



## Year 10 Revision

*Atomic Structure C1.1-5*

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75 minutes

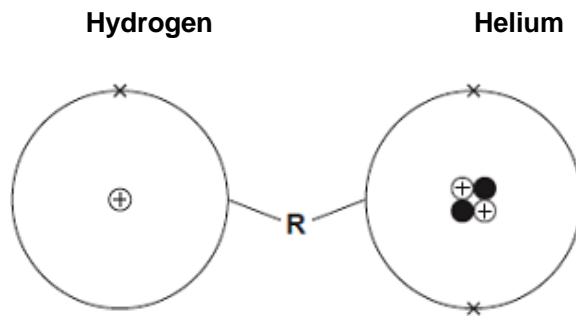


75 marks

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**Q2.** 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?

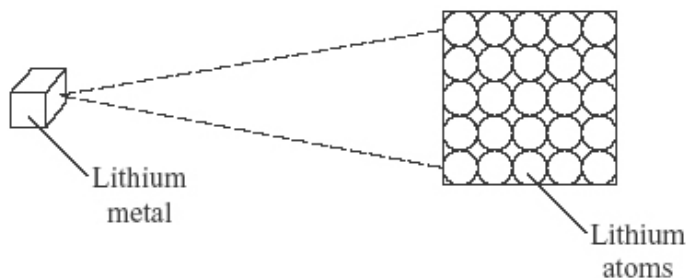
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(1)

(Total 8 marks)

**Q3.** Lithium metal is used in alkaline batteries.

(a) The diagram shows the atoms in lithium metal.



Why is lithium metal described as an element?

.....

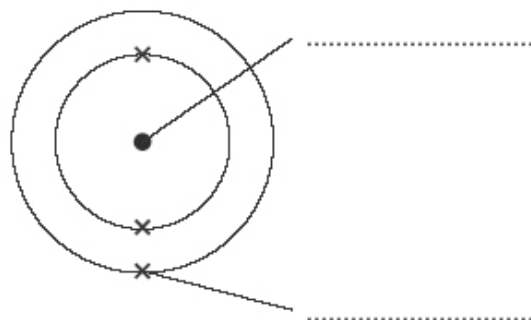
.....

(1)

(b) The diagram below represents a lithium atom.

Choose words from the box to label parts of the atom.

bond	electron	molecule	nucleus
------	----------	----------	---------



(2)  
(Total 3 marks)

**Q4.** Atoms are made up of three main particles called protons, neutrons and electrons.

Use the periodic table on the data sheet to help you to answer these questions.

(a) Sodium is in Group 1 of the periodic table.

(i) Why are potassium and sodium in the same Group of the periodic table?

.....  
.....

(1)

(ii) How many protons are in an atom of sodium? .....

(1)

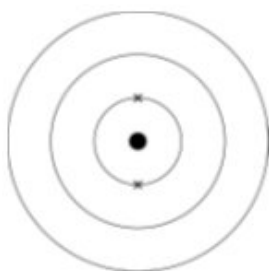
(iii) The atomic number of sodium is 11.

How many neutrons are in an atom of sodium with mass number 23?

.....

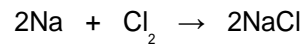
(1)

(iv) Each sodium atom has 11 electrons. Complete the electronic structure of sodium.



(2)

(b) The chemical equation for a reaction of sodium is shown below.



Describe this reaction of sodium in terms of the names of the substances and the numbers of the atoms involved.

.....

.....

.....

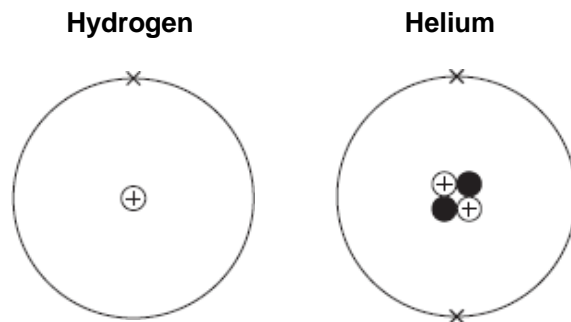
.....

.....

.....

(3)  
(Total 8 marks)

**Q5.** The Sun produces helium atoms from hydrogen atoms by nuclear fusion reactions.



(a) Describe the differences in the atomic structures of a hydrogen atom and a helium atom.

.....

.....

.....

.....

.....

.....

.....

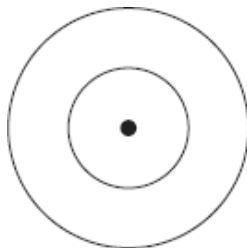
.....

(3)

- (b) The Sun consists of 73% hydrogen and 25% helium.  
The rest is other elements.  
One of the other elements in the Sun is neon.

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

- (i) Complete the diagram to show the electronic structure of a neon atom.



(1)

- (ii) Why is neon in the same group of the periodic table as helium?

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

(1)

(Total 5 marks)

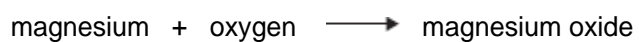
**Q6.** Magnesium burns in oxygen.



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:



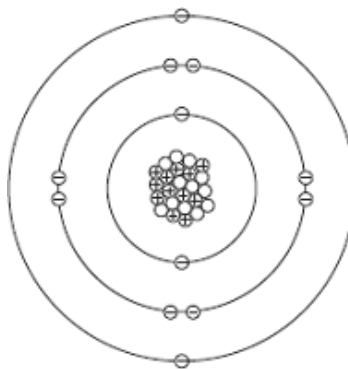
Draw **one** line from each substance to its correct description.

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)

**Q7.** Natural gas is mainly a hydrocarbon called methane.

(a) Use **one** word from the box to complete the sentence.

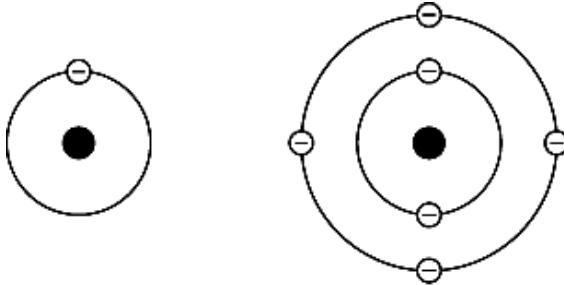
<b>compounds</b>	<b>elements</b>	<b>molecules</b>
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Hydrocarbons contain hydrogen and carbon only.

Hydrogen and carbon are .....

(1)

(b) The diagrams represent atoms of hydrogen and carbon.



**Hydrogen**

**Carbon**

Draw a ring around the correct answer to complete the sentences.

(i) The centre of each atom is called the

bond.
nucleus.
symbol.

(1)

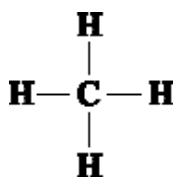
(ii) The hydrogen atom has one electron and the carbon atom has

three
four
six

electrons.

(1)

(c) A molecule of methane can be represented as



Draw a ring around the correct answer to complete the sentences.

(i) The formula of methane is

CH

CH<sub>4</sub>

C<sub>4</sub>H<sub>4</sub>

(1)

(ii) The line between C—H is called a

bond.

molecule.

nucleus.

(1)

(d) Methane burns to produce carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O).

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

When methane burns it reacts with

carbon.

nitrogen.

oxygen.

(1)

(ii) Hydrogen (H<sub>2</sub>) can be used as a fuel.

Suggest why burning hydrogen would be less harmful to the environment than burning methane.

.....

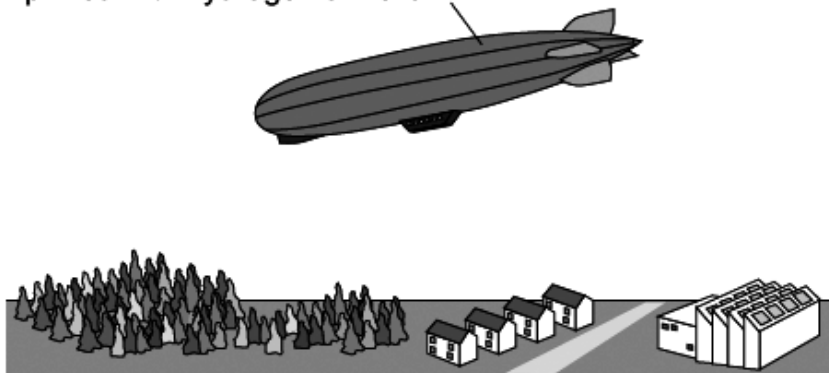
.....

(1)

(Total 7 marks)

**Q8.** Hydrogen and helium have both been used in airships.

**Airship filled with hydrogen or helium**



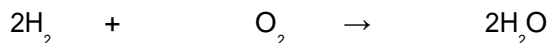
(a) Tick (✓) the property which both hydrogen and helium have that makes an airship float in air.

Property	Tick (✓)
Colourless	
Less dense than air	
More dense than air	

(1)

(b) (i) Hydrogen is no longer used in airships because it burns in oxygen.

The chemical equation for this reaction is shown.



Complete the word equation for this reaction

hydrogen + oxygen → .....

(1)

(ii) Helium is safer than hydrogen because it does **not** burn in oxygen.

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

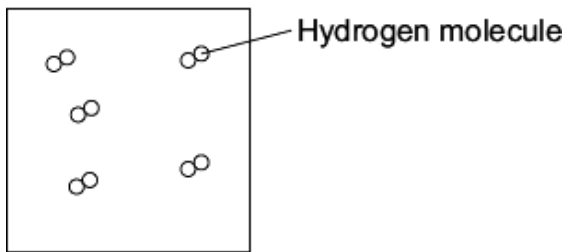
Helium is now used in airships because it is

- |                                                              |
|--------------------------------------------------------------|
| <p>a fuel.</p> <p>already in the air.</p> <p>unreactive.</p> |
|--------------------------------------------------------------|

(1)

(c) **Diagram 1** represents hydrogen molecules.

**Diagram 1**



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

Each hydrogen molecule is made up of two hydrogen

atoms.

compounds.

elements.

(1)

(d) **Diagram 2** shows the parts of a helium atom.

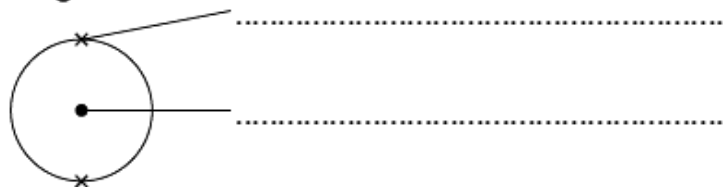
Use words from the box to label **diagram 2**.

bond

electron

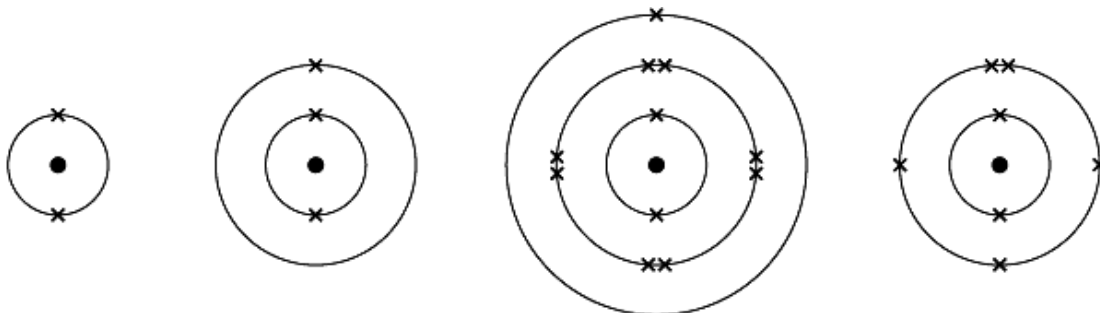
nucleus

**Diagram 2**



(2)  
(Total 6 marks)

**Q9.** 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)

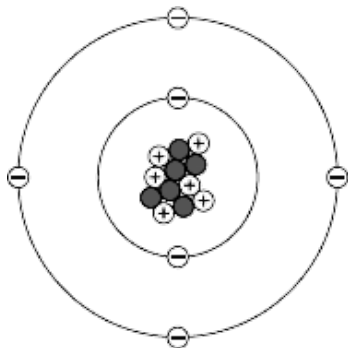
**(Total 5 marks)**

**Q10.** 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?

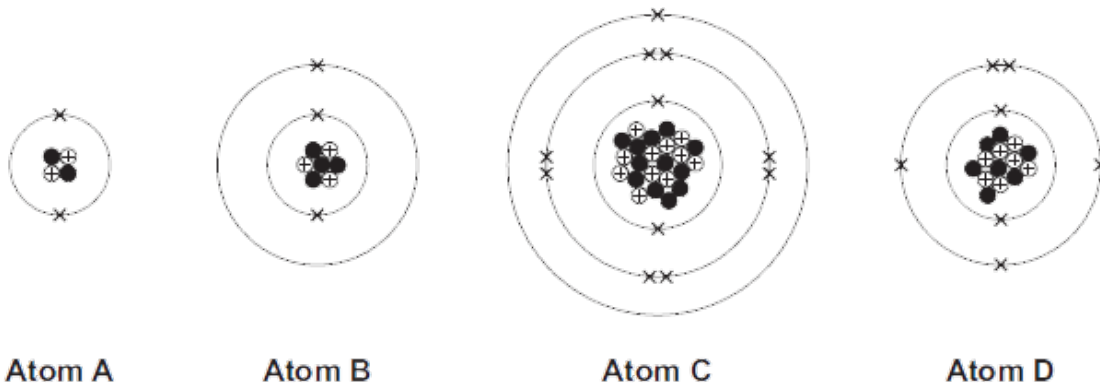
75

79

(3)  
(Total 9 marks)



**Q11.** The diagrams show the sub-atomic particles in four different atoms.



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

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

(i) The centre of each atom is called the

- energy level.
- molecule.
- nucleus.

(1)

(ii) The centre of each atom contains neutrons and

- bonds.
- electrons.
- protons.

(1)

(b) Complete the sentence.

There is no overall electrical charge on each atom because the number of ..... is equal to the number of .....

(1)

(c) What is the name of the element represented by atom **D**? .....

(1)

(d) Which **two** of the atoms, **A**, **B**, **C** and **D**, are in the same group of the periodic table?

Give a reason for your answer.

Atom  and atom

Reason .....

.....

(2)  
(Total 6 marks)

**Q12.** This question is about atoms and molecules.

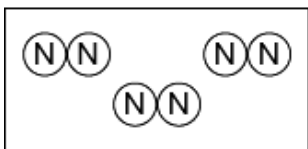
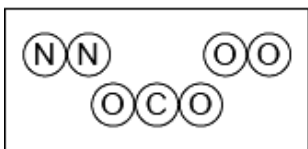
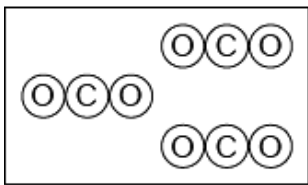
(a) In the diagrams below:

**(N)** is a nitrogen atom

**(O)** is an oxygen atom

**(C)** is a carbon atom.

Draw **one** line from each diagram to its correct description.  
One line has been done for you.

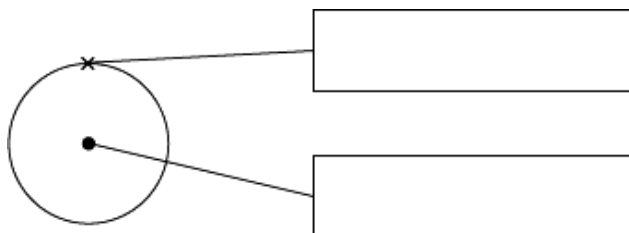
Diagram	Description
	Compound
	Element
	Mixture
	Polymer

A line is drawn from the middle diagram (Diagram 2) to the 'Mixture' description box.

(2)

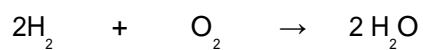
- (b) The diagram below shows a hydrogen atom.  
Use words from the box to write the correct labels on the diagram.

alloy	electron	group	nucleus
-------	----------	-------	---------



(2)

- (c) This chemical equation represents the reaction of hydrogen burning.



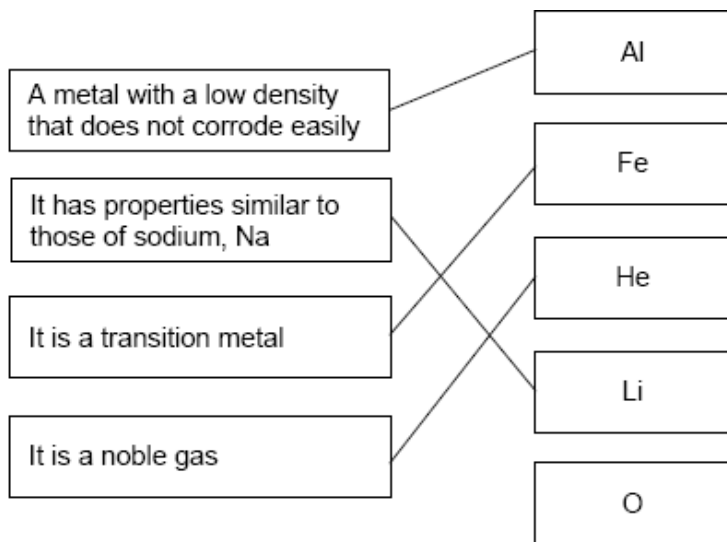
Complete the sentence to describe what is happening in this chemical reaction.

Hydrogen reacts with .....

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

(2)  
(Total 6 marks)

M1.



[4]

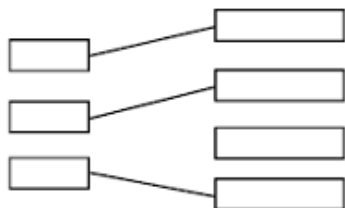
M2. (a) (i) nucleus

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]

- M3.** (a) made of one sort of atom  
*accept it is in the periodic table*  
*accept it only has lithium atoms* 1
- (b) nucleus labelled correctly 1
- electron labelled correctly 1
- [3]**

- M4.** (a) (i) both have one / 1 electron in the outer energy level / shell  
*allow both react in a similar way* 1
- (ii) eleven / 11 1
- (iii) twelve / 12 1
- (iv) (2x)  
*max 1 if candidate changes the number of electrons in the first energy level / shell*
- 8x (in second energy level / shell) 1
- 1x (in outer energy level / shell) 1
- (b) two sodium atoms (react) 1
- two (bonded) chlorine atoms (react)  
*allow one chlorine molecule (reacts)* 1
- two sodium ions and two chloride ions (are produced)  
*allow two molecules of sodium chloride (are produced) or two sodium chloride particles (are produced)* 1
- [8]**

- M5.** (a) hydrogen has one proton whereas helium has two protons  
*accept numbers for words*  
*accept hydrogen only has one proton*  
*ignore references to groups* 1

hydrogen has one electron whereas helium has two electrons

*accept hydrogen only has one electron*

*allow helium has a full outer shell (of electrons)*

1

hydrogen has no neutrons **or** helium has two neutrons

*if no other mark awarded, allow helium has more electrons /  
protons / neutrons for 1 mark*

1

(b) (i) 2 electrons on first shell **and**

8 electrons on outer shell

1

(ii) they have a stable arrangement of electrons

*accept they have full outer energy level / shell of electrons*

*do **not** accept they have the same number of electrons in their  
outer energy level / shell*

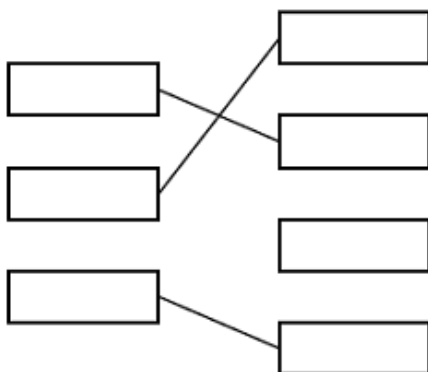
*allow they are noble gases*

*ignore they are in group 0*

1

[5]

M6. (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]

**M7.** (a) elements

1

(b) (i) nucleus

1

(ii) six

1

(c) (i) CH<sub>4</sub>

1

(ii) bond

1

(d) (i) oxygen

1

(ii) any **one** from:

- (water) does not pollute  
*accept no harmful gas(es)*  
*allow less pollution*
- (only) water is produced
- no carbon dioxide / monoxide (is produced)  
*accept no greenhouse gas(es) / effect **or** no global warming*

1

[7]

**M8.** (a) less dense than air

1

(b) (i) water

*accept hydrogen oxide*  
*do **not** accept hydrogen dioxide / hydro oxide*

1

(ii) unreactive

1

(c) atoms

1

(d) electron(s)

1



nucleus

1

[6]

**M9.** (a) protons **(and)** neutrons

*both needed for 1 mark  
ignore p / + and n / 0  
do **not** accept electrons*

1

(b) because the number of protons is equal to the number of electrons

*allow protons and electrons balance / cancel out  
allow positive / + and negative / - balance / cancel out*

1

(c) *it = atom A*

because atom A has a full highest energy level **or** full outer shell

*allow all the shells are full **or** no incomplete shell*

**or** because atom A has a stable arrangement of electrons

*allow because atom A is in Group 0 / a noble gas*

1

(d) (atom) B / lithium / Li **(and)**

(atom) C / sodium / Na

*both needed for 1 mark*

1

because they have the same number/one outer electron(s)

*linked to answer for first mark*

*accept because both need to lose one / an electron*

*allow because (atoms) B and C are in Group 1 / the same group /  
are alkali metals*

1

[5]

**M10.** (a) +1/+

*do **not** accept 1 without the +*

1

electron

*allow phonetic spelling*

1

(b) (i) elements

1

(ii) non-metal

1

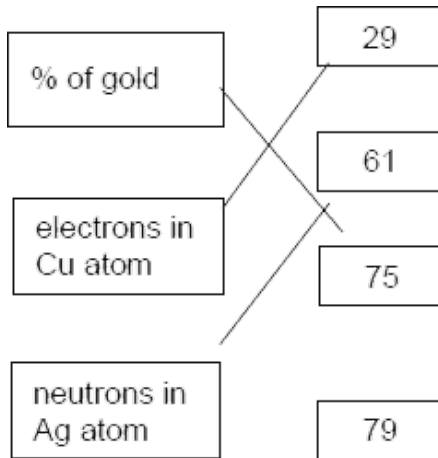
(c) soft

1

an alloy

1

(d)



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

3

[9]

**M11.** (a) (i) nucleus

1

(ii) protons

1

(b) protons / + / positive

electrons / - / negative

*both words needed in any order for 1 mark*

1

(c) nitrogen

*allow N or N<sub>2</sub>*

1

(d) **B and C**

*both letters needed in any order for 1 mark  
allow Li **and** Na*

1

(both) have one electron **or** same number of electrons in the outer energy level / shell

*allow both are in Group 1*

*allow both are alkali metals*

*allow both can lose only one electron **or** become +1 ions*

*allow this mark if no letters given in boxes*

1

[6]

**M12.** (a) NN linked to element

1

OCO linked to compound

1

(b) electron

1

nucleus

*must be correct order*

1

(c) (reacts with) oxygen

1

to produce water

*must be names*

*accept hydrogen oxide*

*allow steam*

1

[6]

