



Rewarding Learning

General Certificate of Secondary Education
2013–2014

Centre Number

| | |
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| 71 | |
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Candidate Number

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Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]



TUESDAY 13 MAY 2014, MORNING

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.

Write your answers in the spaces provided in this question paper.

Answer **all eight** 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 **8(b)**.

For Examiner's
use only

| Question Number | Marks |
|-----------------|-------|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |

Total
Marks

| |
|--|
| |
|--|

- 1 Some food tests were carried out on a sample of milk. Three different test reagents were used, in the tests.

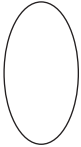

Look at the table below. It shows the colour of each test reagent at the end of the test.

| Substance tested for | Colour of test reagent at the end of the test | Substance | |
|----------------------|---|-----------|--------|
| | | Present | Absent |
| glucose (sugar) | brick red | | |
| protein | purple | | |
| vitamin C | blue | | |

- (a) Complete the table by putting a tick (✓) in the correct box to show if the substance is present or absent in milk. [3]

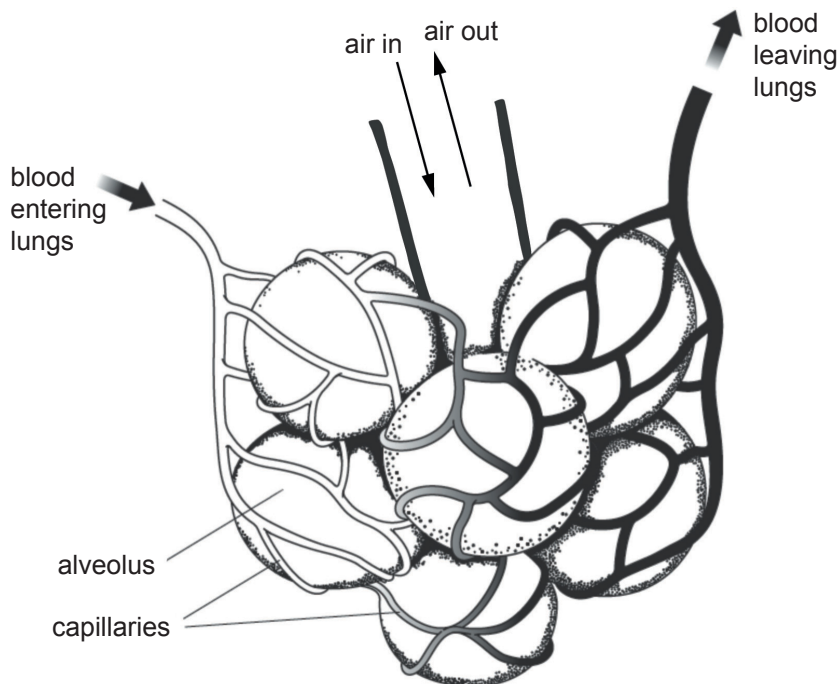
- (b) Write about and describe how the food test for glucose (sugar) is carried out.

_____ [2]

| Examiner Only | |
|---|---|
| Marks | Remark |
|  |  |

- 2 Alveoli are small air sacs in the lungs.
There is gas exchange across the surface of each alveolus.

The diagram shows a number of alveoli.



Source: Chief Examiner

Answer the following questions. Use the diagram and your knowledge to help you.

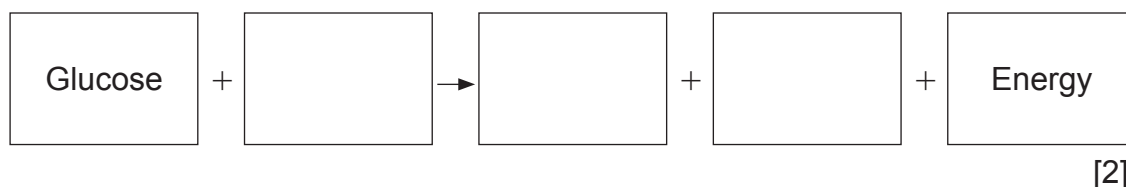
- (a) (i) Write down two adaptations of alveoli that help in gas exchange.

1. _____
2. _____ [2]

- (ii) Write down two differences between the blood leaving the lungs and the blood entering the lungs.

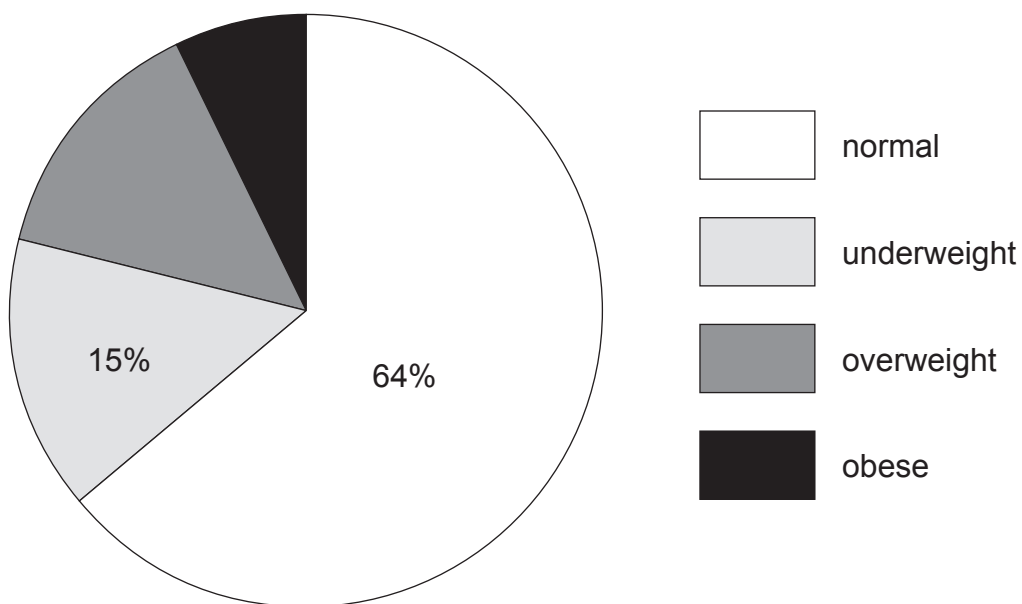
1. _____
2. _____ [2]

- (b) Complete the equation for aerobic respiration.



| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| ○ | ○ |

- 3 Body Mass Index (BMI) gives a measure of a person's body fat. The BMI can be used to group people as **underweight**, **normal**, **overweight** and **obese**. The pie chart below shows the percentages of these groups for the world population in 2008.



There were twice as many overweight people as obese people in the world population in 2008.

- (a) (i) Using this information and the pie chart, work out the percentage of obese people.

Show your working.

_____ % [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| ○ | ○ |

- (ii) The world's population was 7 billion in 2008.
Work out how many people were obese.

Show your working out.

_____ billion [2]

- (b) The percentage of obese people in the world has increased in the past 30 years.

Write down **one** reason for this.

_____ [1]

- (c) Write about **one** effect that obesity can have on health.

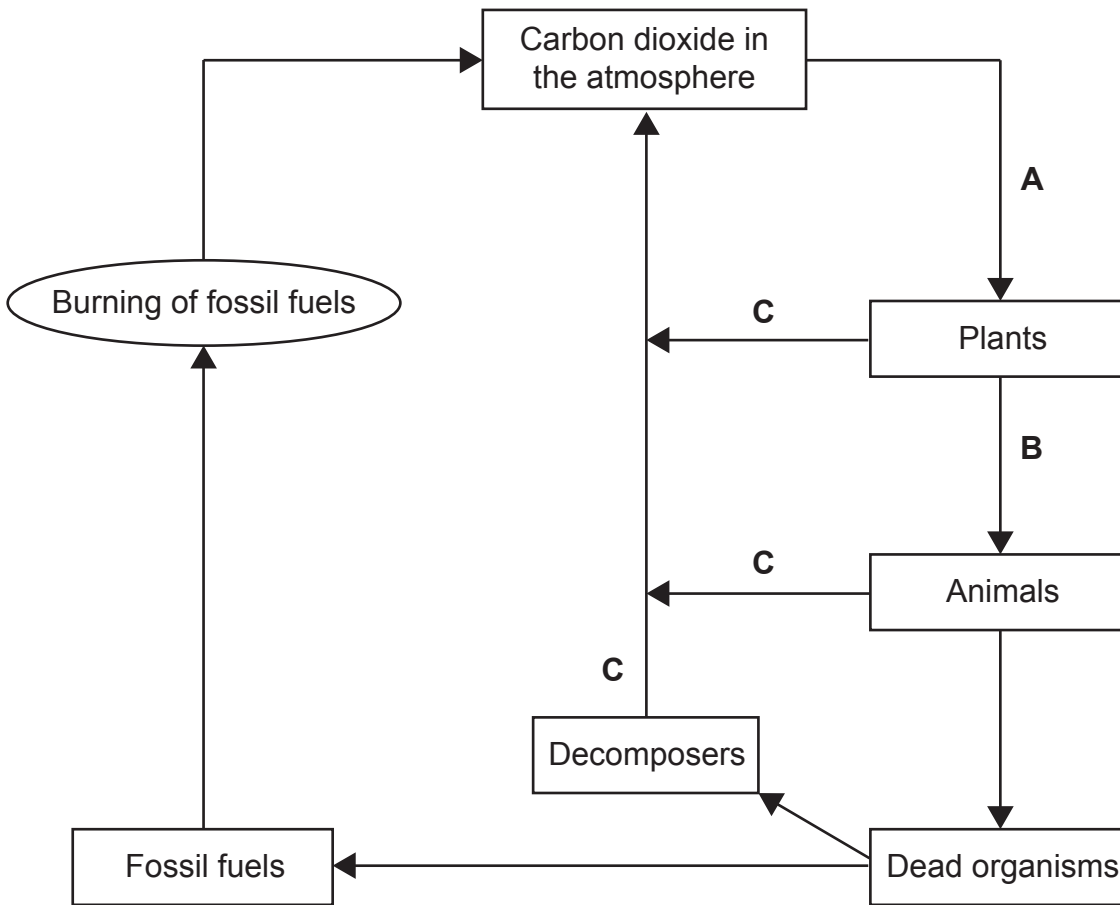
_____ [1]

Examiner Only

Marks

Remark

4 (a) Look at the diagram below. It shows a carbon cycle.



(i) Write the name of processes **A**, **B** and **C**.

A _____

B _____

C _____

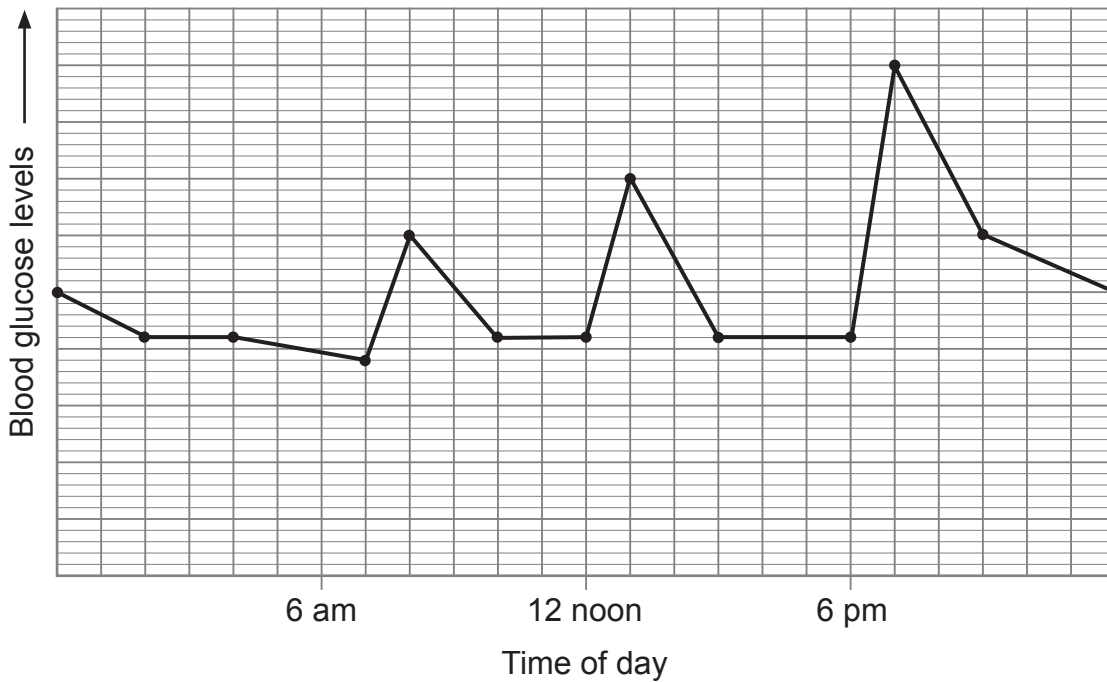
[3]

(ii) Write the name of **one** type of organism that brings about decomposition.

[1]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| ○ | ○ |

5 (a) Look at the graph below. It shows how blood glucose levels changed in Jane's body during one day.



(i) Write about **one** reason why blood glucose levels increase during the day.

_____ [1]

(ii) Insulin lowers blood glucose levels.

Write down the number of times Jane would need to produce insulin to lower her blood glucose levels during the 24 hours. Use the graph above to do this.

_____ [1]

(iii) Write down the name of the target organ for insulin.

_____ [1]

(iv) Write about two ways that insulin lowers blood glucose levels.

1. _____

2. _____ [2]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| ○ | ○ |

(b) (i) Write down the name of the condition when the body does not produce insulin.

[1]

(ii) Write about **one** lifestyle factor that could make a person more likely to develop this condition.

[1]

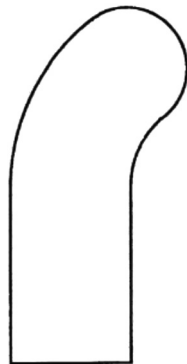
(c) (i) Hormones are present in plants and animals.

Write the name of the hormone produced in the shoot tip of a plant that causes the plant to grow in response to light.

[1]

(ii) Look at the diagram below. It shows a shoot tip that has responded to light coming from one direction.

On the diagram, draw an arrow to show the direction the light has come from.



[1]

(iii) Write about and explain what has happened to the cells on the left side of the shoot tip to cause this growth response.

[3]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

6 (a) Photosynthesis is a process that needs energy.

(i) What is the source of energy for photosynthesis?

_____ [1]

(ii) Write down the name of the green pigment, found in plant leaves, that traps this energy.

_____ [1]

(b) A tomato grower investigated the effects of carbon dioxide and light intensity on the yield (total weight) of his tomato crops.

He set up an investigation using four glasshouses of similar size **A**, **B**, **C** and **D**. Each glasshouse contained the same number of tomato plants.

From April–July the tomatoes produced were collected and weighed.

The tomato grower recorded the yield (total weight) in kilograms (kg), of tomatoes produced from each glasshouse.

The table below shows the results.

| Glasshouse | Conditions | Yield/kg | Increase in yield in kilograms compared to A |
|-----------------------|---|----------|--|
| A (control) | <ul style="list-style-type: none"> • normal carbon dioxide • normal light | 117 | 0 |
| B | <ul style="list-style-type: none"> • increased carbon dioxide • normal light | 137 | 20 |
| C | <ul style="list-style-type: none"> • normal carbon dioxide • increased light | 137 | 20 |
| D | <ul style="list-style-type: none"> • increased carbon dioxide • increased light | 177 | |

(i) Complete the table by working out the increase in yield (total weight) of tomatoes grown in glasshouse **D** compared to glasshouse **A**.

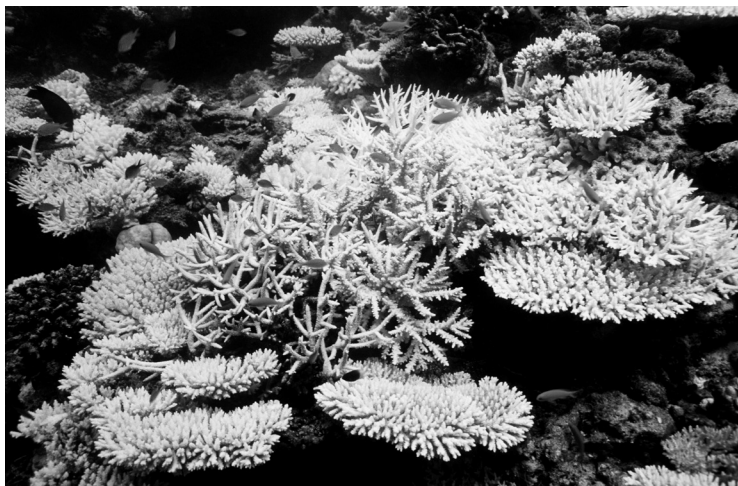
[1]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| ○ | ○ |

7 Read the passage below carefully and answer the questions that follow.

Coral reefs protect shallow coastal regions and provide livelihoods for hundreds of millions of people. They are the most biodiverse regions of the ocean.

Corals are animals and it is their skeletons that form the structure of the reef. **Corals feed on plankton** (tiny floating plants). The corals also have algae that live inside them. These algae carry out photosynthesis and the corals benefit from this by gaining sugar and oxygen. This enables the corals to make their skeletons and grow.



© Georgette Douwma/Science Photo Library

There are several factors that can affect coral reefs.

Increasing sea temperatures destroy the algae in the corals. The corals then die.

In some places the numbers of starfish which eat the corals have gone up due to overfishing of the Triton fish that eat the starfish.

This has resulted in the starfish killing large sections of the reefs.

(a) What does biodiversity mean?

_____ [1]

(b) What is the abiotic factor named in the passage? (line 10)

_____ [1]

Line

1

3

5

7

9

11

13

Examiner Only

Marks

Remark



(c) (i) Complete the food chain below, using the information from the passage.

_____ corals _____ [2]

(ii) Draw a pyramid of biomass for this food chain. Label the organisms on the pyramid.

[3]

(d) (i) How does increasing sea temperatures damage corals?

_____ [2]

(ii) Why is it important to protect coral reefs? Write down **one** reason. [1]

(iii) Write about **one** cause of coral reef damage that has not been mentioned in the passage. [1]

(iv) What is the name of a species that is used to monitor the state of an ecosystem? [1]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

(e) (i) What apparatus would scientists use to measure water temperatures on the reef?

[1]

(ii) Why do these measurements need to be repeated several times in each place?

[1]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

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(Questions continue overleaf)

8 Digestion is carried out by enzymes.

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| ○ | ○ |

(a) (i) Why does food need to be digested?

_____ [2]

(ii) What is the name of the digestive enzyme found in the small intestine that breaks down proteins?
Write down what product is made from this breakdown.

Enzyme _____

Product _____ [2]

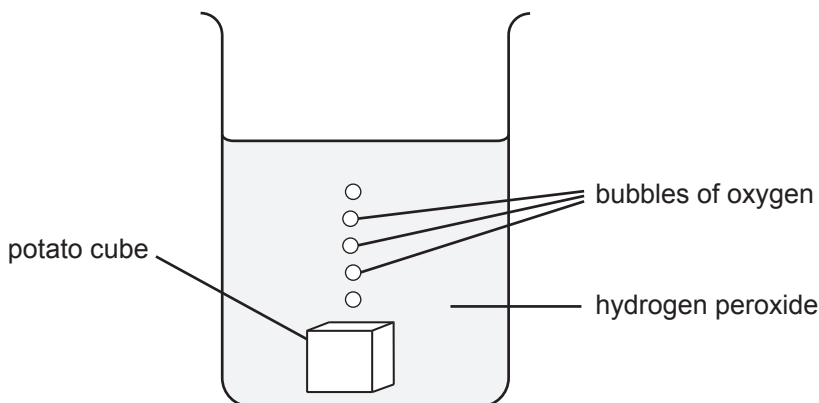
(iii) Write about two ways the small intestine is adapted for its function.

1. _____

2. _____ [2]

(b) Hydrogen peroxide is a waste product formed by cells. It is harmful to all cells, including skin cells. The enzyme catalase works very quickly to break down the hydrogen peroxide into water and oxygen. It is found in many types of living tissue.

The bubbles of oxygen produced can be seen coming off the cells when the tissue is placed in a beaker containing hydrogen peroxide solution.



Write about and describe how you would carry out an experiment to compare the **rate** of catalase action in potato tissue and liver tissue.

Make sure you write about:

- how you would measure the rate of catalase action
- one variable that you would keep constant
- one safety precaution you should take when carrying out the experiment.

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

[6]

| Examiner Only | |
|---------------|--------|
| Marks | Remark |
| | |

THIS IS THE END OF THE QUESTION PAPER

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