

Thursday 12 June 2014 – Morning

**GCSE GATEWAY SCIENCE
BIOLOGY B**

B732/01 Biology modules B4, B5, B6 (Foundation Tier)

Candidates answer on the Question Paper.
A calculator may be used for this paper.

OCR supplied materials:
None

Other materials required:

- Pencil
- Ruler (cm/mm)

Duration: 1 hour 30 minutes




Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

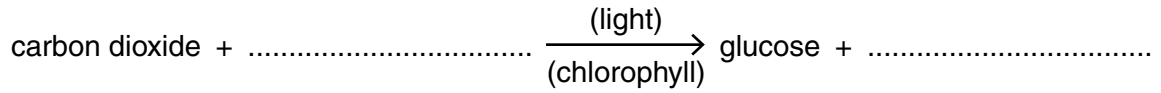
- The quality of written communication is assessed in questions marked with a pencil (.
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **85**.
- This document consists of **24** pages. Any blank pages are indicated.

Answer **all** the questions.

SECTION A – Module B4

1 This question is about photosynthesis.

(a) Complete the word equation for photosynthesis.



[2]

(b) Most photosynthesis happens in leaves.

How does carbon dioxide get into leaves?

.....
.....
..... [2]

(c) Many plants that grow on the ground in forests have darker green leaves than plants that grow in open spaces.

Suggest why they have darker green leaves.

.....
.....
..... [2]

[Total: 6]

2 (a) Harry wants to help the plants in his garden grow better.

He adds fertiliser to the soil.

What substances should fertiliser contain?

Put ticks (✓) in the boxes next to the **two** correct answers.

- DNA
- nitrate
- pesticide
- phosphate
- starch
- water

[2]

(b) Harry's friend says that he could add compost to the soil.

This would help the plants to grow but take longer to work than fertiliser.

Explain why.

.....

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..... [2]

[Total: 4]

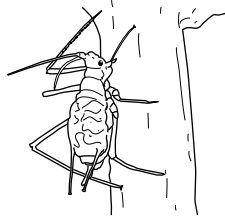
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Question 4 begins on page 6

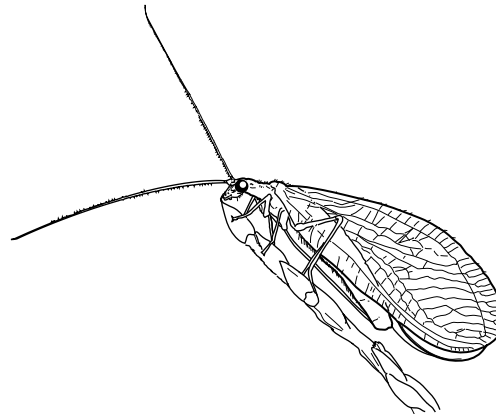
PLEASE DO NOT WRITE ON THIS PAGE

4 Aphids are small insects that feed on plants and damage crops.

Lacewings are insects that can be used for biological control.



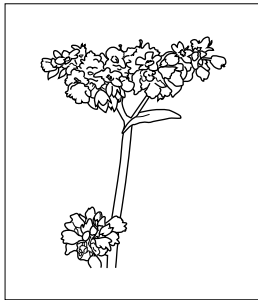
aphid



lacewing

(a) A seed company wants to sell buckwheat seeds to cotton farmers. Look at their advert.

Planting buckwheat seeds increases your cotton crop yield



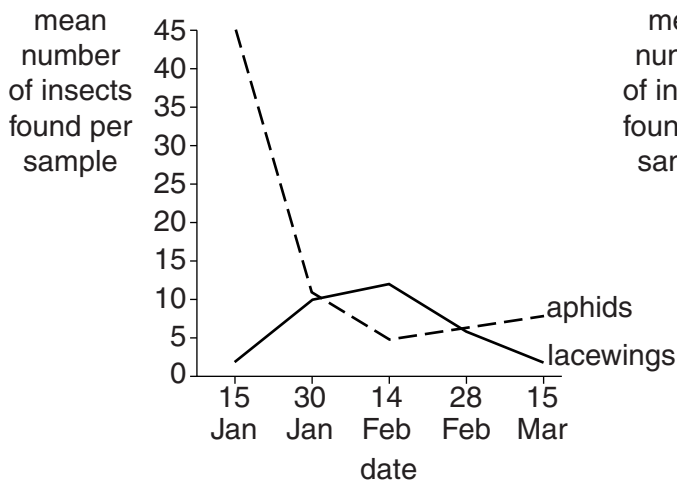
Planting buckwheat alongside your cotton plants will increase your cotton yield.

Buckwheat attracts lacewings because they feed on buckwheat nectar.

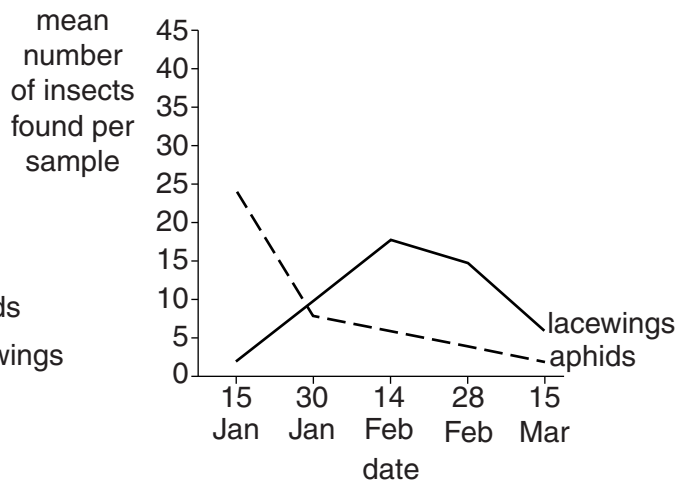
Lacewings are also predators and will control the aphids that damage your cotton plants.

The graphs show the effect of planting buckwheat:

Graph A
No buckwheat



Graph B
With buckwheat



(i) Look at graph **A**.

Describe and explain the relationship between the numbers of aphids and lacewings when there is **no** buckwheat.

.....
.....
.....
..... [2]

(ii) The advert claims that growing buckwheat attracts lacewings and increases crop yield.

Discuss whether the graphs support this claim.

.....
.....
.....
.....
..... [3]

(b) To produce the graphs in the advert, scientists needed to collect aphids and lacewings.

Look at the list of different collecting methods.

nets pitfall traps pooters quadrats

Look at the pictures of an aphid and a lacewing on the previous page.

(i) Choose the method that would be best for collecting aphids.

Explain your answer.

.....
..... [2]

(ii) Choose the method that would be best for collecting lacewings.

Explain your answer.

.....
..... [2]

[Total: 9]

Turn over

SECTION B – Module B5

5 (a) Reproduction in humans is controlled by hormones.

(i) One of these hormones is oestrogen.

Oestrogen repairs the uterus lining after it breaks down.

Write down the name given to the time when the uterus lining breaks down.

..... [1]

(ii) FSH is another important hormone in reproduction.

Write down the name of the gland that releases FSH.

..... [1]

(b) Some couples have problems getting pregnant.

Some problems are linked to women and some are linked to men.

Put a tick (✓) in **each** of the boxes next to problems that are linked to women.

blocked fallopian tubes

blocked sperm ducts

eggs not released

uterus lining will not accept a fertilised egg

[1]

(c) Women naturally have different levels of FSH in their blood.

In vitro fertilisation (IVF) is a method used to treat infertility.

Clinics often measure the woman's FSH level before treatment.

The graph shows the natural FSH levels and results of IVF for women of different ages.



(i) The results of how many women are shown on the graph?

Put a **ring** around the correct answer.

- 2 6 19 25

[1]

(ii) Calculate the percentage of women shown on the graph who become pregnant.

.....

answer %

[1]

(iii) A clinic wants to increase the percentage of women who become pregnant.

They decide to only offer certain women IVF treatment.

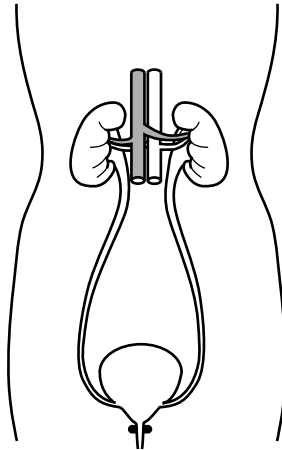
Use the graph to suggest how the clinic decides which women to treat.

.....

[2]

[Total: 7]

6 Kidneys are important organs in excretion.



(a) Write down **one** substance that is normally excreted by the kidneys.

..... [1]

(b) Some people have kidneys that are **not** working properly.

Write down **two** reasons why the kidneys may be damaged and **not** work properly.

.....
.....
..... [2]

[Total: 3]

7 Kaye is an athlete.

She is resting the day before she runs a long race.

The tables show the water taken in and the water lost by Kaye during the rest day.

	water taken in in cm ³
in food	1000
made by respiration	300
drinking	1200

	water lost in cm ³
in sweat	800
in faeces	100
in urine	

Kaye takes in the same amount of water as she loses.

Work out how much water Kaye loses in urine on the rest day.

Explain how and why the data in the tables is likely to change on the day of the race.



The quality of written communication will be assessed in your answer to this question.

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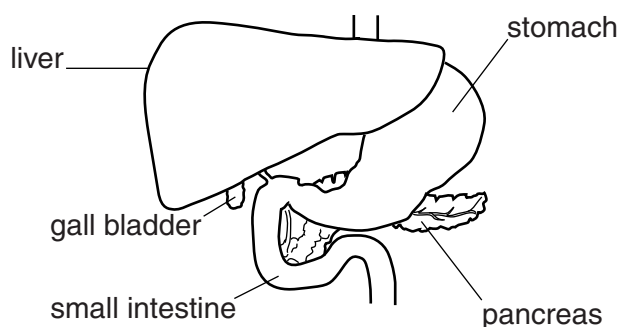
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..... [6]

[Total: 6]

8 The diagram shows part of the digestive system.



(a) (i) Write down the name of the organ shown in the diagram that squeezes and churns food.
 [1]

(ii) Write down the name of the organ shown in the diagram that makes bile.
 [1]

(b) Henry has just eaten a chocolate bar.

The table shows the concentration of glucose in the blood entering and leaving some of Henry's organs.

Organ	Concentration of glucose in grams per litre	
	Blood entering the organ	Blood leaving the organ
liver	14	9
pancreas	9	7
small intestine	9	14
stomach	9	6

Glucose concentration **increases** as blood passes through one of the organs.

Write down the name of this organ and explain why glucose concentration increases.

Name of organ

Explanation

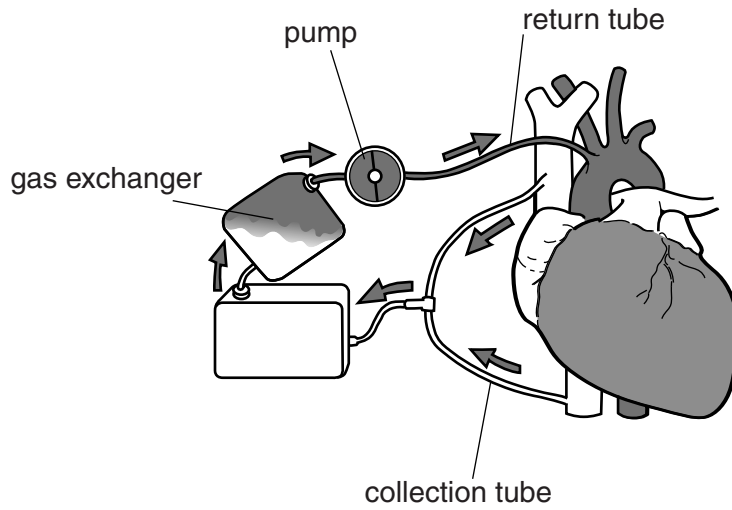
.....

[3]

[Total: 5]

9 During some operations, it is necessary to stop a patient's heart beating.

The patient is connected to a heart and lung machine.



(a) Write about which parts of the machine do the jobs of the heart and the lungs.

.....
.....
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..... [2]

(b) Patients are injected with anticoagulant drugs before the operation starts.

Suggest why it is important that doctors do **not** give the patient **too much** or **too little** of the drug.

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..... [2]

[Total: 4]

SECTION C – Module B6

10 Emma uses reagent test strips to test her urine.

The test strips contain immobilised molecules.

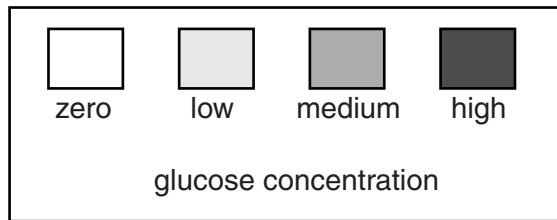
(a) What are these immobilised molecules?

Put a **ring** around the correct answer in this list.

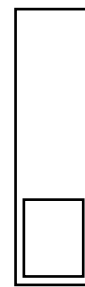
- algae DNA enzymes sugars

[1]

(b) The bottle that contains the test strips has this chart on the side.



chart



test strip

(i) Describe how Emma uses a test strip and the chart to find out about the concentration of glucose in her urine.

.....

.....

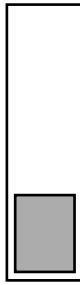
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..... [3]

(ii) The test strip shows the result.



What conclusion can be drawn from this test about her health?

Explain your answer.

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..... [2]

[Total: 6]

Question 11 begins on page 16

11 Soil contains different components such as mineral particles, dead material and living organisms.

(a) Write down **one other** component of soil.

..... [1]

(b) Percy reads about different soils.

He finds out that mineral particles in soil can be sand, silt or clay.

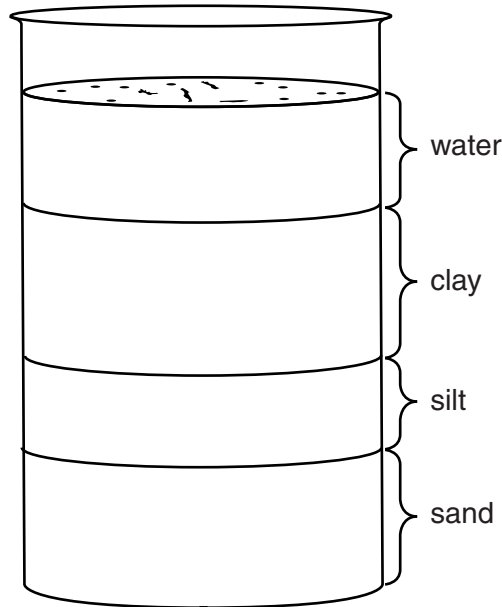
Each particle is a different size.

Sand particles are largest and clay particles are smallest.

Percy gets some soil from his garden and shakes it up in a beaker of water.

He then lets it settle.

Look at the diagram of his results.



(i) Suggest why the sand, silt and clay form separate layers as shown in the diagram.

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..... [2]

(ii) Percy uses his ruler to measure the height of the clay layer.

The height of the clay layer is 20 mm.

The total height of the three mineral layers is 50 mm.

He calculates that 40% of the mineral content is clay.

Use a ruler to measure the height of the sand layer.

Use this to calculate what percentage of the mineral content is sand.

sand = %

[2]

(iii) Percy uses information in this table to work out the type of soil in his garden.

Type of soil	Range of clay content %	Range of sand content %
clay	>50	<50
loam	10–45	30–70
sandy	<45	>55

Work out what type of soil Percy has in his garden.

Use the percentages in (b)(ii) and the table.

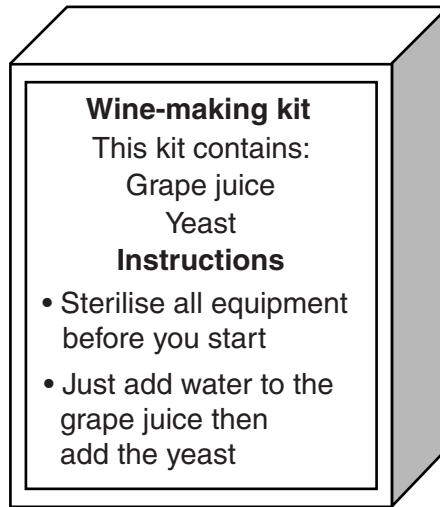
Percy's soil type is

[1]

[Total: 6]

12 Jimmy wants to make some wine.

He sees a kit in a shop.



(a) Explain why it is important to sterilise all equipment.

.....

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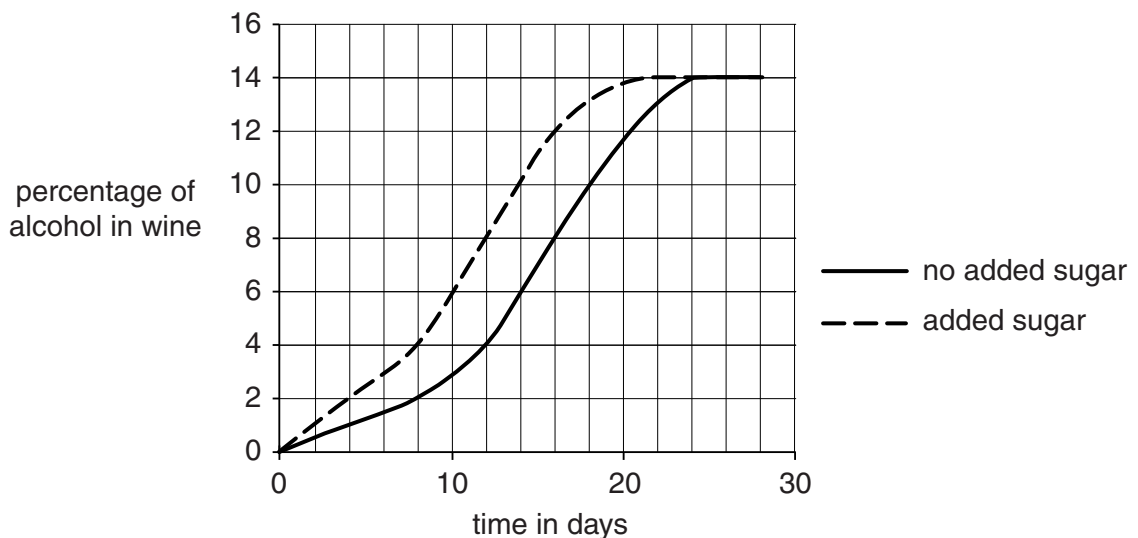
..... [2]

(b) Jimmy buys two wine kits to make two batches of wine.

He makes the first batch of wine by following the instructions.

He makes the second batch in the same way except he also adds sugar.

The graph shows the percentage of alcohol in the two batches of wine as they are being made.



Describe the patterns in the graph and write about how alcohol is made in the wine.



The quality of written communication will be assessed in your answer to this question.

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..... [6]

[Total: 8]

Question 13 begins on page 20

13 (a) Microorganisms have different features.

Finish the table by putting one tick (✓) in each row.

The first row has been done for you.

Feature	Bacteria only	Yeast only	Both
cytoplasm			✓
cell wall			
DNA			
flagellum			

[2]

(b) Microorganisms reproduce in different ways.

Write down how yeast cells reproduce.

.....

..... [1]

(c) Some microorganisms cause disease in cows.

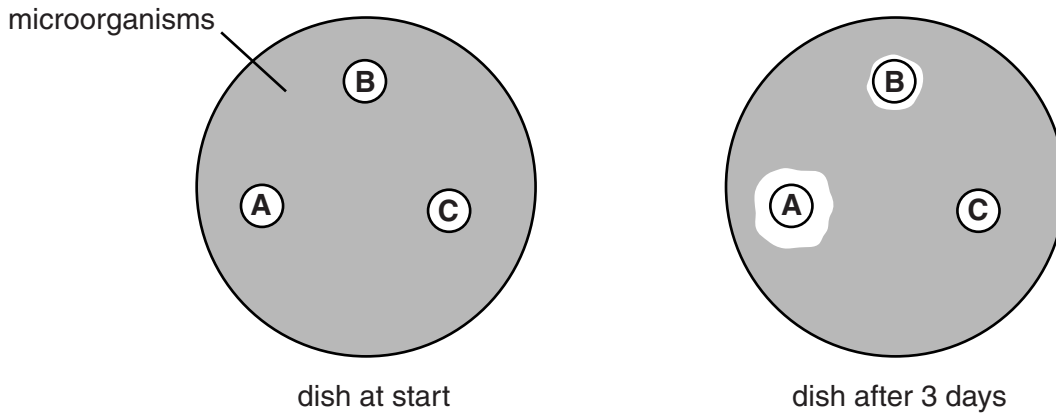
Scientists test three different drugs, **A**, **B** and **C**.

They use three small discs of filter paper.

Each disc is soaked in a different drug.

They put the three discs on a dish of jelly that has the microorganisms growing on it.

They leave the dish for three days to see if the drugs kill the microorganisms.



Which drug should the scientists choose to give to the cows?

Explain your answer.

.....

.....

..... [2]

[Total: 5]

22
SECTION D

- 14 (a) Scientists have been trying to estimate the number of different species there are on the Earth. First they counted the number of species that have already been discovered and named. Then they used several ways to estimate the number of species that might actually exist. The table shows their results.

Kingdom	Number of species already discovered in thousands	Number of species estimated to exist in thousands
animals	953	7770
plants	216	298
fungi	43	611
protocists (mostly single-celled)	21	64
prokaryotes (no nucleus in cells)	11	10
Total	1244	8753

Use the table to answer these questions.

- (i) Calculate the **total** number of species that have **not** yet been discovered.

answer thousand [1]

- (ii) Which kingdom has the **largest** number of species that have **not** yet been discovered?

..... [1]

- (iii) One problem with discovering new species is that sometimes they have already been discovered by someone else.

This means that the same species can be given more than one name.

Which kingdom best shows this problem?

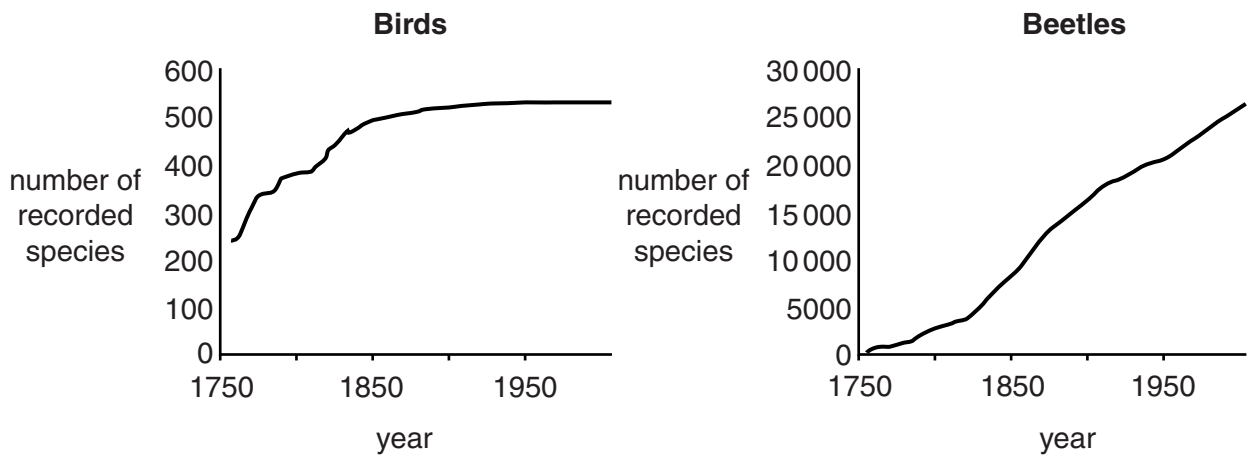
Put a ring around the correct answer.

animals **plants** **fungi** **protocists** **prokaryotes**

[1]

(b) The number of species already discovered increases as time goes on.

The graphs show the number of species of birds and beetles recorded in Europe since 1750.



Look at the two graphs.

(i) Describe how the graphs for birds and beetles are **similar** and how they are **different**.

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..... [3]

(ii) Suggest **why** the graph for birds is **different** from the graph for beetles.

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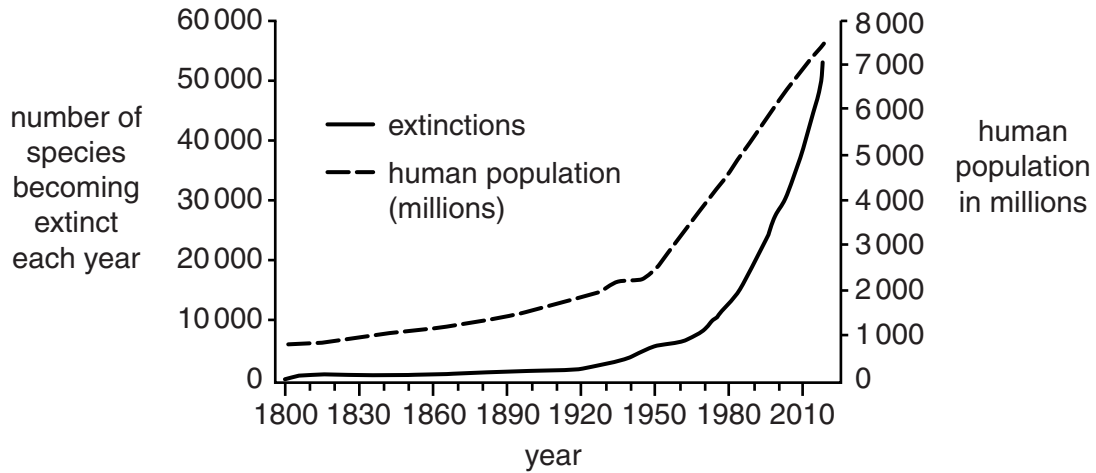
..... [2]

(c) Look at the graph.

It came from a website that is trying to stop species becoming extinct.

The graph shows the human population over the last 200 years.

It also shows the number of species that has become extinct each year.



Does the graph **prove** that humans are causing species to become extinct?

Explain your answer.

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..... [2]

[Total: 10]

END OF QUESTION PAPER



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