Surname	Centre Number	Candidate Number
Other Names		0

GCSE – NEW

3430U10-1

S17-3430U10-1

SCIENCE (Double Award)

Unit 1: BIOLOGY 1
FOUNDATION TIER

WEDNESDAY, 14 JUNE 2017 – MORNING

1 hour 15 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**5**	
2.	**9**	
3.	**11**	
4.	**6**	
5.	**14**	
6.	**5**	
7.	**10**	
Total	**60**	

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ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen. Do not use correction fluid.
Write your name, centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.
Question **5***(c)* is a quality of extended response (QER) question where your writing skills will be assessed.

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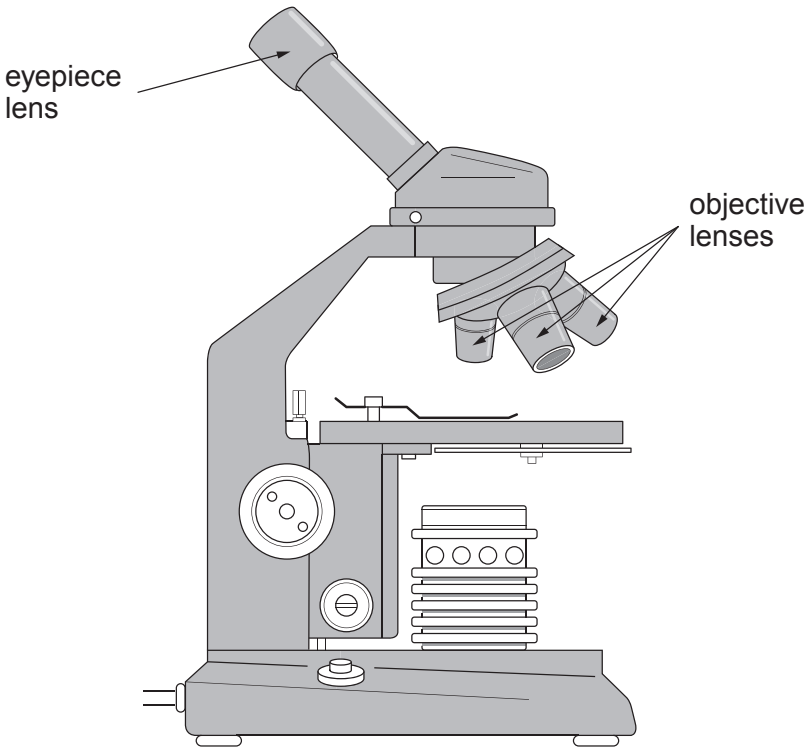
Answer **all** *questions.*

1. Rhys studies some plant tissue using the instrument shown below.



(a) State the name of the instrument shown in the diagram. [1]

.....

(b) The table shows the magnification of each of the four lenses.

Lens	Magnification
eyepiece lens	×10
low power objective lens	×4
medium power objective lens	×10
high power objective lens	×40

Calculate the maximum magnification that is possible with this instrument. [2]

maximum magnification = × .....

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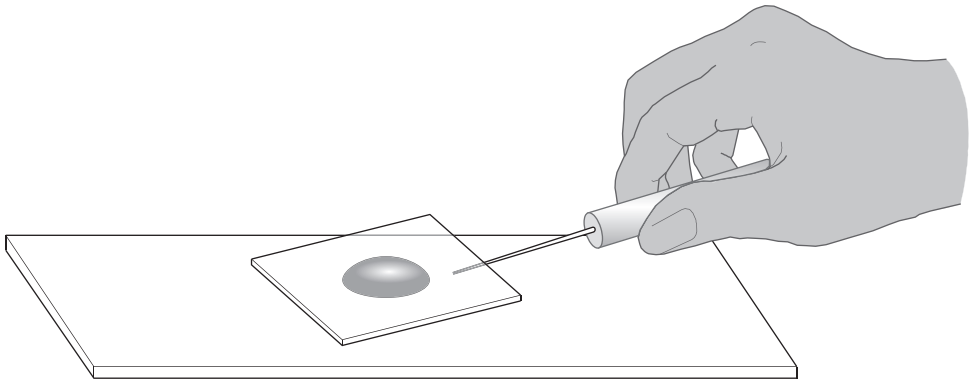
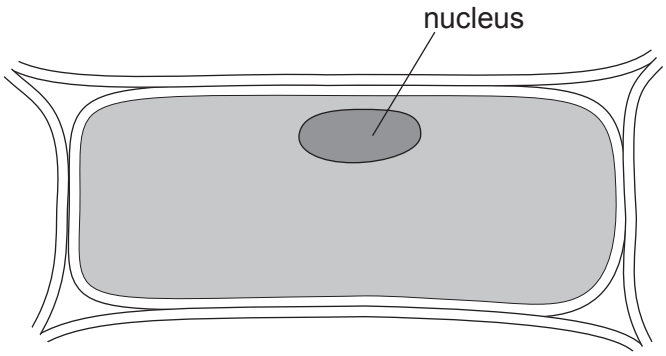
Rhys places some of the plant tissue in water on a slide and lowers a cover slip on top as shown below.



He draws one cell from the tissue as seen under the maximum magnification.
His drawing is shown below.



(c) State what Rhys could have done to the plant tissue to show more detail of the cell structures. [1]

.....

(d) State the function of the nucleus. [1]

.....

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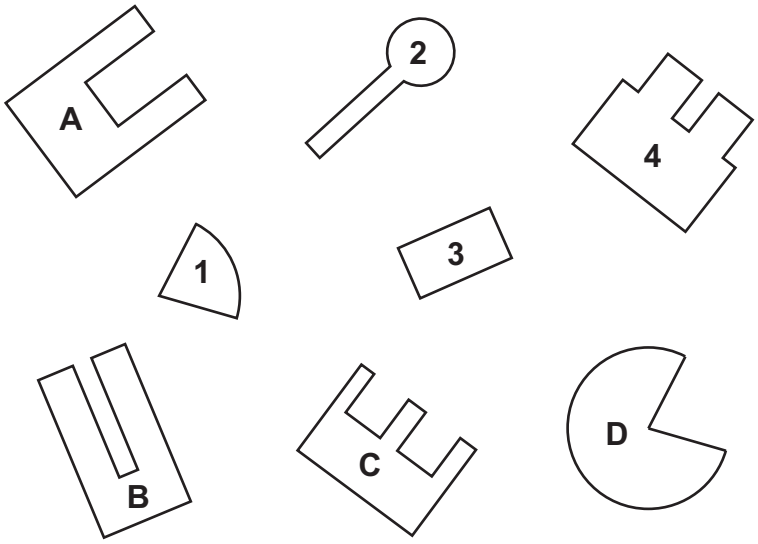
2. *(a)* Use some of the following words to complete the table about enzymes. [3]

fatty acids **lipids** **amino acids** **glucose** **glycerol**

Enzyme	Substrate	Products
protease	protein	.....
lipase	.....	..... and .....

(b) The diagram shows four enzymes **A – D** and four substrates **1 – 4**.



Use your knowledge of the lock and key theory to complete the table below by matching each enzyme to its substrate. [1]

Enzyme	Substrate
A	.....
B	.....
C	.....
D	.....

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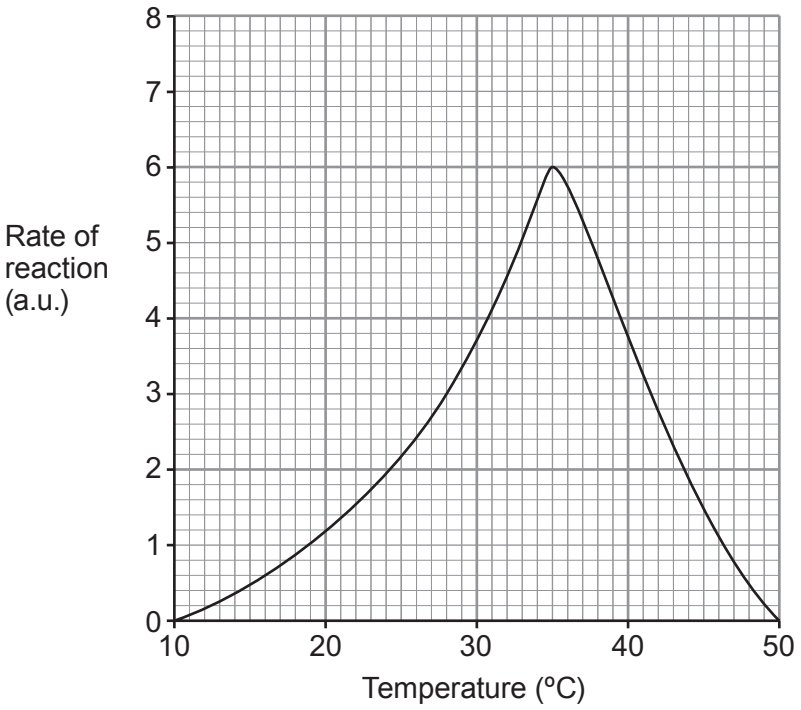
(c) The graph shows the effect of temperature on the rate of an enzyme controlled reaction between 10 °C and 50 °C.



(i) From the graph, describe the effect of temperature on the rate of the reaction between 10 °C and 50 °C. [3]

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(ii) Most enzymes are denatured by boiling.
Use your answer to part *(b)* to help explain why a denatured enzyme can no longer work. [2]

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3. In a study of physical fitness levels, experts analysed a survey of adults in which they were asked how much they had exercised in the previous four weeks.

The report of the survey, which involved 1615 people, claimed that 30% of the British population did no exercise.

Reported in DailyTelegraph 05/06/15

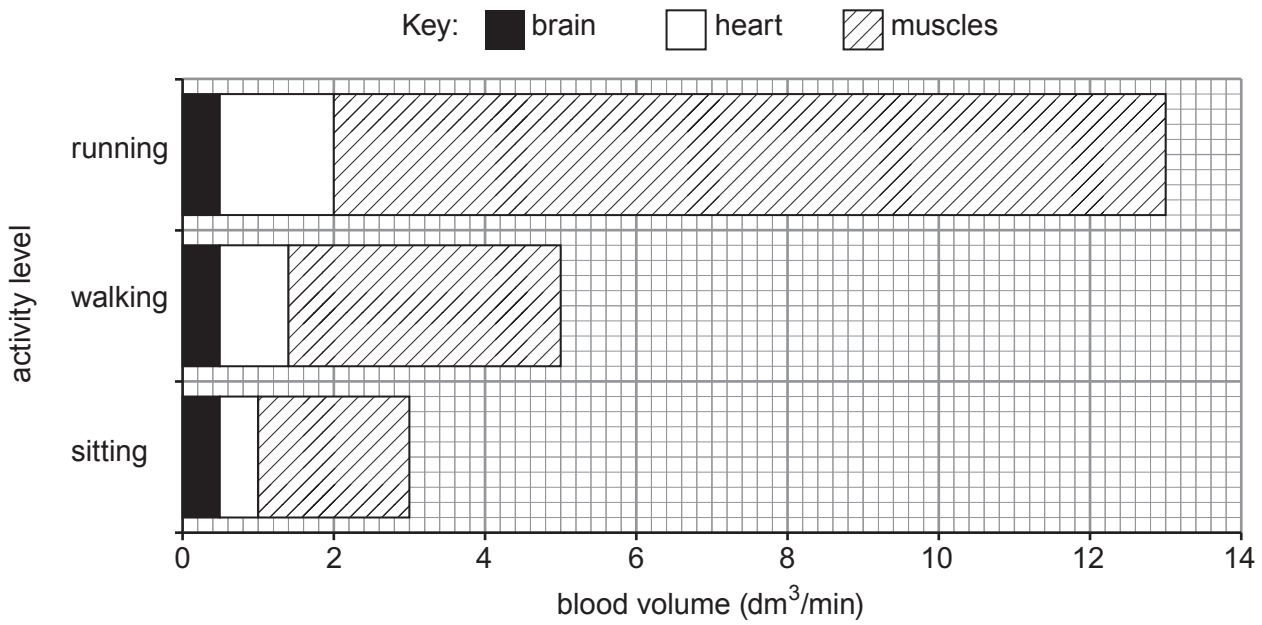
(a) Using the above information, calculate the number of people in the survey who did no exercise. [2]

Number of people = ...

(b) Why was it important to use a large number of people in this survey? [1]

.....

(c) The bar chart shows the blood volume (dm^3/min) supplied to some parts of the body at rest and during exercise.



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(i) Calculate the blood volume supplied to the muscles when sitting. [1]

Blood volume = ... dm^3/min

(ii) Calculate the increase in blood volume supplied to the muscles when running compared to sitting. [1]

Increase in blood volume = ... dm^3/min

(iii) Complete the following sentence. [1]

As blood flows through muscles, substances pass out of narrow blood vessels.

These blood vessels are called ..... .

(iv) Three of the following statements correctly describe the result of **an increase in blood volume** supplied to muscles.

Underline the **three** correct statements. [3]

More oxygen is supplied

More lactic acid is produced

More glucose is supplied

More anaerobic respiration takes place

More aerobic respiration takes place

(d) Explain why lack of exercise can result in obesity. [2]

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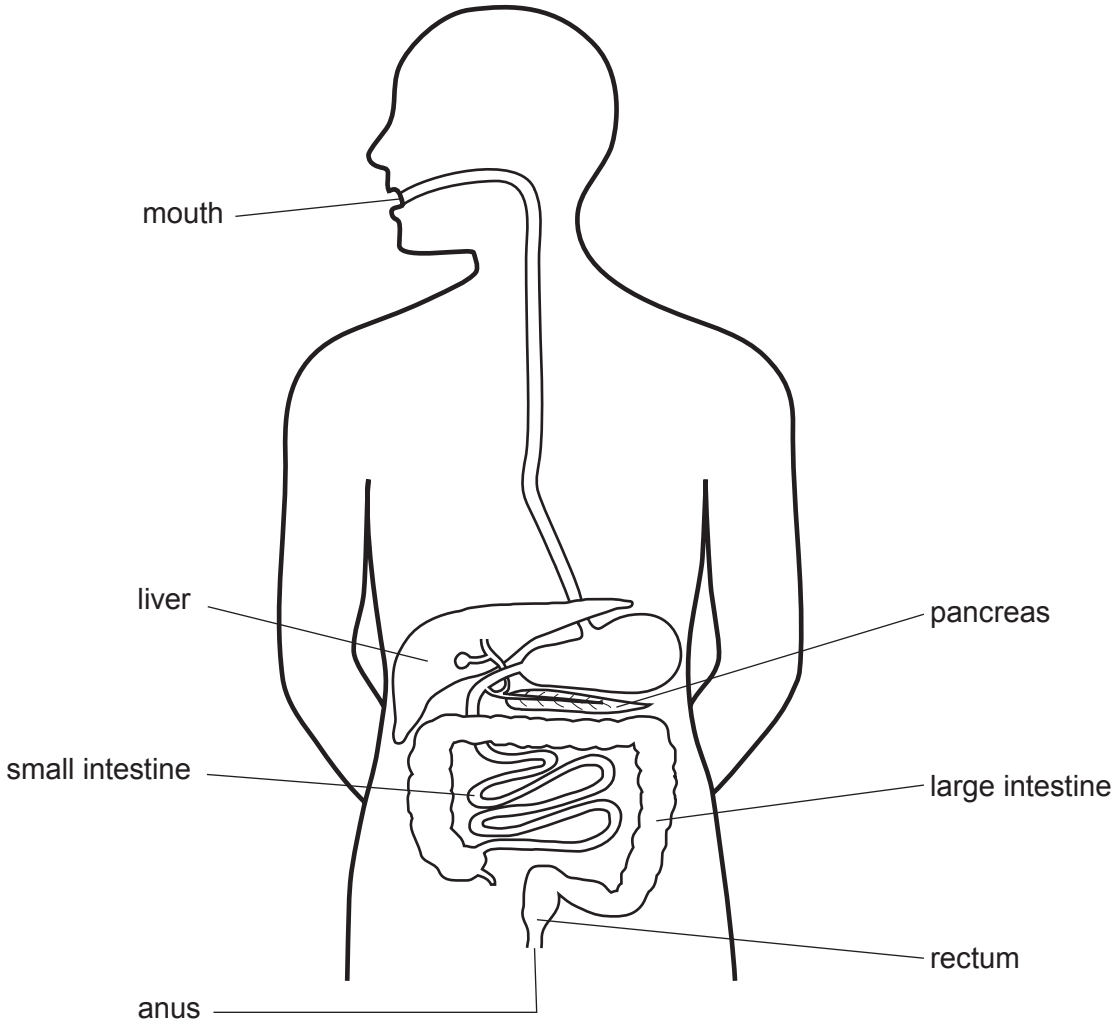
4. The diagram shows the human digestive system.



(a) State which of the **labelled parts** in the above diagram absorbs digested food molecules. [1]

.....

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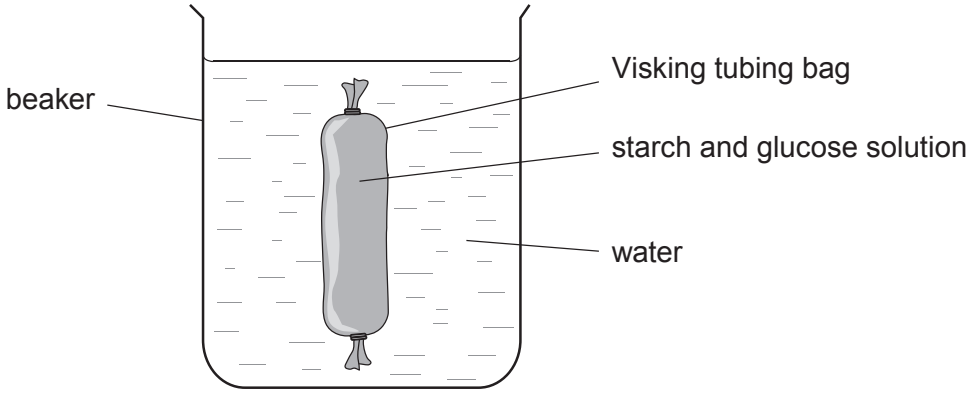
(b) Visking tubing acts as a model of absorption in the digestive system.

The diagram shows a Visking tubing bag filled with a solution of starch and glucose, in a beaker of water.

Samples from inside the Visking tubing bag and the water in the beaker were tested for starch and glucose at the start. This was repeated after 10 and 20 minutes.



(i) **Complete the table below** by writing a ✓ or x in each space to show the expected results at 10 and 20 minutes. [3]

key: ✓ molecule present x molecule absent

Sample tested	Tested for	Start	Time after start (minutes)	
			10	20
Contents of Visking tubing bag	starch	✓	✓	✓
	glucose	✓	✓	.....
Water in the beaker	starch	x	.....	.....
	glucose	x	.....	.....

(ii) Use your knowledge of the size of starch and glucose molecules to explain the expected results **at 20 minutes** for **the water in the beaker**. [2]

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5. Smoking is the largest single cause of avoidable ill health and early death in Wales. In order to reduce this, the Welsh Government has focused on three areas in recent years: discouraging young people from starting to smoke, helping smokers to give up and extending smoke-free environments.

(a) Tobacco smoke contains carcinogens.

State the type of disease caused by carcinogens. [1]

.....

(b) The table below shows the percentage of the adult population of Wales between 2007 and 2014 who smoked cigarettes.

Year	Percentage of the adult population who smoke (%)
2007	24
2008	24
2009	23
2010	22
2011	22
2012	21
2013	20
2014	19

Sources: National Public Health Service for Wales, Welsh Assembly Government, Office for National Statistics

(i) Complete the graph of the data above on the grid opposite by: [3]

I. plotting the points from 2010 to 2014

II. joining all the plots using a ruler.

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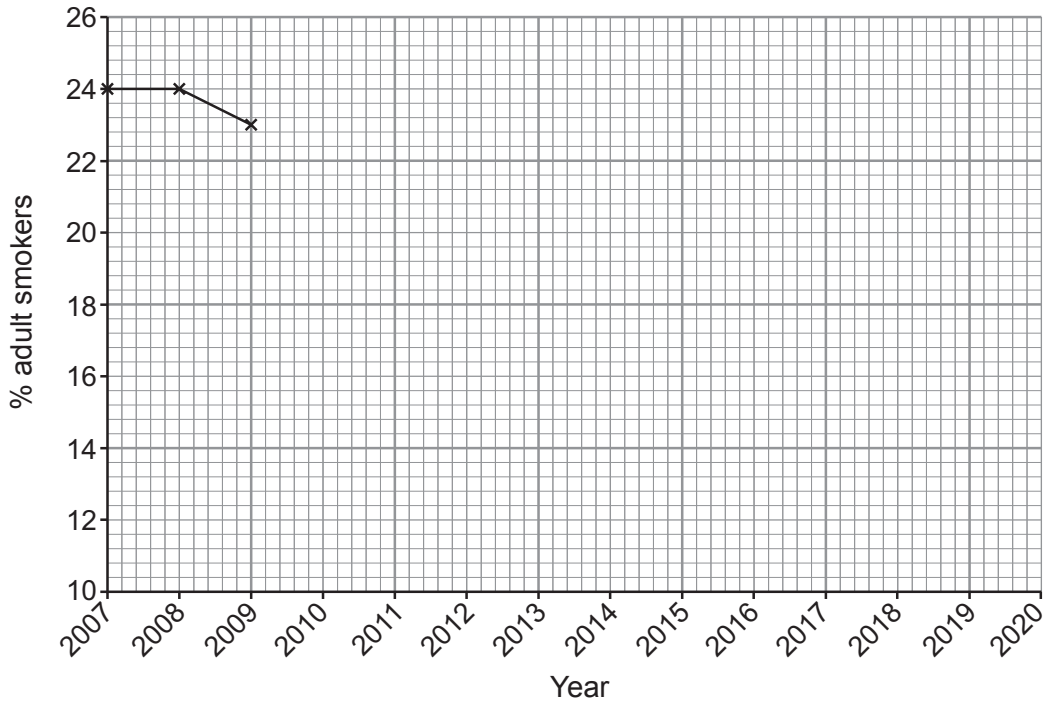

(ii) In 2007, the Welsh Government banned smoking in enclosed public places as part of a policy to reduce the percentage of adults who smoke.

Give the evidence that the ban had no immediate effect on the percentage of adults who smoke. [1]

.....

(iii) In 2012, the Welsh Government produced a Tobacco Control Action Plan. One aim was that by 2020 no more than 16% of adults would smoke.

I. **Extend the line on the graph to predict** the % of adult smokers in 2020. Write your answer below. [1]

adult smokers in 2020 = ... %

II. Your prediction in part (I) is based on an assumption. What does your prediction assume? [1]

.....

.....

(iv) Suggest **one** *other* step that could further reduce the percentage of adults who smoke. [1]

.....

.....

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(c) The breathing rate is the number of times a person breathes in and out in one minute. You have 100 volunteers. Of these, 50 are cigarette smokers and 50 do not smoke.

Plan an investigation to answer the following question:

'Is the breathing rate of smokers different from that of non-smokers?'

Include at least **two** factors which should be kept the same in order to make it a fair test.
[6 QER]

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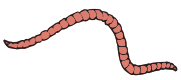
6.

Following flooding in parts of Wales in 2015, environmental scientists investigated nitrate pollution in three different streams. They counted the numbers of eight different indicator species in equal lengths of the three streams, on the same day. The indicator species they counted are shown in the chart below.

GROUP	INDICATOR SPECIES	POLLUTION LEVEL
A	Mayfly nymph Stonefly nymph	If you find these animals in your stream, then there is **LITTLE OR NO POLLUTION**
B	Caddis fly larva Freshwater shrimp	If you find these animals, but none from Group **A**, then there may be **SLIGHT POLLUTION**
C	Hoglouse Bloodworm	If you find these animals, but none from Groups **A** or **B**, then there is probably **MEDIUM POLLUTION**
D	 Worm (*Tubifex*) Rat-tailed maggot	If you find these animals, but none from Groups **A**, **B** or **C**, then there is **HIGH POLLUTION**
E	No live animals found	If you find no animals at all, then there is **VERY HIGH POLLUTION**

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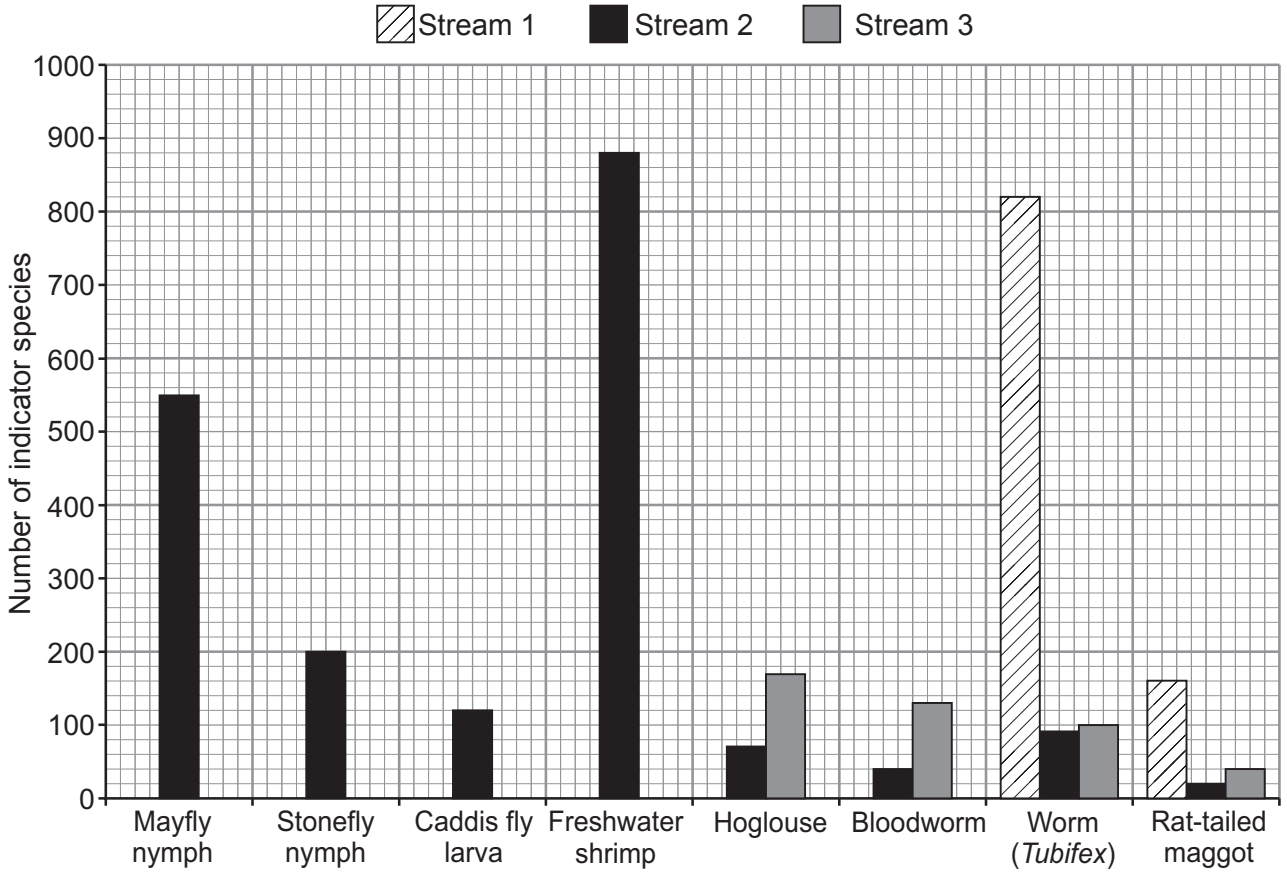
Graph showing the number of indicator species found in each of the streams 1, 2 and 3



(a) (i) Using the graph above and the chart on the opposite page state the pollution level in each of the three streams. [2]

stream **1** .....

stream **2** .....

stream **3** .....

(ii) Suggest **two** possible **sources** of nitrate pollution in streams. [2]

.....

.....

(b) Name **one** type of indicator species which could be used to assess levels of air pollution. [1]

.....

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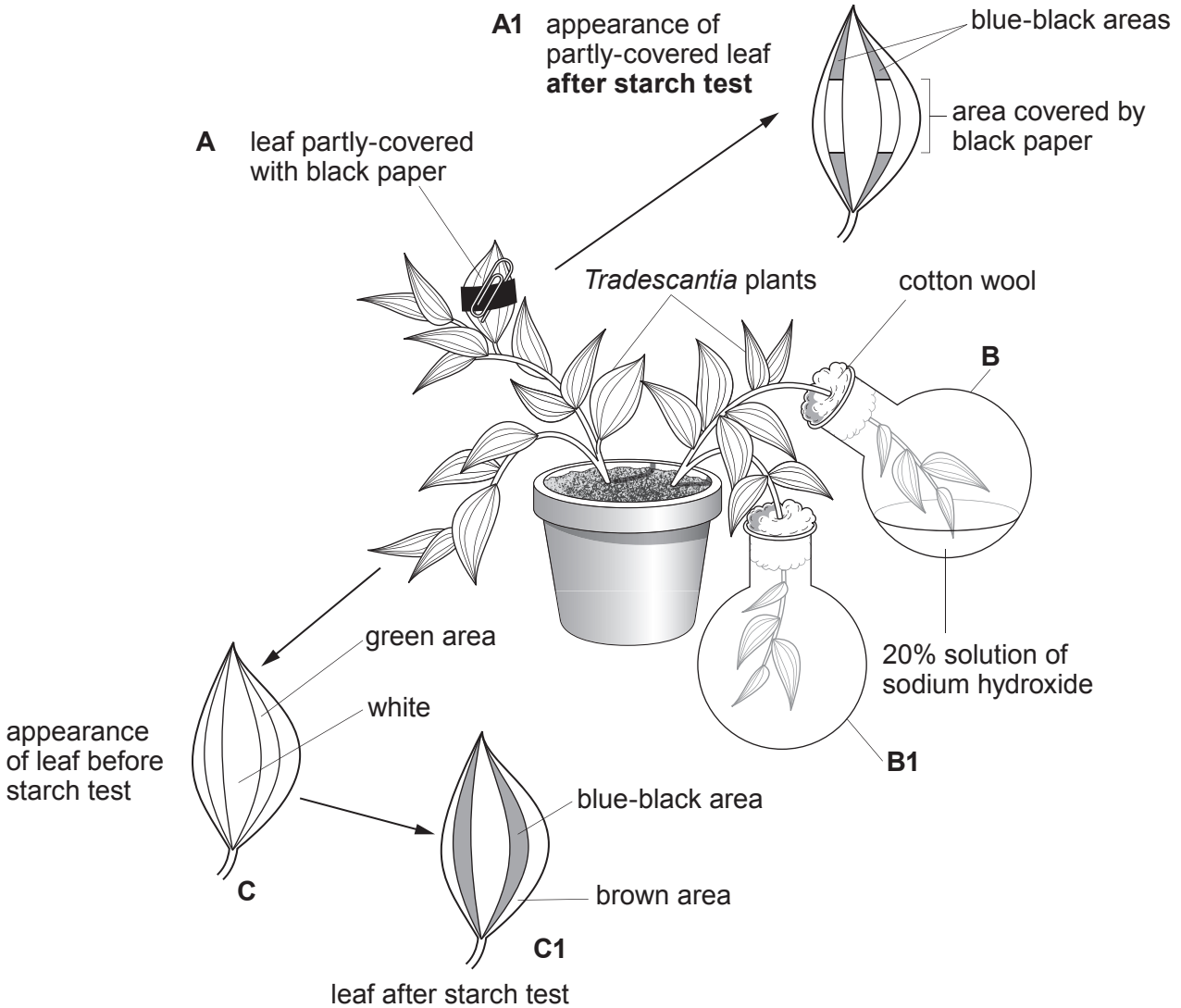
7. *Tradescantia* is a plant whose leaves have green and white areas.

Tradescantia leaves

In the experiment below, a *Tradescantia* plant is used in an investigation to demonstrate **three** factors, **A**, **B** and **C**, needed for photosynthesis.



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(a) (i) State the factor needed for photosynthesis, which is being demonstrated in each of the following: [3]

A .....

B .....

C .....

(ii) How could the experiment in flasks **B** and **B1** be improved? Explain your answer. [2]

.....

.....

(iii) Before the apparatus was set up, the *Tradescantia* plant was kept in a dark cupboard for 48 hours. Explain the reason for this. [2]

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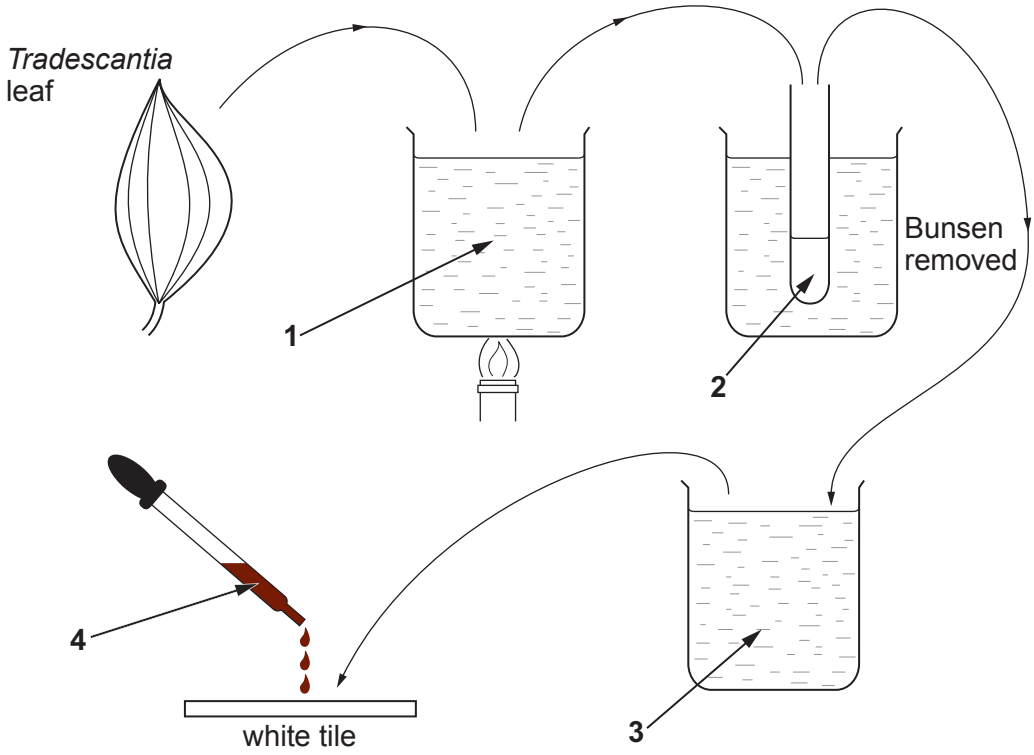
(b) The diagram below shows the stages in testing a leaf for starch.



Name the liquids **1**, **2**, **3 and 4** shown in the diagram. [3]

1 .....

2 .....

3 .....

4 .....

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