

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	



General Certificate of Secondary Education
Foundation Tier
June 2012

Chemistry

CHY3F

Unit Chemistry C3

F

Written Paper

Thursday 24 May 2012 9.00 am to 9.45 am

For this paper you must have:

- a ruler
 - the Data Sheet (enclosed).
- You may use a calculator.

Time allowed

- 45 minutes

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 45.
- 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.



J U N 1 2 C H Y 3 F 0 1

G/T80528 6/6/6/

CHY3F

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

- 1** Platinum and gold can both be used to make wedding rings.



Use the Data Sheet to help you to answer these questions.

- 1 (a)** Draw a ring around the part of the periodic table in the list below to which platinum and gold belong.

group 1

group 2

transition elements

group 7

(1 mark)

- 1 (b)** Platinum and gold have properties that make them suitable for wedding rings.

Tick (✓) **two** of these properties.

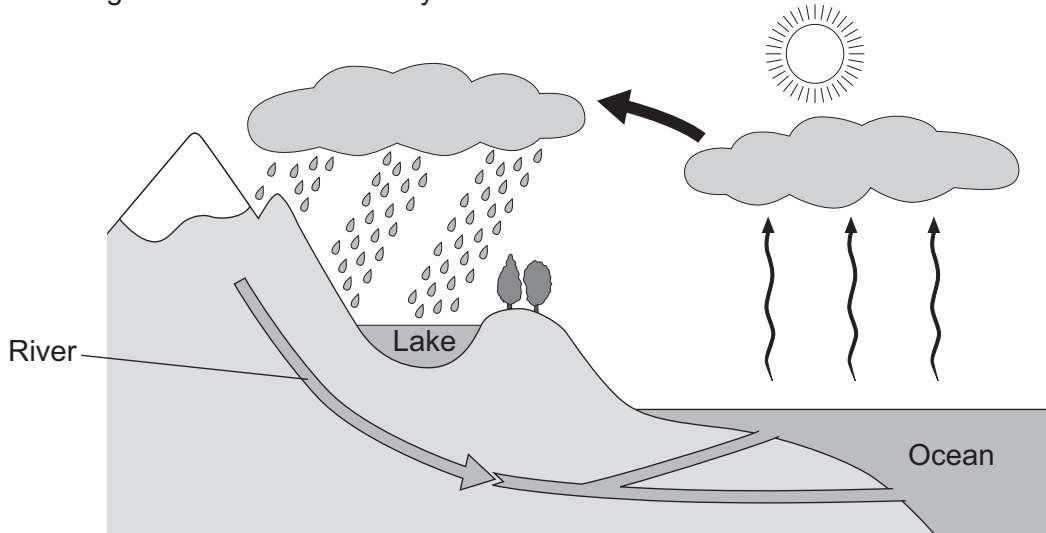
Property	Tick (✓)
These metals do not react with air.	
These metals have low melting points.	
These metals do not react with water.	
These metals have low densities.	

(2 marks)

3



2 The diagram shows the water cycle.



2 (a) Use the diagram and your knowledge of the water cycle to add the **three** missing words to complete the sentences below.

Water in rivers, lakes and oceans because of heat from the to form water vapour. The water vapour rises in the atmosphere and cools so that it to form water droplets. The water droplets form clouds. The water droplets join together to produce rain.

(3 marks)

2 (b) Drinking water often comes from water in lakes and rivers. Small particles of solid are removed and bacteria are killed before the water is fit to drink.

2 (b) (i) Draw a ring around the method used to remove small particles of solid from the water.

condensation evaporation filtration

(1 mark)

2 (b) (ii) Draw a ring around the name of the substance added to kill bacteria in the water.

chlorine helium nitrogen

(1 mark)

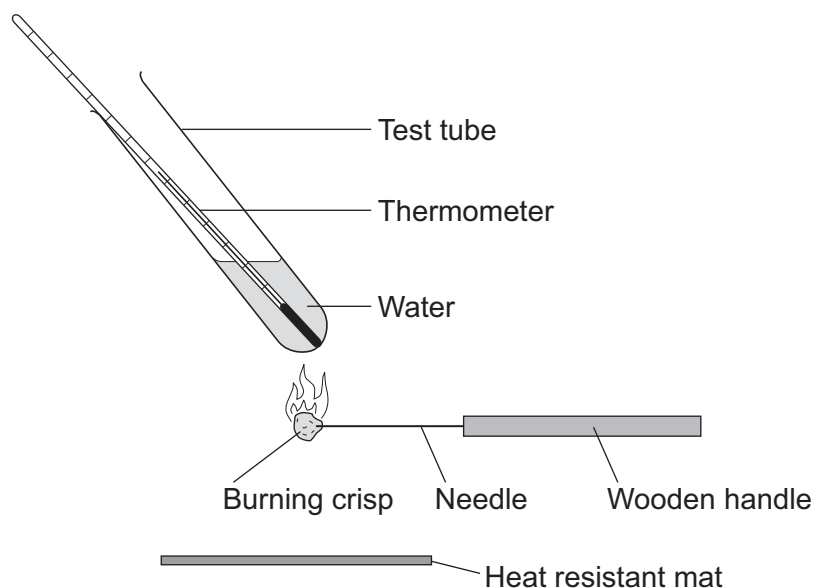
2 (c) Why is it important to kill bacteria in the water before it is used for drinking water?

.....

(1 mark)



- 3 A student investigated the amount of energy released when four different makes of plain salted crisps were burned.



The following method was used for each make of plain salted crisp. The pieces of crisp were all the same size.

- The starting temperature of the water was measured.
- The piece of crisp was burned underneath the test tube.
- The final temperature of the water was measured.

- 3 (a) The results of the investigation are shown in the table.

	Make 1	Make 2	Make 3	Make 4
Final temperature of the water in °C	26	25	29	25
Starting temperature of the water in °C	19	20	20	21
Temperature rise of the water in °C	7	5	9	

- 3 (a) (i) Calculate the temperature rise for **make 4**.

.....

Temperature rise = °C
(1 mark)



3 (a) (ii) Which make of crisp, 1, 2, 3 or 4, releases the most energy?

Make

Give a reason for your answer.

.....
.....

(2 marks)

3 (b) The energy needed by a student is about 9000 kJ each day.

3 (b) (i) One large bag of crisps states that the energy released by the crisps is 240 kcal.

Calculate the energy of this bag of crisps in kJ.

1 kcal = 4.2 kJ

.....
.....

Answer = kJ

(2 marks)

3 (b) (ii) Eating too many crisps is thought to be bad for your health.

Use the information above and your knowledge to explain why.

.....
.....
.....
.....

(2 marks)

7

Turn over for the next question

Turn over ►



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ANSWER IN THE SPACES PROVIDED**



4 Vinegar can be added to food.

Vinegar is a solution of ethanoic acid in water.



4 (a) Ethanoic acid is a *weak* acid.

Draw a ring around the correct answer to complete each sentence.

4 (a) (i) When dissolved in water, an acid forms a solution containing

carbonate ions.

hydrogen ions.

hydroxide ions.

(1 mark)

4 (a) (ii) Ethanoic acid is a *weak* acid because in water it is

completely ionised.

not ionised.

partially ionised.

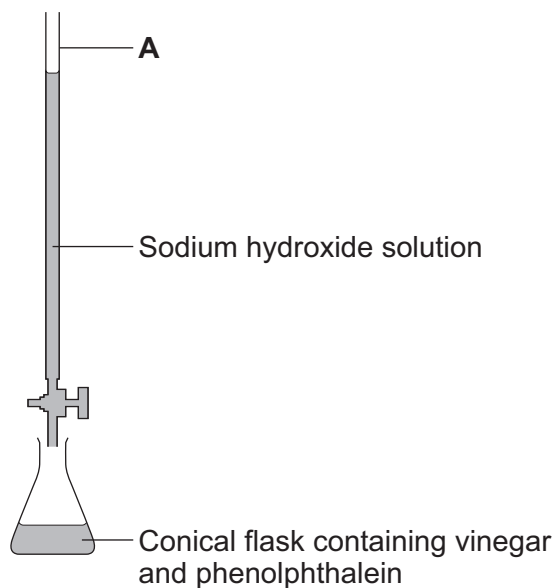
(1 mark)

Question 4 continues on the next page

Turn over ►



- 4 (b)** The diagram shows the apparatus used to investigate the amount of ethanoic acid in vinegar.



- 4 (b) (i)** Draw a ring around the name of the piece of apparatus labelled **A** on the diagram.

burette

measuring cylinder

pipette

(1 mark)

- 4 (b) (ii)** Phenolphthalein is added to the vinegar in the conical flask so that the end point of the titration can be seen.

What type of substance is phenolphthalein?

Draw a ring around the correct answer.

alkali

catalyst

indicator

(1 mark)

- 4 (b) (iii)** How would you know that the end point of the titration has been reached?

.....

.....

(1 mark)



4 (c) The results of the titration are shown in the table.

	Rough titration	Accurate titrations		
		1	2	3
Final reading in cm ³	22	21.30	22.50	24.40
Initial reading in cm ³	0	1.00	2.00	4.00
Volume used in cm ³	22	20.30	20.50	20.40

Calculate the best value of the mean volume from these titrations.

.....

.....

.....

Mean volume used = cm³
(2 marks)

4 (d) 25.0 cm³ of this vinegar contained 1.25g of ethanoic acid.

Calculate the mass of ethanoic acid in 1 litre (1000 cm³) of this vinegar.

.....

.....

.....

Mass = g
(2 marks)

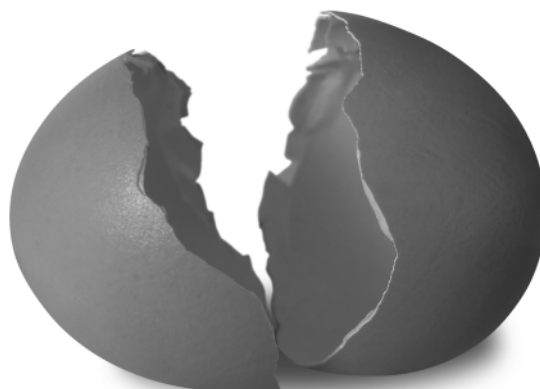
9

Turn over for the next question

Turn over ►



5 A student investigated an egg shell.



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

5 (a) (i) Test 1

Dilute hydrochloric acid was added to the egg shell.

Carbon dioxide gas was produced which turned limewater

milky.

blue.

red.

This test shows that the egg shell must contain

carbonate ions.

chloride ions.

sulfate ions.

(2 marks)

5 (a) (ii) Test 2

The student then did a flame test.

He used the solution remaining after dilute hydrochloric acid was added to the egg shell.

The flame test showed that the egg shell contained calcium ions because

the flame was

red.

blue.

lilac.

(1 mark)



5 (b) Some scientists investigated the amount of lead found in egg shells. They used a modern instrumental method which was more *sensitive* and more *accurate* than older methods.

5 (b) (i) Draw a ring around the correct answer to complete the sentence.

The modern instrumental method is more *sensitive*, which means that

it can measure

larger
much larger
smaller

 amounts of lead than older methods.

(1 mark)

5 (b) (ii) Tick (✓) the meaning of more *accurate*.

	Tick (✓)
The measurement is given to more decimal places.	
The answer obtained is closer to the true value.	
The equipment used is more expensive.	

(1 mark)

5

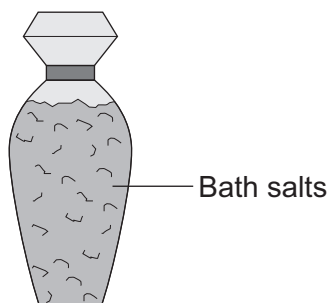
Turn over for the next question

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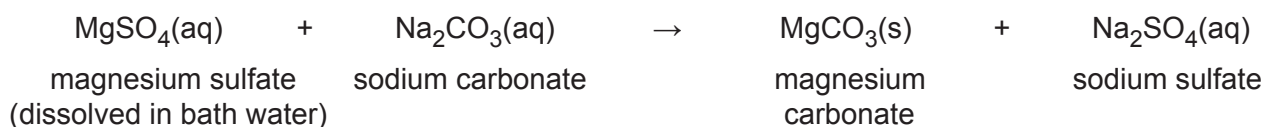


6 In some areas of the UK the water is hard.
Bath salts are added to bath water to soften the water.

6 (a) Bath salts contain sodium carbonate.



The equation shows one reaction in which sodium carbonate removes hardness from bath water.



Use the equation and your knowledge of hard water to explain;

- why this bath water is hard
- and**
- how sodium carbonate removes hardness from bath water.

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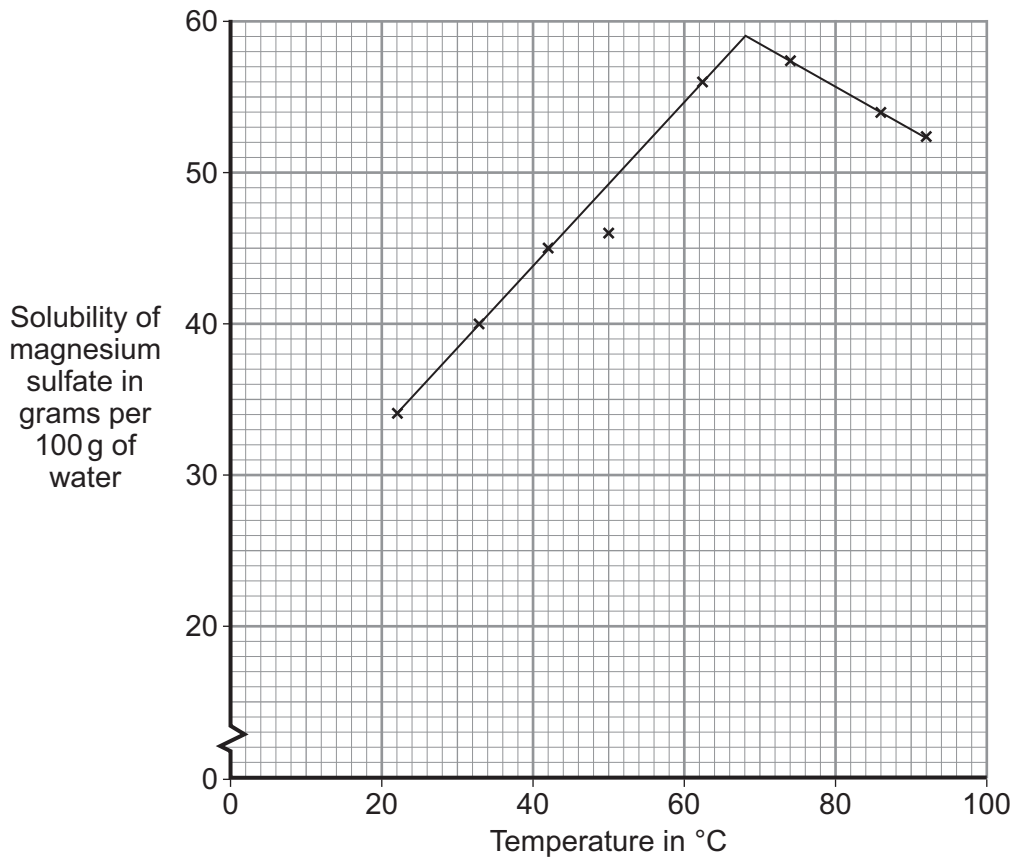
(3 marks)

6 (b) The bath water contains magnesium sulfate.

A student did experiments to find the maximum amount of magnesium sulfate that dissolves in water at different temperatures.

The student's results are shown on the graph.





6 (b) (i) Why did the student **not** draw a line through the point at 50°C?

.....

 (1 mark)

6 (b) (ii) Suggest why the student did **not** do an experiment at 100°C.

.....

 (1 mark)

6 (b) (iii) At what temperature is the solubility of magnesium sulfate greatest?

Temperature = °C
 (1 mark)

6 (b) (iv) Suggest why the student was surprised by the shape of the solubility graph line.

.....

 (2 marks)

8

Turn over ►



7 John Newlands was a chemist who worked in a sugar factory.

In 1866 he designed a periodic table.

He arranged the elements in order of their relative atomic masses.

He found a repeating pattern for some of the elements.

Newlands wrote, 'the eighth element starting from a given one, is a kind of repetition of the first, like the eighth note in an octave of music'.

H	Li	G	Bo	C	N	O
F	Na	Mg	Al	Si	P	S
Cl	K	Ca	Cr	Ti	Mn	Fe
Co, Ni	Cu	Zn	Y	In	As	Se
Br	Rb	Sr	Ce, La	Zr	Di, Mo	Ro, Ru
Pd	Ag	Cd	U	Sn	Sb	Te
I	Cs	Ba, V	Ta	W	Nb	Au
Pt, Ir	Tl	Pb	Th	Hg	Bi	Os

Newlands' periodic table

7 (a) In Newlands' periodic table, the elements lithium, sodium and potassium are grouped together.

Give **two** properties of these elements which support the idea that they should be grouped together.

1

.....

2

.....

(2 marks)



7 (b) Newlands' periodic table was not accepted by most chemists in 1866.

Suggest reasons why.

Use the information on page 14 to help you to answer this question.

.....

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.....

.....

(3 marks)

7 (c) State **and** explain **one** way in which Mendeleev improved Newlands' periodic table.

.....

.....

.....

.....

(2 marks)

7

END OF QUESTIONS



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