Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2013–2014

Double Award Science: Biology

Unit B1

Foundation Tier

[GSD11]

GSD11

TUESDAY 13 MAY 2014, MORNING

TIME

1 hour.

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	

Examiner Only

Marks	Remark

1 Several food tests were carried out on a sample of milk.
Three different test reagents were used.

The table 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 adding a tick (✓) in the correct box to show if the substance is present or absent in milk. [3]

(b) Describe how the food test for glucose (sugar) is carried out.

_____

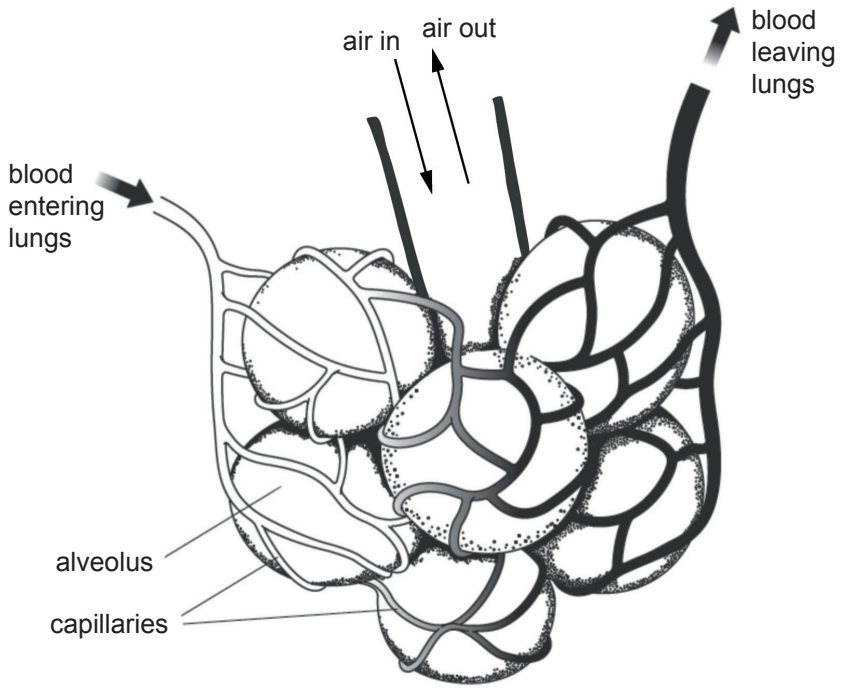
_____ [2]

Examiner Only

Marks	Remark

2 Alveoli are small air sacs in the lungs.
Gas exchange occurs across the surface of each alveolus.

The diagram shows a number of alveoli.



Source: Chief Examiner

Using the diagram and your knowledge, answer the following questions.

(a) (i) Give two adaptations of alveoli that help in gas exchange.

1. _____

2. _____ [2]

(ii) Suggest two differences between the composition of blood leaving the lungs and blood entering the lungs.

1. _____

2. _____ [2]

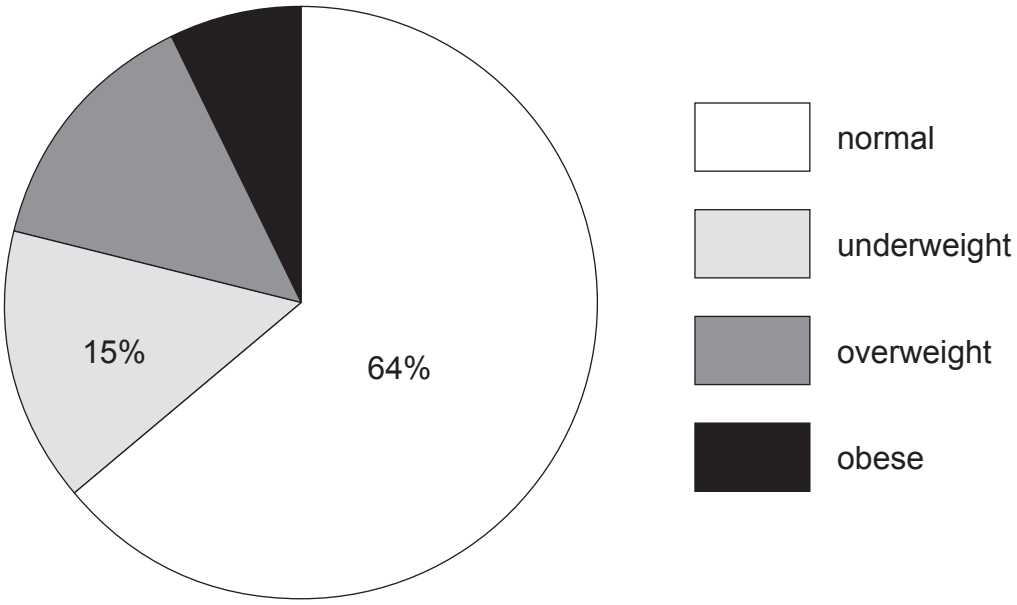
(b) Complete the equation for aerobic respiration.

Glucose	+		→		+		+	Energy

[2]

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 **normal**, **underweight, overweight** and **obese**.
The pie chart 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, calculate the percentage of obese people.

Show your working.

_____ % [2]

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

Show your working.

_____ billion [2]

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

Suggest **one** reason for this.

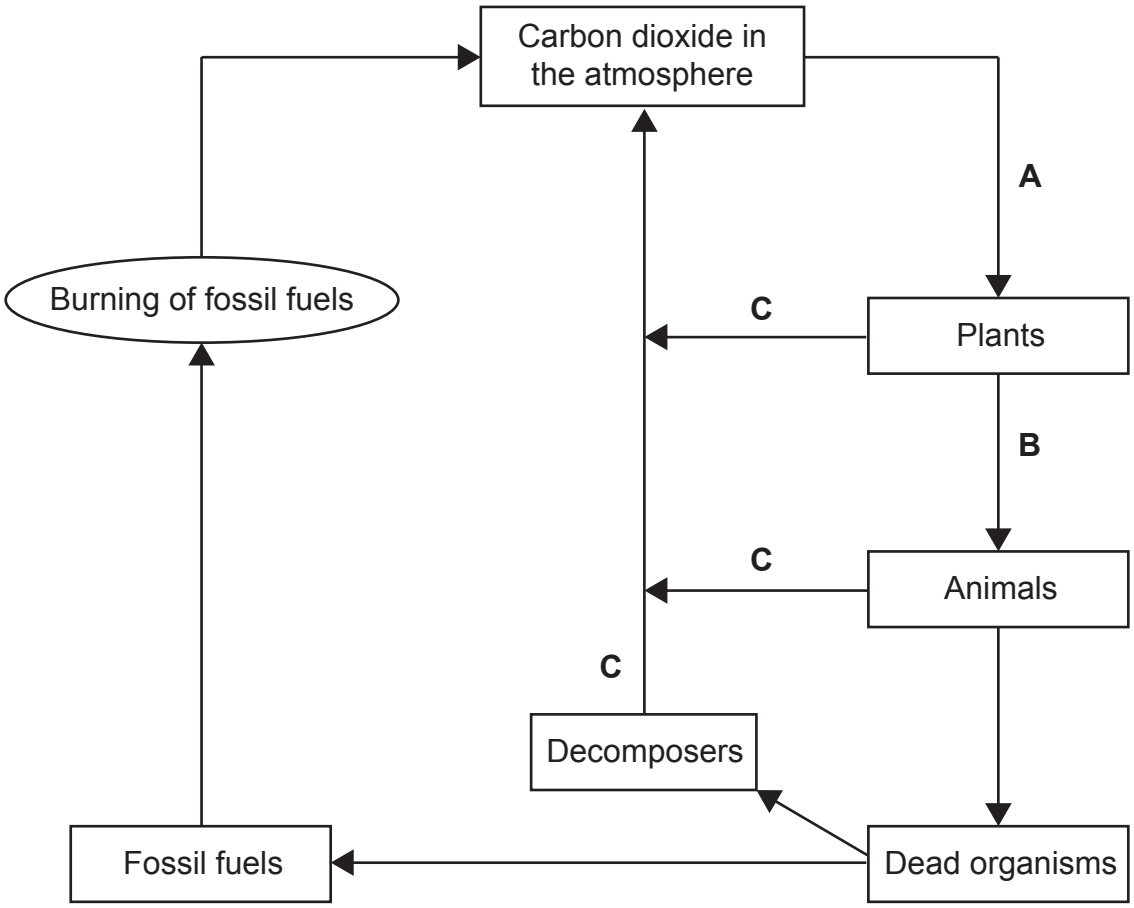
_____ [1]

(c) Give **one** effect obesity can have on health.

_____ [1]

Examiner Only	
Marks	Remark

4 **(a)** The diagram shows a carbon cycle.



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

A _____

B _____

C _____ [3]

(ii) Name **one** type of organism that brings about decomposition.

_____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

(b) (i) The increased burning of fossil fuels has led to an increase in carbon dioxide levels in the atmosphere.

Explain **how** this change can cause global warming.

_____

_____

_____

_____

_____ [2]

(ii) Give **one** result of global warming.

_____ [1]

(iii) The 18th international annual climate change talks took place in Doha, Qatar in 2012.
The talks provided little agreement among countries on how to solve the problem of global warming.

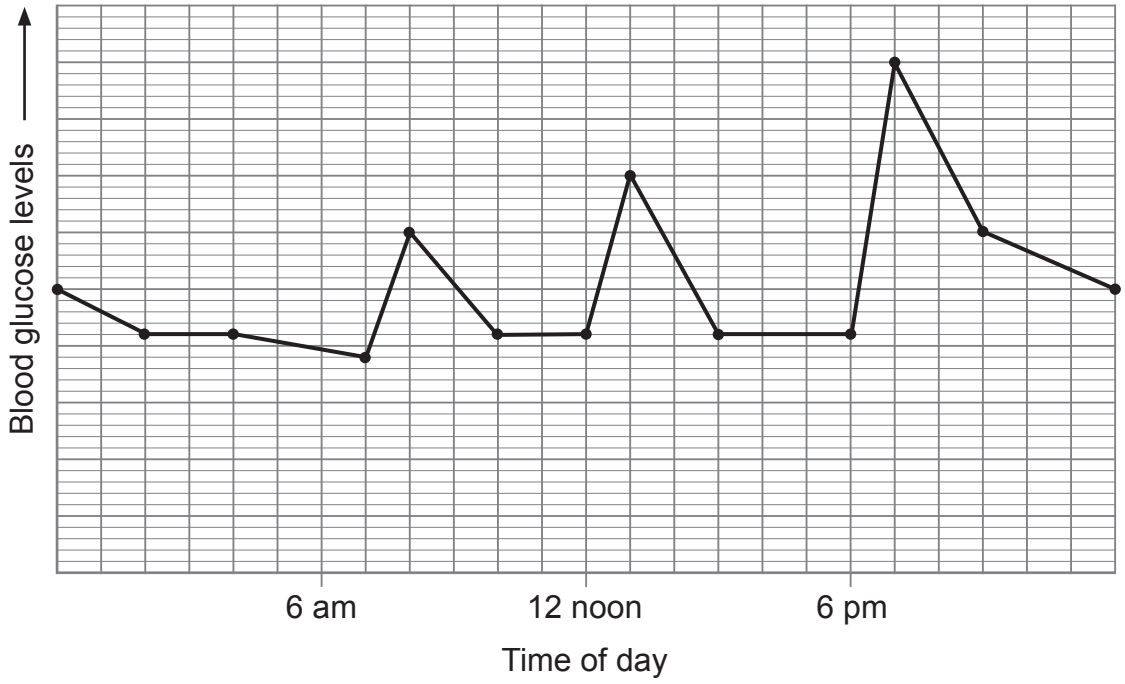
Suggest **one** reason why it is difficult to get international agreement about solving the problem of global warming.

_____

_____ [1]

Examiner Only	
Marks	Remark

5 **(a)** The graph shows how blood glucose levels changed in Jane's body over the course of a day.



(i) Give **one** reason for the **increases** in blood glucose levels during the day.

_____ [1]

(ii) Insulin lowers blood glucose levels.

Using the graph above, state the number of times Jane would need to produce insulin, during the 24 hour period, to lower her blood glucose levels.

_____ [1]

(iii) Name the target organ for insulin.

_____ [1]

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

1. _____

2. _____ [2]

(b) (i) Name the condition that occurs when the body does not produce insulin.

_____ [1]

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

_____ [1]

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

Name the hormone produced in the shoot tip of a plant that causes a growth response to light.

_____ [1]

(ii) The diagram 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) Describe and explain what has happened to the cells on the left hand side of the shoot tip to bring about this growth response.

_____

_____

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

Examiner Only
Marks | Remark

6 **(a)** Photosynthesis is a process requiring energy.

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

_____ [1]

(ii) Name the green pigment, found in plant leaves, that traps this energy.

_____ [1]

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

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

Over a period of several months, April–July, the tomatoes produced were collected and weighed.

The 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)	• normal carbon dioxide • normal light	117	0
B	• increased carbon dioxide • normal light	137	20
C	• normal carbon dioxide • increased light	137	20
D	• increased carbon dioxide • increased light	177	

(i) Complete the table by calculating the increase in yield of tomatoes grown in glasshouse **D** compared to glasshouse **A**. [1]

(ii) Explain the result for glasshouse **D**.

_____

_____

_____

_____ [2]

(iii) Give **one** other factor that should be kept constant in the glasshouses during this investigation.

_____ [1]

(iv) Give **one** economic factor that the grower would need to consider if he was going to make a profit when growing tomatoes.

_____

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

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

Line

Coral reefs protect shallow coastal regions and provide livelihoods for hundreds of millions of people. They are the most biodiverse regions of the ocean. 1 3

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. 5 7

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There are several factors that can affect coral reefs. 9

Increasing sea temperatures destroy the algae in the corals. The corals then die. 11

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. 13

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

(a) What is meant by biodiversity?

_____ [1]

(b) Give the abiotic factor named in the passage. (line 10)

_____ [1]

Examiner Only	
Marks	Remark

(c) **(i)** Using the information in the passage, complete the food chain below.

_____ corals _____ _____ _____

[2]

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

[3]

(d) **(i)** Explain how increasing sea temperatures damage corals.

_____

_____

_____ [2]

(ii) Suggest **one** reason why it is important to protect coral reefs.

_____ [1]

(iii) Other than those mentioned in the passage, suggest **one** other cause of coral reef damage.

_____ [1]

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

_____ [1]

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

_____ [1]

(ii) Explain why these measurements would need to be repeated several times in each location.

_____ [1]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

Examiner Only	
Marks	Remark

8 Digestion is carried out by enzymes.

(a) **(i)** Explain why food needs to be digested.

_____

_____ [2]

(ii) Name the digestive enzyme found in the small intestine that breaks down proteins and give the product of the breakdown.

Enzyme _____

Product _____ [2]

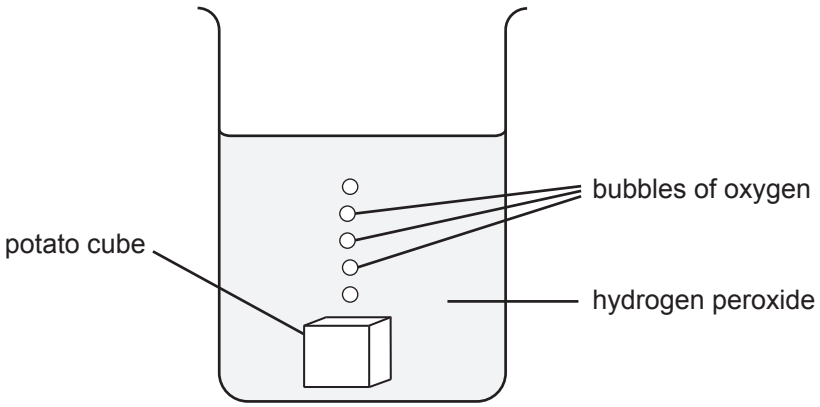
(iii) Give two ways the small intestine is adapted for its function.

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 if the tissue is placed in a beaker containing hydrogen peroxide solution.



Describe how you would carry out an experiment to compare the **rate** of catalase action in potato and liver tissues.

Your account should include:

- 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