

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

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General Certificate of Secondary Education
June 2004



**SCIENCE SINGLE AWARD (CO-ORDINATED) 3463/2F
FOUNDATION TIER
PAPER 2**

Monday 14 June 2004 9.00 am to 9.45 am

F

In addition to this paper you will require:

- a ruler;
- the Data Sheet (enclosed).

You may use a calculator.

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

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 in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want marked.

Information

- The maximum mark for this paper is 45.
- Mark allocations are shown in brackets.
- You are reminded of the need for good English and clear presentation in your answers.

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

1 Choose elements from the box to complete the table.

The periodic table on the Data Sheet may help you to answer this question.

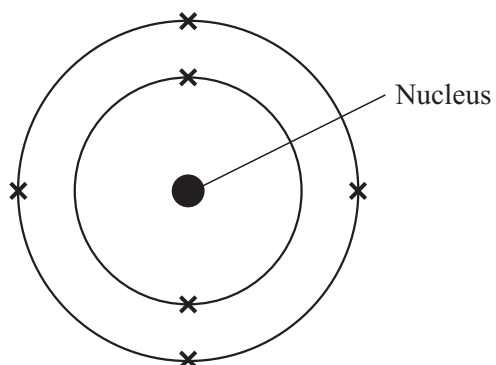
astatine	bromine	chlorine	hydrogen
lithium	magnesium	nickel	oxygen

Description of element	Name of element
A gas which gives a squeaky pop when tested with a burning splint	
A transition element	
The least reactive element in Group 7	
A red-brown liquid which is in Group 7	
A metal which moves around on the surface of cold water and produces bubbles of gas	

(5 marks)

5

2 The diagram represents the electronic structure of an atom of an element.



The periodic table on the Data Sheet may help you with this question.

(a) Name this element.

.....
(1 mark)

(b) Complete this sentence.

The nucleus of an atom contains neutrons and.....
(1 mark)

○
—
2

TURN OVER FOR THE NEXT QUESTION

Turn over ►

- 3 This label was on a bottle of stain remover.



- (a) What do the hazard symbols on the label mean?

Put a tick (✓) next to the best **two** descriptions.

It can attack and destroy living tissue	
It can provide oxygen which can make other substances burn more fiercely	
It can cause reddening or blistering of the skin	
It can catch fire very easily	
It is highly toxic	
It is a harmful substance	

(2 marks)

(b) Suggest **one** item of safety clothing that might be worn when mixing ‘Simply Amazing’ with water. Explain why it should be worn.

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

(2 marks)

(c) When ‘Simply Amazing’ is mixed with water a reaction takes place which produces bubbles of oxygen gas.

(i) Suggest a method that you could use to measure how quickly this reaction takes place.

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

(2 marks)

(ii) Read the instructions on the label and then suggest how increasing the temperature of the water affects the rate of this reaction.

.....
.....

(1 mark)

(iii) Suggest **one** other way in which the rate of a reaction can be changed.

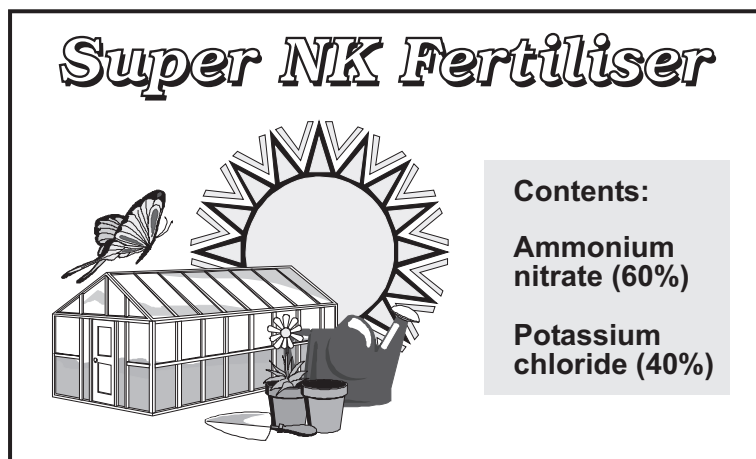
.....
.....

(1 mark)



Turn over ►

4 The label gives information about one type of fertiliser.



- (a) This fertiliser is an NK fertiliser. Use the Data Sheet to help you to suggest which elements all NK fertilisers contain.

.....
(1 mark)

- (b) Calculate the mass of ammonium nitrate in 1000 g of this fertiliser.

.....
.....

Mass = g
(2 marks)

- (c) Ammonium nitrate and potassium chloride are both salts. They can be made by neutralisation reactions.

Choose substances from the box to complete the word equations for the formation of these two salts.

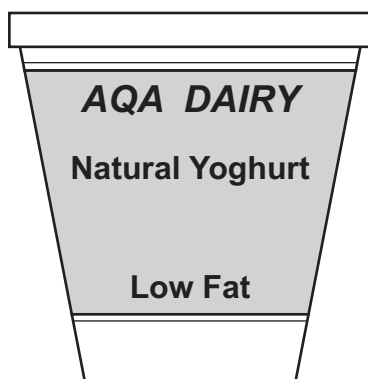
ammonia	hydrochloric acid	nitric acid
potassium nitrate	water	potassium hydroxide

ammonia + → ammonium nitrate + water

..... + hydrochloric acid → potassium chloride +

(3 marks)

- 5 Yoghurt is made from milk by the action of microorganisms. The sugar in the milk is converted into an acid.



- (a) Draw a ring around the name of the type of microorganism which changes milk into yoghurt.

bacteria

fungus

virus

yeast

(1 mark)

- (b) Draw a ring around the name of the acid formed in the yoghurt.

ethanoic

hydrochloric

lactic

nitric

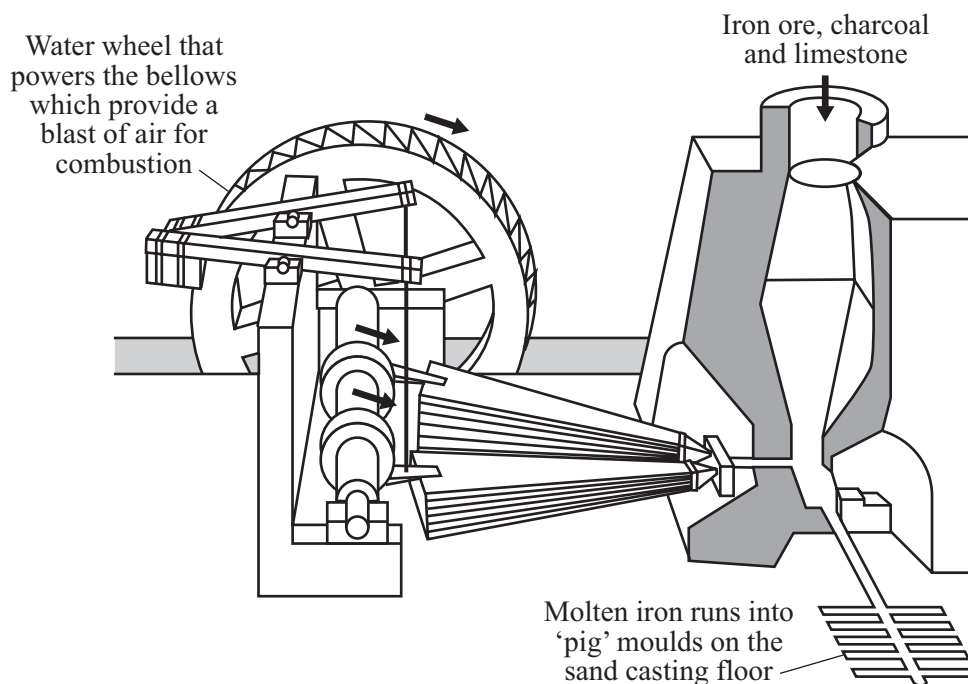
(1 mark)

2

TURN OVER FOR THE NEXT QUESTION

Turn over ►

6 The diagram shows an early type of blast furnace used in Wales about 300 years ago.



- (a) (i) This early type of furnace uses charcoal. Name the raw material that has replaced charcoal in modern furnaces.

.....
(1 mark)

- (ii) State **one** other way in which this early type of furnace differs from a modern furnace.

.....
.....
(1 mark)

- (b) The charcoal provides carbon. This reacts with oxygen to form carbon monoxide. The iron oxide in the iron ore is *reduced* by the carbon monoxide.

- (i) State what the word *reduced* means.

.....
(1 mark)

- (ii) Name the **two** substances formed when iron oxide reacts with carbon monoxide.

..... and
(1 mark)

(c) Why is limestone added to the blast furnace?

.....
.....

(1 mark)

(d) Explain why sodium cannot be extracted from its ore by this method.

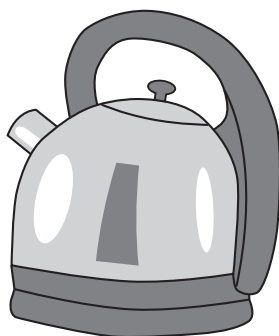
The Data Sheet may help you to answer this question.

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

(2 marks)

(e) Stainless steel is an alloy which contains iron and other metals.

This kettle is made from stainless steel.



(i) Name a metal which is added to iron to make stainless steel.

.....

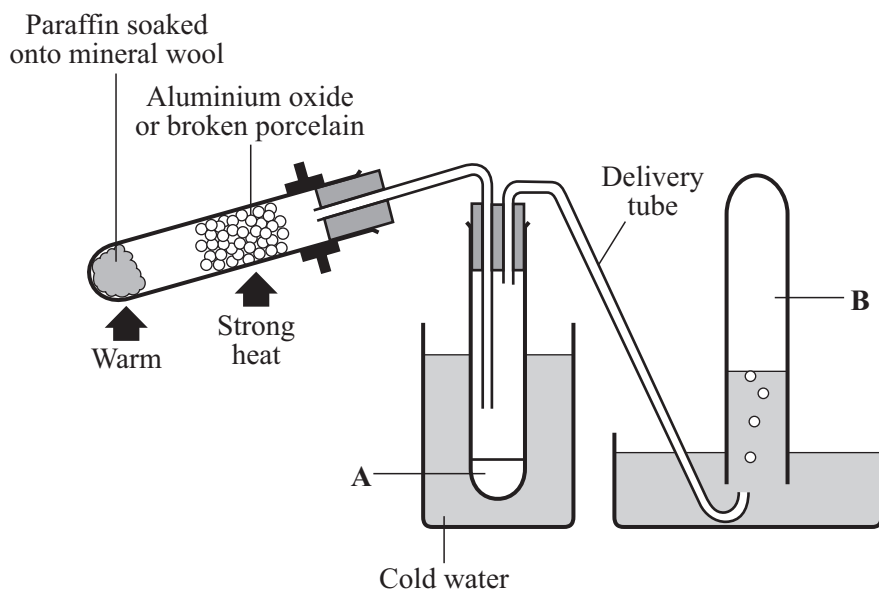
(1 mark)

(ii) Why is stainless steel a good material for making kettles?

.....
.....

(1 mark)

7 The diagram shows an apparatus that can be used to carry out cracking reactions in a laboratory.

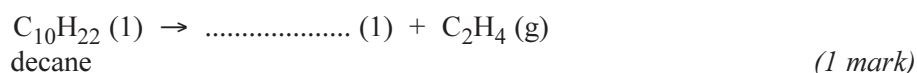


(a) Why is aluminium oxide or broken porcelain used?

.....
(1 mark)

(b) Paraffin contains decane. The cracking of decane can be represented by the equation below. A decane molecule is split into two smaller molecules.

Complete the equation by adding the formula of the other product.



(c) Would you expect C_2H_4 molecules to collect at position **A** or **B** shown on the diagram?

Position.....

Explain your answer.

.....
.....
(1 mark)

(d) Cracking reactions involve *thermal decomposition*.

What is meant by *thermal decomposition*?

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

(2 marks)

(e) Explain, as fully as you can, why cracking is used in the oil industry.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

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

(3 marks)

(f) The cracking reaction produces a mixture of products. The mixture contains hydrocarbons with different boiling points.

Suggest a method of separating this mixture.

.....
.....

(1 mark)

9

Turn over ►

8 The periodic table on the Data Sheet may help you to answer this question.

- (a) Newlands and Mendeleev both designed periodic tables in which the elements were put in the order of their relative atomic masses.

When the elements are put in this order a few of them are placed incorrectly when compared with a modern periodic table.

- (i) Give **one** example of a pair of elements that would be placed incorrectly if they were in the order of their relative atomic masses.

..... and
(1 mark)

- (ii) Explain why placing these two elements in the order of their relative atomic masses would **not** be correct.

.....
.....
(1 mark)

- (b) In the modern periodic table the elements are put in order of their atomic (proton) numbers.

Explain how the positions of the elements in the periodic table are linked to the electronic structure of their atoms.

.....
.....
.....
.....
(2 marks)

END OF QUESTIONS

4