OCR
RECOGNISING ACHIEVEMENT

H

GENERAL CERTIFICATE OF SECONDARY EDUCATION

GATEWAY SCIENCE

B632/02

BIOLOGY B

Unit 2 Modules B4 B5 B6 (Higher Tier)

OCE/15085

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)

Monday 25 January 2010
Afternoon

Duration: 1 hour

B632/02

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- 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 **60**.
- This document consists of **24** pages. Any blank pages are indicated.

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Answer **all** the questions.

Section A – Module B4

1 Graham grows tomatoes.

Tomato plants make food during a process called photosynthesis.

Photosynthesis occurs in plant leaves.

(a) Leaves are adapted for photosynthesis in several ways.

Draw straight lines to connect each **adaptation** to **how it helps photosynthesis**.

One line has been drawn for you.

adaptation	how it helps photosynthesis
chlorophyll	short distance for gases to travel
network of veins	to absorb light
stomata	to transport water
thin	to exchange gases

[2]

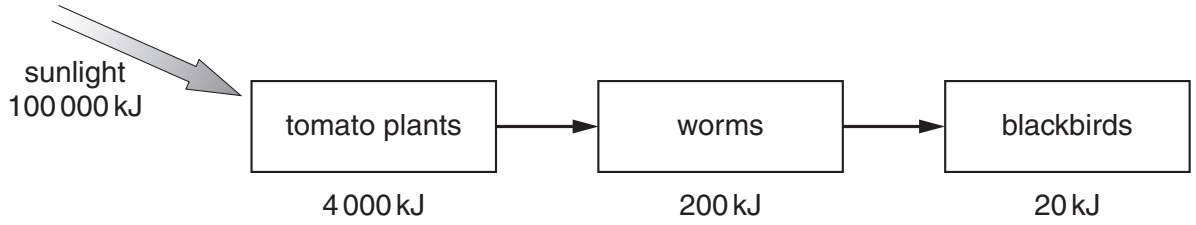
Turn over for the remainder of question 1

(b) Some of Graham's tomato crop has been damaged.

The damaged tomatoes are eaten by worms.

The worms are eaten by blackbirds.

The diagram shows how energy flows through this food chain.



Look at the food chain.

(i) How much energy is lost from the food chain as energy is transferred from the tomato plants to the blackbirds?

..... **[1]**

(ii) In this food chain the amount of energy transferred to the blackbirds when they feed on worms is less than the energy in the worms.

Explain why.

.....

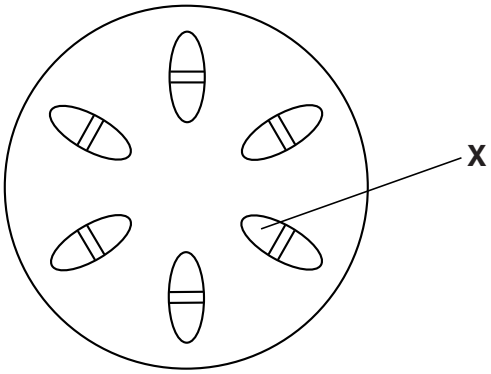
..... **[1]**

(c) Next year Graham plans to grow tomato plants using an intensive farming method called **hydroponics**.

What is meant by the term hydroponics?

..... **[1]**

(d) The diagram shows a section through the stem of a tomato plant.



Part **X** is the xylem.

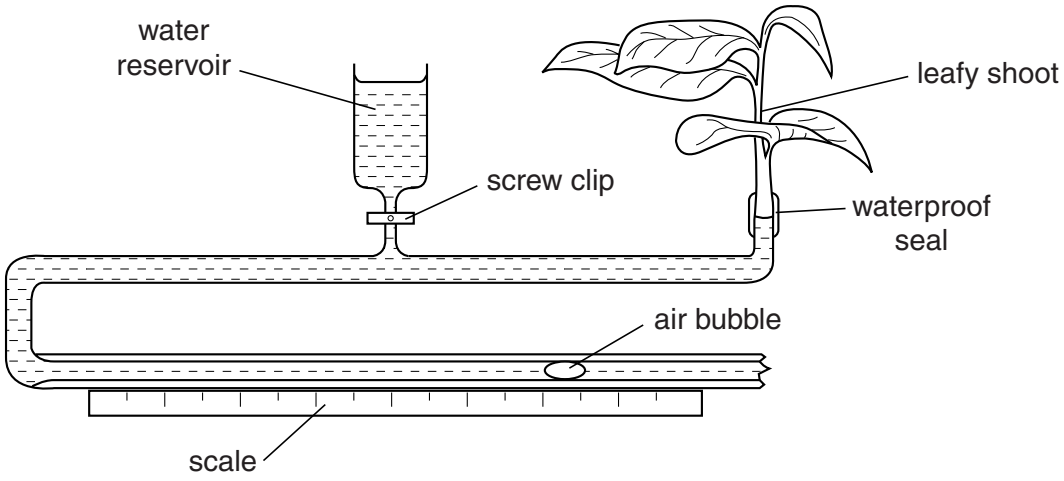
Write down **one** job of the xylem in the tomato plant.

..... **[1]**

[Total: 6]

2 Mehmet uses this equipment to investigate water uptake in a leafy shoot.

The distance moved by the air bubble shows the amount of water uptake.



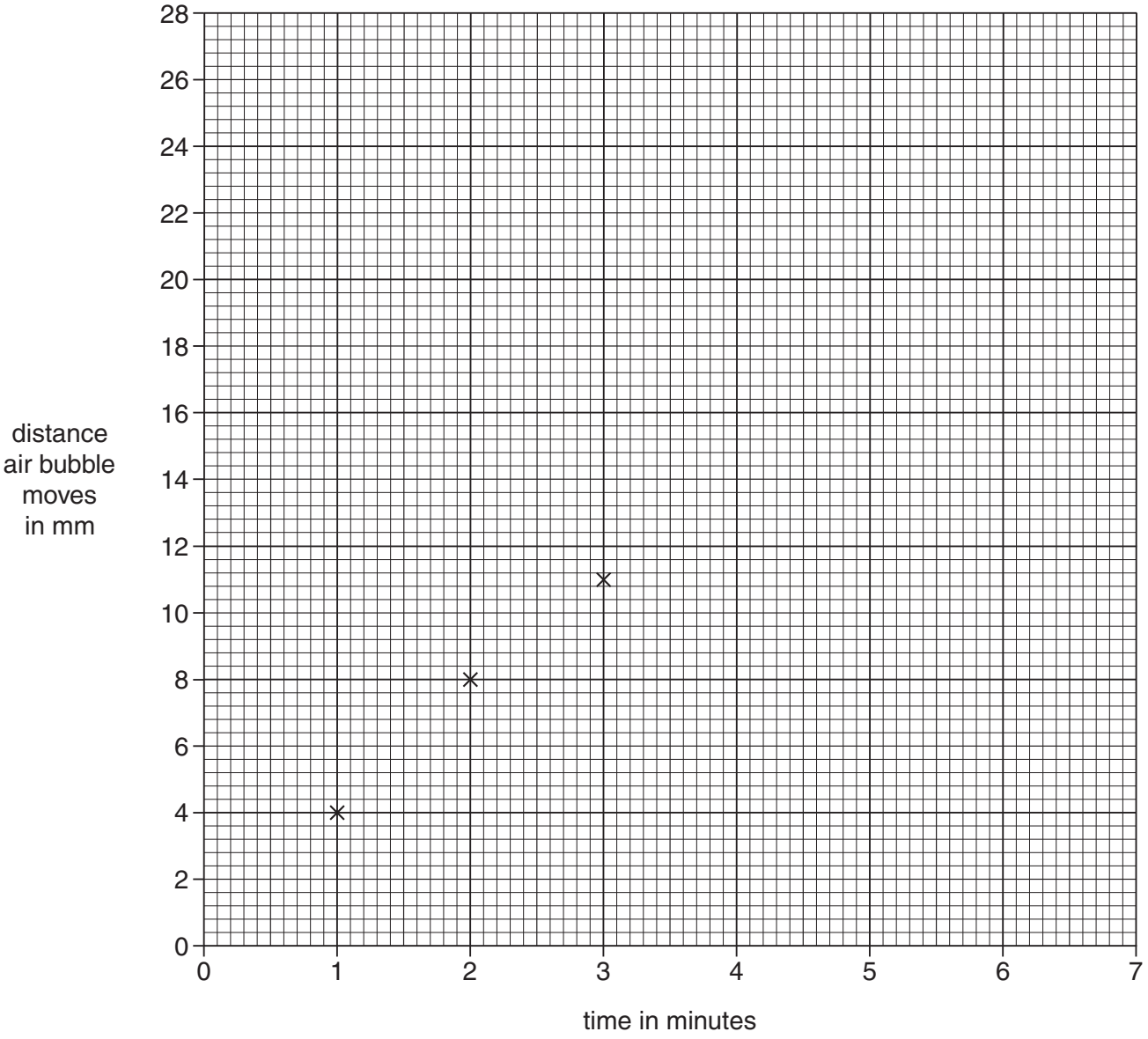
He measures the distance the air bubble moves in each minute for 7 minutes.

Mehmet's results are in the table below.

time in minutes	distance air bubble moves from start position in mm
0	0
1	4
2	8
3	11
4	15
5	19
6	24
7	28

(a) Mehmet starts to draw a graph.

Finish the graph by plotting the rest of the points and drawing the best line.



[2]

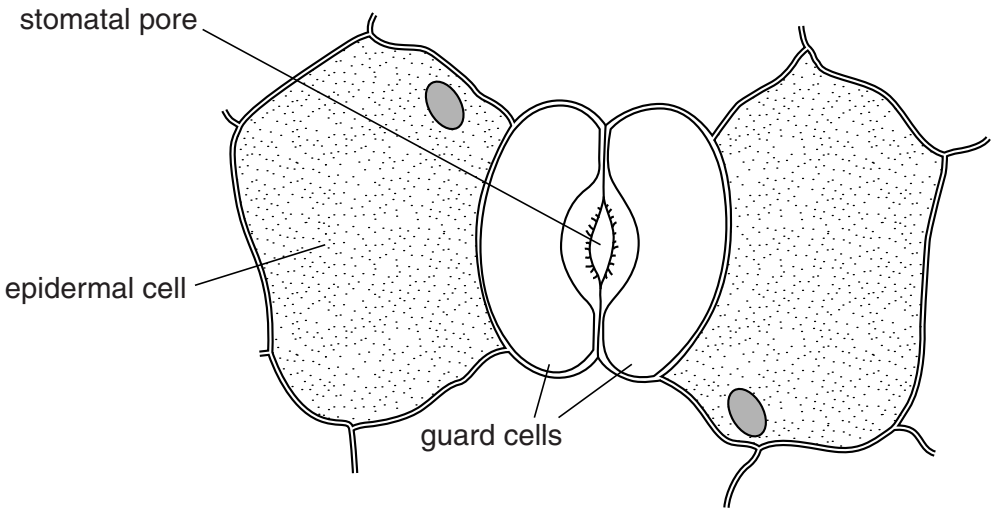
(b) The leafy shoot is taking up water because water is evaporating and moving out of the leaves.

Write down the name of this process.

..... **[1]**

Turn over for the remainder of question 2

(c) The plant loses water from the leaf surfaces through tiny pores called stomata.



Explain how the stomata in the leaf help **reduce water loss**.

In your answer write about

- the distribution of the stomata
- how the size of the stomatal pore is controlled.

.....

.....

.....

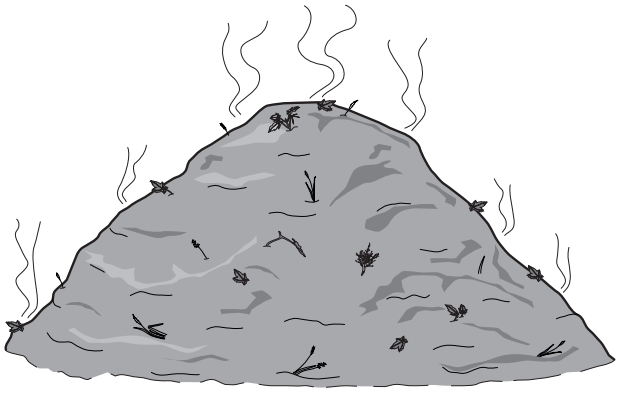
.....

.....

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

[Total: 6]

3 Local Councils make large compost heaps from household garden waste.



(a) (i) Decay in the compost heap is caused by decomposers.

Which of the following does **NOT** affect the rate of decay?

Put a (ring) around the correct answer.

amount of nitrogen

amount of oxygen

temperature

amount of water

[1]

(ii) Decomposers cause decay.

Write down the type of nutrition they use.

..... **[1]**

(iii) Earthworms, maggots and woodlice are **detritivores** that live in the heap.

They increase the rate of decay.

Explain how.

.....

..... **[1]**

(b) Gardeners add compost to the soil because it is rich in nitrogen compounds.

Plants need a type of chemical substance containing nitrogen for respiration and photosynthesis.

Name this type of chemical substance.

..... **[1]**

(c) Nitrogen compounds are taken up by the root hair cells.

If respiration stops in root hair cells they will take up less nitrogen compounds.

Explain why.

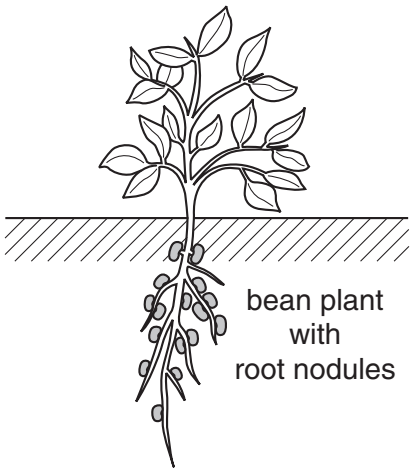
.....

.....

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

[Total: 6]

4 Sophie is a farmer who grows some bean plants.



(a) Bean plants contain root nodules.

Root nodules are important in the nitrogen cycle.

What type of bacteria do root nodules contain?

..... **[1]**

(b) Nitrifying bacteria are also important in the nitrogen cycle.

Nitrifying bacteria bring about a chemical change in the soil.

This change helps Sophie's crops to grow better.

What happens in this chemical change?

.....

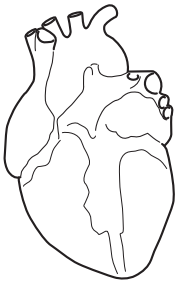
..... **[1]**

[Total: 2]

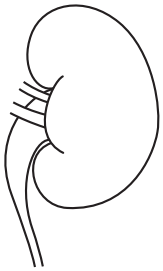
Section B – Module B5

5 The diagrams show five organs from a human body.

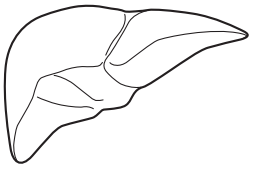
a muscle



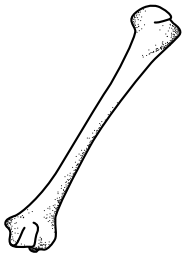
heart



kidney



liver



a bone

(a) Answer the following questions.

Choose from the five organs.

(i) Write down the name of the organ that **produces** urea.

..... **[1]**

(ii) Write down the name of the organ that starts off being cartilage but is then ossified.

..... **[1]**

(b) Sometimes a person's heart does not work properly.

Doctors can monitor the heart by listening to the heart beat or by taking the pulse rate.

(i) Write down one **other** way that doctors can monitor heart action.

..... **[1]**

(ii) A person may need to wait a long time for a donor heart.

Write down **two** reasons why there is a shortage of suitable donor hearts.

.....

.....

.....

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

(c) Some people carry donor cards.

This shows that their organs can be used for transplants if they die.

Some people want this system to change.

They want a dead person's organs to be used unless they have opted not to allow it.

Suggest **one** reason why some people are in favour of this new idea and **one** reason why some are against it.

in favour .....

.....

against .....

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

[Total: 7]

6 Some women find it difficult to get pregnant.

(a) They may use IVF to try and get pregnant.

What is **IVF** short for?

Put a tick (✓) in the box next to the correct answer.

intra vaginal fertilisation	☐
in vitro fertilisation	☐
in vivo fertilisation	☐
intravenous fertilisation	☐

[1]

(b) IVF involves taking eggs from the women just before ovulation happens.

Write down what normally happens in a woman's body at ovulation.

..... **[1]**

(c) In normal IVF treatment, women are given large doses of hormones to stimulate the growth of eggs.

A new technique is being developed that takes immature eggs from women.

The immature eggs can then be stimulated in a dish with lower concentrations of hormones.

The eggs are then fertilised.

(i) Write down the name of the hormone that can be used to stimulate the growth of the eggs.

..... **[1]**

(ii) Suggest why women might prefer using this new technique rather than normal IVF.

.....

..... **[1]**

[Total: 4]

7 The lungs are important organs in the body.

Sometimes the lungs do not work properly.

This happens when a person has an asthma attack.

(a) What treatment is available when a person has an asthma attack?

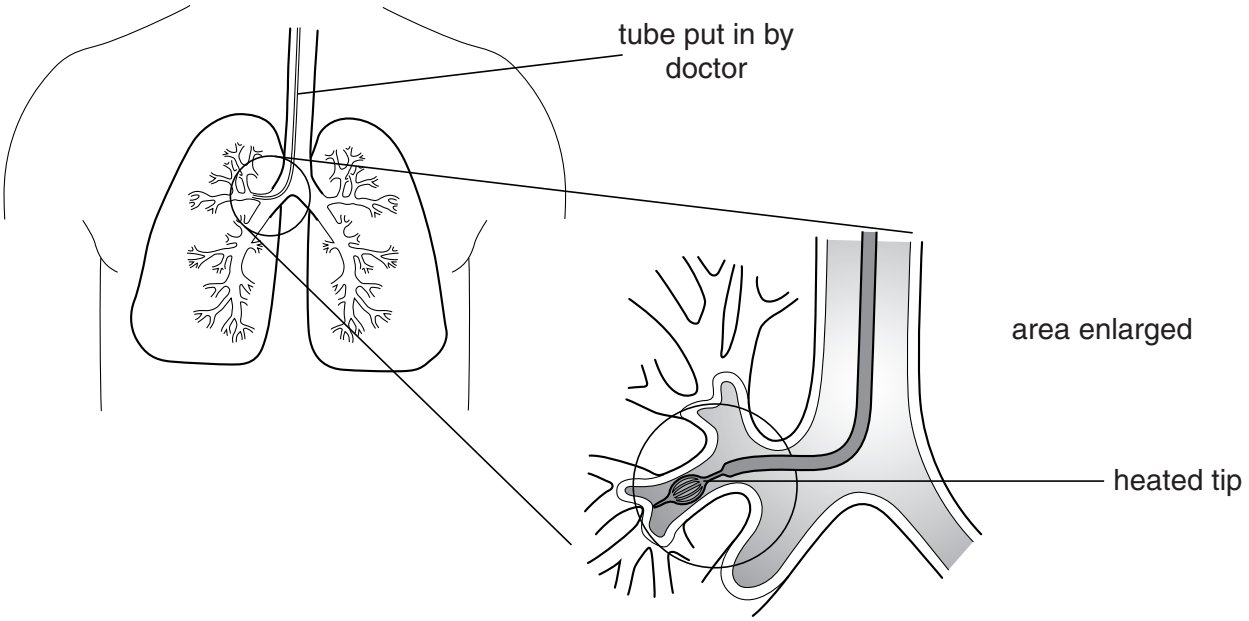
..... **[1]**

(b) A new treatment is being tested that might help prevent asthma attacks.

A tube is passed down the airways leading to the lungs.

The tip of the tube then heats up.

This weakens the muscles in the walls of the airways.



Write down what happens to the airways during an asthma attack.

.....

.....

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

(c) One problem is that the heating might destroy ciliated cells in the airways.

Write down the function of these ciliated cells.

.....

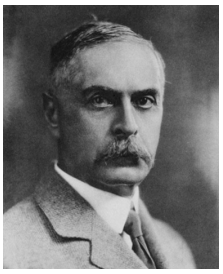
..... **[1]**

[Total: 4]

8 Read the following information about blood transfusions.

The first doctor to try a blood transfusion between two people was Dr Blundell in 1818.
He took blood from a person and injected it into his patient.
He did this quickly so that the platelets would not clot the blood.
Unfortunately he did not know about blood groups and so his transfusions often did not work.
He also carried out the first transfusion to try and cure haemophilia.

In 1901 Dr Landsteiner discovered blood groups.
He said that there were three, A, B and O.
This helped to make blood transfusions safer.



(a) Dr Blundell had to work quickly so that the blood did not clot.

Write down the **name** of one drug that can be used to stop blood clotting.

..... **[1]**

(b) Dr Blundell tried to cure a case of haemophilia with a transfusion.

Put a tick (✓) in the box next to the **best** description of haemophilia.

A genetic condition that makes the blood clot easily.	☐
Blood clotting in blood vessels due to long aeroplane journeys.	☐
A bacterial infection that causes blood clots in arteries.	☐
An inherited condition that prevents blood clotting easily.	☐

[1]

(c) Dr Landsteiner discovered blood groups.

Explain why this would make blood transfusions much safer.

.....

.....

.....

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

[Total: 5]

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Section C begins on page 18.

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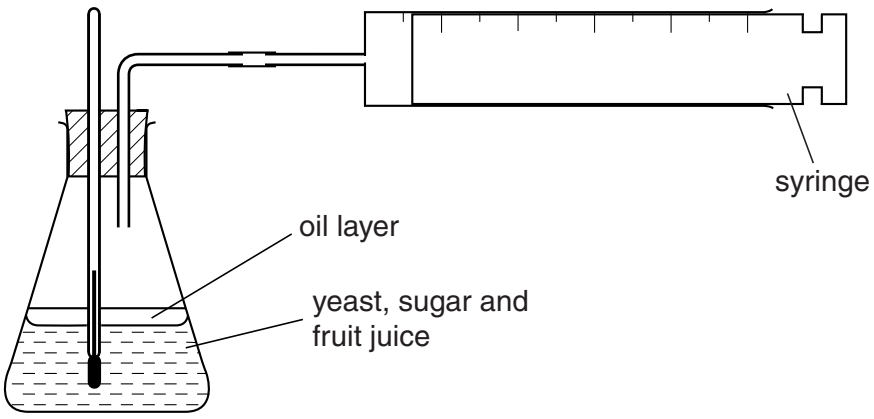
Section C – Module B6

9 Kevin and Sam investigate the best way to make cider.

The diagram shows the apparatus they use to collect the carbon dioxide.



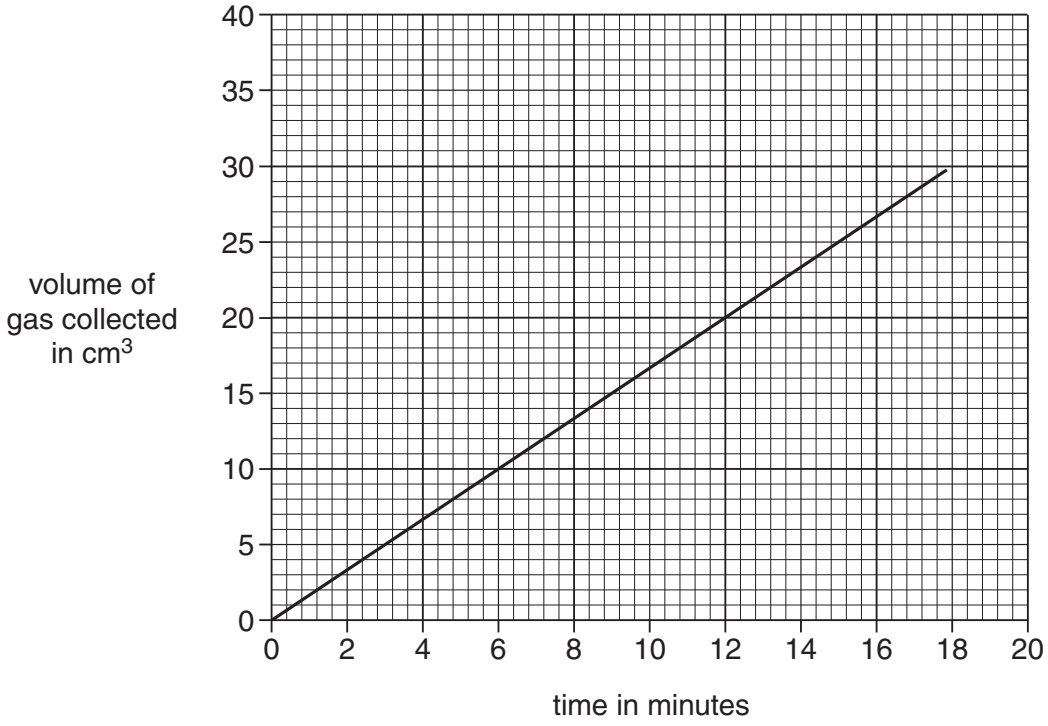
(a) The yeast breaks down the sugar to make ethanol and carbon dioxide gas.

Finish the balanced symbol equation for this reaction.

$C_6H_{12}O_6 \rightarrow$ ..... + ... **[2]**

(b) Look at the graph.

It shows their results when they collect the gas at 20 °C.



(i) The gradient of the graph will equal the rate of the reaction.

Calculate the rate of the reaction over the first 12 minutes.

Show your working out.

answer ..... cm^3/minute **[2]**

(ii) Kevin and Sam repeat the investigation at 30 °C.

Draw a line on the graph to predict their results. **[1]**

(c) Alcohol can be mixed with petrol and used as biofuel.

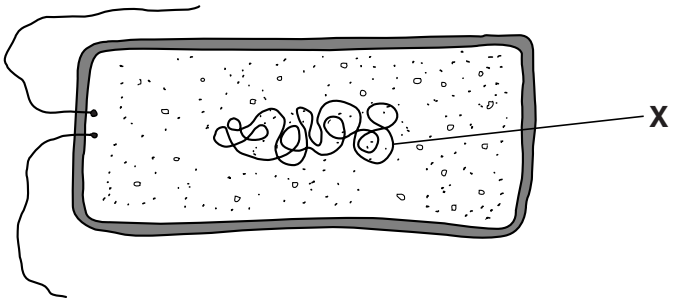
Write down **one** advantage of using this biofuel instead of petrol.

.....

..... **[1]**

[Total: 6]

10 Look at the diagram of a bacterial cell.



(a) Write down the **job** of the part labelled **X**.

..... **[1]**

(b) Bacteria can be used to make yoghurt.

All equipment must be sterilised before the bacteria are added.

Explain why.

..... **[1]**

(c) Bacteria can cause cholera.

(i) Which bacteria cause cholera?

Choose from the list.

E.coli **Entamoeba** **Salmonella** **Vibrio**

answer ..... **[1]**

(ii) Cholera outbreaks can increase following an earthquake.

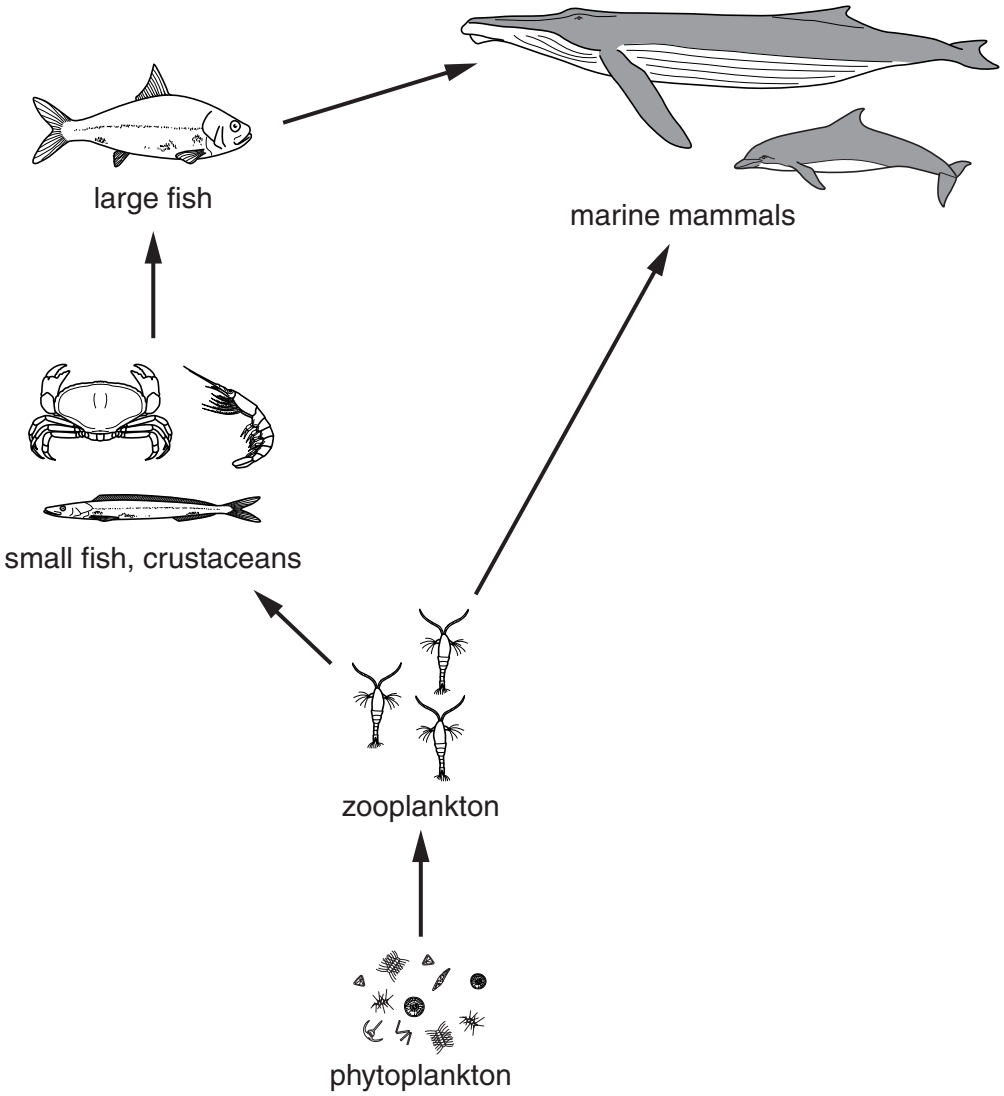
Explain why.

.....

..... **[1]**

[Total: 4]

11 Look at the diagram of a seawater food web.



(a) Write down the name of the organism in this food web that uses photosynthesis.

..... **[1]**

(b) Numbers of producers increase in the summer.

Explain why.

.....

.....

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

Turn over for the remainder of question 11

(c) Large marine mammals sometimes get washed up on the beach.

They often die because they become crushed by their own weight.

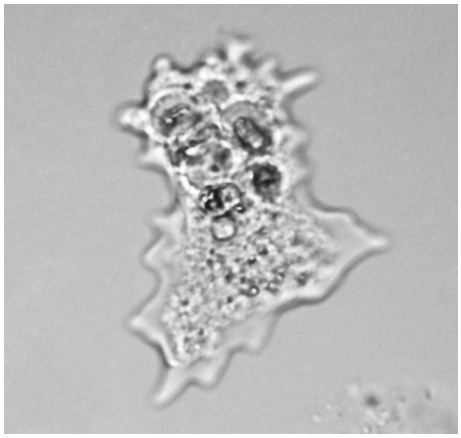
Explain why living in water stops their weight crushing them.

.....

..... **[1]**

(d) Look at the picture.

It shows an amoeba.



It is a single-celled organism that lives in fresh water.

Look at the statements about amoeba and water balance.

Put ticks (✓) in the boxes to show if each statement is true or false.

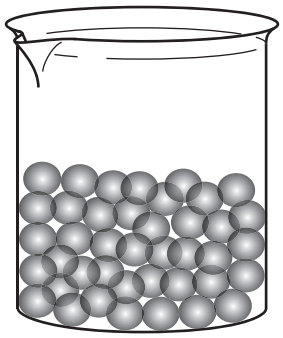
	true	**false**
Water enters the amoeba by osmosis.	☐	☐
The contractile vacuole stores dissolved sugars.	☐	☐
The amoeba has a higher water concentration than its surroundings.	☐	☐
The amoeba uses active transport to move water out of the contractile vacuole.	☐	☐

[2]

[Total: 6]

12 This question is about enzymes.

(a) Look at the picture. It shows beads of immobilised sucrase (invertase) enzyme.



The sucrase beads can be added to sucrose solution.

The sucrose is broken down into **two** sweeter tasting sugars.

(i) Write down the names of these two sugars.

..... and ..... **[1]**

(ii) Write down **one** advantage of using **immobilised** sucrase instead of sucrase solution.

.....

..... **[1]**

(b) A scientist is developing a new washing powder.

The washing powder is to be used to remove fat stains from clothes.

It contains an enzyme.

(i) Write down the name of this enzyme.

..... **[1]**

(ii) The enzyme digests the fat in the stains to fatty acids and glycerol.

These substances are more easily removed from the clothes than fat.

Explain why.

..... **[1]**

[Total: 4]

END OF QUESTION PAPER

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