Exampro GCSE Chemistry

C1 Chapter 1 Higher

Name:

Class:

Author:

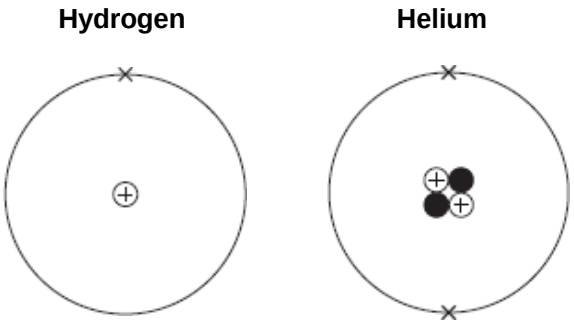
Date:

Time: 28

Marks: 28

Comments:

Q1. 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.

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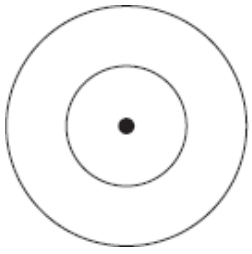
(3)

(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?

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(1)

(Total 5 marks)

Q2. 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?

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.....

(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?

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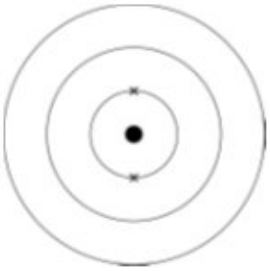
(1)

(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.

$$2Na + Cl_2 \rightarrow 2NaCl$$

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

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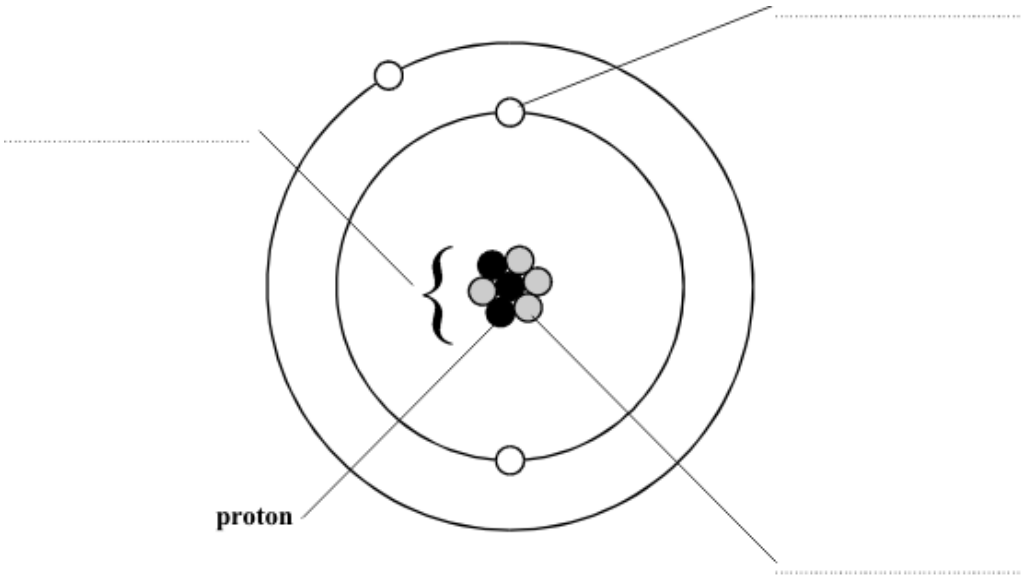
(3)
(Total 8 marks)

Q3. The diagram represents an atom. Choose words from the list to label the diagram.

electron **ion** **neutron** **nucleus**



(Total 3 marks)

Q4. The formula for the compound hydrogen peroxide is H_2O_2.

Write down everything that the formula tells you about each molecule of hydrogen peroxide.

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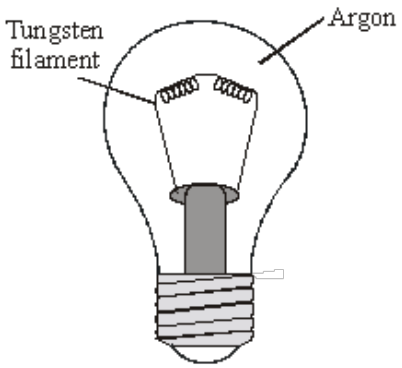
(Total 4 marks)

Q5. The diagram shows an electric light bulb.



When electricity is passed through the tungsten filament it gets very hot and gives out light.

(a) What reaction would take place if the hot tungsten was surrounded by air?

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(1)

(b) State why argon is used in the light bulb. Explain your answer in terms of the electronic structure of an argon atom.

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(3)
(Total 4 marks)

Q6. (a) Balance these chemical equations.

(i) H_2 + O_2 → H_2O

(1)

(ii) Al + O_2 → Al_2O_3

(1)

(b) Briefly explain why an unbalanced chemical equation cannot fully describe a reaction.

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.....

(2)
(Total 4 marks)

M1. (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]

M2. (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]

M3. electron
nucleus
neutron

each for 1 mark

[3]

M4. contains oxygen atoms
contains hydrogen atoms
atoms are [chemically] bonded
ratio of two hydrogen to two oxygen atoms

each for 1 mark

[4]

M5. (a) react with oxygen / oxidise / burn in oxygen / burning / combustion **or** tungsten to tungsten oxide **or** makes an oxide

key idea is oxidation
ignore breaking ignore fire / flames / exothermic
ignore react with air

1

(b) it is (very) unreactive / not reactive / inert / does not react with tungsten **or** it is a noble gas **or** it is in group 0 or 8 or 18

*do **not** accept unreactive / inert metal **or** argon is not <u>very</u> reactive*

1

full outer shell (of electrons) / 8 electrons in outer shell

1

does not need to gain / lose / swap / transfer / share electrons **or** does not need to form bonds

does not bond ionically / covalently

1

[4]

M6. (a) (i) $H_2 + O_2 \rightarrow H_2O$ *both circled correct

for 1 mark

1

(ii) $A1 + O_2 \rightarrow A1_2O_3$ all circled correct

for 1 mark

1

(b) *idea that:*
must end up with the same number of atoms as at the start

any 2 each

otherwise matter is shown to be lost/gained

for 1 mark

won't show correct amount of each element/compound

2

[4]