



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]



**TUESDAY 12 MAY 2015, AFTERNOON**

## TIME

1 hour, plus your additional time allowance.

## 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.

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)**.

9639.03 ML



\*24GSD1101\*

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

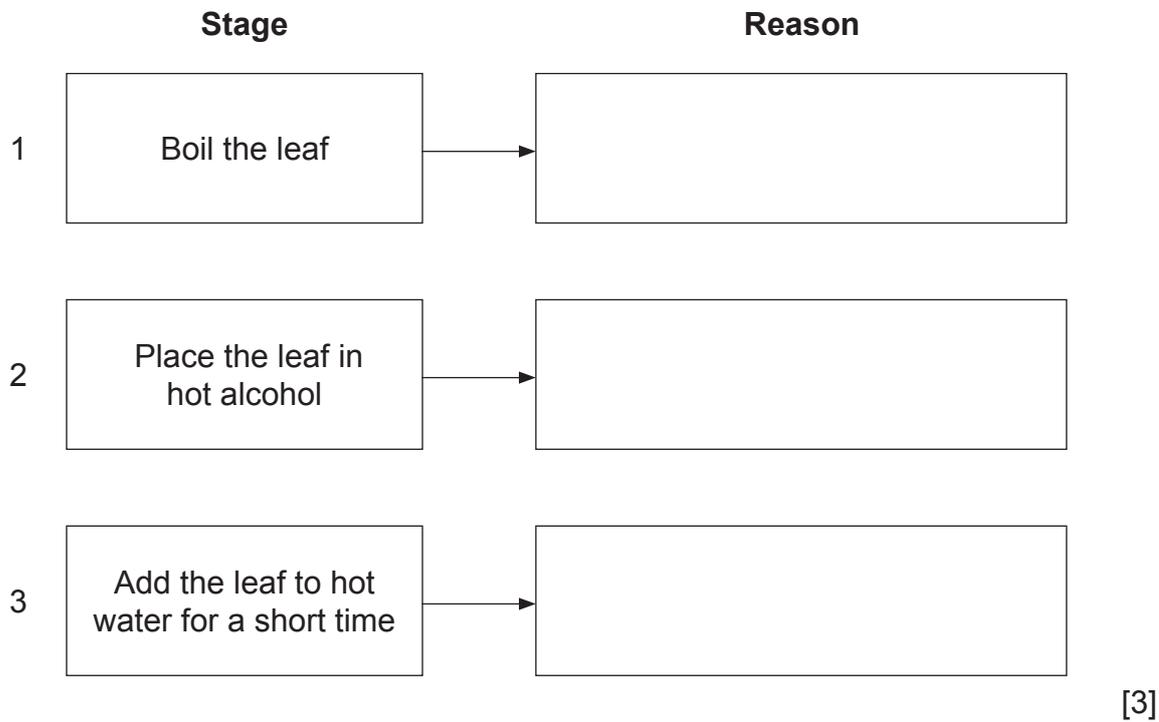
the \_\_\_\_\_ to a target \_\_\_\_\_.

[4]



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

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



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

\_\_\_\_\_

[1]

(ii) What colour does the leaf 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) Obesity and diabetes can result from an unhealthy diet.

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]

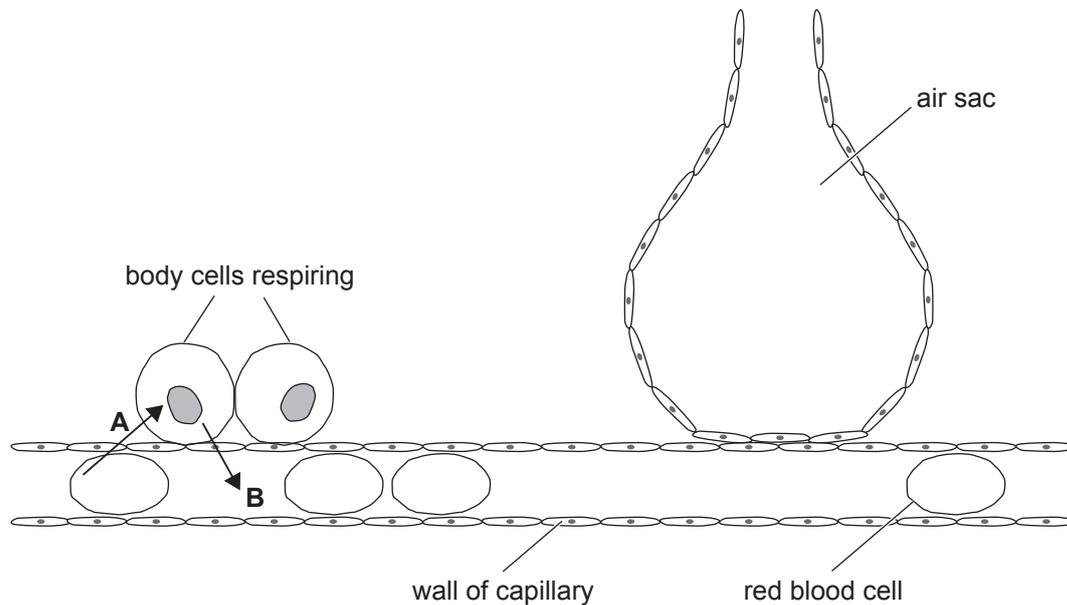
- (ii) What colour change would you expect if vitamin C is present in the food sample when tested with this chemical?

Colour change \_\_\_\_\_ to \_\_\_\_\_

[1]



- 4 (a) Look at the diagram below. It 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) Gas **A** enters the body cells to allow them to carry out respiration. What is the name of Gas **A**?

\_\_\_\_\_ [1]

- (iii) Gas **B** is produced when the body cells respire. What is the name of Gas **B**?

\_\_\_\_\_ [1]

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

\_\_\_\_\_

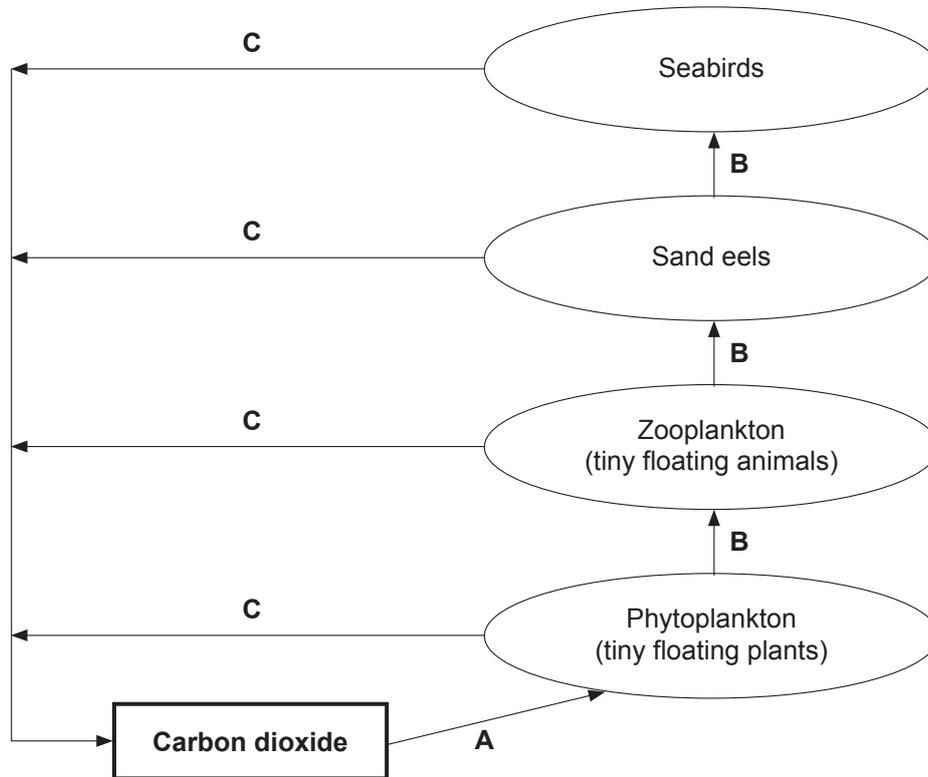
\_\_\_\_\_

\_\_\_\_\_ [2]

[Turn over



- 5 Look at the diagram below. It 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

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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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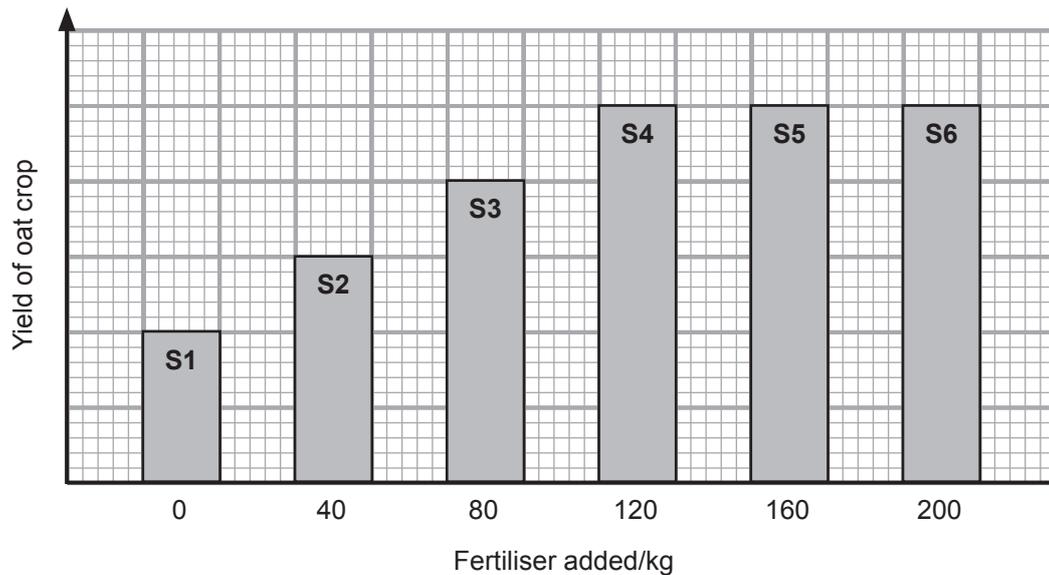
(c) Fertilisers add minerals to the soil.

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?

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[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.

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[2]

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

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[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 **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 fewer sand eels and herring to arrive near these cliffs.

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

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[4]



8 (a) What are enzymes?

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[2]

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

A 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 washing powder was used on clothes that had **only** protein stains.

Name the breakdown product found in the resulting waste water.

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[1]

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

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[1]

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

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[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?

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[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?

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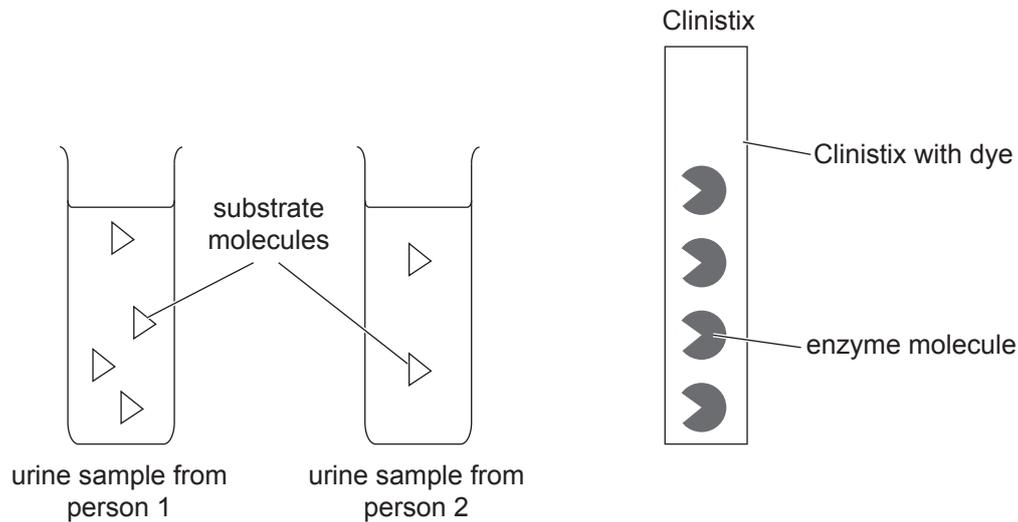
[1]



- (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.

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[2]

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

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[1]

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

(i) Name this hormone.

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[1]

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

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[1]

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

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[3]

[Turn over





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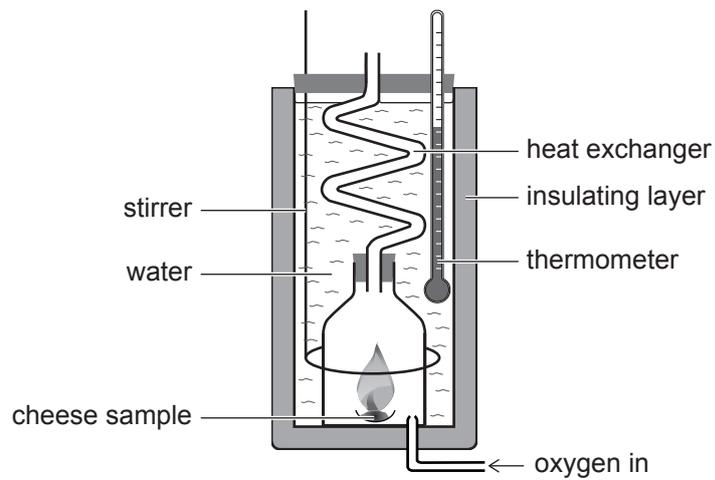
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[6]

- (b) The diagram below 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 out.

\_\_\_\_\_ J [2]

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For Examiner's use only	
Question Number	Marks
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<b>Total Marks</b>	
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Examiner Number

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