AQA

General Certificate of Secondary Education
Foundation Tier
June 2012

Science B

SCB1FP

Unit 1 My World

F

Written Paper

Tuesday 12 June 2012   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 6 (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.

SCB1FP

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

1 Phytoplankton are tiny plants found in the ocean.

1 (a) Draw a ring around the correct answer in the box to complete each sentence about phytoplankton.

Phytoplankton use carbon dioxide to make fats,

minerals and carbohydrates.
proteins and carbohydrates.
proteins and minerals.

When phytoplankton die and their bodies decay,

carbon dioxide
nitrogen
oxygen

is released.

(2 marks)

1 (b) Phytoplankton live near the surface of the ocean.

Suggest why.

....

....

....

....

(2 marks)

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

Phytoplankton are part of the plant

| kingdom. |
| phylum. |
| species. |

(1 mark)

1 (d) Human activity can increase the amount of carbon dioxide in the atmosphere.

In the table, tick the **three** human activities that increase the amount of carbon dioxide in the atmosphere.

Tick (✓) **three** boxes.

Activity	Tick (✓)
Cutting down trees	
Growing rice	
Farming cattle	
Cooking with natural gas	
Driving cars	
Using nuclear power	

(3 marks)

8

Turn over for the next question

Turn over ▶

2 In industry, crude oil can be separated into useful substances using the equipment shown in the diagram.
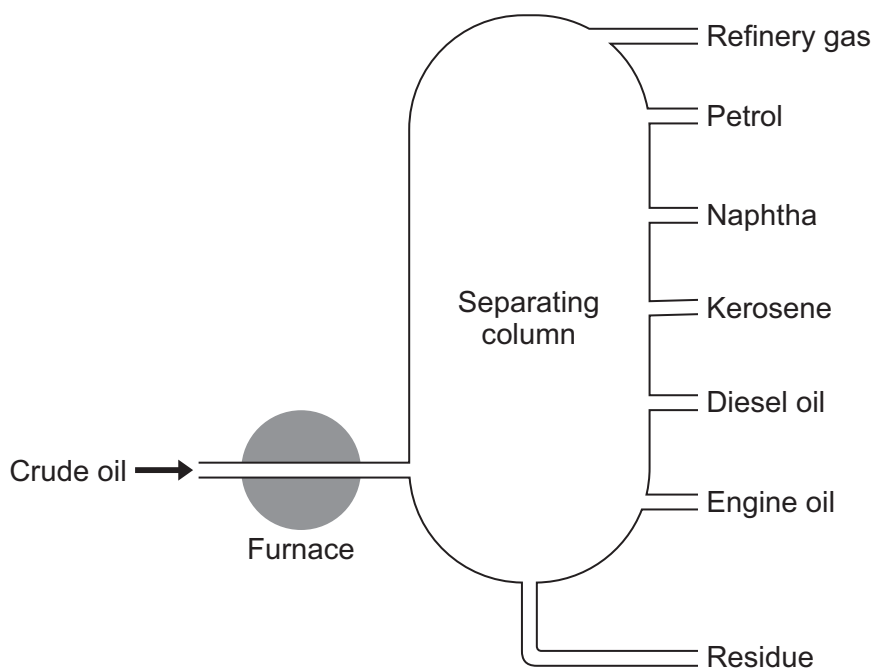
2 (a) What is the name of the process that is used to separate crude oil?

Draw a ring around the correct answer.

fractional distillation   partial cracking   liquid filtration

(1 mark)

2 (b) The table shows the carbon chain length of substances separated from crude oil and the boiling point of each substance.

Substance	Number of carbon atoms in chain	Boiling point in °C
Petrol	5–7	40
Naphtha	7–10	110
Kerosene	10–15	180
Diesel oil	15–20	260
Engine oil	20–40	300
Residue	more than 40	340

2 (b) (i) Use the information in the table to complete the bar chart.

Number of carbon atoms in chain
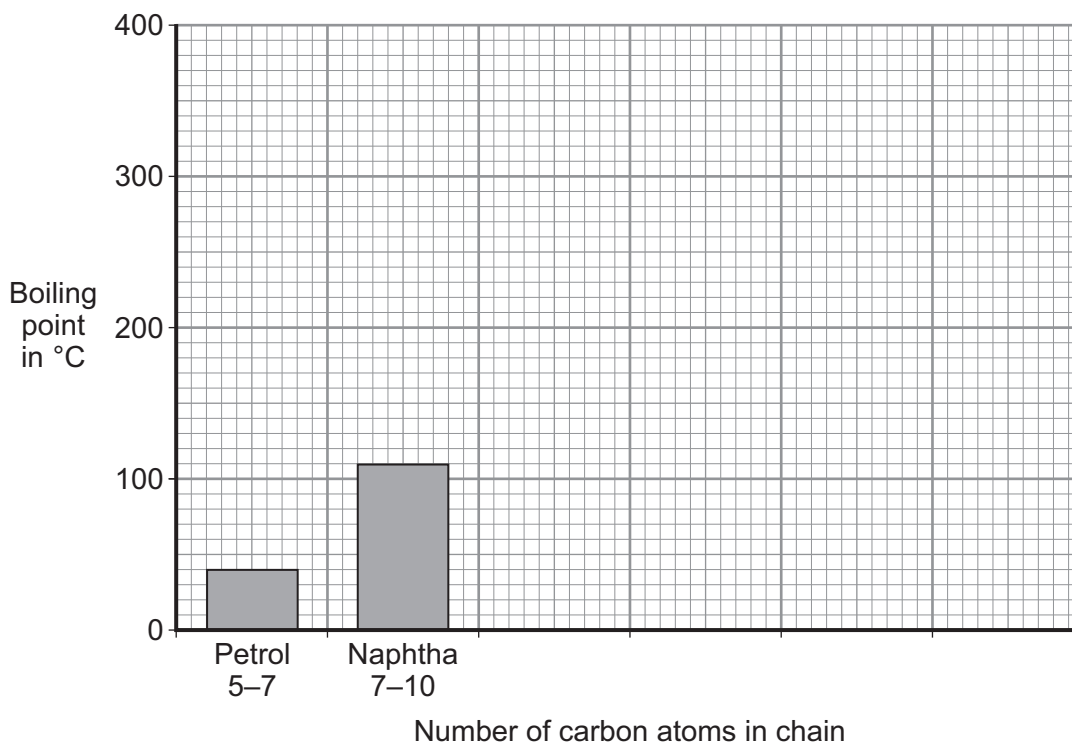
(3 marks)

2 (b) (ii) Describe the pattern shown in the bar chart.

....

....

....

....

(2 marks)

2 (b) (iii) How does viscosity change with chain length of the compound?

Tick (✓) **one** answer.

Viscosity increases as chain length increases. ☐

Viscosity decreases as chain length increases. ☐

Viscosity does not change as chain length increases. ☐

(1 mark)

7

Turn over ▶

3   The photographs show a simple food chain.

3 (a) (i)   The fox dies. Name a group of organisms that would make the body of the fox decay.

....

(1 mark)

3 (a) (ii)   Give **two** conditions that would cause the fox's body to decay more quickly.

....

....

(2 marks)

0 6

3 (b) A different food chain is shown below.

A ⟶ B ⟶ C ⟶ D

The table shows the energy transferred at each stage in the food chain.

Stage in food chain	Energy transferred in kJ per m² per year
A ⟶ B	15 000
B ⟶ C	3 000
C ⟶ D	100

3 (b) (i) What percentage of the energy transferred from **A** to **B** is then transferred from **B** to **C**?

....

....

.... %

(2 marks)

3 (b) (ii) What happens to the energy that is **not** used for growth?

....

....

....

....

....

....

(3 marks)

8

Turn over ▶

4 (a) When magnesium is burnt in air magnesium oxide is formed.

Draw **one** line from each substance to the correct description of the substance.

Substance   **Description**

mixture

air

compound

magnesium oxide

element

(2 marks)

4 (b) In an experiment, a student heated some magnesium in a crucible.

The student's results are shown in the table.

Mass of magnesium before heating	5.00 g
Mass of magnesium oxide formed	7.53 g
Difference in mass	……… g

4 (b) (i) Complete the table to show the difference in mass.

(1 mark)

4 (b) (ii) Explain why the mass has increased.

....

....

....

....
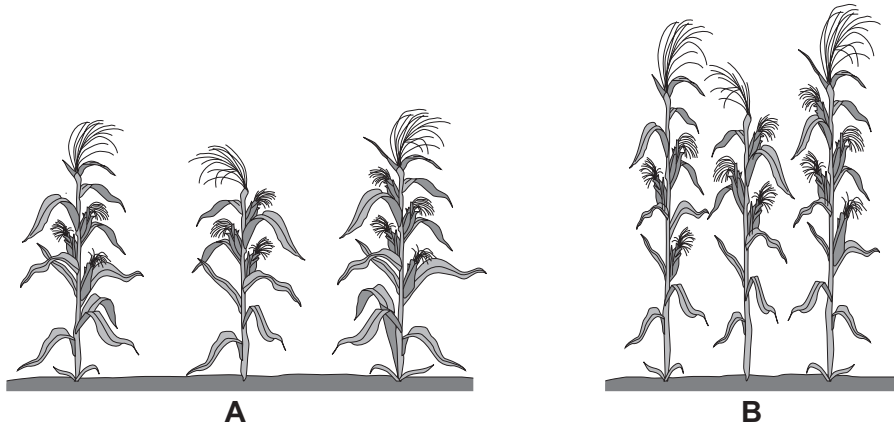
(2 marks)

5

5 A farmer grew some sweetcorn plants in two plots, **A** and **B**.

He planted the plants in plot **A** further apart than the plants in plot **B**.

The diagram shows the plants growing in each plot. The plants have been drawn to the same scale.

5 (a) State **two** differences between the plants in plot **A** and the plants in plot **B**.

....

....

....

....

(2 marks)

5 (b) Other than light, what **two** factors do plants need to survive?

....

....

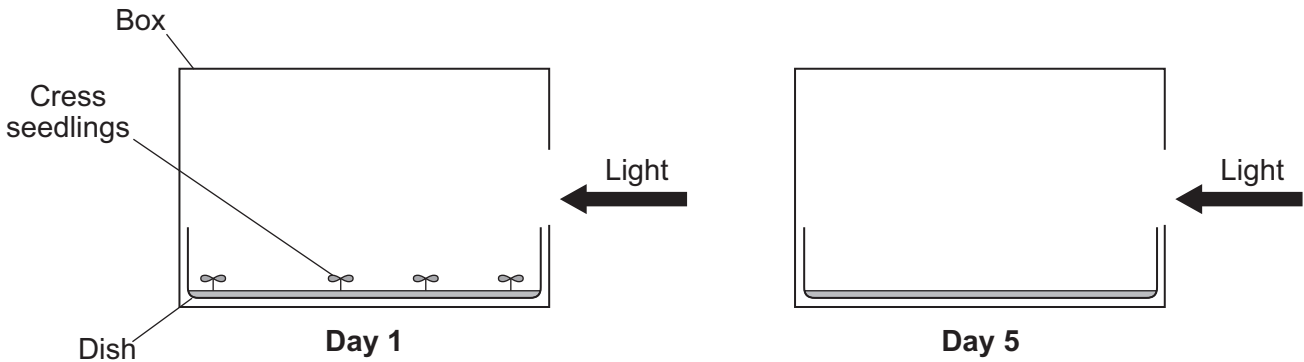*(2 marks)*

Question 5 continues on the next page

Turn over ▶

5 (c) Some students did an investigation to see how light affects the growth of cress seedlings.

The students grew some cress seedlings on a dish and then placed the dish inside a black box. They put a lid on the box but allowed light to enter from the side.

5 (c) (i) Complete the diagram to show what the cress would look like on day 5 of the investigation.

Box

Cress seedlings

Light →

Day 1

Dish

Light →

Day 5

(2 marks)

5 (c) (ii) Use the correct answer from the box to complete the sentence.

gravitropism	phototropism	thermotropism

Plant growth in response to light is called ....

(1 mark)

5 (c) (iii) Suggest **two** variables that the students should control in their investigation.

....

....

....

....
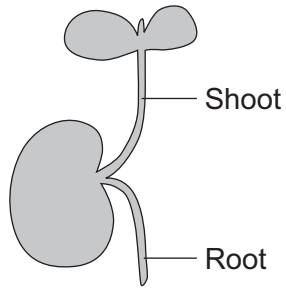
(2 marks)

5 (d) In a different experiment, the students grew some bean seedlings in the dark.
The seedlings looked like the diagram below.

— Shoot

— Root

The students then put the seedlings on their side.

5 (d) (i) Which diagram below shows what the seedlings would look like after 2 days in the dark on their side?

Tick (✓) **one** answer.

☐   ☐   ☐
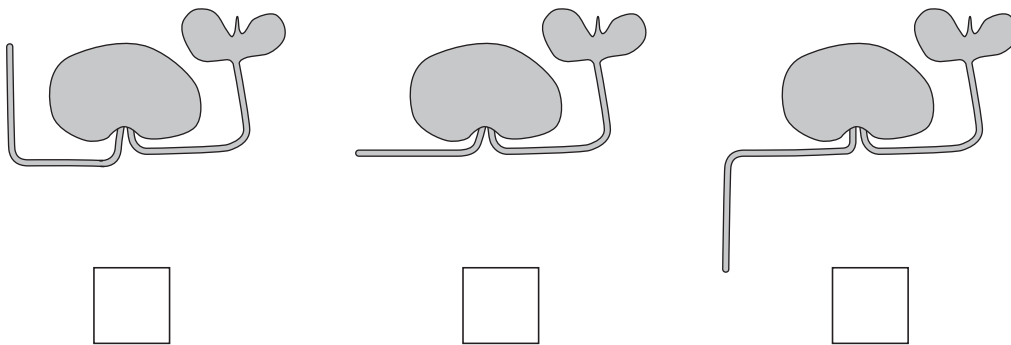
(1 mark)

5 (d) (ii) Draw a ring around the correct answer to complete the sentence.

The response of the root is caused by

| gravity. |
| heat. |
| light. |

(1 mark)

Turn over for the next question

Turn over ▶

11

6 (a) The Earth's atmosphere has changed over millions of years. The table shows the percentages of gases in the Earth's atmosphere today.

Gas	Percentage in atmosphere (%)
Oxygen	20
Nitrogen	78
Other gases and water vapour	2

Use the data in the table to sketch a pie chart of the percentages of gases in the Earth's atmosphere. Label each sector clearly.
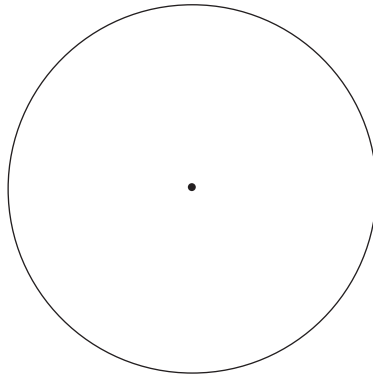
(2 marks)

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

The diagrams show the position of the areas of land on the Earth 3 billion years ago and the areas of land on Earth today. The arrows show the direction of movement of the areas of land.

3 billion years ago   **Today**
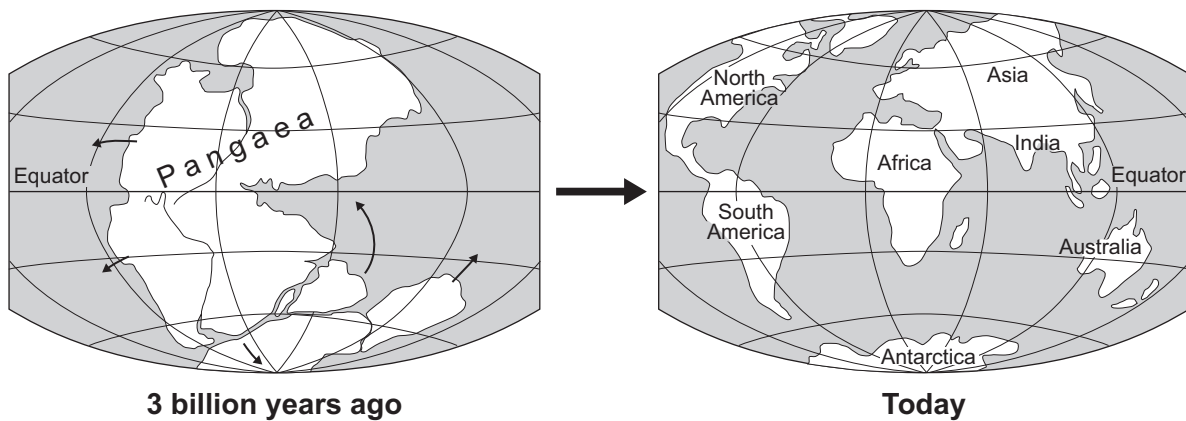
Over 3 billion years the continents have separated. Explain how the continents have moved.

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

(6 marks)

8

Turn over for the next question

Turn over ▶

7 The photograph shows two varieties of moth, **X** and **Y**. The moths belong to the same species.

The moths are resting on a tree trunk in open countryside.

Moth **X**

Moth **Y**

7 (a) A student investigated the populations of different moths that live in a woodland. The woodland the student studied was not polluted by smoke or soot.

The student captured 66 moths of variety **X**.

The student marked each moth with a spot of paint on the underside of one wing, and then released all the moths.

A few days later, the student captured 62 moths of variety **X**. 12 of the captured moths had a spot of paint on the underside of one wing.

7 (a) (i) Why did the student put the paint on the underside of the wing and not on the top?

Tick (✓) **one** answer.

So it is easier to collect the results. ☐

So the paint cannot be seen by predators. ☐

So the paint does not poison the moth. ☐

(1 mark)

7 (a) (ii) Use the information from the experiment and the equation below to estimate the population size of moth variety **X** in the woodland.

$$\text{Population size} = \frac{\text{number captured first time} \times \text{number captured second time}}{\text{number in second capture with paint spot}}$$

....

....

....

Answer = ...

(2 marks)

7 (b) Which variety of moth, **X** or **Y**, is more likely to be eaten by insect-eating birds in the woodland?

Give the reason for your answer.

....

....

....

(1 mark)

7 (c) In the 19th century there was a lot of smoke pollution, which caused the tree trunks in the woodland to become very dark.

Suggest how the numbers of moth **X** and moth **Y** would have been different in the 19th century from what they are today. Explain your answer.
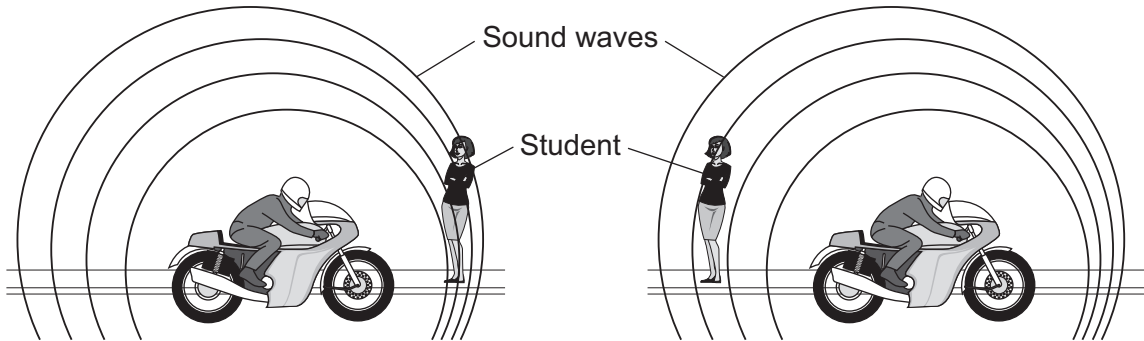
....

....

....

....

....

....

....

(3 marks)

7

Turn over ▶

8 The diagrams show a motor bike passing a student.

8 (a) The motor bike produces a sound with a frequency of 120 Hz.

The table gives information about how the movement of the motor bike towards and away from the student affects the sound she hears.

Speed of motor bike in metres per second	Frequency of sound heard by the student in Hz	
	Motor bike moving towards student	Motor bike moving away from student
20	127.25	112.75
30	130.91	109.09
40	134.55	105.45
50	138.18	101.85
60	141.82	98.18

Use information from the diagrams and the table to explain how the movement of the motor bike affects the sound the student hears.

You should answer in terms of frequency and wavelength.

....

....

....

....

....

....

....

....

(4 marks)

8 (b) As distant galaxies move away from the Earth, the wavelength of the light we detect on Earth increases.

What is the name of this effect?

....

(1 mark)

8 (c) The effect described in **8 (b)** provides evidence to support the theory that the universe began from a very small initial point. What is the name of this theory?

....

(1 mark)

6

END OF QUESTIONS

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED