



GCSE Chemistry

Electron Configuration

Question Paper

Time available: 45 minutes

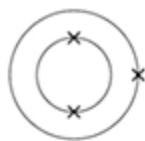
Marks available: 44 marks

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1.

The electronic structure of the atoms of five elements are shown in the figure below.

The letters are **not** the symbols of the elements.



Element A



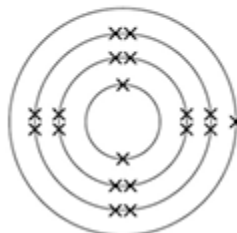
Element B



Element C



Element D



Element E

Choose the element to answer the question. Each element can be used once, more than once or not at all.

Use the periodic table to help you.

(a) Which element is hydrogen?

Tick **one** box.

A

B

C

D

E

(1)

(b) Which element is a halogen?

Tick **one** box.

A

B

C

D

E

(1)

(c) Which element is a metal in the same group of the periodic table as element A?

Tick **one** box.

A

B

C

D

E

(1)

(d) Which element exists as single atoms?

Tick **one** box.

A B C D E

(1)

(e) There are two isotopes of element **A**. Information about the two isotopes is shown in the table below.

Mass number of the isotope	6	7
Percentage abundance	92.5	7.5

Use the information in the table above to calculate the relative atomic mass of element **A**.

Give your answer to 2 decimal places.

Relative atomic mass = _____

(4)

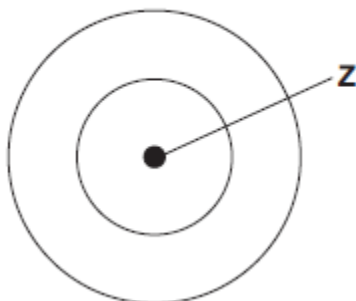
(Total 8 marks)

2.

There are eight elements in the second row (lithium to neon) of the periodic table.

(a) **Figure 1** shows an atom with two energy levels (shells).

Figure 1



(i) Complete **Figure 1** to show the electronic structure of a boron atom.

(1)

(ii) What does the central part labelled **Z** represent in **Figure 1**?

(1)

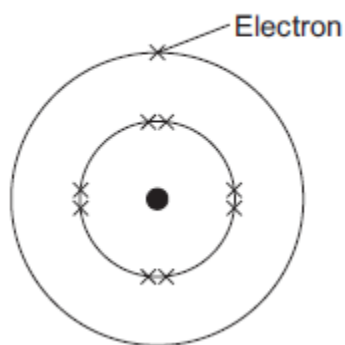
(iii) Name the sub-atomic particles in part **Z** of a boron atom.

Give the relative charges of these sub-atomic particles.

(3)

(b) The electronic structure of a neon atom shown in **Figure 2** is **not** correct.

Figure 2



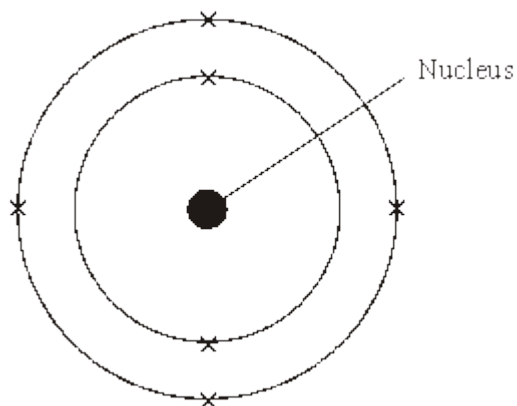
Explain what is wrong with the electronic structure shown in **Figure 2**.

(3)

(Total 8 marks)

3.

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)

(b) Complete this sentence.

The nucleus of an atom contains neutrons and _____ .

(1)

(Total 2 marks)

4.

Use the Periodic Table on the Data Sheet to help you to answer this question.

(a) State **one** similarity and **one** difference in the electronic structure of the elements:

(i) across the Period from sodium to argon;

(2)

(ii) down Group 7 from fluorine to astatine.

(2)

(b) (i) State the trend in reactivity of the Group 1 elements.

(1)

(ii) Explain this trend in terms of atomic structure.

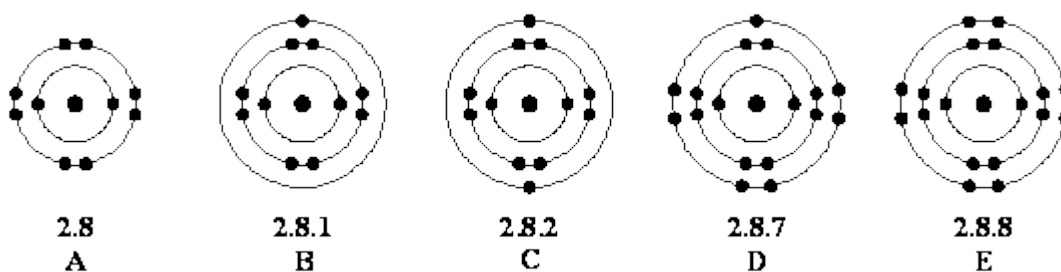
(3)

(c) Hydrogen is an element which is difficult to fit into a suitable position in the Periodic Table. Give reasons why hydrogen could be placed in either Group 1 or Group 7.

(3)
(Total 11 marks)

5. Use the Data Sheet to help you answer this question.

When sodium reacts with water it forms sodium ions. The diagrams below represent the electron arrangements of some atoms and ions.



Which of the diagrams, **A** to **E**, represents the electron arrangement of each of the following?

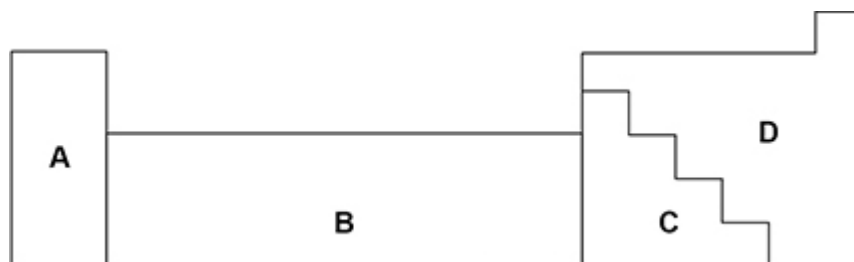
- (i) A sodium atom, Na _____
- (ii) A sodium ion, Na⁺ _____

(Total 2 marks)

6. This question is about metals and non-metals.

Figure 1 shows an outline of part of the periodic table.

Figure 1



(a) Element **Q** is a dull solid with a melting point of 44 °C.

Element **Q** does not conduct electricity.

Which section of the periodic table in **Figure 1** is most likely to contain element **Q**?

Tick (✓) **one** box.

A

B

C

D

(1)

(b) Element **R** forms ions of formula R^{2+} and R^{3+}

Which section of the periodic table in **Figure 1** is most likely to contain element **R**?

Tick (✓) **one** box.

A

B

C

D

(1)

(c) Give **two** differences between the physical properties of the elements in Group 1 and those of the transition elements.

1 _____

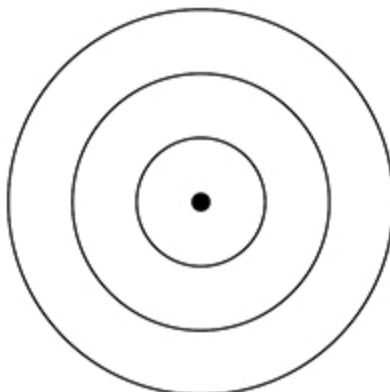
2 _____

(2)

(d) Complete **Figure 2** to show the electronic structure of an aluminium atom.

Use the periodic table.

Figure 2



(1)

(e) Aluminium is a metal.

Describe how metals conduct electricity.

Answer in terms of electrons.

(3)

(f) Name the type of bonding in compounds formed between metals and non-metals.

(1)

(g) Magnesium oxide is a compound formed from the metal magnesium and the non-metal oxygen.

Describe what happens when a magnesium atom reacts with an oxygen atom.

You should refer to electrons in your answer.

(4)
(Total 13 marks)