

2.1 Ionic, Covalent & Metallic Bond

Question Paper

Course	AQA GCSE Chemistry
Section	2. Bonds, Structure & Properties of Matter
Topic	2.1 Ionic, Covalent & Metallic Bond
Difficulty	Medium

Time Allowed	60
Score	/46
Percentage	/100

Question 1a

The arrangement of electrons in a sodium atom can be written as 2, 8, 1 which represents the atom's electronic structure.

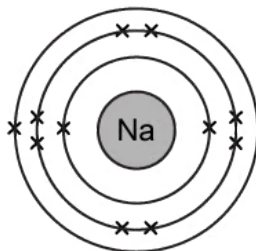
Write the electronic structure for an atom of potassium.

[1 mark]

Question 1b

The electronic structure of a sodium atom can also be shown using an electron shell diagram as shown in **Figure 1**.

Figure 1



Repeat the drawing for a chlorine atom to show its electronic structure.

[2 marks]

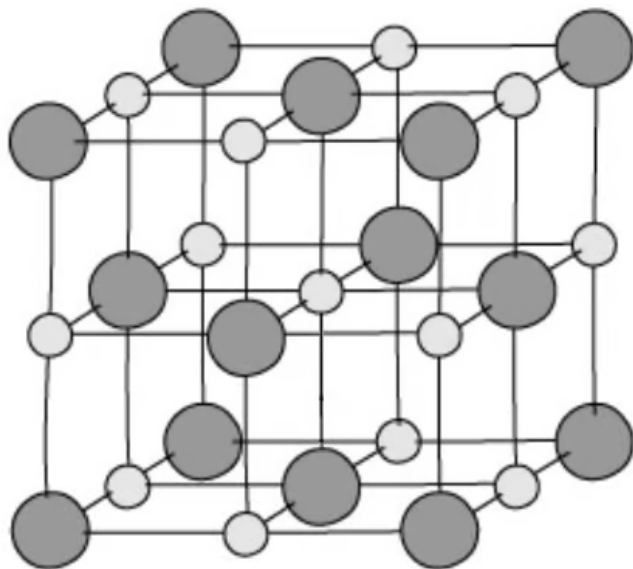
Question 1c

Draw a similar diagram to show the electronic structure of the particles in sodium chloride, indicating how the compound was formed.

[3 marks]

Question 2a

The ionic lattice structure of sodium chloride is shown in the diagram.



Complete the table.

Name of ion	Charge

[2 marks]

Question 2b

Using the diagram in (a) to help you, describe the nature of the chemical bonding in ionic structures.

[3 marks]

Question 2c

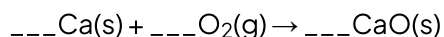
Suggest **two** assumptions that the diagram in part (a) makes.

[2 marks]

Question 2d

Calcium metal combusts in oxygen and produces calcium oxide, CaO.

Balance the equation for the reaction.



[1 mark]

Question 2e

Describe what happens when a calcium atom becomes ionised.

[2 marks]

Question 3a

Magnesium iodide is an ionic compound containing magnesium ions (Mg^{2+}) and iodide ions (I^-).

State the chemical formula of magnesium iodide.

[1 mark]

Question 3b

Describe, in terms of electrons and bonding, the reaction between magnesium and iodine.

[5 marks]

Question 4a

This question is about covalent bonding.

Write down four differences between ionic compounds and simple covalent compounds.

[4 marks]

Question 4b

Describe the bonding in a molecule of ammonia, NH_3 .

[5 marks]

Question 5a

Iodine and bromine are both halogens. The bonding in iodine is similar to the bonding in chlorine.

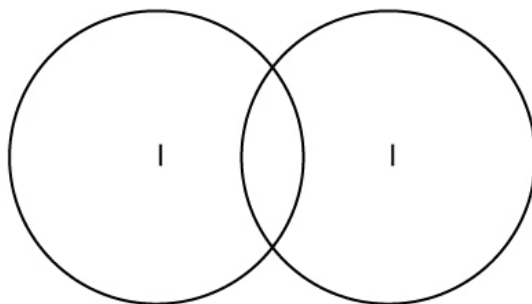
Suggest **two** reasons why they bond in similar ways.

[2 marks]

Question 5b

Complete the diagram below to show the bonding arrangement in a molecule of iodine.

Show the outer shell electrons only.



[2 marks]

Question 5c

Explain why liquid iodine is unable to conduct electricity.

[2 marks]

Question 6a

Zinc is a typical metal.

Describe the structure and bonding in zinc.

[4 marks]

Question 6b

Explain how zinc is able to conduct electricity?

[1 mark]

Question 6c

The surface of some metals, such as iron and copper, corrode when exposed to the air which reduces their electrical conductivity.

Suggest why their conductivity is reduced.

[2 marks]

Question 6d

Magnesium ribbon is used in many school laboratories for carrying out reactions involving metals and acids. It can be cut and folded easily.

Explain why metals can be bent and shaped.

[2 marks]