



**Topic Test: OxfordAQA**  
**International GCSE Chemistry 9202**  
Atomic structure and the periodic table

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Date: \_\_\_\_\_

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Time: **45 minutes**

Marks: **45 marks**

Comments:

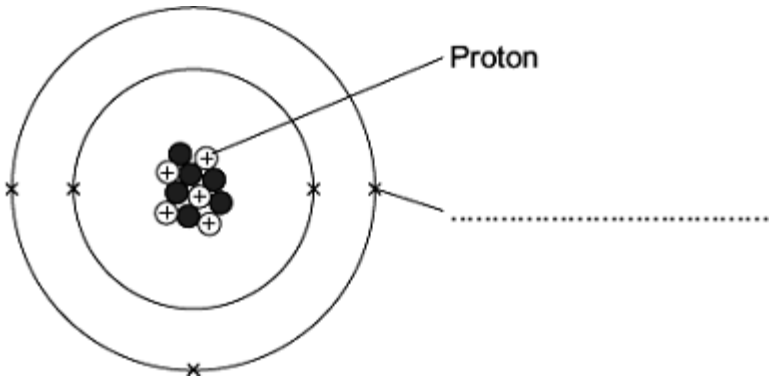
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1

The diagram represents an atom of an element.

(a) Choose **one** word from the box to complete the label on the diagram.

electron      neutron      nucleus



(1)

(b) (i) What is the atomic (proton) number of this atom? \_\_\_\_\_

(1)

(ii) Name the element.

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

The name of the element is \_\_\_\_\_ .

(1)

(c) (i) Draw a ring around the mass number of this atom.

5      11      16

(1)

(ii) Another atom of this element has a different mass number.

Draw a ring around the correct word in the box to complete the sentence.

Atoms of the same element with different numbers of

are called isotopes.

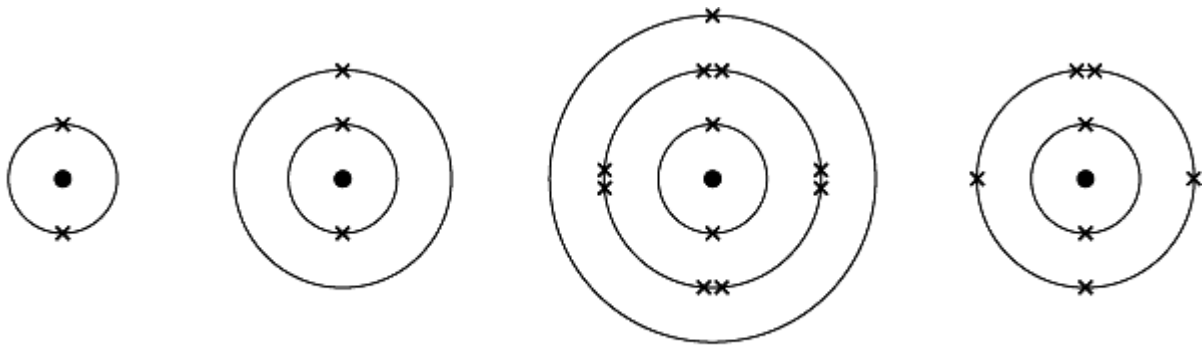
electrons  
neutrons  
protons

(1)

(Total 5 marks)

2

The diagrams show the electronic structure of four different atoms.



Atom A

Atom B

Atom C

Atom D

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

(a) Name the two sub-atomic particles in the nucleus of an atom.

\_\_\_\_\_

(1)

(b) Why is there no overall electrical charge on each atom?

\_\_\_\_\_  
\_\_\_\_\_

(1)

(c) Why is **Atom A** unreactive?

\_\_\_\_\_

(1)

(d) Which **two** of these atoms have similar chemical properties?  
Give a reason for your answer.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(2)

(Total 5 marks)

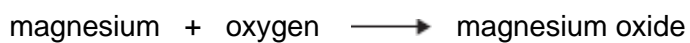
**3** Magnesium burns in oxygen.



By Kingsway School [CC BY 2.0],  
via Flickr

(a) Use the Chemistry Data Sheet to help you to answer this question.

The word equation for magnesium burning is:

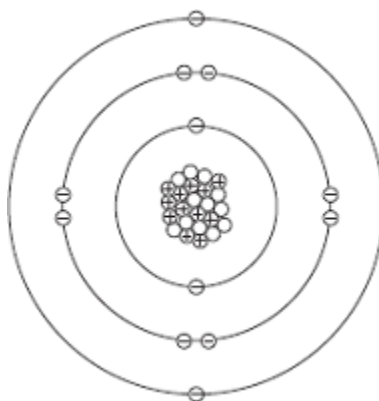


Draw **one** line from each substance to its correct description.

| Substance       | Description |
|-----------------|-------------|
| magnesium       | compound    |
| magnesium oxide | metal       |
| oxygen          | mixture     |
|                 | non-metal   |

(3)

(b) The diagram represents a magnesium atom.



Complete the table to show the name of each particle and the charge of each particle in the magnesium atom.

| Name of particle | Charge |
|------------------|--------|
| proton           | +1     |
| neutron          | _____  |
| _____            | -1     |

(2)

(c) Use the Chemistry Data Sheet to help you to answer these questions.

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

(i) In a magnesium atom, the protons and neutrons are in the

|          |
|----------|
| core.    |
| nucleus. |
| shell.   |

(1)

(ii) The number of protons in a magnesium atom is the

|               |
|---------------|
| atomic number |
| mass number.  |
| group number. |

(1)

(iii) The sum of the protons and neutrons in a magnesium

atom is the

atomic number.  
mass number.  
group number.

(1)

(Total 8 marks)

4

This question is about the periodic table.

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

(a) Complete the sentences.

Elements in the periodic table are arranged in order of atomic

\_\_\_\_\_.

The elements in Group \_\_\_\_\_ are called the noble gases.

(2)

(b) Calcium (Ca) is in Group 2.

Name **one** other element in Group 2.

\_\_\_\_\_

(1)

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

(i) Sodium (Na) is

an alkali metal.  
a non-metal.  
a transition metal.

(1)

(ii) Nickel (Ni) is

an alkali metal.  
a non-metal.  
a transition metal.

(1)

(d) In 1869 Mendeleev produced his periodic table.

Why did Mendeleev leave gaps in his periodic table?

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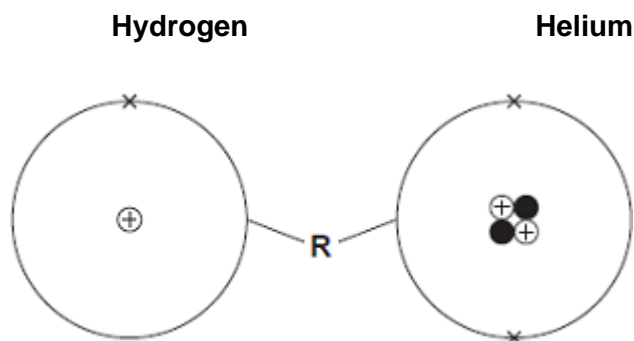
(1)

(Total 6 marks)

5

The Sun is mainly hydrogen and helium.

The diagrams show an atom of hydrogen and an atom of helium.



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

(i) The centre of each atom is called the

- molecule.
- nucleus.
- shell.

(1)

(ii) The circle (labelled **R**) around the centre of each atom

is called

- a bond.
- an electrical charge.
- an energy level (shell).

(1)

(b) Use the diagrams in part (a) to help you to answer these questions.

Draw **one** line from each question to its correct answer.

| Question   | Answer |
|--|--------|
| How many protons are there in the hydrogen atom? | 1      |
| How many electrons are there in the helium atom? | 2      |
| What is the mass number of the helium atom?      | 3      |
|  | 4      |

(3)

(c) The Sun is 73% hydrogen and 25% helium. The rest is other elements.

What is the percentage of other elements in the Sun?

\_\_\_\_\_ %

(1)

(d) One of the other elements in the Sun is neon.  
Neon is in the same group of the periodic table as helium.

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

(i) How many protons are there in a neon atom?

\_\_\_\_\_

(1)

(ii) Which group of the periodic table are helium and neon in?

\_\_\_\_\_

(1)

(Total 8 marks)

**6**

Use the periodic table on the Data Sheet to answer these questions.

The table below gives the electronic structures of four elements, **W**, **X**, **Y** and **Z**.

| Element  | Electronic structure |
|----------|----------------------|
| <b>W</b> | 2,5                  |
| <b>X</b> | 2,7                  |
| <b>Y</b> | 2,8,8                |
| <b>Z</b> | 2,8,8,1              |

(a) Which element **W**, **X**, **Y** or **Z**:

- (i) is a Group 0 gas? \_\_\_\_\_
- (ii) is nitrogen? \_\_\_\_\_
- (iii) is a Group 7 gas? \_\_\_\_\_
- (iv) reacts violently with water? \_\_\_\_\_

**(3)**

(b) Which **two** Groups of the periodic table do **not** contain any non-metals?

\_\_\_\_\_

**(1)**

**(Total 4 marks)**

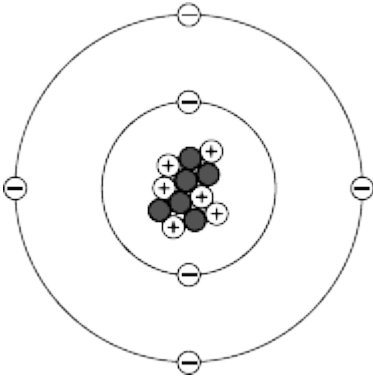
7

The picture shows a diamond ring.



Photograph supplied by Comstock/Thinkstock

(a) Diamond is a form of carbon. The diagram represents a carbon atom.



Complete the table to show the name and charge of each type of particle in the carbon atom.

| Name of particle | Charge |
|------------------|--------|
| proton           |        |
| neutron          | 0      |
|                  | -1     |

(2)

(b) Use the Chemistry Data Sheet to help you to answer these questions.

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

Gold and carbon are

- compounds.
- elements.
- mixtures.

(1)

(ii) Complete the sentence.

Gold and carbon have different properties because gold is a metal  
and carbon is a \_\_\_\_\_

(1)

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

Pure gold is not used to make the ring because pure gold is too

hard.  
reactive.  
soft.

The gold ring is made by mixing pure gold with other metals to form

a compound.  
an atom.  
an alloy.

(2)

(d) The data in the table shows some information about the three metals in the gold ring.

| Name of metal | Atomic number | Percentage (%) of metal |
|---------------|---------------|-------------------------|
| gold          | 79            |                         |
| silver        | 47            | 16                      |
| copper        | 29            | 9                       |

Draw **one** line from each question to its correct answer.

| Question  | Answer |
|---|--------|
| What is the percentage of gold in this ring?                          | 29     |
| How many electrons are there in a copper atom?                        | 61     |
| How many neutrons are in an atom of silver with a mass number of 108? | 75     |
|   | 79     |

(3)  
(Total 9 marks)

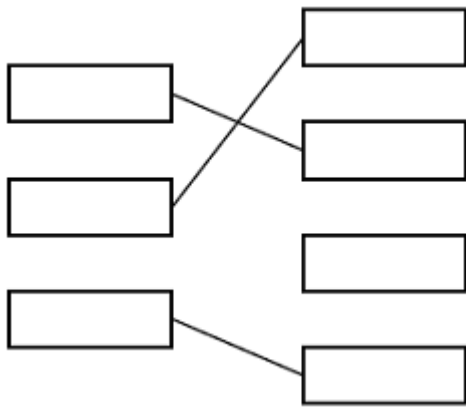
## Mark schemes

|          |     |  |                          |   |
|----------|-----|--|--------------------------|---|
| <b>1</b> | (a) | electron   | 1                        |   |
|          | (b) | (i)  | 5                        | 1 |
|          |     | (ii)   | boron<br><i>accept B</i> | 1 |
|          | (c) | (i)  | 11                       | 1 |
|          |     | (ii)   | neutrons                 | 1 |
|          |     |  | <b>[5]</b>               |   |
| <b>2</b> | (a) | protons <b>(and)</b> neutrons<br><i>both needed for 1 mark</i><br><i>ignore p / + and n / 0</i><br><i>do <b>not</b> accept electrons</i>   | 1                        |   |
|          | (b) | because the number of protons is equal to the number of electrons<br><i>allow protons and electrons balance / cancel out</i><br><i>allow positive / + and negative / - balance / cancel out</i>  | 1                        |   |
|          | (c) | <i>it = atom A</i><br><br>because atom A has a full highest energy level <b>or</b> full outer shell<br><i>allow all the shells are full <b>or</b> no incomplete shell</i><br><br><b>or</b> because atom A has a stable arrangement of electrons<br><i>allow because atom A is in Group 0 / a noble gas</i> | 1                        |   |
|          | (d) | (atom) B / lithium / Li <b>(and)</b><br><br>(atom) C / sodium / Na<br><i>both needed for 1 mark</i>  | 1                        |   |
|          |     | because they have the same number/one outer electron(s)<br><i>linked to answer for first mark</i><br><i>accept because both need to lose one / an electron</i><br><i>allow because (atoms) B and C are in Group 1 / the same group / are alkali metals</i>   | 1                        |   |

**[5]**

**3**

(a)



*one mark for each substance linked correctly to its description  
do **not** accept more than one line from each substance*

3

(b) 0 / zero / none / no charge

1

electron

1

(c) (i) nucleus

1

(ii) atomic number

1

(iii) mass number

1

**[8]**

**4**

(a) number

1

0

*allow 8*

1

(b) beryllium **or** magnesium **or** strontium **or** barium **or** radium

*allow correct symbols*

1

(c) (i) an alkali metal

1

(ii) a transition metal

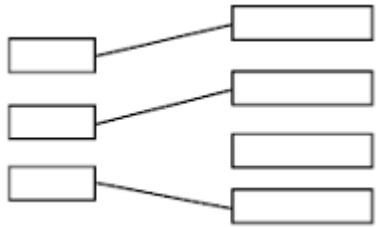
1

(d) for undiscovered elements

*accept so elements with similar properties were in the same groups  
accept so elements fitted the pattern of properties*

1

**[6]**

- 5** (a) (i) nucleus 1
- (ii) an energy level (shell) 1
- (b)
- 
- 3
- (c) 2 / two(%) 1
- (d) (i) 10 / ten 1
- (ii) (group) 0  
*accept noble gases*  
*ignore (group) 8* 1
- [8]**

- 6** (a) (i) Y **or** 2,8,8 **or** Argon **or** Ar  
*All correct gains 3 marks* 3
- (ii) W **or** 2,5  
*3 correct gains 1 mark*
- (iii) X **or** 2,7 **or** fluorine **or** F  
*2 or 1 correct gains 1 mark*
- (iv) Z **or** 2,8,8,1 **or** potassium **or** K  
*N.B. number of ticks on script must equal number of marks*
- (b) 1 and 2 (both needed)  
*do not credit if any other group listed*  
*'transition metals' neutral*  
*allow alkali metals and alkali earth metals* 1
- [4]**

- 7** (a) +1/+  
*do **not** accept 1 without the +* 1

electron

*allow phonetic spelling*

1

(b) (i) elements

1

(ii) non-metal

1

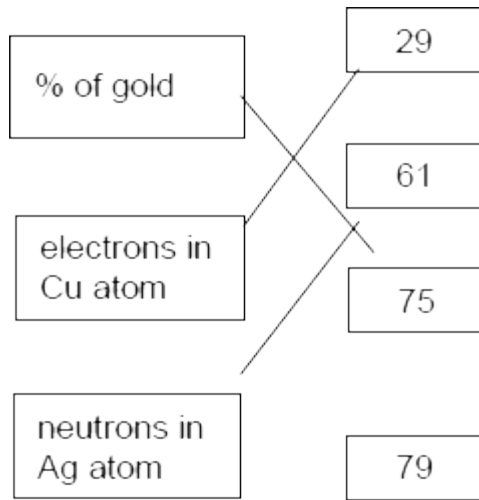
(c) soft

1

an alloy

1

(d)



**one** mark for each correct link  
*extra lines lose the mark*

3

[9]