Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

For Examiner's Use

General Certificate of Secondary Education
January 2008

SCIENCE B **CHY1F**
Unit Chemistry C1

F

CHEMISTRY
Unit Chemistry C1

Foundation Tier

Friday 18 January 2008 1.30 pm to 2.15 pm

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed: 45 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

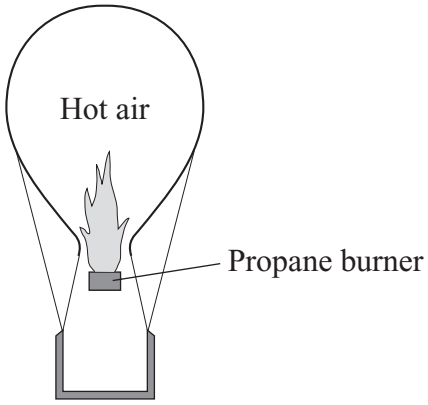
Information
- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

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

For Examiner's Use			
Question	Mark	Question	Mark
1		7	
2		8	
3			
4			
5			
6			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

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

1 Hot air balloons burn hydrocarbons to heat the air.



(a) The hot air contains these gases: nitrogen, N_2
oxygen, O_2
argon, Ar
carbon dioxide, CO_2
water vapour, H_2O

(i) Argon is an *element*.

What is an *element*?

.....

.....

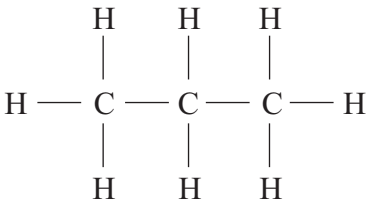
(1 mark)

(ii) Name **one** other gas in the hot air that is also an element.

.....

(1 mark)

(b) Propane, C_3H_8, can be represented as:



Use the correct words from the box to complete the sentences.

bond	**carbon**	**compound**	**element**	**mixture**

(i) Propane is a ..... and is made up of atoms of hydrogen and ..... .

(2 marks)

(ii) Each line between the atoms in propane represents a chemical ..... .

(1 mark)

5

Turn over for the next question

2 There are six main groups of food additives.

(a) Use the correct food additive from the box to complete the sentences below.

acidity regulators	**antioxidants**	**colours**
emulsifiers	**flavourings**	**preservatives**

(i) To make orange drinks look orange we would add ..... .

(1 mark)

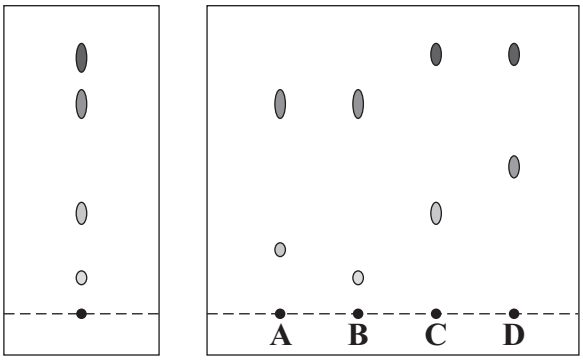
(ii) To improve the coating ability of salad creams we would add ..... .

(1 mark)

(iii) To make the food 'stay fresh' as long as possible we would add ..... .

(1 mark)

(b) Chromatography was carried out on a sample of soft drinks to check that they contained only colours that were safe. This is the result.



Safe colours Colours from the soft drinks

What conclusions about the safety of the colours in the soft drinks **A**, **B**, **C** and **D** can be made from the results shown by chromatography?

.....

.....

.....

.....

(2 marks)

5

Turn over for the next question

3 High amounts of cholesterol in the blood can cause heart disease.

- Eating saturated fat increases the amount of cholesterol in blood.
- Eating monounsaturated fat does not increase the amount of cholesterol in blood.
- Eating polyunsaturated fat decreases the amount of cholesterol in blood.

(a) The amounts of saturated fat and polyunsaturated fat in different types of margarine are shown in the table.

Type of margarine	Description	Saturated fat, g per 100 g margarine	Polyunsaturated fat, g per 100 g margarine
W	Hard margarine from animal and vegetable oils	30	14
X	Soft margarine from animal and vegetable oils	27	16
Y	Hard margarine from vegetable oils only	30	10
Z	Soft margarine from vegetable oils only	26	18

Which type of margarine, **W**, **X**, **Y** or **Z**, would you consider best to use to lower blood cholesterol?

Explain your answer.

The best type of margarine to use is ..... .

Explanation .....

.....

.....

(2 marks)

(b) Use the correct words from the box to complete the sentences.

higher	**hydrogen**	**lower**
oxygen	**saturated**	**unsaturated**

(i) Animal and vegetable oils that contain ..... fats can be hardened.
(1 mark)

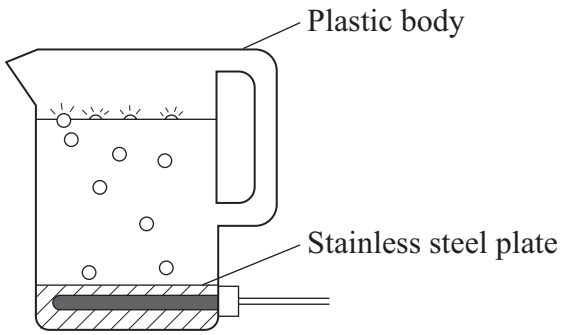
(ii) When oils are hardened with ..... gas, a chemical change takes place, producing margarine which has a ..... melting point than the original oil.

(2 marks)

5

Turn over for the next question

4 Plastics are used to make many everyday items, such as the body of the kettle.



(a) Complete the sentences by drawing a ring around the correct words.

(i) The plastic is made from many small molecules called

catalysts
monomers
polymers

.

(1 mark)

(ii) Propene is produced by cracking some of the fractions that are

separated from

crude oil
limestone
metal ores

.

(1 mark)

(b) After a few years the kettle no longer worked.

- Some parts of the kettle are made of plastic.
- Some parts of the kettle are made of stainless steel.
- The owner of the kettle disposed of it in a landfill site.

Consider these statements.

Suggest **three** reasons why the kettle should **not** be disposed of in a landfill site.

1 .....

.....

2 .....

.....

3 .....

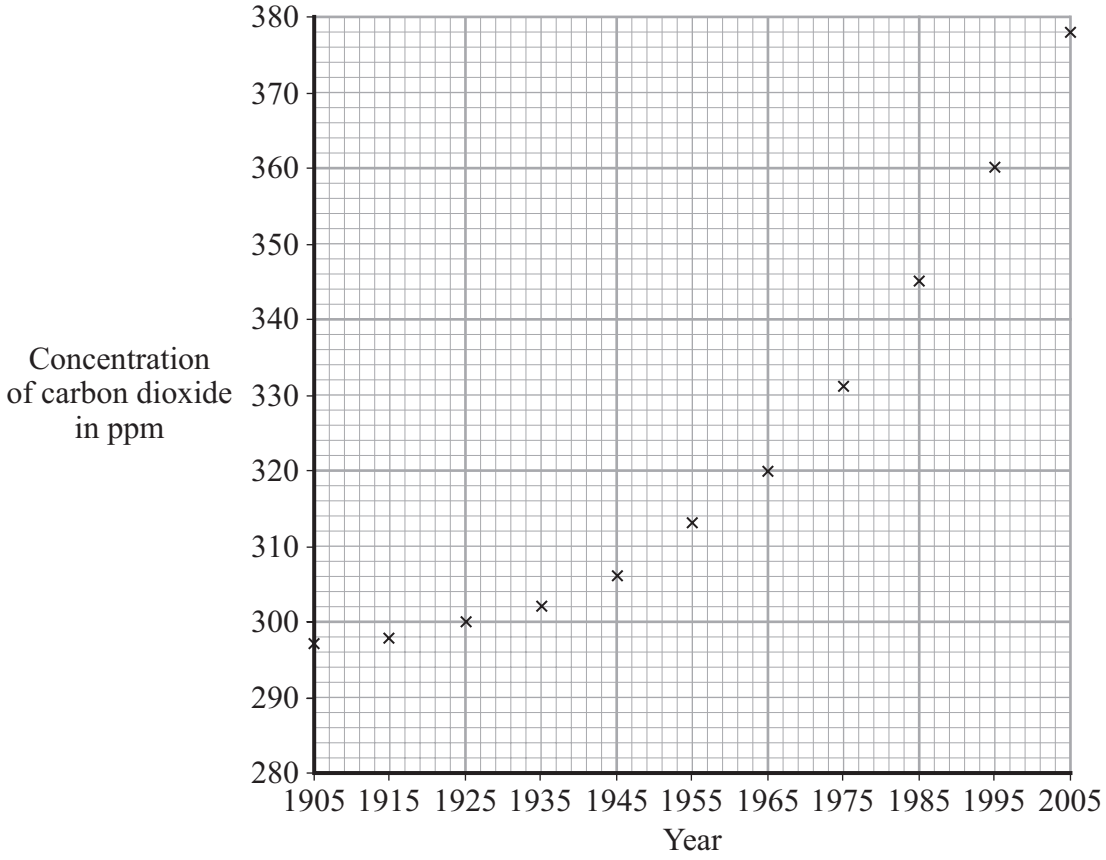
.....

(3 marks)

5

Turn over for the next question

5 Global warming is thought to be happening because of the increased burning of fossil fuels. The concentration of carbon dioxide in the air from 1905 to 2005 has been calculated.



(a) Draw a line of best fit for these points. *(1 mark)*

(b) (i) What was the concentration of carbon dioxide in 1955?

..... ppm *(1 mark)*

(ii) In what year did the concentration of carbon dioxide reach 350 ppm?

.....

(1 mark)

(c) Use the graph to describe, in as much detail as you can, what happened to the concentration of carbon dioxide from 1905 to 2005.

.....

.....

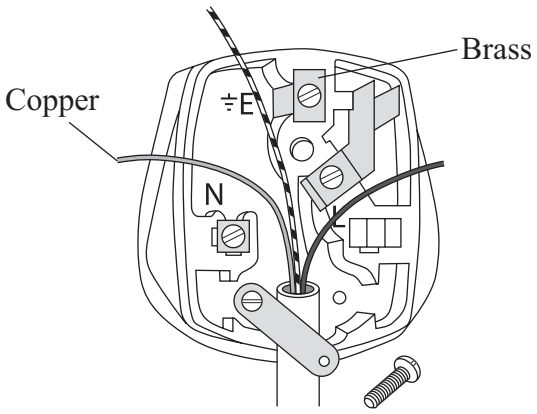
.....

.....

(2 marks)

5

6 Copper metal is used for electric wires.
An alloy of copper, called brass, is used for pins and terminals of electric plugs.



(a) Copper metal is relatively soft and flexible.

Give another reason why copper is used for electric wires.

.....

.....

(1 mark)

(b) Brass is an *alloy*.

What is an *alloy*?

.....

.....

(1 mark)

Question 6 continues on the next page

(c) Open-cast mining of copper ore makes a very large hole.

Source: Photograph © MELVYN P. LAWES; *Papilio/CORBIS*

(i) Suggest **one** environmental problem that is caused by open-cast mining of copper ore.

.....

.....

(1 mark)

(ii) Some copper ores contain copper sulfide, CuS.
Copper sulfide is heated in air to produce copper and sulfur dioxide.

$$CuS + O_2 \rightarrow Cu + SO_2$$

Suggest **one** environmental problem caused by heating copper sulfide in air.

.....

.....

(1 mark)

(d) The amount of copper-rich ores is estimated to last only a few more years. New houses need several kilometres of copper wire.

(i) Explain why the need to use so much copper will cause a problem in the future.

.....

.....

(1 mark)

(ii) Suggest **two** ways in which society could overcome this problem.

1 .....

.....

2 .....

.....

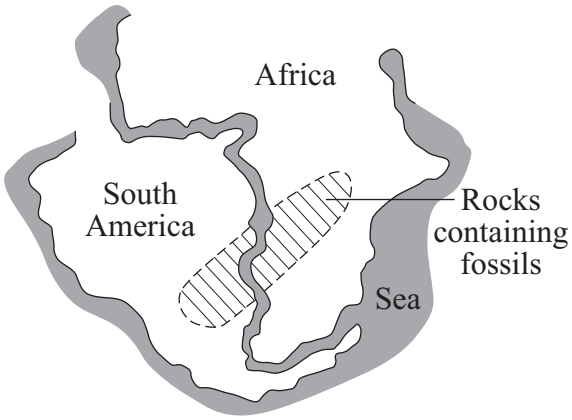
(2 marks)

7

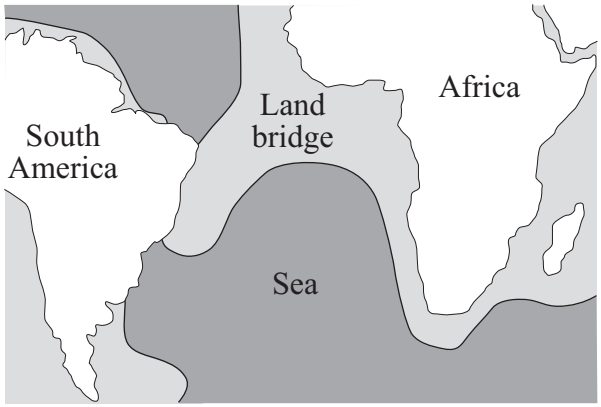
Turn over for the next question

7 A map of the world shows that the outline of South America looks as if it would fit into the west coast of Africa.

- Alfred Wegener in 1920 suggested his idea that the continents had been joined together but then slowly drifted apart.



- Other scientists in 1920 said that the continents were fixed on solid Earth and had been joined by a land bridge.



Modern South American animals are different from modern African animals.
Most fossils of animals found in South America and Africa are exactly the same.

(a) Consider the information above.

(i) What evidence gave Wegener the idea that the continents of South America and Africa had been joined?

.....

.....

(1 mark)

(ii) Suggest **two** reasons why the other scientists in 1920 thought that Wegener was wrong.

1 .....

.....

2 .....

.....

(2 marks)

(b) Complete the sentences by writing in the correct words.

Recent evidence has supported Wegener's idea.

The Earth's ..... and the upper part of the mantle are now thought to be composed of tectonic plates.

Heat released by radioactive processes causes convection currents within the Earth's ..... . These convection currents cause the plates to move a few centimetres per ..... .

(3 marks)

6

Turn over for the next question

LEAVE MARGIN BLANK

8 Soda-lime glass is made by heating, to above 1500 °C, a mixture of:

soda (sodium carbonate), Na_2CO_3

limestone (calcium carbonate), $CaCO_3$

sand (silicon dioxide), SiO_2

(a) (i) Which element do all of these compounds contain?

.....

(1 mark)

(ii) Explain what the formula Na_2CO_3 shows about the compound.

.....

.....

.....

.....

(2 marks)

(b) Calcium carbonate breaks down when heated to above 1500 °C.

(i) Write a word equation to show what happens.

..... → ..... + ...

(2 marks)

(ii) What is the name of this type of chemical reaction?

.....

(1 mark)

(c) The melting point of soda-lime glass is about 750 °C.
The raw materials for making soda are limestone and common salt (sodium chloride).
There are almost unlimited amounts of the raw materials available to manufacture soda-lime glass.

From the information given, what is the most important reason for recycling soda-lime glass?

.....

.....

(1 mark)

7

END OF QUESTIONS