

Centre Number						Candidate Number				
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For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
TOTAL	



General Certificate of Secondary Education
Foundation Tier
March 2013

Science B

SCB1FP

Unit 1 My World

F

Written Paper

Tuesday 5 March 2013 9.00 am to 10.00 am

For this paper you must have:

- a ruler.
- You may use a calculator.

Time allowed

- 1 hour

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 7(b) should be answered in continuous prose. In this question you will be marked on your ability to:
 - use good English
 - organise information clearly
 - use specialist vocabulary where appropriate.

Advice

- In all calculations, show clearly how you work out your answer.



M A R 1 3 S C B 1 F P O 1

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SCB1FP

Answer **all** questions in the spaces provided.

- 1** The photograph shows an apple that has been left in the fruit bowl for many weeks.



- 1 (a) (i)** What is the name of the process shown in the photograph?

Draw a ring around the correct answer.

corrosion

decomposition

melting

(1 mark)

- 1 (a) (ii)** What organisms cause the apple to break down?

Draw a ring around the correct answer.

animals

microorganisms

plants

(1 mark)

- 1 (b)** Draw a ring around the correct answer to complete each sentence.

- 1 (b) (i)** The organisms growing on the apple gain energy from it by a process called

digestion.

photosynthesis.

respiration.

(1 mark)

- 1 (b) (ii)** The process the organisms on the apple use to gain energy from it produces the

waste gas

carbon dioxide.

nitrogen.

oxygen.

(1 mark)



1 (b) (iii) The most important element returned to the **soil** when organisms break down the

apple is	carbon.
	nitrogen.
	oxygen.

(1 mark)

1 (c) Draw a ring around the correct answer to complete each sentence.

1 (c) (i) Carbon compounds in a plant are produced by

excretion.
photosynthesis.
respiration.

(1 mark)

1 (c) (ii) An example of a carbon compound in plants is

calcium.
carbohydrate.
water.

(1 mark)

1 (d) Supermarkets package apples in an atmosphere of argon instead of air, or by keeping them in a refrigerated display.

Explain why these two methods slow the breakdown of the apples.

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(3 marks)

10

Turn over ►



2 Some scientists were studying the universe and made a discovery about a star.

The star was 4.3 light years away. A planet the same size as the Earth was orbiting the star.

2 (a) Draw a ring around the correct answer to complete the sentence.

The scientists knew how far away the star was by measuring the change in frequency

of the

light waves.
seismic waves.
sound waves.

(1 mark)

2 (b) There were oceans on the planet orbiting the star.

Living organisms need water to survive.

2 (b) (i) The temperature on the planet was suitable for organisms, like those on Earth, to survive.

Suggest the temperature range of the planet.

Tick (✓) the correct temperature range.

-150 to -50 °C

0 to 70 °C

150 to 200 °C

(1 mark)

2 (b) (ii) Give the reason why you chose this answer.

.....

.....

(1 mark)



2 (c) The scientists found oxygen in the atmosphere of the planet.

Why does oxygen in the atmosphere suggest there is life on the planet?

Tick (✓) **one** reason.

Because animals produce oxygen by respiration.

Because plants produce oxygen by respiration.

Because plants produce oxygen by photosynthesis.

(1 mark)

2 (d) The scientists used the Hubble Space Telescope to study a distant star.

The Hubble Space Telescope orbits the Earth.

Images from the Hubble Space Telescope are clearer than the images from a telescope on Earth. Why?

Tick (✓) the **two** correct answers.

The Hubble Space Telescope is always closer to the star.

There is no atmospheric distortion.

There is no light pollution.

There is less gravity in space.

(2 marks)

6

Turn over for the next question

Turn over ►




3 Many metals are extracted from their ores before they can be used.

3 (a) Name **one** metal that is usually found in the ground as the metal, not as a compound.

.....
(1 mark)

3 (b) The table shows a reactivity series of some metals compared with carbon.

A method of extracting some of the metals is shown in the table.

Reactivity	Metal	Method of extracting the metal
Most reactive  Least reactive	Sodium	
	Magnesium	
	Aluminium	Electrolysis
	Carbon (non-metal)	
	Zinc	
	Iron	Heat with carbon
	Tin	
	Lead	
	Copper	
	Gold	

3 (b) (i) Name **one** metal from the table, **not** aluminium, that is extracted by electrolysis.

.....
(1 mark)

3 (b) (ii) Name **one** metal from the table, **not** iron, that can be extracted by heating with carbon.

.....
(1 mark)



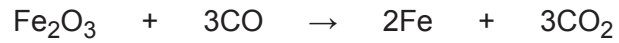
3 (b) (iii) It is more expensive to extract aluminium than it is to extract iron. Why?

.....
.....

(1 mark)

3 (c) Iron can be extracted from iron oxide using carbon monoxide.

The chemical equation shown represents this reaction.



How many molecules of carbon dioxide are produced in this reaction?

.....

(1 mark)

5

Turn over for the next question

Turn over ►



- 4 Yellowstone National Park is on the site of a volcano and has a lot of hot springs. One of the hot springs has a temperature of 80 °C.



Environmental scientists working in Yellowstone National Park have discovered some bacteria.

The bacteria can survive in very high water temperatures.

- 4 (a) What is the name for bacteria that can survive in very high temperatures?

Draw a ring around the correct answer.

extremophiles

geophiles

photophiles

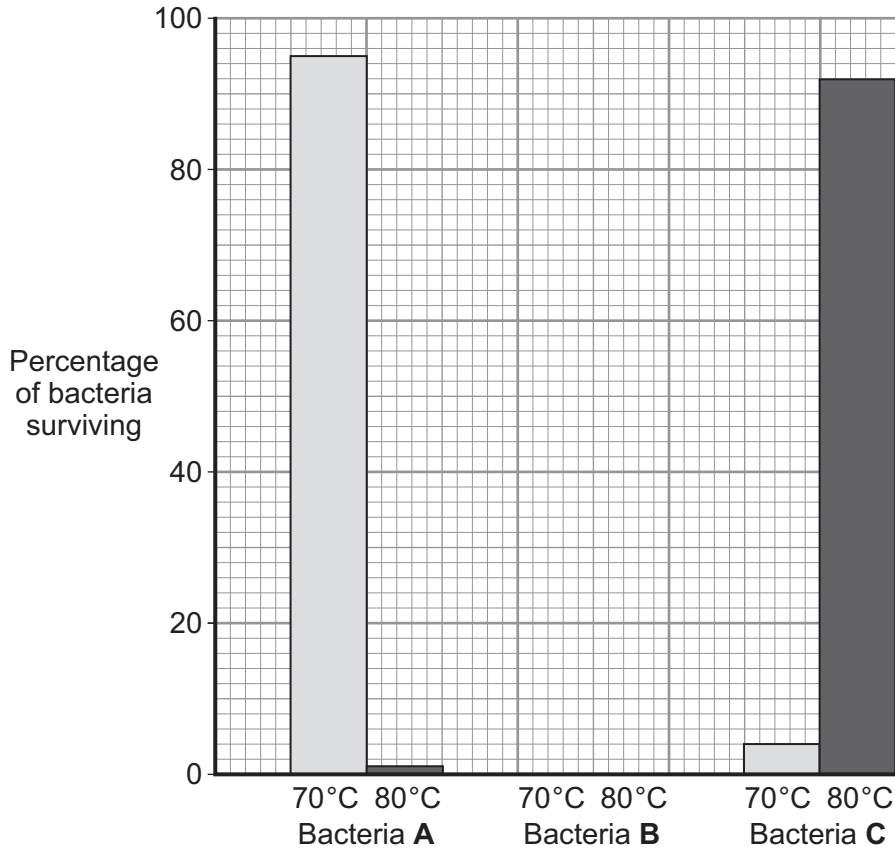
(1 mark)

- 4 (b) The table shows the survival rates of three different bacteria, **A**, **B** and **C**, at two different temperatures.

Bacteria	Percentage of bacteria surviving	
	At 70 °C	At 80 °C
A	95	1
B	30	75
C	4	92



4 (b) (i) Complete the bar chart to show the survival rates of Bacteria **B** at the two different temperatures. Bacteria **A** and **C** have been done for you.



(2 marks)

4 (b) (ii) The temperature of the hot spring increases to 90 °C.

Suggest which bacteria, **A**, **B** or **C**, are most likely to survive at 90 °C.

Give a reason for your answer.

.....

.....

.....

(1 mark)

4 (b) (iii) Why can you **not** be sure that the bacteria you chose in 4(b)(ii) will survive?

.....

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(1 mark)

Turn over ►



4 (c) If the volcano under Yellowstone National Park erupted, large amounts of carbon dioxide would be released.

Carbon dioxide is a greenhouse gas.

Complete the sentences.

If the volcano under Yellowstone National Park erupted, the extra carbon dioxide would make the temperature of the Earth's surface

The carbon dioxide allows wave radiation to enter the Earth's atmosphere.

Carbon dioxide also stops wave radiation from escaping.
(3 marks)

8



5 Most plants do not grow well if there is a high concentration of salt in the soil.

5 (a) Which place might have a high concentration of salt in the soil?

Tick (✓) **one** answer.

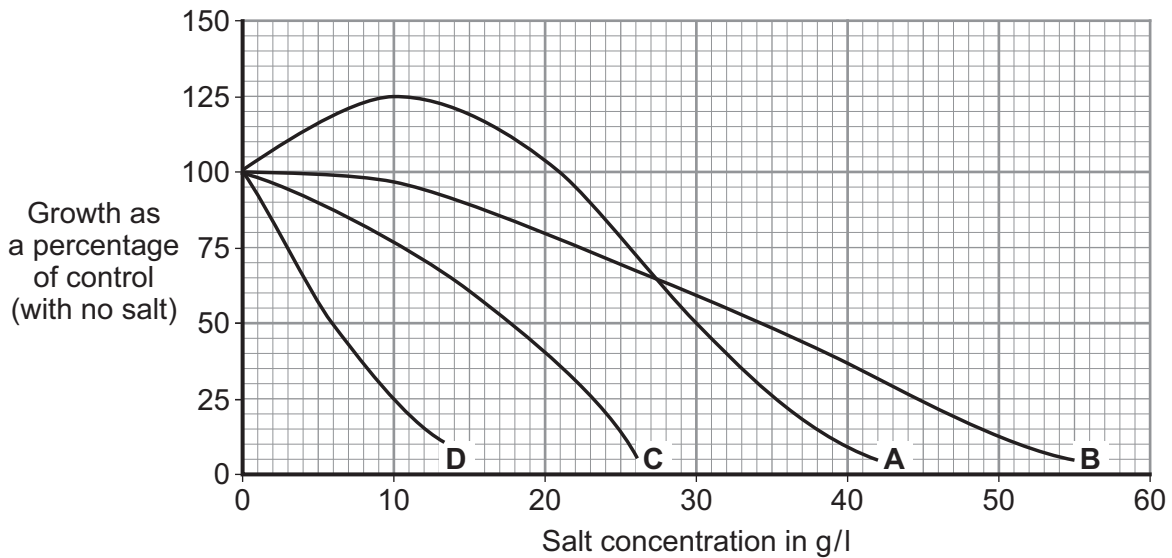
Sand dunes by the sea

Sports field

Woodland

(1 mark)

5 (b) The graph gives some information about the growth of four plants, **A**, **B**, **C** and **D**, in different salt concentrations.



5 (b) (i) Barley grows four times better in soil with no salt than in soil with 10 g/l of salt.

Which plant, **A**, **B**, **C** or **D**, is barley? Write your answer in the box.

(1 mark)

5 (b) (ii) Which plant, **A**, **B**, **C** or **D**, grows better when there is 20 g/l of salt in the soil? Write your answer in the box.

(1 mark)

5 (b) (iii) Which plant, **A**, **B**, **C** or **D**, would survive in soil containing 50 g/l of salt? Write your answer in the box.

(1 mark)

Turn over ►



5 (c) Salt marsh has concentrations of salt in the soil that are too high for most plants to grow. Salt marsh often floods.

Biofuel can be made from plants such as wheat and barley, which are also used for food.

Why do some people support the idea of using salt marsh plants to make biofuel?

Tick (✓) **two** answers.

Because we cannot use the salt marsh for growing wheat and barley

Because salt marsh is the habitat of some birds

Because fewer food crops would be used to make biofuel

Because salt marsh plants grow faster than wheat and barley.

(2 marks)



5 (d) Salt is often used in cooking.

Describe how salt can be separated from rock salt.

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(5 marks)

11

Turn over for the next question

Turn over ►



6 The 'Megaclean' company produce cleaning products for kitchens and bathrooms.

The cleaning products contain abrasives such as calcite (CaCO_3), silica (SiO_2) and silicon carbide (SiC).

6 (a) (i) The word equation below shows the manufacture of calcite.

calcium hydroxide + carbon dioxide \rightarrow calcite + water

Complete the symbol equation for this reaction.



6 (a) (ii) Give the chemical name of calcite
(1 mark)

6 (a) (iii) In the reaction the mass of the reactants is conserved.

A What does 'conservation of mass' mean?

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.....

B Why is mass conserved in a reaction?

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(2 marks)

6 (a) (iv) When 'Megaclean' make calcite they react 111 g of calcium hydroxide with 66 g of carbon dioxide to complete the reaction.

27 g of water is produced in the reaction.

What is the mass of calcite produced?

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(2 marks)



6 (a) (v) It is inefficient to add more carbon dioxide to 111 g of calcium hydroxide.

Suggest why.

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(2 marks)

6 (b) Many people have marble tiles in their kitchens.



People need to use cleaners that do **not** scratch the tiles.

The table shows some data about the hardness of abrasives in the cleaners.

Abrasive	Hardness scale
calcite	3
silica	7
silicon carbide	13

Marble has a hardness of 5 on the hardness scale.

Which product would you recommend to use on marble tiles? Explain why.

.....

.....

.....

(2 marks)

10

Turn over ►



7 (a) Crude oil is a mixture of compounds. Some of these compounds are called alkanes.
Three examples of alkanes are pentane (C_5H_{12}), octane (C_8H_{18}) and decane ($C_{10}H_{22}$).

7 (a) (i) Name the atoms in alkanes.

.....
(1 mark)

7 (a) (ii) How many atoms are there in total in octane?

.....
(1 mark)

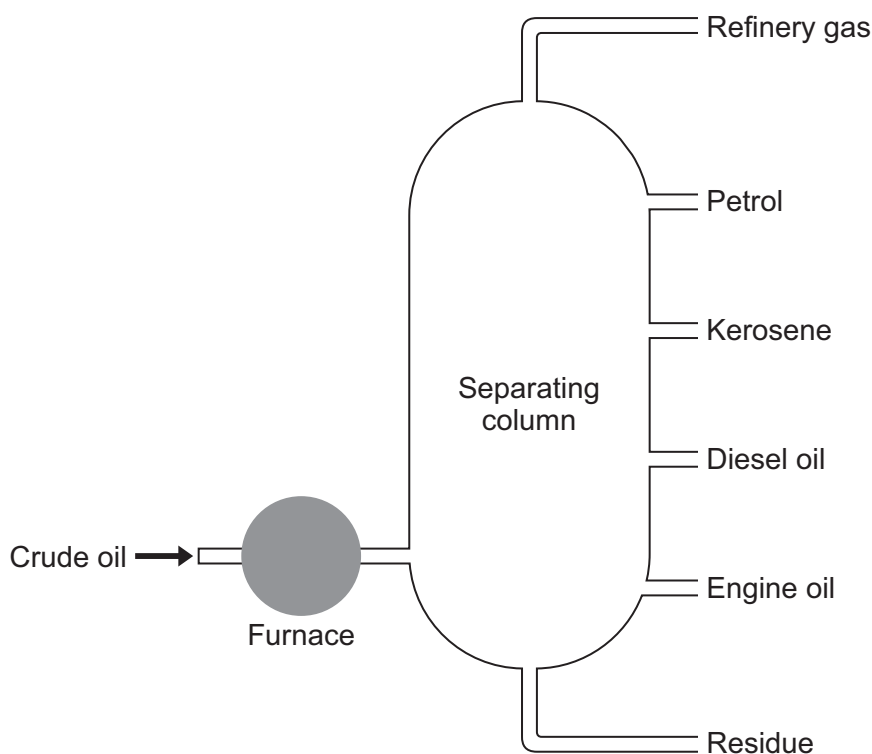
7 (a) (iii) Octane is a compound and crude oil is a mixture. Explain why.

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(2 marks)

7 (b) *In this question you will be assessed on using good English, organising information clearly and using scientific terms where appropriate.*

The diagram shows equipment used to separate the materials found in crude oil.

The separated materials are named on the diagram.



Explain how crude oil is separated using the equipment shown in the diagram.

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(6 marks)

END OF QUESTIONS

10



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