Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

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

AQA

General Certificate of Secondary Education
Higher Tier
June 2015

Science B

SCB1HP

Unit 1 My World

H

Friday 5 June 2015 1.30 pm to 2.30 pm

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 1 hour

A

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 3 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.

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

1 (a) Crude oil is a mixture of hydrocarbons.

The properties of a hydrocarbon, such as boiling point and viscosity, depend on the number of carbon atoms that it contains.

Which row in **Table 1** shows the correct trend for the boiling point and viscosity of hydrocarbons?

Tick (✓) **one** box.

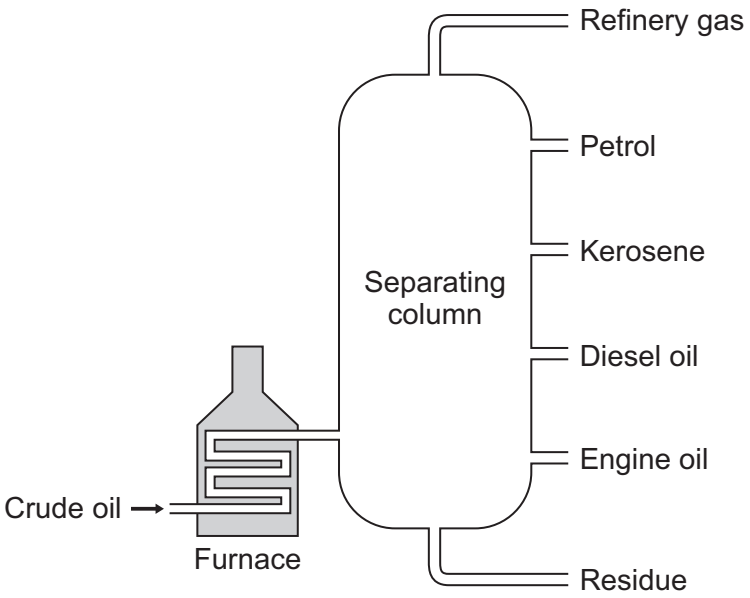
[1 mark]

Table 1

Number of carbon atoms in hydrocarbons	Boiling point of hydrocarbons	Viscosity of hydrocarbons	Tick (✓)
Increases	Decreases	Decreases	
Increases	Decreases	Increases	
Increases	Increases	Decreases	
Increases	Increases	Increases	

1 (b) **Figure 1** shows the equipment used to separate hydrocarbons in crude oil.

Figure 1



1 (b) (i) Describe **fully** what the furnace does.

[2 marks]

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1 (b) (ii) Why do the different hydrocarbons condense at different distances up the separating column?

[1 mark]

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1 (b) (iii) What is the relationship between the number of carbon atoms in the hydrocarbon molecule, and the distance the hydrocarbon travels up the separating column?

[1 mark]

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1 (b) (iv) Some hydrocarbons, like methane, are gases.

Suggest the name of **one other** hydrocarbon that is found in refinery gas.

[1 mark]

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6

Turn over for the next question

2 (a) Marine animals, such as corals, form limestone from carbon dioxide.

Describe how limestone is formed from marine animals.

[4 marks]

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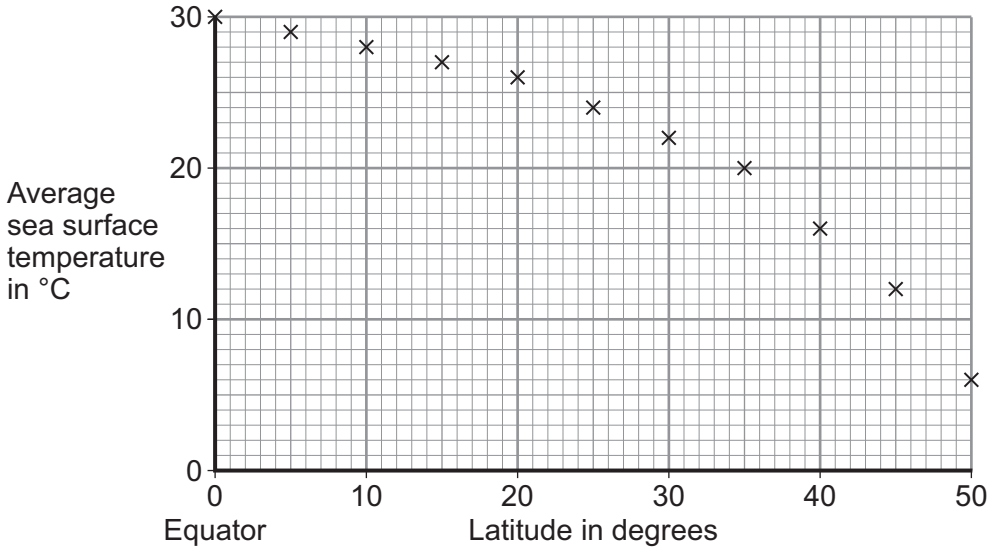
2 (b) **Figure 2** shows how the average sea surface temperature of the Pacific Ocean changes with the latitude.

Figure 2



2 (b) (i) Most corals are found between 0 degrees latitude and 30 degrees latitude.

Use the data given in **Figure 2** to suggest why.

[2 marks]

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2 (b) (ii) Corals have algae living inside them.

The algae produce food by photosynthesis.

Corals cannot live without the food made by the algae.

Table 2 shows how the percentage of light penetrating sea water depends on the depth of the water.

Table 2

Depth of water in metres	Percentage (%) of light penetrating the sea water
20	70
40	45
60	18
80	8
100	1

Most corals cannot live at depths greater than 50 metres.

Suggest why.

Use the data given in **Table 2** to help you.

[2 marks]

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8

Turn over for the next question

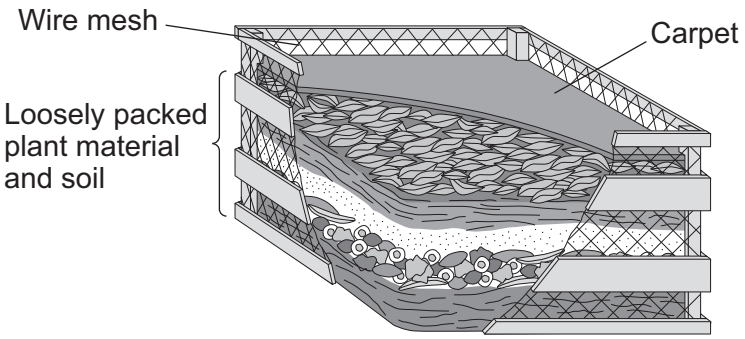
3 **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Compost is made when plant material decomposes.

A gardener made a compost heap. She filled a container, made of wood and wire mesh, with a mixture of loosely packed plant material and soil.

Figure 3 shows the features of the compost heap made by the gardener.

Figure 3



Describe the conditions needed to make compost and how the features of the compost heap made by the gardener, in **Figure 3**, helps to produce these conditions.

[6 marks]

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Extra space .....

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Turn over for the next question

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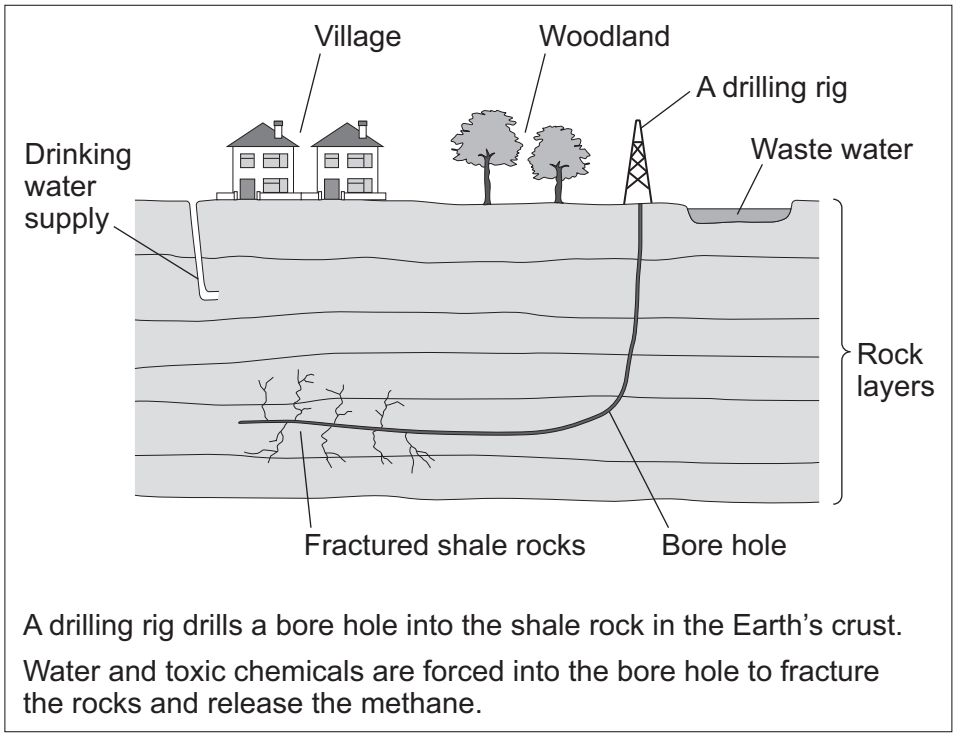
ANSWER IN THE SPACES PROVIDED

4 Methane is an important energy resource. Methane can be obtained from shale rocks in the Earth's crust by fracking.

Fracking is described in **Figure 4**.

Figure 4



A drilling rig drills a bore hole into the shale rock in the Earth's crust.

Water and toxic chemicals are forced into the bore hole to fracture the rocks and release the methane.

Figure 5 contains newspaper headlines about fracking in the UK and the USA.

Figure 5

UK shale reserves of methane are enough for hundreds of years.

The cost of electricity in USA halved by the use of fracked methane.

Blackpool is hit by two small earthquakes after nearby fracking.

Fracking would provide thousands of jobs in the UK.

The US Environmental Protection Agency confirms that fracking in the State of Wyoming has put toxic chemicals into water supplies.

4 (a) Evaluate the use of fracking to get methane. Use information from **Figure 4** and **Figure 5** to help you.

There are no marks for just copying the headline.

Remember to give a conclusion.

[5 marks]

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4 (b) Another important energy resource is coal. Coal is mainly made of carbon.

Carbon is an element with atomic number 6 and mass number 12.

Give the meaning of 'atomic number' and 'mass number'.

[2 marks]

Atomic number .....

.....

Mass number .....

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Question 4 continues on the next page

4 (c) We burn fuels to obtain useful energy. Burning fuels that contain carbon produces carbon dioxide.

Reducing the amount of carbon dioxide reduces the human impact on the environment.

Burning 1 g of methane releases the same amount of useful energy as burning 1.27 g of coal.

> Burning 1 g of coal produces 3.67 g of carbon dioxide.
>
> Burning 1 g of methane produces 2.75 g of carbon dioxide.

Use the information in the box to answer the following questions.

4 (c) (i) Calculate how much carbon dioxide is produced when 1.27 g of coal is burned.

[1 mark]

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4 (c) (ii) Calculate the percentage reduction in carbon dioxide produced when burning 1 g of methane instead of burning 1.27 g of coal.

[3 marks]

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4 (d) The complete combustion of methane is shown in the balanced symbol equation.

$$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$$

Explain why this is a **balanced** equation.

[1 mark]

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12

5 (a) Our universe is constantly changing.

Astronomers believe the universe started from a very small point and exploded outwards.

Describe the evidence astronomers use to support this belief.

[3 marks]

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5 (b) (i) The Earth's atmosphere is changing all the time.

The Earth's early atmosphere contained carbon dioxide, water vapour and very small proportions of oxygen.

Name **one other** gas found in small proportions in the Earth's early atmosphere.

[1 mark]

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5 (b) (ii) One gas found in the atmosphere today shows that living organisms exist on the Earth.

Name the gas and give a reason why it shows that living organisms exist on the Earth.

[1 mark]

Gas .....

Reason .....

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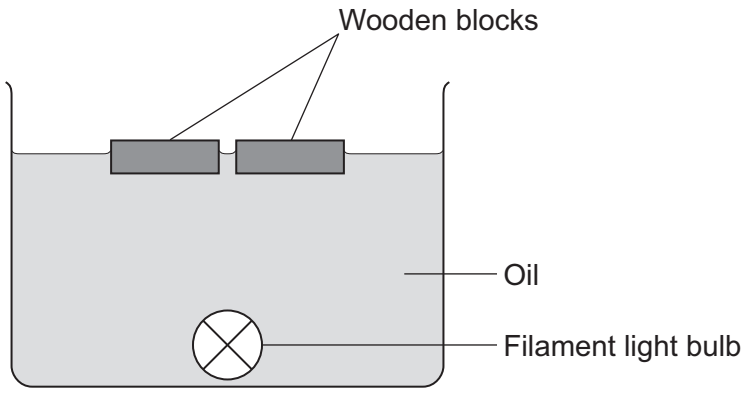
Question 5 continues on the next page

5 (c) The Earth's crust is broken into pieces which are continually moving over the Earth's surface. The movement of the pieces of the Earth's crust is called continental drift.

A student set up an experiment to model the movement of the pieces of the Earth's crust.

The model is shown in **Figure 6**.

Figure 6



5 (c) (i) Name the parts of the Earth's structure that are represented by each of the parts labelled in **Figure 6**.

[3 marks]

The wooden blocks .....

The oil .....

The filament light bulb .....

5 (c) (ii) When the filament light bulb in **Figure 6** is switched on, the wooden blocks move apart after a short time.

Explain why.

[2 marks]

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5 (c) (iii) The model in **Figure 6** is not a good model for continental drift.

Suggest **one** reason why.

[1 mark]

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5 (d) (i) Explain what causes a volcano to erupt.

[3 marks]

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5 (d) (ii) How are earthquakes caused?

[1 mark]

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15

Turn over for the next question

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6 Living organisms on the Earth can be put into food chains.

6 (a) (i) Describe how energy enters a food chain.

[2 marks]

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6 (a) (ii) Describe how energy leaves a food chain.

[2 marks]

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6 (a) (iii) Food chains rarely contain more than five different organisms.

Give **two** reasons why.

[2 marks]

1 .....

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2 .....

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6

Turn over for the next question

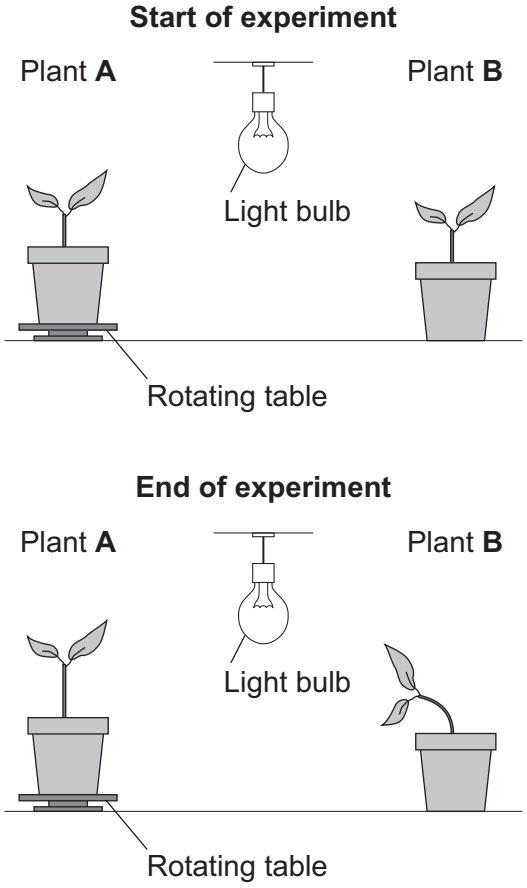
7 A student investigated phototropism. His experiment is shown in **Figure 7**.

The **only** light given to the plants was from the light bulb.

Plant **A** was kept on a rotating table that turned slowly all the time. The rotating table completed one rotation every hour. Plant **B** did not rotate.

The experiment lasted one day.

Figure 7



7 (a) (i) Explain what happens in the stem of plant **B** to cause the response shown in **Figure 7**.

[4 marks]

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7 (a) (ii) Explain why plant **A** did **not** make the same response as plant **B**.

[3 marks]

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7

END OF QUESTIONS

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