AQA

Please write clearly, in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

Marks

ELC SCIENCE 5960

Externally-Set Assignment

Component 3 – Chemistry: Elements, mixtures and compounds

Date of Exam

Time allowed: 45 minutes

Materials

For this paper you must have:

- a ruler

Instructions

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the bottom 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 to be marked.

Information

- There are 20 marks available on this paper.
- The marks for questions are shown in brackets.

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

1. The diagram below shows part of the periodic table of elements.

							H										He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr

(a) How many elements are in the complete periodic table?

[1 mark]
Outcome 1

Tick (✓) **one** box.

about 100 ☐

about 500 ☐

about 1000 ☐

(b) Which **two** elements have similar chemical properties?

[1 mark]
Outcome 1

Tick (✓) **one** box.

H and He ☐

F and Br ☐

Al and Si ☐

(c) Complete the word equation for the reaction of a metal and a non-metal to produce magnesium oxide.

[1 mark]
Outcome 2

…….... + ……. → magnesium oxide

(d) Use the correct answer from the box to complete the sentence.

[1 mark]
Outcome 2

a compound	**an element**	**a mixture**

Magnesium oxide is …….. .

Turn over for the next question

2. We can extract metals from rocks dug from the ground.

(a) Use the correct answer from the box to complete the sentence.

[1 mark]
Outcome 7

dangerous	**easy**	**economic**	**quick**

Rock is called an ore if it is ..... to extract the metal.

(b) Three metals and their reactivity are listed in the table below.

Metal	**Reactivity**
magnesium	more reactive than carbon
iron	less reactive than carbon
gold	unreactive

Which metal is extracted by heating its ore mixed with carbon?

Metal: ……

[1 mark]
Outcome 7

(c) Why should we recycle metals?

[1 mark]
Outcome 7

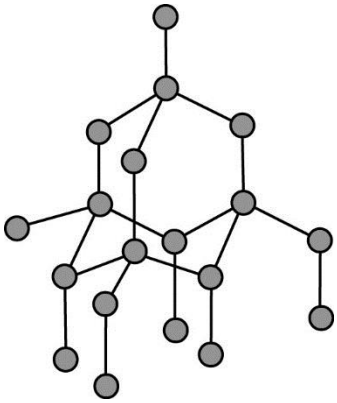
Tick (✓) **one** box.

To employ more people and reduce transport costs. ☐

To prevent waste and reduce profits made by industry. ☐

To save resources and reduce damage to the environment. ☐

3. The diagram shows how the atoms are joined in part of a diamond.



(a) Use the correct answer from the box to complete the sentence.

[1 mark]
Outcome 4

one	**two**	**three**	**four**

Diamond is hard because the atoms are joined in a giant …….. dimensional structure.

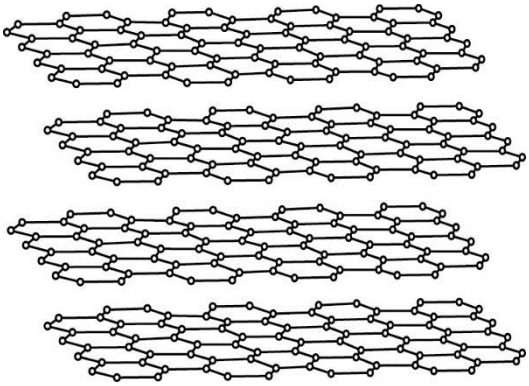
(b) Complete the sentence.

[1 mark]
Outcome 3

Diamond has a high melting point because the forces joining the atoms are joined by strong …… .

Turn over for the next question

4. The diagram shows the structure of graphite.



[1 mark]
Outcome 4

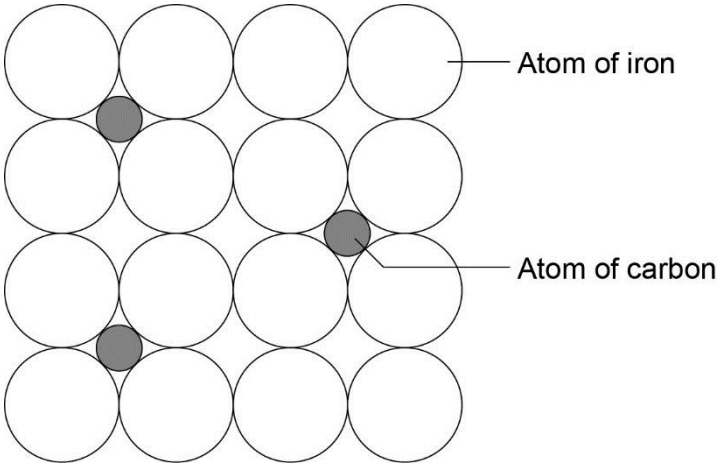
Tick (✓) **one** box.

The atoms are in layers that can slide over each other. ☐

The atoms can move within the layers in the structure. ☐

The layers of atoms can bend and change shape. ☐

5. The structure of steel is shown below.



(a) Steel is a mixture of iron and carbon.

What do we call this type of mixture?

[1 mark]
Outcome 9

Draw a ring around the correct answer.

an alloy **a compound** **a solution**

(b) Steel melts at a high temperature.

What happens to the atoms in steel when it melts?

[1 mark]
Outcome 3

Tick (✓) **one** box.

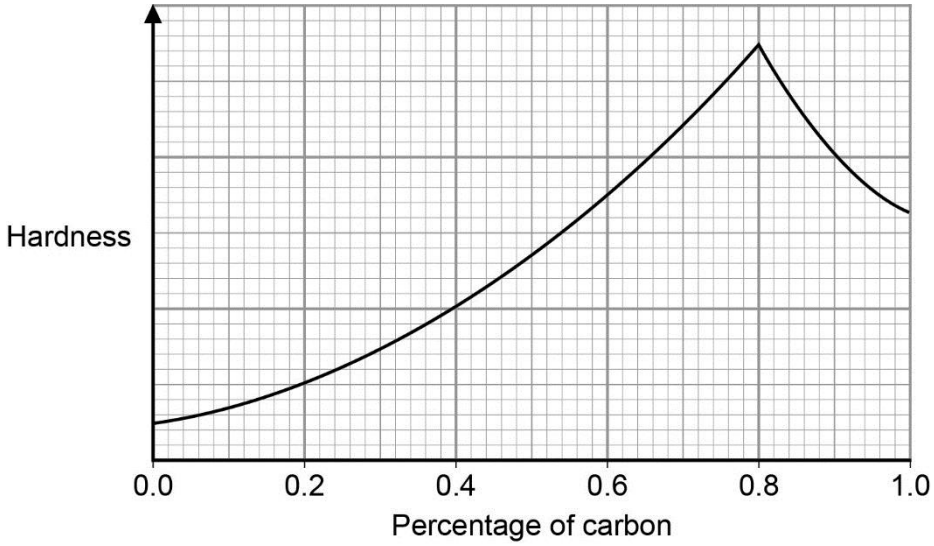
The atoms are only able to vibrate in their original positions. ☐

The atoms are able to move about and stay close together. ☐

The atoms move about rapidly and become far apart. ☐

Question 5 continues on the next page

(c) The hardness of steel changes with the percentage of iron in it.
The graph below shows how the hardness changes.



What percentage of carbon gives the hardest steel?

[1 mark]
Outcome 9

..... %

6. Three descriptions of metals are listed on the left. Some metals are listed on the right.

Draw **one** line from each description to the correct metal.

We have done one to help you.

[2 marks]
Outcome 8

Descriptions	**Metals**
We use this metal for electrical wires and water pipes.	iron
	aluminium
This metal has a low density and we use it to make drinks cans.	
	gold
This metal is unreactive and is used to make jewellery.	
	copper

7. Many of the things we buy are in poly(ethene) bags.

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

[2 marks]
Outcome 10

biodegradable	**flammable**	**rigid**	**waterproof**

One advantage of using poly(ethene) to make bags is it is ..... .

Poly(ethene) can harm the environment because it is not ..... .

8. Red cabbage contains colours.

Some cabbage was shredded and boiled in a dilute acid.

The solution turned red.

(a) Which method could be used to separate the red solution from the cabbage?

[1 mark]
Outcome 5

Tick (✓) **one** box.

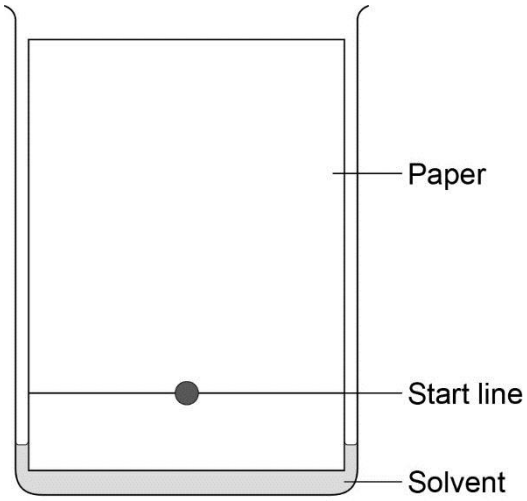
Crystallisation ☐

Distillation ☐

Filtration ☐

(b) We can separate the colours in the solution using paper chromatography.

The diagram shows how this can be done.



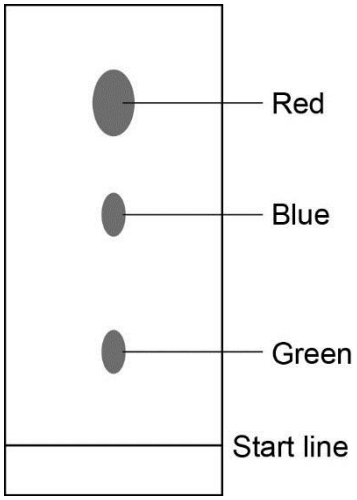
What moves through the paper to separate the colours?

[1 mark]
Outcome 6

……..

Question 8 continues on the next page

(c) The diagram shows the results of the paper chromatography.



Write down **one** conclusion about red cabbage.

[1 mark]
Outcome 6

……

……

END OF QUESTIONS