

**Paper Reference(s) 5CH2F/01**

**Edexcel GCSE**

**Chemistry/Additional Science**

**Unit C2: Discovering Chemistry**

**Foundation Tier**

**Monday 21 May 2012 – Morning**

**Time: 1 hour plus your additional time allowance**

**INSTRUCTIONS TO CANDIDATES**

**Write your centre number, candidate number, surname, initials and your signature in the boxes below. Check that you have the correct question paper.**

<b>Centre No.</b>							
<b>Candidate No.</b>							
<b>Surname</b>							
<b>Initial(s)</b>							
<b>Signature</b>							
<b>Paper Reference</b>	<b>5</b>	<b>C</b>	<b>H</b>	<b>2</b>	<b>F</b>	<b>/</b>	<b>0 1</b>

- Use **BLACK** ink or ball-point pen.
- Answer **ALL** questions.
- Answer the questions in the spaces provided – there may be more space than you need.

## **MATERIALS REQUIRED FOR EXAMINATION**

**Calculator, ruler**

## **ITEMS INCLUDED WITH QUESTION PAPERS**

**Nil**

## **INFORMATION FOR CANDIDATES**

- The total mark for this paper is 60.
- The marks for **EACH** question are shown in brackets – use this as a guide as to how much time to spend on each question.
- Questions labelled with an **ASTERISK (\*)** are ones where the quality of your written communication will be assessed – you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.
- A Periodic Table is provided.

## **ADVICE TO CANDIDATES**

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**(Turn over)**

**Answer ALL questions**

**Some questions must be answered with a cross in a box . If you change your mind about an answer, put a line through the box  and then mark your new answer with a cross .**

## **TEMPERATURE CHANGES**

**1 (a) When a small amount of solid ammonium chloride is shaken with water, a colourless solution forms.**

**(i) What type of change has occurred? (1 mark)**

**Put a cross () in the box next to your answer.**

- A** dissolving
- B** displacement
- C** neutralisation
- D** precipitation

**(Question continues on next page)**

**(Turn over)**

- (ii) When this change takes place there is a decrease in temperature.

Describe how you could measure this change in temperature. (2 marks)

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- (iii) Some chemical reactions cause a decrease in temperature.

Give the name of the type of chemical reaction that causes a decrease in temperature.  
(1 mark)

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(Question continues on next page)

(Turn over)

**(b) Marble is a form of calcium carbonate.**

**When marble chips are added to cold, dilute hydrochloric acid, the mixture fizzes.**

**The word equation for the reaction is**



**(i) Give the name of the product that causes the mixture to fizz. (1 mark)**

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**(Question continues on next page)**

**(Turn over)**

- (ii) The experiment is repeated using warm, instead of cold, acid.

State the difference you would SEE when the marble chips react with warm, instead of cold, acid. (1 mark)

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- (iii) Explain what must be done to the marble chips so that the reaction with the warm, dilute hydrochloric acid is even faster. (2 marks)

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(Total for Question 1 = 8 marks)

**SALTS**

- 2 The table shows some salts that are soluble and some that are insoluble in water.

<b>SOLUBLE SALTS</b>	<b>INSOLUBLE SALTS</b>
copper chloride lead nitrate sodium carbonate	barium sulfate lead carbonate

- (a) An insoluble salt can be prepared by mixing two salt solutions.

Choose **TWO** salts from the table that can be reacted together to form lead carbonate. (2 marks)

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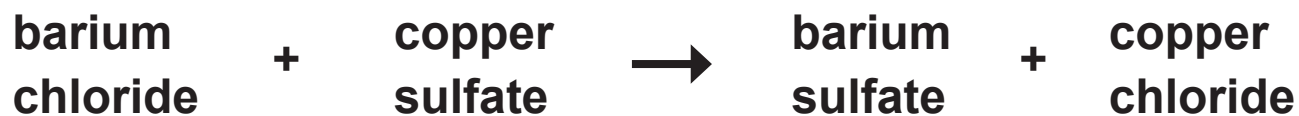
and

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(Question continues on next page)

(Turn over)

(b) Barium chloride solution reacts with copper sulfate solution.



Explain what is SEEN when solutions of barium chloride and copper sulfate are mixed. (2 marks)

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(Question continues on next page)

(Turn over)



(c) A 'barium meal' may be given to a patient before an X-ray is taken.

A 'barium meal' is a suspension of barium sulfate in water.

Give ONE reason why barium sulfate is used in this way. (1 mark)

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(d) Complete the sentences by putting a cross (☒) in the box next to your answer.

(i) The table shows that copper chloride is soluble in water.

This suggests that the structure of copper chloride is

A simple molecular, covalent

B giant molecular, covalent

C ionic

D metallic

(1 mark)

(ii) Sodium carbonate is an ionic compound.

The most likely melting point of sodium carbonate is

A     $-85\text{ }^{\circ}\text{C}$

B     $17\text{ }^{\circ}\text{C}$

C     $146\text{ }^{\circ}\text{C}$

D     $851\text{ }^{\circ}\text{C}$

(1 mark)

(e) Sodium carbonate contains sodium ions,  $\text{Na}^+$ , and carbonate ions,  $\text{CO}_3^{2-}$ .

Give the formula for sodium carbonate. (1 mark)

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(Total for Question 2 = 8 marks)

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(Questions continue on next page)

(Turn over)

**MIXTURES**

**3 (a) Water and oil do not mix.**

**(i) What term is used to describe two liquids that do not mix? (1 mark)**

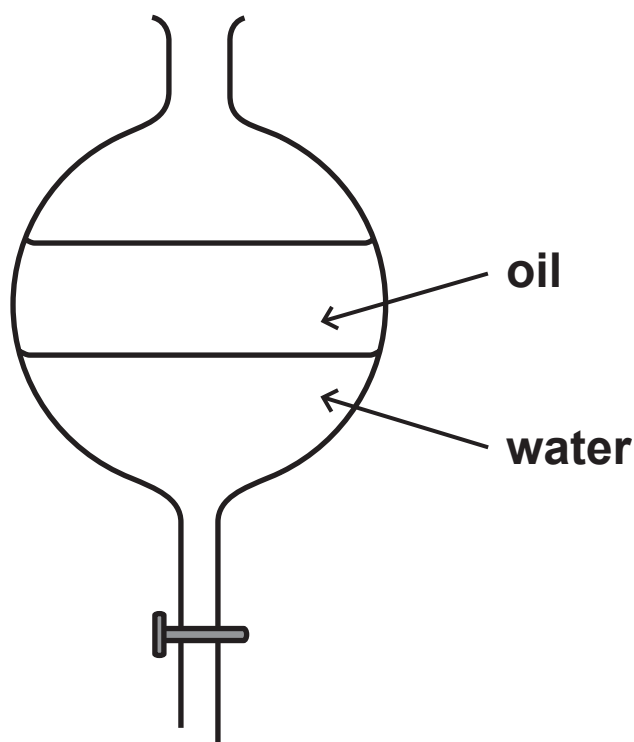
**Put a cross (☒) in the box next to your answer.**

- A ionic**
- B inflammable**
- C immiscible**
- D insoluble**

**(Question continues on next page)**

**(Turn over)**

- (ii) The water and oil mixture can be separated using a separating funnel.



Describe how the separating funnel is used to separate samples of water and oil from the mixture. (2 marks)

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**(b) Wax and sand are both solids at room temperature.**

**The wax has a melting point of 64 °C.**

**The sand has a melting point of 1610 °C.**

**(i) State what will happen to the wax when it is heated using a Bunsen burner. (1 mark)**

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**(ii) When the sand is heated using a Bunsen burner there is no visible change.**

**Explain why. (2 marks)**

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**(Question continues on next page)**

**(Turn over)**

(iii) The wax has a low melting point because there are only weak forces between the molecules in the wax.

What type of structure does wax have?  
(1 mark)

Put a cross (☒) in the box next to your answer.

- A simple molecular, covalent
- B giant molecular, covalent
- C ionic
- D metallic

(Question continues on next page)

- (c) A written note was found at a crime scene. Forensic scientists used chromatography to investigate the dyes in the ink used to write the note.

They put spots of four substances on chromatography paper.

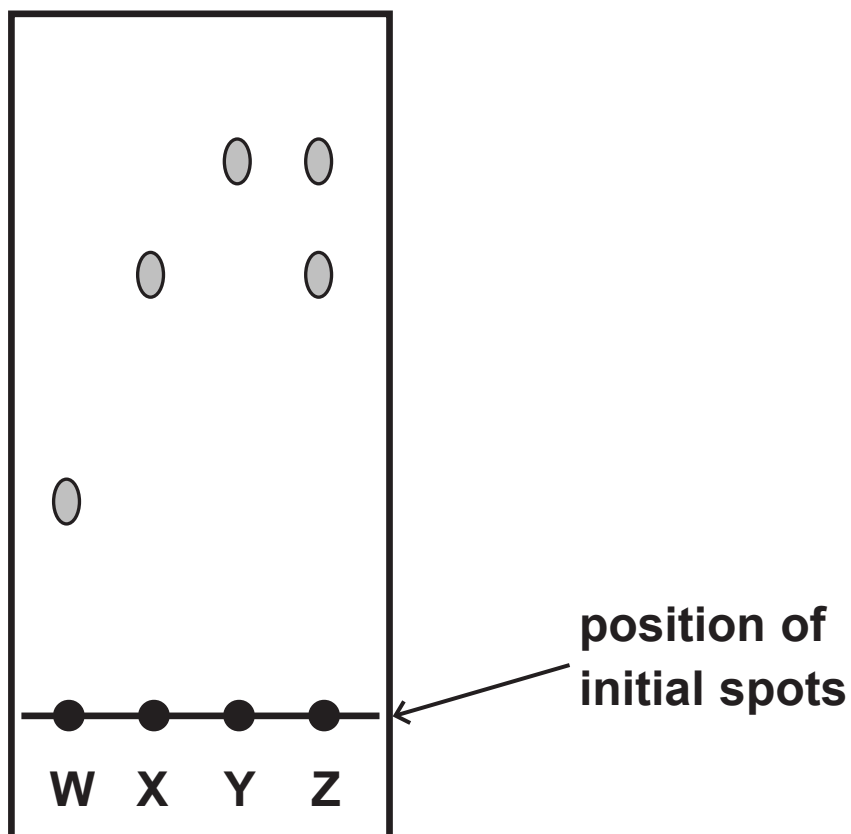
W was pure red dye

X was pure blue dye

Y was pure yellow dye

Z was the ink used on the note

The result of the chromatography is shown.



(i) State how you can tell that dyes W, X and Y are pure. (1 mark)

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(ii) Explain what you can deduce about the ink Z used on the note. (2 marks)

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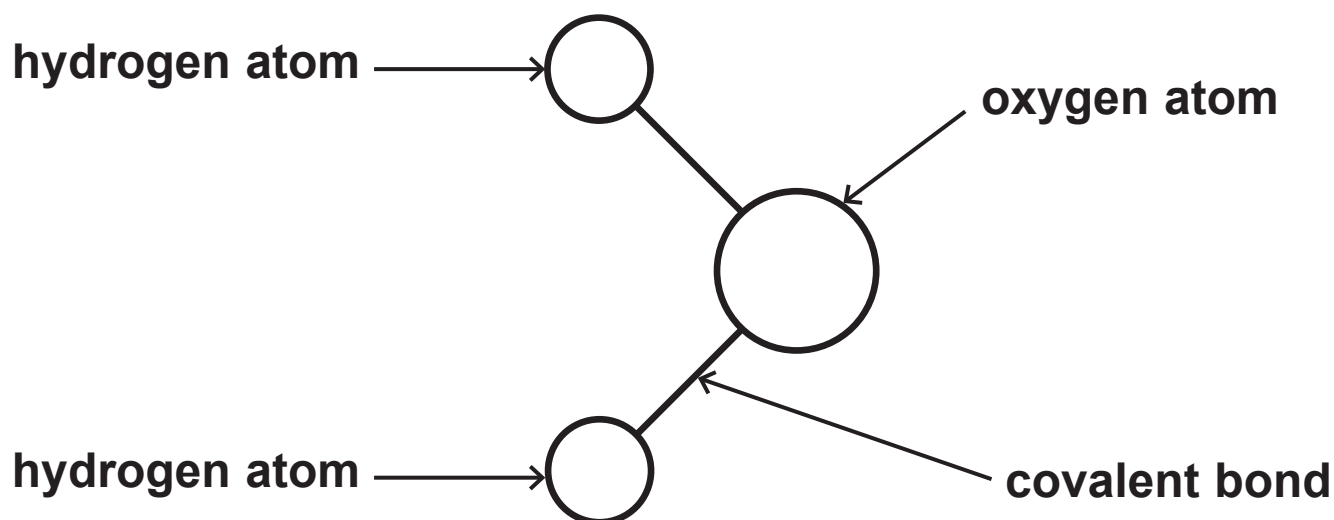
**(Total for Question 3 = 10 marks)**

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**WATER**

4 The diagram shows a model of a water molecule.



(a) Explain, in terms of electrons, how a covalent bond is formed between an oxygen atom and a hydrogen atom. (2 marks)

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(Question continues on next page)

(Turn over)

- (b) Calculate the relative formula mass of water,  $\text{H}_2\text{O}$ .  
(2 marks)

(Relative atomic masses:  $\text{H} = 1.0$ ,  $\text{O} = 16$ )

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answer = \_\_\_\_\_

- (c) Hydrogen burns in oxygen to form water.

- (i) Write the balanced equation for this reaction.  
(3 marks)

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(Question continues on next page)

- (ii) In an experiment the mass of water obtained was 2.0 g.  
The theoretical yield for this experiment was calculated to be 4.0 g.

Calculate the percentage yield. (2 marks)

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percentage yield = \_\_\_\_\_ %

- (iii) Suggest ONE reason why less than 4.0 g of water was obtained in this experiment. (1 mark)

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(Total for Question 4 = 10 marks)

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(Questions continue on next page)

(Turn over)

## ATOMS

5 The positions of five elements, A, B, C, D and E, are shown in the periodic table.

These letters are not the atomic symbols of these elements.

1	2										3	4	5	6	7	0	
A																	
B																	E
									C		D						

(a) Which element, A, B, C, D or E, is a transition metal? (1 mark)

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(b) State why elements A and B have similar reactions. (1 mark)

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- (c) When Mendeleev produced his periodic table, the element labelled D had not been discovered. He predicted the properties of the element and left a space for it in his table.

Explain how Mendeleev was able to predict the properties of element D. (2 marks)

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(Question continues on next page)

**(d) An atom of element C contains 29 protons.**

**Explain how you can use this information to calculate the number of protons in an atom of element D. (2 marks)**

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**(Question continues on next page)**







**METALS AND THEIR COMPOUNDS**

- 6 (a) Complete the sentence by putting a cross (⊗) in the box next to your answer.

Sodium is an alkali metal.

In the periodic table, sodium is in group

A 0

B 1

C 4

D 7

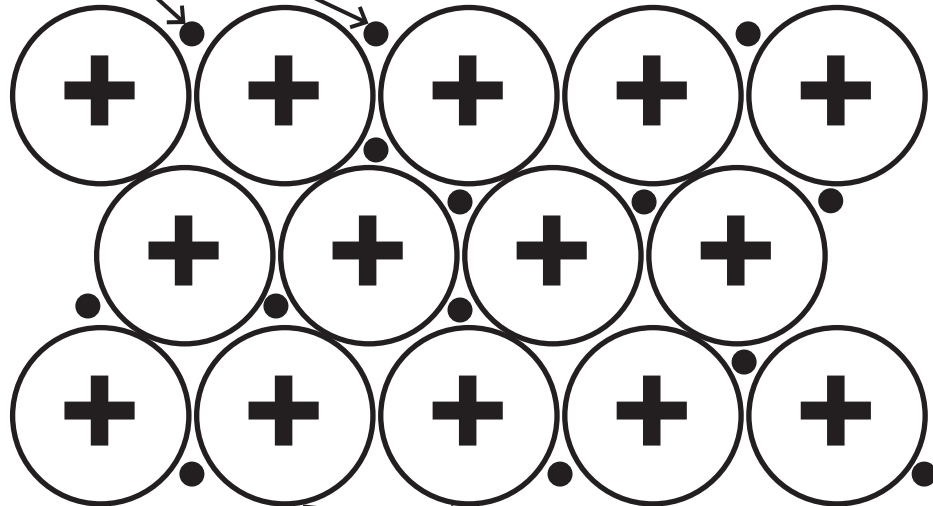
(1 mark)

(Question continues on next page)

(Turn over)

(b) The diagram shows the structure of a metal.

delocalised electrons



positively charged ions

Explain how metals conduct electricity. (2 marks)

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**(c) A sodium chloride crystal contains sodium cations and chloride anions.**

**(i) State the colour produced by sodium compounds in a flame test. (1 mark)**

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**(ii) Describe how silver nitrate solution can be used to show that solid sodium chloride contains chloride ions. (2 marks)**

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**(Question continues on next page)**

**(Turn over)**





