



General Certificate of Secondary Education
2014–2015

Centre Number

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Candidate Number

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Double Award Science: Biology

Unit B1
Foundation Tier



[GSD11]

GSD11

TUESDAY 12 MAY 2015, AFTERNOON

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in blue or black ink only. **Do not write with a gel pen.**

Answer **all nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Quality of written communication will be assessed in Question **9(a)**.



- 1 Complete the passage by writing the correct words in the spaces.
Choose the words from the list.

brain heart faster slower organ blood

The Central Nervous System (CNS) is made up of the _____
and spinal cord. It co-ordinates responses between the receptors and the muscles.

The nervous system responds _____ than the hormonal
system. Hormones are chemical messengers that travel in

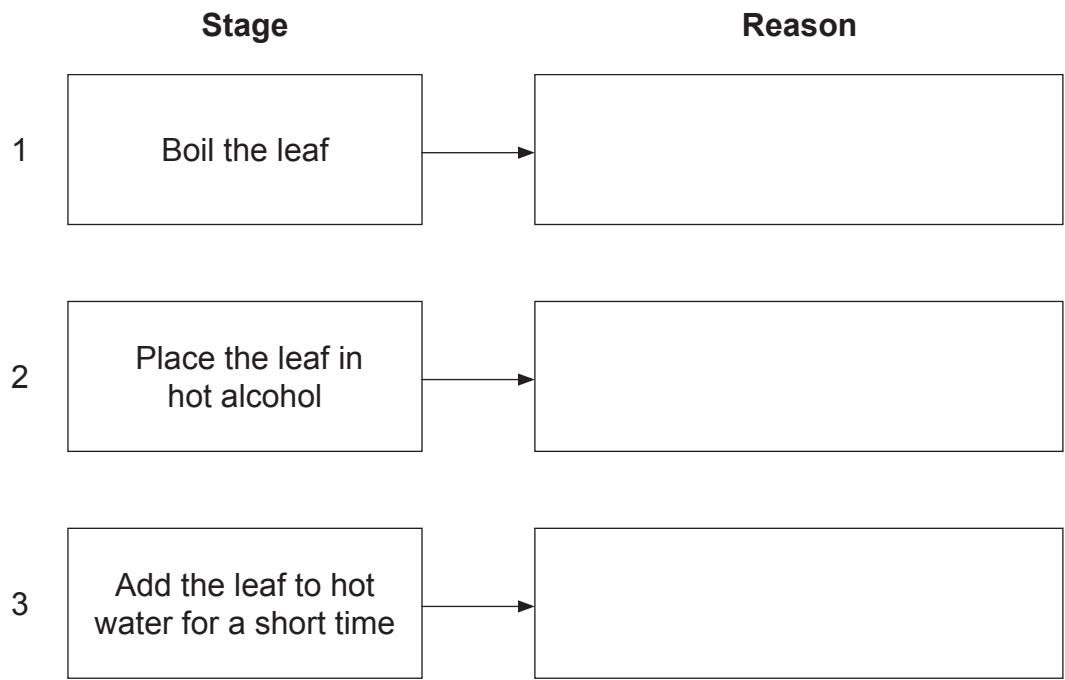
the _____ to a target _____.

[4]



2 The diagram gives the first three stages when testing a leaf for starch.

(a) Complete the diagram by writing the reason for each stage in the box opposite.



[3]

(b) (i) Name the chemical used to test the leaf for starch.

[1]

(ii) Give the colour the leaf would turn if starch is present.

[1]

[Turn over



3 (a) Human health can be affected by environmental factors and food choices.

Give **one other** factor that affects human health.

[1]

(b) An unhealthy diet can result in obesity and diabetes.

Name **two other** conditions that can result from an unhealthy diet.

1. _____

2. _____

[2]

(c) Vitamin C is needed in a balanced diet.

(i) Name the chemical that is used to test for vitamin C in a food sample.

[1]

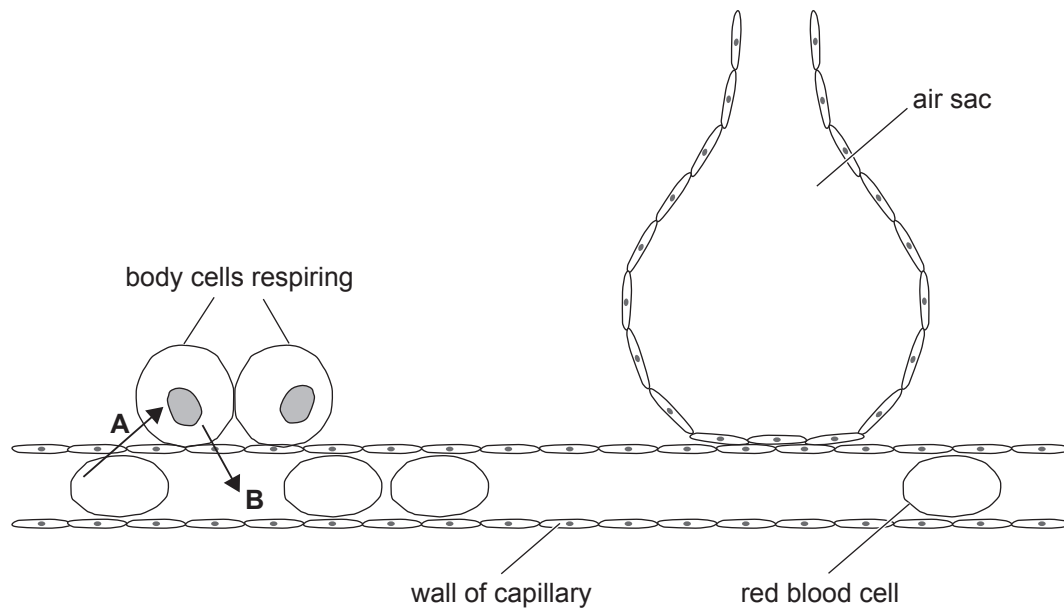
(ii) Give the colour change you would expect if vitamin C is present in the food sample when tested with this chemical.

Colour change _____ to _____

[1]



- 4 (a) The diagram shows a blood capillary, an air sac from the lungs and body cells that are respiring.



Source: Principal Examiner

- (i) Why do cells need to respire?

_____ [1]

- (ii) Name gas **A** that enters the body cells to allow them to carry out respiration.

_____ [1]

- (iii) Name gas **B** that is produced when the body cells respire.

_____ [1]

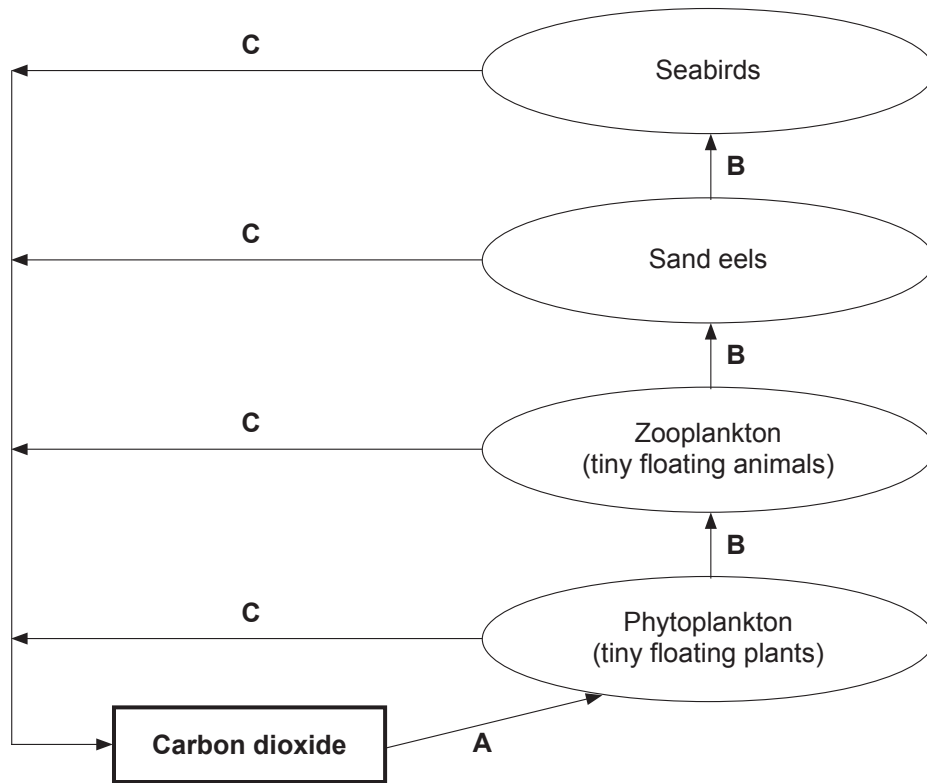
- (b) Use the diagram to give **two** ways the air sacs of the lungs are adapted as a respiratory surface.

 _____ [2]

[Turn over



5 The diagram shows how carbon is cycled through a food chain in the sea.



Source: Principal Examiner

(a) Name processes **A**, **B** and **C**.

A _____

B _____

C _____

[3]

(b) (i) What is the source of energy for the food chain?

[1]

(ii) Name the producer in the food chain.

[1]



(c) Use the food chain in the diagram opposite to draw a pyramid of biomass.

Label the organisms in the pyramid.

[3]

[Turn over



6 (a) Minerals in the soil are used by plants.

(i) Name the cells in the plant that take up minerals from the soil.

[1]

(ii) Plants use nitrates to produce a substance.

Name this substance.

[1]

(b) Farmers can increase the nitrates in the soil by adding artificial or natural fertiliser.

The photographs show a farmer spreading artificial fertiliser and some natural fertiliser.

Artificial



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Natural



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(i) Give **one** example of a natural fertiliser.

[1]

(ii) Give **one** advantage to the **soil** of using a natural fertiliser rather than an artificial fertiliser.

[1]





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[Turn over



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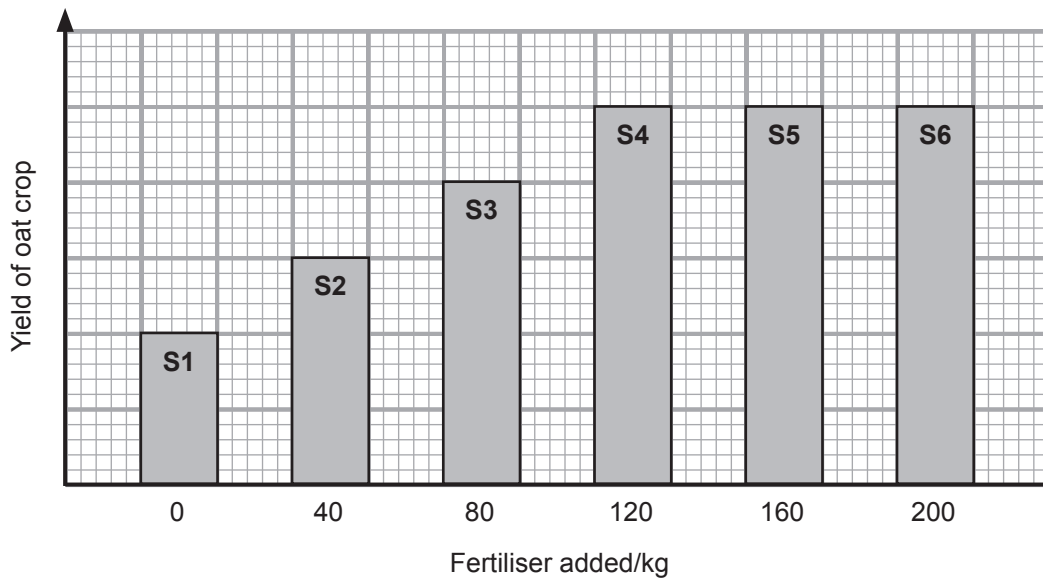
(c) Fertilisers add minerals to the soil.

A farmer planted the same number of oat seedlings in each of six equal-sized strips (**S1** to **S6**) in a field.

He added no fertiliser to strip **S1**, and different amounts of the same fertiliser to strips **S2** to **S6**.

He recorded the yield of the oat crop for each strip after five months.

The bar chart shows the results.



Source: Principal Examiner

(i) Why did oat seedlings grow in strip **S1** in the field?

[1]



(ii) Use **data** from the graph to describe the trend in the yield of the oat crop when increasing amounts of fertiliser were added.

[2]

(iii) Why should the farmer **not** add more than 120 kg of fertiliser when growing oats the following year?

[1]



7 Shags and cormorants are birds that nest on the same cliffs and feed on prey in the same waters.

(a) (i) What does the term habitat mean?

[1]

(ii) What is the habitat of the shags and cormorants?

[1]

(b) The table shows the results from a study of the birds' feeding habits over a two week period.

Region of water where prey live	Type of prey eaten	Numbers of prey eaten/day by the different types of bird	
		Shag	Cormorant
Surface dwelling	Sand eels	33	0
	Herring	49	0
Bottom dwelling	Flatfish	0	26
	Shrimps	0	33

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Use the information in the table and your knowledge to answer the following questions.

(i) Describe and explain how the shags and cormorants can live together in the same area.

[2]



- (ii) A change in currents in the water causes less sand eels and herring to arrive near these cliffs.

Describe and explain what effect this would have on the shag and cormorant populations.

[4]



8 (a) What are enzymes?

[2]

(b) Biological washing powders contain enzymes that break down stains on clothes.

One brand of biological washing powder contains the enzymes lipase and protease. These enzymes work best at 40 °C.

Use this information and your knowledge to answer the following questions.

(i) This brand of washing powder was used on clothes that had **only** protein stains.

Name the breakdown product found in the resulting waste water.

[1]

(ii) What type of stain would be broken down by the lipase enzyme?

[1]

(iii) Suggest **one** reason why it is important to follow the manufacturer's guidelines on the amount of powder to add to each wash.

[1]

(iv) What is the advantage to the **environment** of using a washing powder that works best at 40 °C rather than at a higher temperature?

[1]



(v) Non-biological washing powders do **not** contain enzymes.

Why can non-biological washing powders be used at higher temperatures than biological washing powders?

[1]

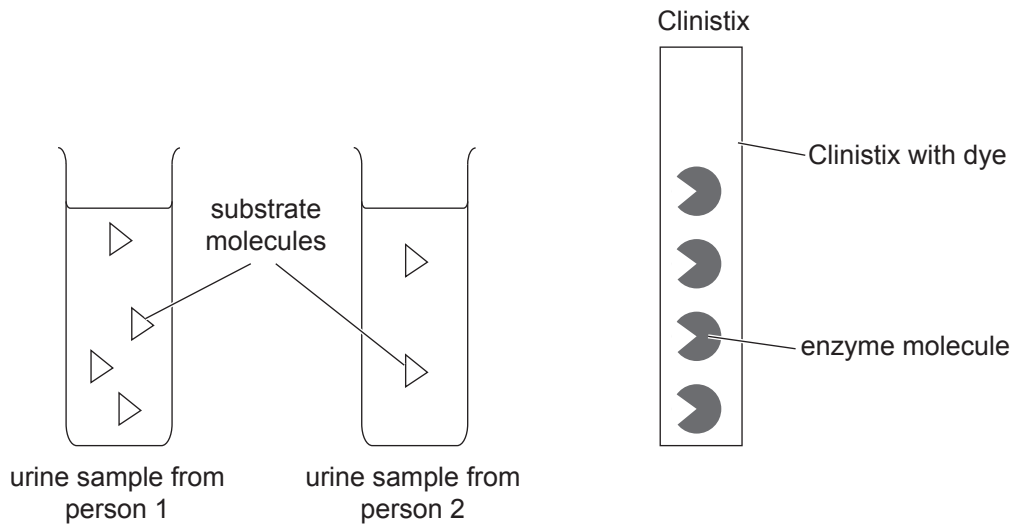
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- (c) A Clinistix is a small paper strip containing one type of enzyme and a dye. It is used to test urine to find out if someone has diabetes.

When **each** enzyme molecule on the Clinistix joins with a substrate molecule, it produces a small change in the colour of the dye.

The diagram shows urine samples from two people with untreated diabetes and a Clinistix.



Source: Principal Examiner

Use this information, the diagram and your knowledge to answer the following questions.

- (i) What substance is found in the urine of a person indicates that they may have diabetes?

[1]



- (ii) Separate Clinistix were placed in the urine samples of person 1 and person 2.

Describe and explain the difference you would expect to see in the two Clinistix test results.

[2]

- (iii) Explain why the Clinistix will **not** react to the presence of other molecules in the urine.

[1]

- (d) Some people with diabetes have to inject a hormone into their bloodstream.

- (i) Name this hormone.

[1]

- (ii) Where in the body is this hormone produced?

[1]

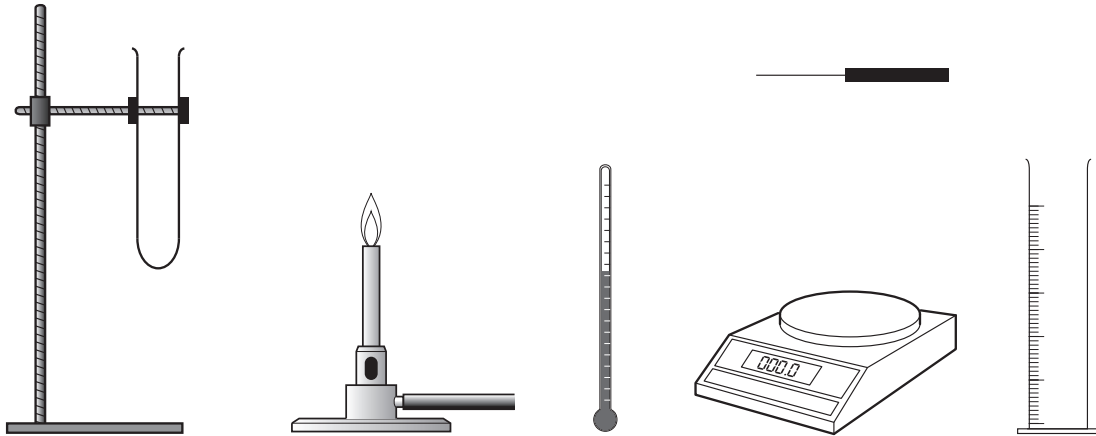
- (iii) Describe and explain the action of this hormone.

[3]

[Turn over



- 9 (a) A student wants to find out the energy content of 1 gram of cheese.
The diagram shows the apparatus that she needs.



Source: Principal Examiner

Describe how the student would carry out this experiment.

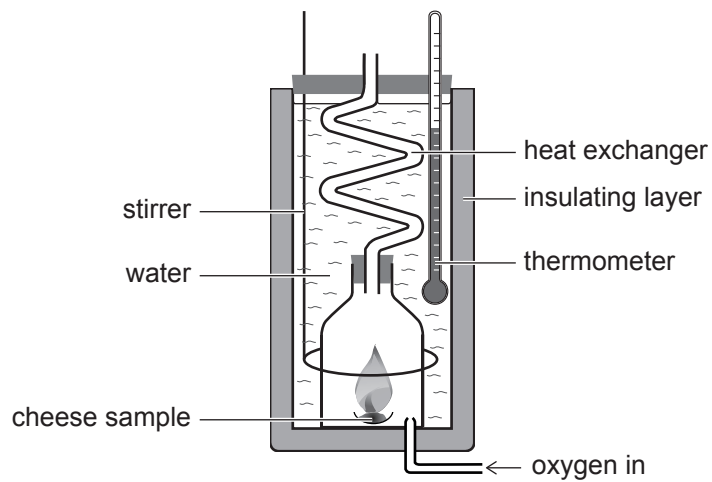
State any measurements she would need to take when using this apparatus.

In this question you will be assessed on your written communication skills, including the use of specialist scientific terms.



[6]

(b) The diagram shows apparatus that a manufacturer would use to check the energy content of 1 gram of cheese.



Source: Examining Team

This apparatus will give more accurate values compared to the student's apparatus.

Give **three** reasons why.

1. _____

2. _____

3. _____

[3]

[Turn over



(c) The energy content of a food is calculated using the formula below.

$$\text{Energy in food/J} = \text{Mass of water/g} \times \text{Rise in temperature/}^{\circ}\text{C} \times 4.2$$

The table below shows the results obtained by a manufacturer when using this apparatus with 1 gram of cheese.

20 grams of water were used.

Food	Temperature of water/ $^{\circ}\text{C}$	
	Initial	Final
Cheese	25	55

Calculate the energy content of 1 gram of this cheese.

Show your working.

_____ J [2]

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24GSD1122





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Question Number	Marks
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Examiner Number

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