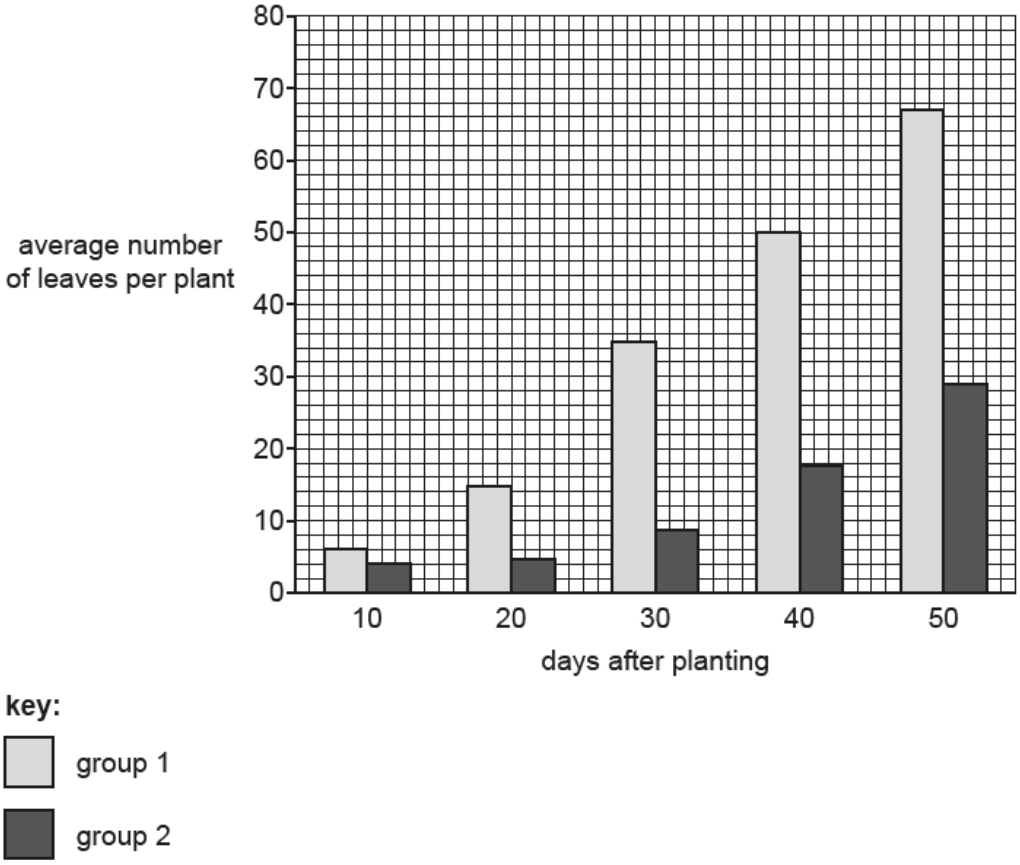



**Fig. 7.1**

**(a)** Describe the results shown in Fig. 7.1.

.....

.....

.....

.....

.....

.....

..... [3]

**(b)** A student wrote a series of statements to explain why an increase in nitrate and magnesium ions increased the number of leaves. Not all of the statements are correct.

**A** – Magnesium is required for the synthesis of chlorophyll.

**B** – Nitrate ions are a component of carbohydrates.

**C** – Chlorophyll is required for photosynthesis.

**D** – Proteins are needed for growth.

**E** – Plants make their own food by the process of respiration.

**F** – Respiration produces glucose.

State the letters of the correct statements.

..... [3]

**(c)** State the principal source of energy for plants.

..... [1]

[Total: 7]

**19.** June/2020/Paper_32/No.8

**(a)** Table 8.1 shows the mass of different materials recycled in one country in 2012 and 2017.

**Table 8.1**

| year | material recycled / tonnes | | | |
|---|---|---|---|---|
| | cardboard | paper | metal | plastic |
| 2012 | 193091 | 222455 | 41488 | 44262 |
| 2017 | 245345 | 144416 | 24874 | 23498 |

**(i)** Describe the data in Table 8.1.

.....

.....

.....

.....

.....

.....

..... [3]

**(ii)** Calculate the percentage change in mass of plastic recycled between 2012 and 2017.

..... %
[2]

**(b)** Discarded rubbish is one source of pollution.

Adding excess fertiliser to soil is another source of pollution.

**(i)** State **two** other types of substances used in agriculture that can pollute land and water.

1 .....

2 .....
[2]

**(ii)** State the names of **two** gases that pollute air and are linked to climate change.

1 .....

2 .....

[2]

[Total: 9]

**20.** June/2020/Paper_42/No.4

Some crop farmers use herbicides on their fields.

Fig. 4.1 shows a farmer spraying a rice crop with herbicides.



**Fig. 4.1**

**(a)** Herbicides kill weeds.

Explain why farmers use herbicides.

.....

.....

.....

.....

..... [2]

**(b)** Fields of crop plants were sprayed with two herbicides. A farmer measured the concentration of the two herbicides, **A** and **B**, in a lake near the fields.

The water in the lake was sampled at intervals for two weeks.

Fig. 4.2 shows the results.

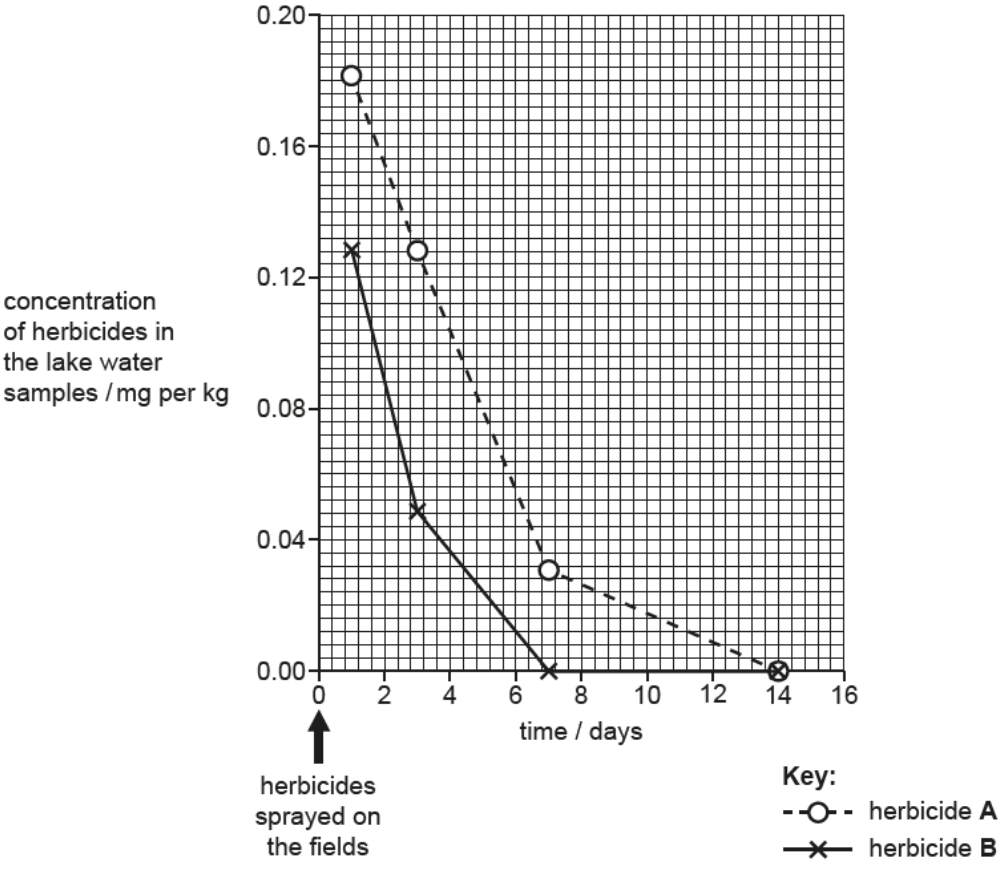



**Fig. 4.2**

**(i)** Compare the concentrations of herbicide **A** and herbicide **B** in the lake.

Use the information in Fig. 4.2 to support your answer.

.....

.....

.....

.....

.....

.....

..... [3]

**(ii)** Suggest how herbicides damage ecosystems in a lake.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

**(c)** Herbicide **A** is a synthetic plant hormone called 2,4-D that selectively kills dicotyledonous plants only.

**(i)** State **two** features that distinguish leaves of dicotyledonous plants from leaves of monocotyledonous plants.

1 .....

2 .....

[2]

**(ii)** State the name of a natural plant hormone that stimulates cell elongation.

..... [1]

**(iii)** Herbicide **B** is a chemical that prevents the uptake of magnesium ions.

Suggest how herbicide **B** kills plants.

.....

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..... [3]

[Total: 15]

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**(ii)** Explain how xerophytes are adapted to reduce water loss to the atmosphere.

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..... [3]

**(iii)** Xerophytes often have many defence mechanisms that reduce or prevent herbivores eating them.

Suggest how xerophytes protect themselves against herbivores.

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..... [2]

**(b)** Forest ecosystems can be affected by acid rain.

Describe how the production of acid rain **and** its effects on forest ecosystems can be reduced.

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..... [4]

[Total: 13]