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Rewarding Learning

**General Certificate of Secondary Education
2013**

Biology

Unit 1

Foundation Tier

[GBY11]

GBY11

WEDNESDAY 5 JUNE, AFTERNOON

TIME

1 hour 15 minutes.

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 box, around each page or on blank pages.
Complete in blue or black ink only. **Do not write with a gel pen**.
Answer **all twelve** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is **80**.
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 questions **4 and 12**.

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1   The diagram shows part of the carbon cycle.
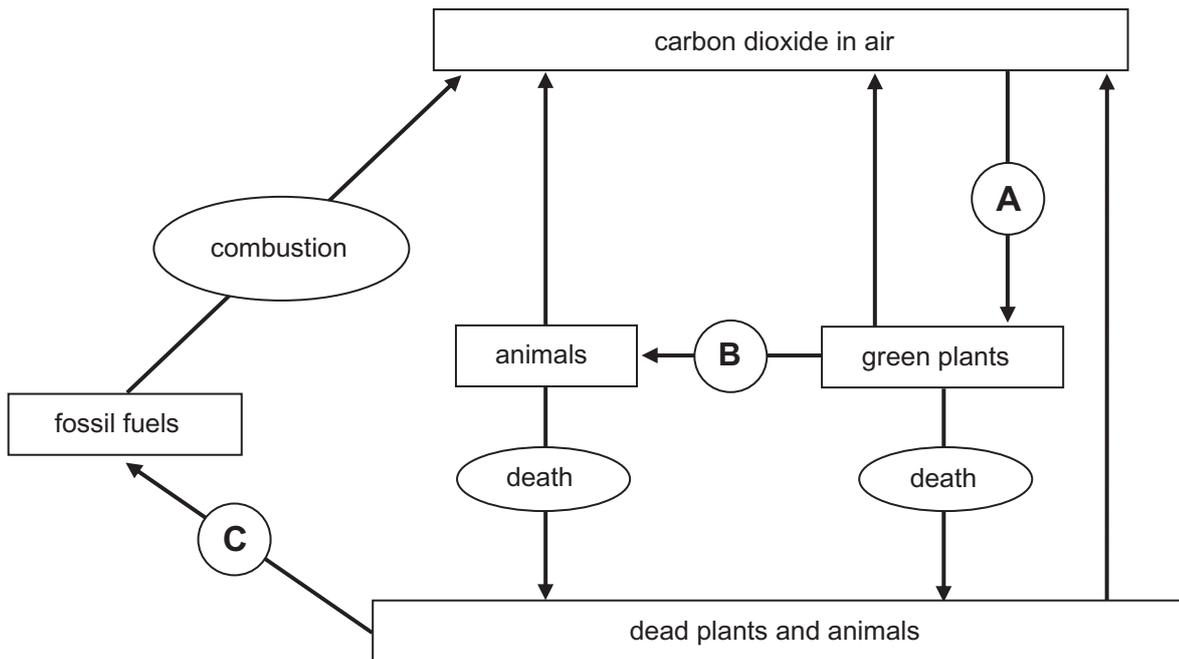
(a) Name the processes **A**, **B** and **C**.

A _____   [1]

B _____   [1]

C _____   [1]

(b) Give **one** reason why carbon dioxide in the air is increasing.

_____

_____   [1]

2 The diagram shows **some** apparatus used to test a food sample for sugar.

water —————————•

————————— food sample

(a) Describe how you would test a food sample for the presence of sugar.

_____

_____

_____

_____ [2]

(b) Describe the **colour change** when sugar is present.

_____

_____

_____ [2]

Total Question 2

[Turn over

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3 A Petri dish was filled with agar jelly containing blue DCPIP.

Three holes were cut out of the agar jelly.

One hole was filled with $1\,cm^3$ of water, one with $1\,cm^3$ of fruit juice **X** and one with $1\,cm^3$ of fruit juice **Y**.

The fruit juices contained different concentrations of vitamin C.

The Petri dish was left for 60 minutes.

Use the results found after 60 minutes to help answer the following questions.

(a) (i) What conclusion can be drawn about the concentration of vitamin C in fruit juice **Y** compared to fruit juice **X**?

_____

_____ [1]

(ii) How did you reach this conclusion?

_____

_____ [1]

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(iii) Explain the changes shown in the jelly around the fruit juices.

_____

_____

_____ [2]

(b) Why was water added to one of the holes?

_____ [1]

Total Question 3

[Turn over

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4 The diagrams show the apparatus used in an experiment to test where starch is present in a leaf.

black card

plant

iodine
solution

Iodine

lamp

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Describe and explain how the apparatus could be used to find if light is needed for photosynthesis.

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

_____

_____

_____

_____

_____

_____

_____

_____

_____ [6]

Total Question 4

[Turn over

8213

5 Living organisms release energy by aerobic respiration.

(a) (i) Where in the body does aerobic respiration take place?

_____ [1]

(ii) Complete the word equation for aerobic respiration.

glucose + [ ] ➡ carbon dioxide + [ ] + energy

[2]

(iii) Give **one** way living organisms use the energy released by aerobic respiration.

_____ [1]

The table shows the mass of four different animals and the energy they use.

Animal	Mass/kg	Energy used per kilogram of body mass per day/kJ	Total energy used per day/kJ
Pig	128	80	
Man	64	134	8576
Dog	15		3240
Mouse	0.02	2736	54.72

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(b) (i) Calculate the missing energy values. Complete the table by writing the answers in the empty boxes. [2]

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(ii) Describe the relationship shown in the table between the mass of the animal and the

energy used per kilogram of body mass per day.

_____

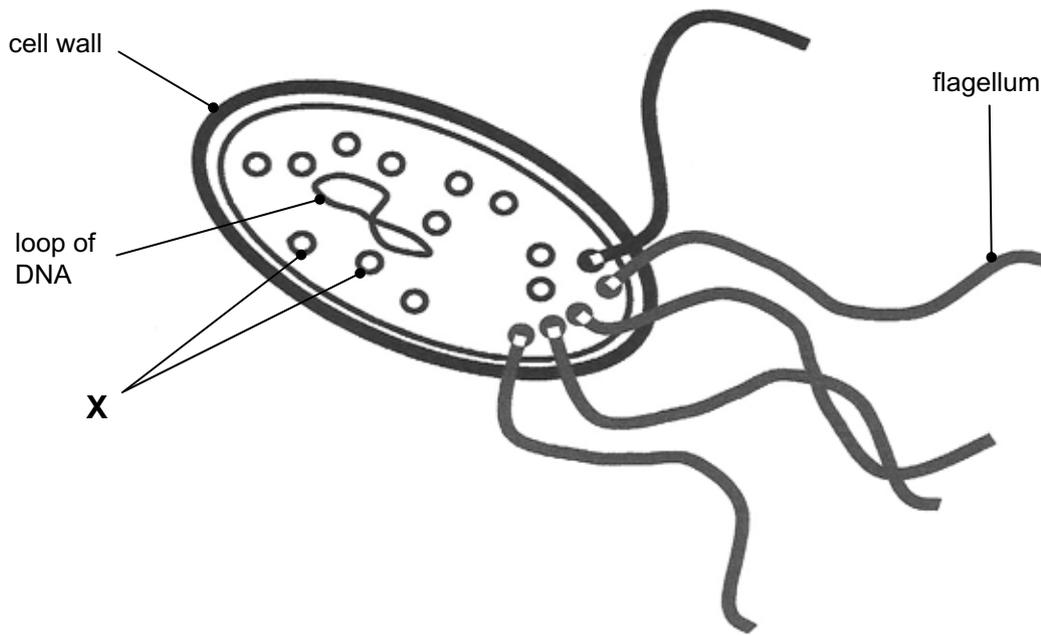_____

_____ [1]

total amount of energy used per day.

_____

_____

_____ [1]

Total Question 5

[Turn over

6 The diagram shows a section through an eye.

© *Dr C J Clegg – Mammals Structure & Function by Dr C J Clegg, published by John Murray, 1998.*

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

A _____ [1]

B _____ [1]

C _____ [1]

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(b) Describe the function of the

iris. _____

_____

_____ [2]

lens. _____

_____

_____ [2]

retina. _____

_____ [1]

Total Question 6

[Turn over

7 The photograph shows a leaf cell.

© J C Revy, ISM / Science Photo Library

(a) (i) Name parts **A** and **B**.

A _____ [1]

B _____ [1]

(ii) Give the letter of the part which contains

cellulose. _____ [1]

chlorophyll. _____ [1]

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(b) The diagram shows a Salmonella bacterium.

cell wall

loop of
DNA

X

flagellum

(i) Name the structures labelled **X**.

_____ [1]

Plants do not have these structures.

(ii) Give **one other** way the Salmonella bacterial cell differs from a plant cell.

_____

_____ [1]

[Turn over

Salmonella bacteria can cause food poisoning.

Some probiotic drinks contain living bacteria.

Manufacturers claim these can help reduce the risk of Salmonella food poisoning.

The diagrams show a section through the ileum of a person who does not take probiotic drinks and one who does.

wall of ileum

mucus layer

pH 7.5

pH 6.5

villus

lumen

without probiotics
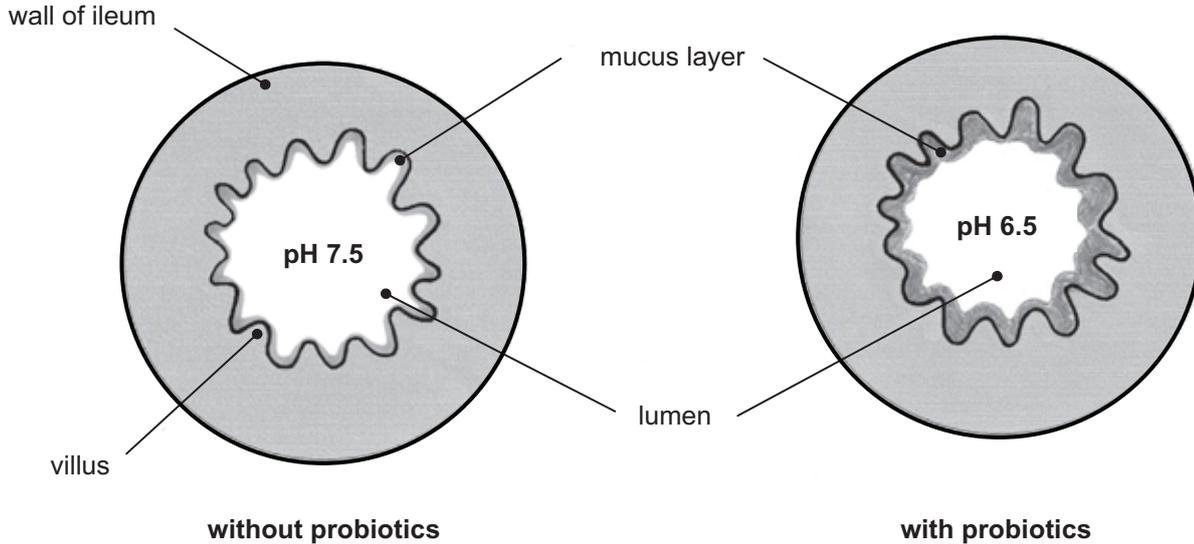
with probiotics

(c) **Use evidence from the diagrams** to describe and explain **two** ways probiotics may help reduce the number of Salmonella bacteria in the ileum.

1. Description _____

_____

Explanation _____

_____

2. Description _____

_____

Explanation _____

_____ [4]

Examiner Only	
Marks	Remark
Total Question 7	

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(Questions continue overleaf)

8 The diagram shows part of the respiratory system.

© Focus Educational Software Ltd

(a) Name parts **A**, **B**, **C** and **D**.

A _____ [1]

B _____ [1]

C _____ [1]

D _____ [1]

The graph shows the results of an investigation into the effect of exercise on the breathing rate of two pupils Stephen and Mark.

Rest	Exercise	Recovery
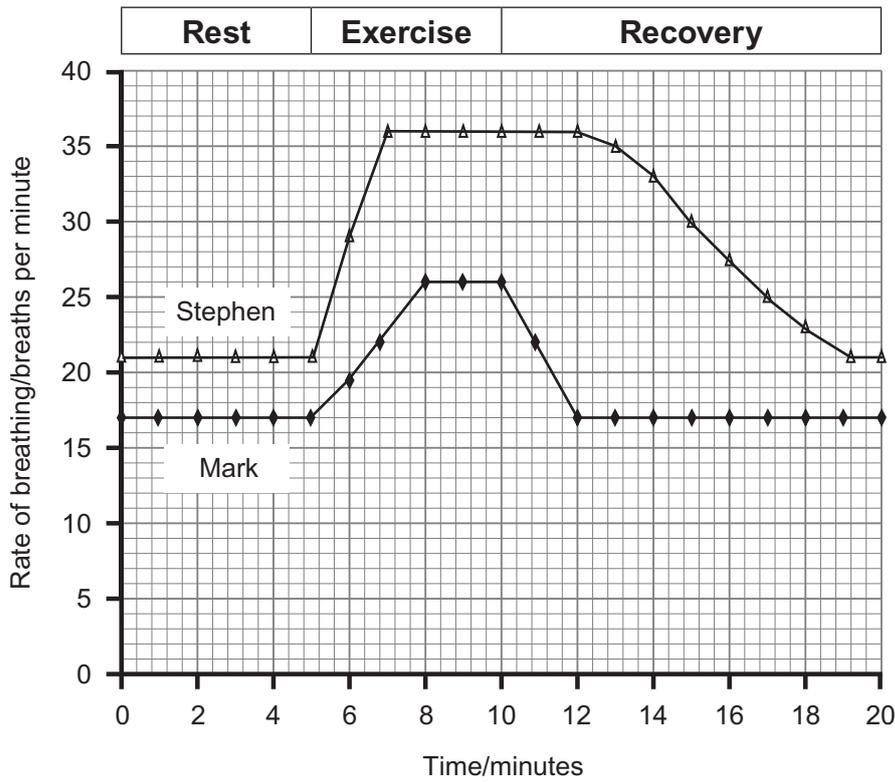
(b) Calculate the increase in Stephen's breathing rate during exercise.

Show your working.

_____ breaths per minute [2]

Respiratory fitness can be described as the ability to exercise with **little change** in breathing rate.

(c) Suggest which pupil in this investigation is fitter.
Give **three** reasons for your choice, **using data from the graph**.

Pupil _____

_____

_____

_____

_____

_____ [3]

(d) Describe how the pupils would have carried out this investigation to obtain these results.

_____

_____

_____

_____

_____

_____

_____ [4]

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During the investigation the percentage of oxygen in the air exhaled by Stephen was also measured.

The table shows the percentage of oxygen in the air exhaled by Stephen at 4 and 8 minutes during the investigation.

Time/minutes	Percentage of oxygen in exhaled air
4	16
8	12

(e) **Look at the table and the graph.**

Suggest why there is a difference in the percentage of oxygen exhaled between 4 and 8 minutes.

_____

_____

_____ [2]

Total Question 8

[Turn over

9 **(a)** Name **two** chemical elements found in all food molecules.

_____ [1]

(b) Complete the table about components of the diet.

Component	Example	Source	Function	
Carbohydrate	Lactose		Energy	[1]
	D	Milk	Growth of bones and teeth	[1]
Mineral		Red meat	Needed for haemoglobin in red blood cells	[1]

Total Question 9

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(Questions continue overleaf)

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10 The diagram shows part of a food web found in a forest ecosystem.

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(a) Why are plants important in a food web?

_____

_____

_____ [2]

(b) What do the arrows in the food web represent?

_____

_____ [1]

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After a very severe winter a large number of owls died.

(c) Explain how this may affect the number of stoats.

_____

_____

_____ [2]

[Turn over

8213

11 The diagram shows a section of a shoot growing in one-sided light.

chemical produced
by cells in tip

direction of light

magnified view
of cells from
shaded side of
shoot

magnified view
of cells from
light side of
shoot

© JD Boyd / CCEA

(a) Name the chemical produced by cells in the tip.

_____

[1]

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Use the diagram to answer the following questions.

(b) (i) Compare the distribution of the chemical in the light and shaded side of the shoot below the tip.

_____

_____ [1]

(ii) How has the chemical affected the cells in the shaded side of the shoot?

_____

_____ [1]

(c) Explain the advantage to the plant of bending towards light.

_____

_____

_____ [2]

Total Question 11

[Turn over

8213

12 The diagram shows the shape of two enzyme molecules and a substrate molecule.
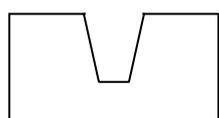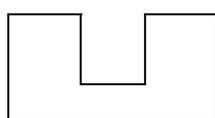
Enzyme A	Enzyme B	Substrate

The graph shows the mass of substrate broken down by each enzyme over 90 minutes.

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Use the information in the diagrams and your knowledge to help explain the shape of the two lines on the graph.

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

_____

_____

_____

_____

_____

_____

_____

_____

_____ [6]

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