OCR
RECOGNISING ACHIEVEMENT

SPECIMEN F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

GATEWAY SCIENCE

BIOLOGY B

B732/01

Unit B732: 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	

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.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

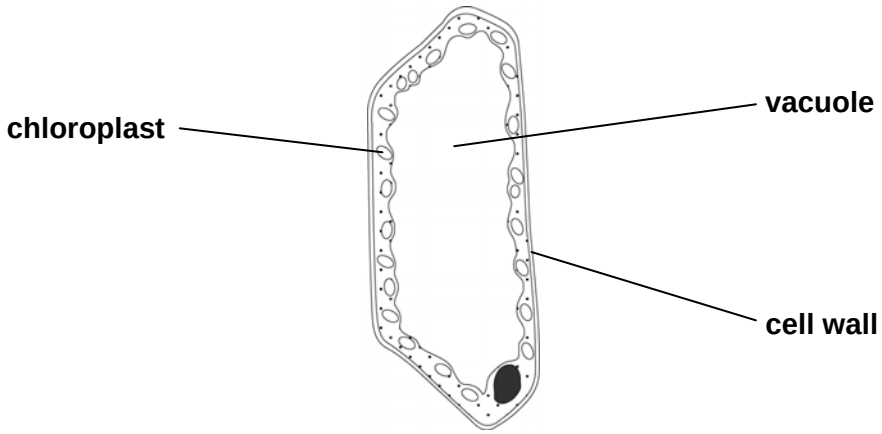
- Your quality of written communication is assessed in questions with a pencil (✎).
- The number of marks for each question is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **85**.
- This document consists of **28** pages. Any blank pages are indicated.

Examiner's Use Only:			
1		9	
2		10	
3		11	
4		12	
5		13	
6			
7			
8			
Total			

Answer **all** the questions.

Section A – Module B4

1 Look at the diagram of a plant leaf cell.



(a) A root hair cell does **not** contain chloroplasts.

Suggest why.

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

(b) What are the jobs of a root hair cell?

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

[Total: 4]

2 Australia produces a lot of sugar cane.

(a) Look at the table showing climate information for Australia and the UK.

month	Australia		UK	
	average temperature in °C	average daily sunshine in hours	average temperature in °C	average daily sunshine in hours
January	31.4	6.8	7.0	1.9
February	31.2	6.1	7.4	2.5
March	30.6	6.5	10.2	3.6
April	29.2	6.7	12.6	4.9
May	27.6	6.7	16.5	6.3
June	26.0	7.2	19.4	6.0
July	25.7	7.3	22.2	6.4
August	26.6	7.9	22.3	6.2
September	28.1	8.6	18.9	4.7
October	29.5	8.8	14.6	3.8
November	30.6	8.5	9.9	2.3
December	31.4	7.8	7.8	1.6

Sugar cane grows better in Australia than in Britain.

Use the data in the table and your own knowledge to explain why.

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

(b) Insect pests can eat the sugar cane. This reduces the crop yield.

Describe how farmers can prevent insects eating the sugar cane.

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

[Total: 5]

3 This question is about sewage.

(a) Jenny wants to show that decay is caused by microorganisms, such as bacteria.

Describe how Jenny could do an experiment to show that decay is caused by microorganisms.

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

(b) The microorganisms need a gas to help them break down the sewage.

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

carbon dioxide	☐
carbon monoxide	☐
nitrogen	☐
oxygen	☐

[1]

(ii) The presence of this gas is one factor that helps the microorganisms.

Write down **one other** factor that helps the microorganisms break down sewage.

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

(c) After sewage has been treated it can be used as fertiliser by farmers.

(i) Why does sewage need to be treated before it can be used as fertiliser by farmers?

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

(ii) Fertilisers are used in intensive farming.

What is meant by intensive farming?

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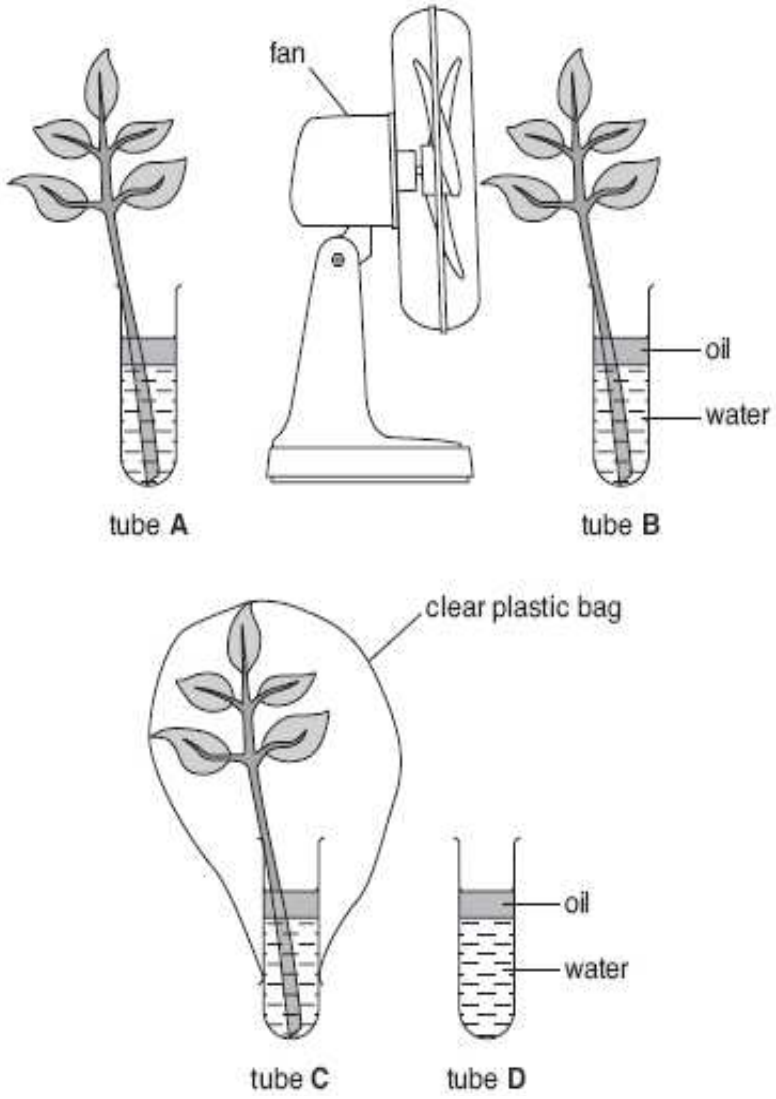
..... **[1]**

[Total: 7]

4 Jo is investigating the effect of some factors on transpiration in plants.

Look at the diagram. It shows the apparatus she uses.



Jo records the mass of each tube and its contents.

She leaves the apparatus for 5 days in the same room.

She then records the mass again.

The table shows Jo's results.

tube	**A -** left at room temperature	**B –** left in room with a moving fan next to it	**C –** left in room with a clear plastic bag over it	**D –** no plant left at room temperature
mass at start in g	42.4	47.3	39.2	31.9
mass at end in g	35.3	35.8	38.5	31.9

(a) Compare the effects of increasing air movement and increasing humidity on the rate of transpiration in Jo's plants.

Use information from the table, as well as your own calculations, to help you answer.

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

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..... **[6]**

(b) Explain why Jo set up tube **D**.

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

(c) Jo left each tube in the same room for the same amount of time.

She did this to help make her experiment a fair test.

Suggest **one other** thing she could have done to help make it a fair test.

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

(d) In Jo's experiment, water moves from the tubes to the leaves through transport vessels.

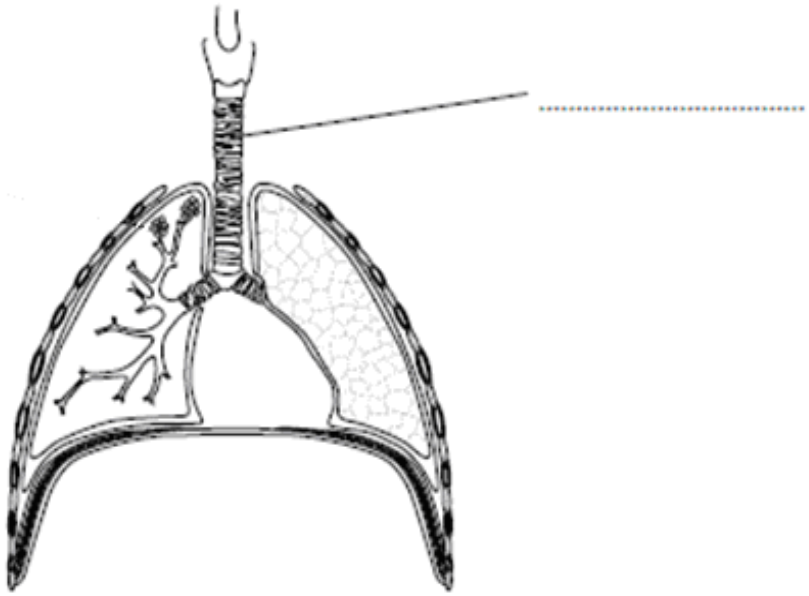
Write down the name of these vessels.

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

[Total: 9]

Section B – Module B5

5 The diagram shows the main parts of the human respiratory system.



(a) Write the correct name next to the label line.

Choose the part from this list.

air sac

bronchus

diaphragm

intercostal muscle

trachea

[1]

(b) The respiratory system can be damaged by a number of different medical conditions.

One of these conditions is asthma.

Write down the name of **one other** condition that can damage the respiratory system.

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

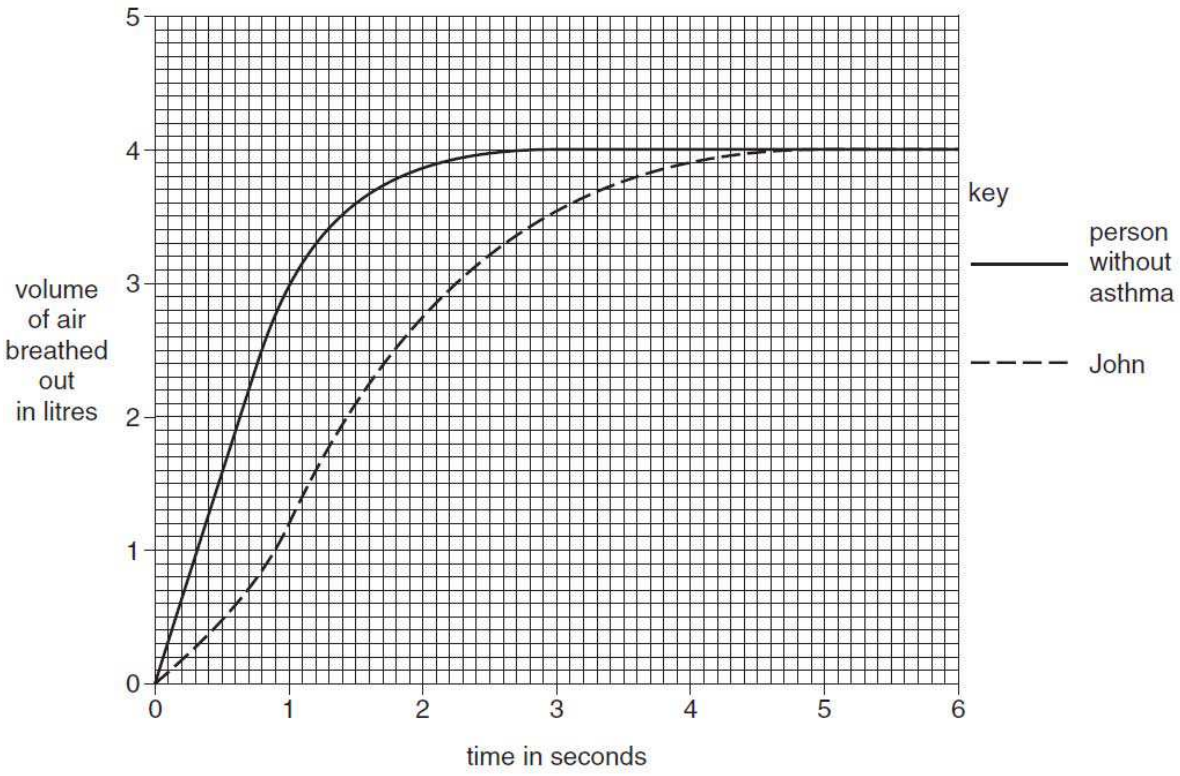
(c) John has asthma.

He goes to his doctor who asks him to breathe into a machine called a spirometer.

This measures the volume of air John breathes out in a single deep breath.

The graph shows the results for John.

It also shows the results for a person of John's size and age who does **not** have asthma.



(i) John and the other person have the same vital capacity.

Look at the graph.

What is their **vital capacity**?

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

(ii) One of the symptoms of asthma is difficulty in breathing.

Look at the graph.

What evidence does the graph show that supports the fact that John has asthma?

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

(iii) John was worried that blowing hard into the spirometer might lead to an asthma attack.

Suggest what precautions he or his doctor could have taken to make the test as safe as possible.

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

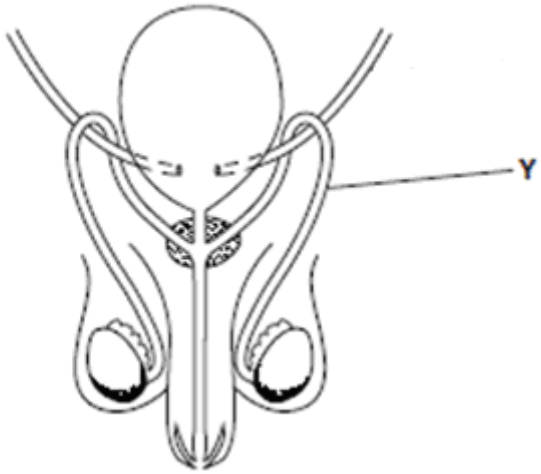
[Total: 6]

6 Paul and Sue have been trying to start a family.

However so far Sue has not become pregnant.

Paul goes to his doctor to check his fertility.

(a) The diagram shows Paul's reproductive system.



Paul's doctor finds that the tube labelled **Y** on the diagram is narrower than usual.

Will this affect Paul's fertility? Explain your answer.

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

(b) Fertility treatments have been developed by scientists to help people become pregnant.

Suggest how such developments could affect couples like Paul and Sue.

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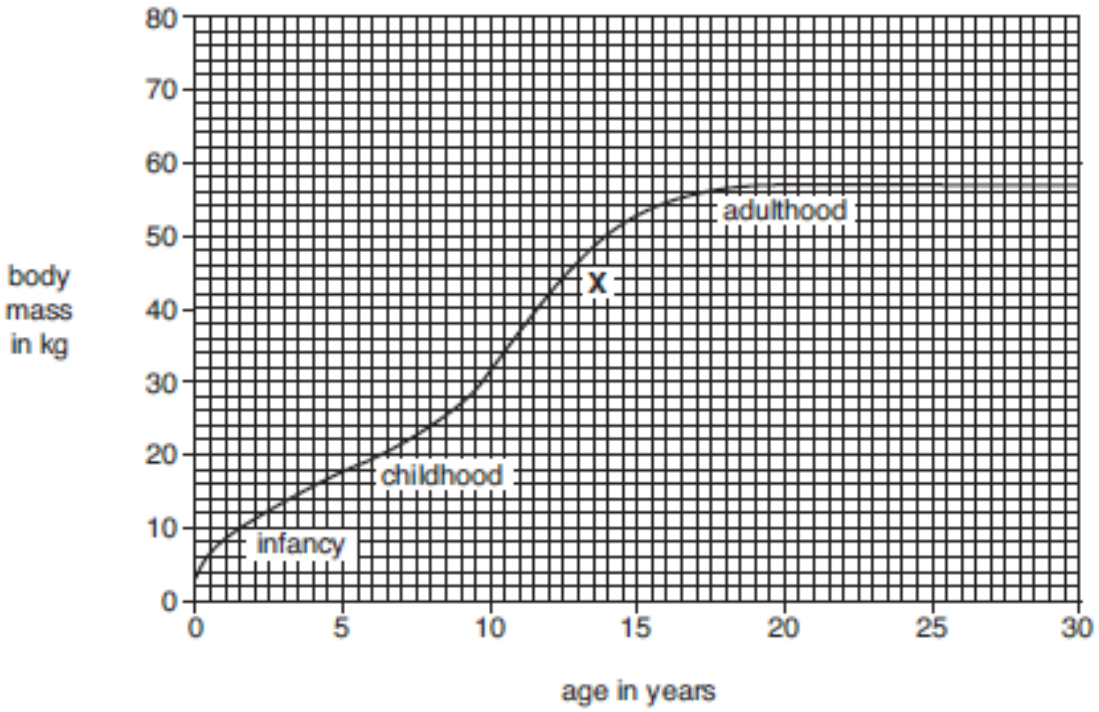
..... **[2]**

[Total: 4]

7 Mass since birth can be recorded on average growth charts.

The graph shows average growth data for women up to the age of 30.



(a) The graph shows four different stages of growth.

Look at the graph.

Name the stage labelled with an **X**.

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

(b) Look at the graph.

(i) At what age do women grow most quickly?

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

(ii) At what age do women stop growing?

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

(c) Lucy is a 10 year-old girl with a body mass of 22 kg.

Lucy's parents are concerned about her growth.

Should Lucy's parents be concerned about her growth and what factors could have affected Lucy's growth?

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

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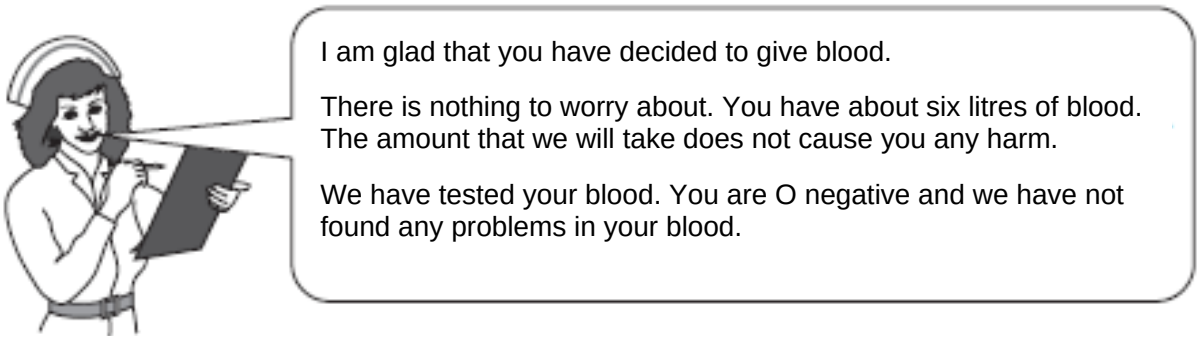
[Total: 9]

8 Tony decides to donate blood.

The nurse in charge of the donation is talking to him.



(a) Why is it important to donate blood?

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

(b) The nurse tells Tony that he is **O negative**.

What is this describing?

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

(c) In the past, some people thought that illnesses could be treated by removing some of a patient's blood using a type of worm called a leech.

The leech was placed on the patient so its mouthparts pierced the skin so it could feed on the patient's blood.

When a leech feeds, **anti-coagulants** from its mouthparts enter the patient's blood.

Suggest how the anti-coagulants help the leech.

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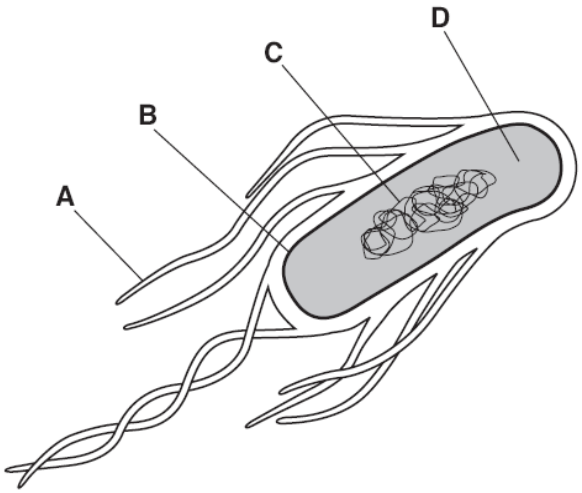
..... **[2]**

[Total: 6]

Section C – Module B6

9 (a) Sewage can contain bacteria called coliforms.

A coliform is shown in the diagram.



(i) Look at the diagram.

Which labelled part is a flagellum?

Choose **A**, **B**, **C** or **D**.

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

(ii) On the diagram, the coliform is shown 90 mm long.

It is shown on the diagram 30 000 times larger than in real life.

Light microscopes can be used to see things as small as 0.3 microns (0.0003mm).

Use calculations to show that a light microscope can be used to count the number of coliforms in a sample.

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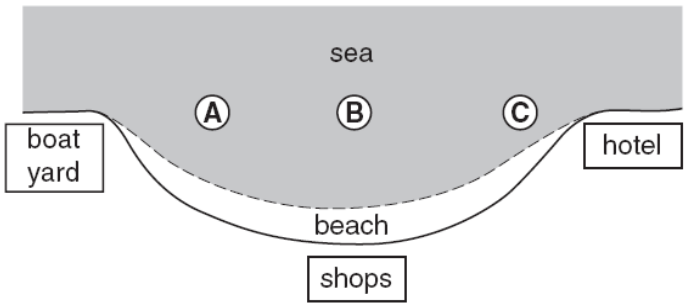
..... **[2]**

(b) Coliforms can be found in sea water if sewage is released into the sea.

The number of coliforms in samples from the sea near beaches is counted.

This tells people whether it is safe to swim.

The drawing shows an area around a beach.



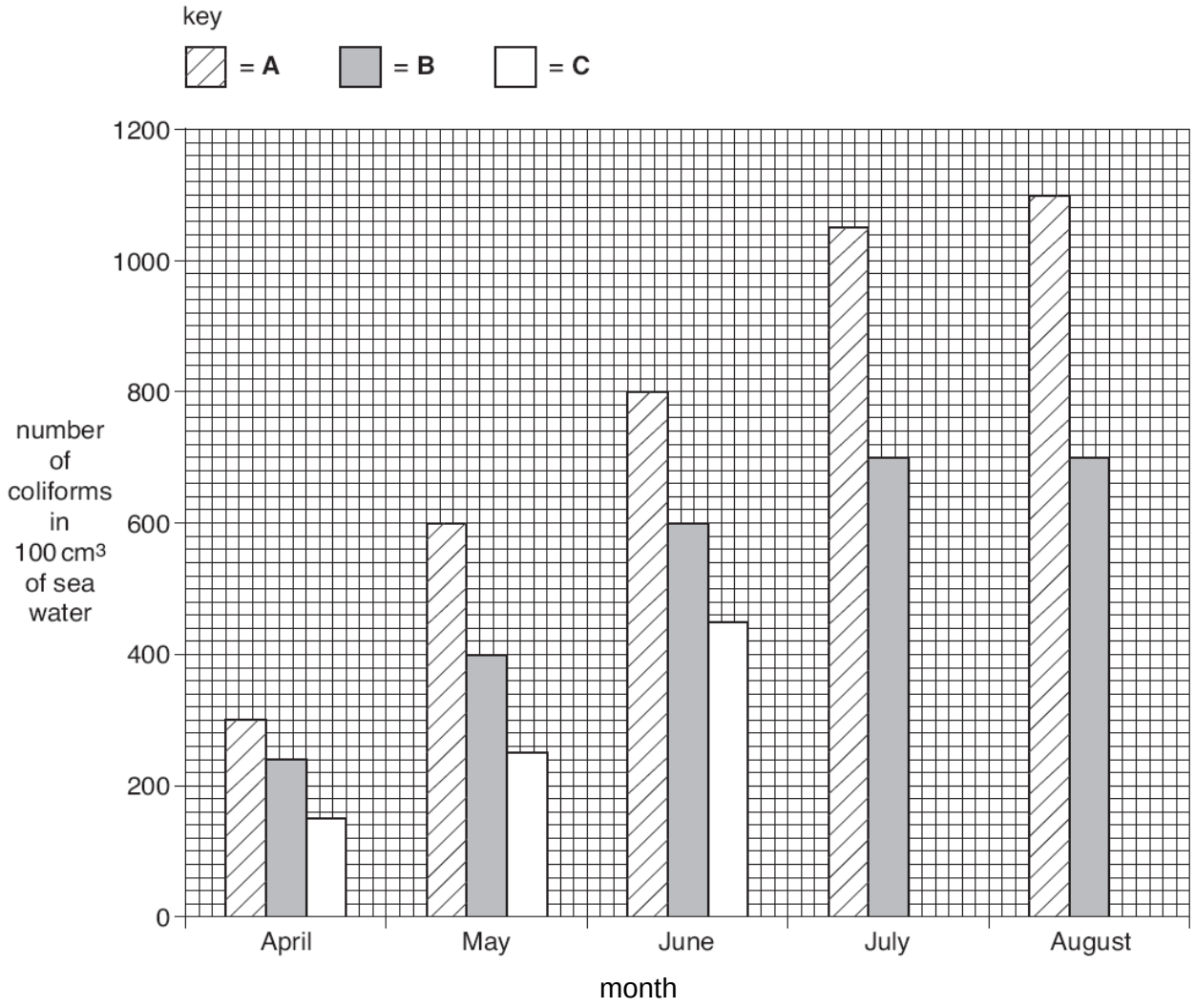
The sea water has been sampled at points A, B and C.

The table shows the results for point **C**.

month	**number of coliforms in 100 cm^3 of water at point C**
April	150
May	250
June	450
July	500
August	300

(i) The bar chart shows the number of coliforms found in the sea at sample sites **A**, **B** and **C**.

Use the information in the table to draw the **two** bars on the bar chart for point **C** in July and August. **[1]**



(ii) The beach is closed to people if the number of coliforms goes above 1000 in 100 cm^3 of water.

During which **two** months is the beach closed?

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

(iii) Scientists think that the sewage may be leaking from **one** of the three buildings near the beach.

Look at the graph and the drawing of the beach area.

Write down which building the sewage **probably** comes from.

Explain your answer.

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

(iv) The scientists are **not certain** about which building the sewage is leaking from.

What could the scientists do to support their conclusion?

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

[Total: 8]

10 Wine is made from grapes using micro-organisms.

Describe the process by which wine is made.

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

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..... **[6]**

[Total: 6]

11 Read the article from a newspaper.

Fighting cholera with potatoes!

Cholera can spread very quickly from person to person. It is a disease caused by bacteria.
It kills 200 000 people a year.

Scientists have used potato plants to make a new medicine.
They hope that this new medicine might stop people getting cholera.

The scientists genetically engineered the potato plants so they produce the medicine.
They hope that just eating the potatoes will protect people from the disease.

(a) Cholera often spreads very quickly after natural disasters such as earthquakes.

Explain why earthquakes can cause **cholera** to spread very quickly.

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

(b) The potato plants used to make the new medicine have been **genetically engineered**.

Describe the process used to genetically engineer the potato plants.

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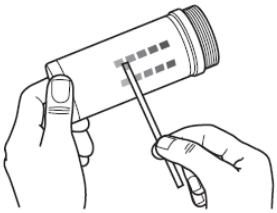
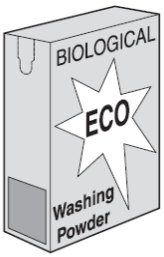
..... **[2]**

[Total: 4]

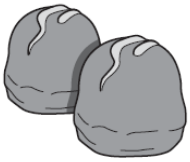
12 The diagrams show some products made using enzymes.



reagent testing strips for people with diabetes



biological washing powder



low sucrose chocolates

(a) Describe how people with diabetes use reagent testing strips.

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

(b) The chocolates are made low in sucrose using sucrase.

How will this affect the taste of the chocolates compared to chocolates high in sucrose?

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

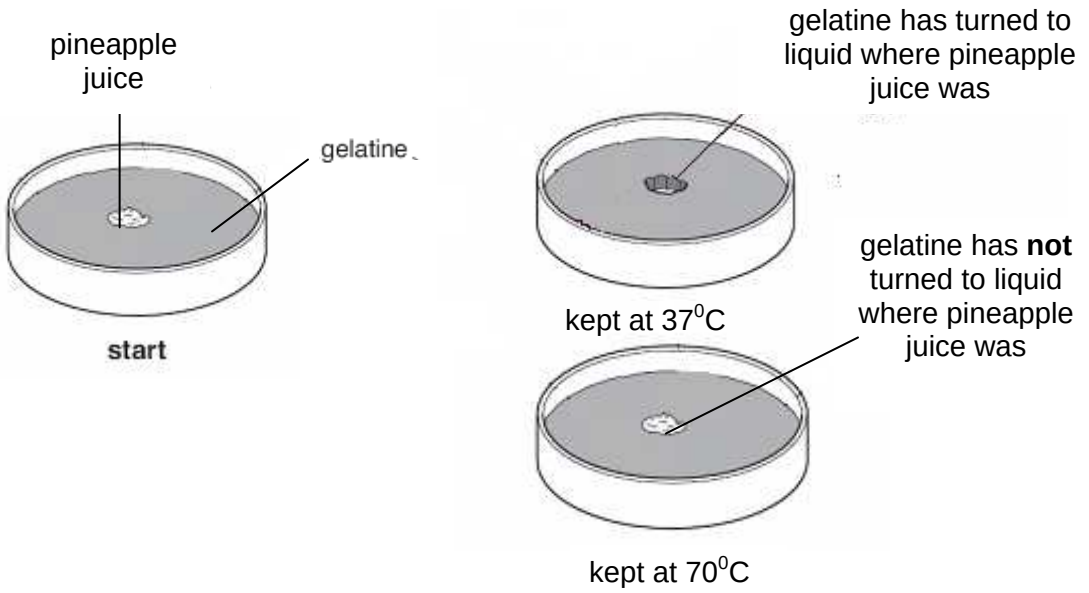
(c) Gerant decides to do an experiment with pineapple juice.

He puts a small amount of the pineapple juice in a dish containing a jelly called gelatine.

Gelatine is a protein. When gelatine is digested it turns to liquid.

He keeps the dish at 37 ^{0}C.

He repeats this with another dish but keeps this dish at 70 ^{0}C.



Explain the results of Gerant's experiment.

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..... **[4]**

[Total: 7]

Section D

13 This question is about measuring fitness levels.

(a) One way of measuring fitness is to calculate someone's **recovery rate.**

Recovery rate is a measure of how quickly after exercise the pulse rate returns to a resting level.

Recovery rate can be calculated using the formula:

$$\text{recovery rate} = \frac{\text{pulse rate during exercise} - \text{pulse rate after 1 minute}}{10}$$

The table shows how recovery rate relates to fitness level.

recovery rate	**fitness level**
less than 2	poor
2 to 2.9	fair
3 to 3.9	good
4 to 5.9	excellent
above 6	outstanding

Pulse rate is measured in beats per minute (bpm).

(i) Amy measures her pulse rate whilst running on a treadmill.

It is 120 bpm.

She stops running and measures her pulse rate one minute later.

Now it is 91 bpm.

Show that Amy's **fitness level** is 'fair'.

Show all your working clearly.

[1]

(ii) When Neil does the test, his recovery rate is 3.1, so his fitness level is 'good'.

Is Neil really fitter than Amy?

Explain your answer.

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

(b) Amy measures her resting pulse rate.

She counts her pulse for 15 seconds. She does this three times.

Amy uses each measurement to calculate her pulse rate in **beats per minute** (bpm).

She now has three values for her pulse rate in bpm.

The table shows her results.

	number of pulses in 15 seconds	pulse rate in beats per minute
1st measurement	18	72
2nd measurement	17	68
3rd measurement	19	76

Neil measures his resting pulse rate.

He counts his pulse for 60 seconds (1 minute).

He does this three times.

The table shows his results.

	pulse rate in beats per minute
1st measurement	66
2nd measurement	67
3rd measurement	65

Compare the methods used by Amy and Neil for measuring pulse rate.

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

(c) Neil and Amy want to measure their fitness levels in a different way.

First, they measure their resting pulse rates.

Then they exercise by doing press-ups for one minute.

Then they measure their pulse rates every minute for five minutes.

The table shows their results.

		pulse rate in bpm					
	resting pulse rate in bpm	straight after exercise	1 min after exercise	2 min after exercise	3 min after exercise	4 min after exercise	5 min after exercise
Neil	66	110	82	68	66	66	66
Amy	72	128	114	102	92	84	78

Look at the table.

Who is the fittest, Neil or Amy?

Explain your answer using data from the table.

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

(d) Amy and Neil have now measured their fitness levels using two different methods.

Evaluate these methods and the results they produce.

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

[Total: 10]

[Paper Total: 85]

END OF QUESTION PAPER

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